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# China Twenty Years After: Substance Use Under Rapid Social Changes

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CHINA TWENTY YEARS LATER: SUBSTANCE USE UNDER RAPID SOCIAL CHANGES

For the degree of Doctor of Philosophy

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CHINA TWENTY YEARS AFTER:  
SUBSTANCE USE UNDER RAPID SOCIAL CHANGES

A Dissertation

Submitted to the Faculty

of

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by

Xiaozhao Y. Yang

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of

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## ABSTRACT

Yang, Xiaozhao Y. Ph.D., Purdue University, August 2016. *China Twenty Years After: Substance Use Under Rapid Social Changes*. Major Professor: Brian C. Kelly.

This dissertation discusses how China's rapid modernization and social transformation over the last twenty years since a series of reforms at the end of 1980s contribute to the changes in substance use behaviors. Specifically, there are three individual empirical chapters in this dissertation, each exploring one dimension of social change and its association with substance use. First, I have demonstrated how substance use can be a protective factor against unemployment over the long term, especially against the background of massive layoffs among former socialist industrial workers and landless peasants during this period. Second, another chapter examines how social mobility (i.e. changes in a person's social position in society) contributes to substance use. And finally, I have tested the impact of economic and social modernization on substance use, and considered the social disorganization aspects of community change.

Using survival analysis, I have found that general drinking protected against unemployment risk for both men and women, while smoking, even heavy smoking, only protected men but penalized women. However, on the other hand, heavy drinking was not a significant factor against unemployment hazards. Possible explanations have been drawn from social capital theory and the social nature of substances.



In order to disentangle the class assimilation effect and mobility effect from the overall differential distribution of substance use among classes, diagonal reference modeling has been employed in the second chapter to show that, overall, higher classes smoked and drank more than lower classes in China. While people, especially those who moved upward in the class ladder, tend to assimilate into their destination class' drinking pattern, there was no assimilation effect for smoking among the upwardly mobile people. Instead, the independent mobility effect contributes to a higher level of smoking, suggesting that adaptive responses emerged during socially mobile events. I conclude that drinking has more socially vested interests for socially mobile people than smoking.

Through multilevel modeling with a feature of growth curve analysis, this dissertation also assesses the influence of community-level social changes and modernization on substance use. I have found that there are certain "good" and "bad" dimensions of modernization, even though all dimensions have been growing together in the past twenty years. Economic modernization amplifies the income effect on substance use, making people with higher incomes smoke even more. Meanwhile, social modernization can mitigate the harmful effect of income on both drinking and smoking. With regard to inequality, its negative interaction with individual income also confirms our hypothesis that poor people tend to use substances more than the rich do in an unequal community. Furthermore, the modernization process has also elevated women's risk of using substances.

## CHAPTER 1 INTRODUCTION

### 1.1 The Big Picture of China Since the Reform

In 1978, two years after Chairman Mao died, Deng Xiaoping took over the chaotic regime and cleaned up Mao's controversial legacy of the Gang of the Four, who were now believed to blame for starting the ten year long Cultural Revolution. Deng adopted a brave approach to warm up China's previous hostile ties with both the West and the Soviet Union, resulting in a thawed international diplomatic stage for China. Domestically, Deng also experimented in the economic and social sectors with a range of policies previously unknown in China during the communist era. In fact, from today's perspective, commentators believe that Deng did not even have a plan about what new policies to adopt for the reform. Instead, he and the Party simply started to become more lenient about the then mistaken perception of "western" values and policies. His famous speech while visiting port areas near Hong Kong in 1979 has been summarized as "white cat or black cat, whoever catches rats is a good cat". Compared to his predecessor's staunch anti-Western attitude that expressed as "let's talk about the struggle against bourgeoisie and imperialists, hourly, daily, monthly, and yearly", this non-dualistic attitude and ideology created enormous implications for Chinese society in the next few decades to come.

Since the "Reforming and Opening Up" (I will refer to it simply as the Reform afterward), economic foreign investment suddenly poured in, factories started to produce a large stock of a variety of goods that were never seen under the Communist regime, which has been characterized as "the shortage economy" by today's economists (Kornai, 1982). Socially, the least regulated era since the founding of the People's Republic is between the start of the Reform and 1989's student movement. Even after 1989, despite the slow tightening of ideological policies, the level of liberty in social and economic affairs was still a colossal jump from the Maoist era. Taking religion as a striking example—the most pressed issue under the Maoist rule: by the beginning of 1980's there were 3 million Protestants according to official data, by 1995 there were already 9 million Protestants in official registry, and the number furthered to 15 million in 2009 by China's official estimates or 60 million by Pew Research Center's estimate. Buddhism, the traditional belief system in China, saw a ten-fold multiplication of registered monks and nuns from 1980 to 1995(F. Yang, 2006). This change could not be attributed to the asynchronous demographic increase alone. The divorce rate, another indicator through which we comprehend how people think and behave traditionally, has gone through a straight rise since 1978 from less than 0.2% to 9% in 2014<sup>1</sup>. Although this figure is remarkably low compared to some European countries and the U.S.A, the clear trajectory of the changes indicates the strong underlying momentum of the evolution in familial and intimate relationships in China.

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<sup>1</sup> <http://news.qq.com/a/20150728/006885.htm>.

The demographic and social changes have also induced the inevitable transition in neighborhood structure and land utilization. Through a series of controversial policies including land appropriation, massive privatization of state-owned properties, the reform of collective communes, the decline in the function of “jiedao” (a unit of governance in local communes), and real estate stimulations, among others, the ways how residents in China live in their communities have undergone a vast transformation. I will focus on the changes to Chinese communities brought by three major developments: migration, economic development, and social changes, and how these community changes shape the lives of Chinese citizens. These changes within the wider society are important for changes in individual and community life that may affect substance use among the Chinese.

## **1.2 Changes in the Neighborhood and Chinese Communities**

### *1.2.1 Relaxing the Household Registration System*

With the breakdown or temporary loosening of the previously strict household-registration system, individuals are now allowed to voluntarily move between cities and rural areas. Work-based migration became the largest population movement after the 1980s. Before the 80s, the household-registration system (hukou) typically designated one’s eligibility for welfare, educational, and occupational opportunities based on his/her birth origin location, and relocation was only possible through interactions with the state. At that time, each person could attain jobs and education only associated with his/her current hukou. For example, Mr. Zhang was born in a village, he would be entitled to welfare restricted to his rural registration, such as a share of land in that specific village,

some medical benefits, a guaranteed food assistance when crops or stock in his commune failed to harvest, etc. To switch to a registration in another place (which applies to citizens seeking either an alternate rural or urban location but the hardest scenario is switching from rural to urban regions), Zhang had a few options: by marrying a person with an urban registration and resettling therein; by passing the college entrance exam and graduating the college (jobs were state-assigned for college graduates before the 90s); by becoming a government cadre and assigned a position in the city. Very few other scenarios existed because the labor market and education system were entirely centralized, thus excluding the possibility of relocating through job searching or private education. Some may argue the real function of household registration is a continuum of the centralized imperial system which effectively prohibited all but the best educated citizens to move from the surrounding rural locations to well governed cities (Cheng & Selden, 1994). For today, rigorous empirical study has proved that the registration has de facto permitted rural residents' upward mobility only via college education, and the restriction for the otherwise less educated rural residents is serious for many generations (X. Wu & Treiman, 2007).

The hukou system had a significant effect on Chinese society. To quote Cheng and Selden (1994:1)'s discussion of hukou's function as a social policy: "the hukou system was integral to the collective transformation of the countryside, to a demographic strategy that restricted urbanization, and to the redefinition of city-countryside and state-society relations." The rigidity of hukou was austere under the 1950-70s communist experiment, but relaxed due to the 80s market reform, and in 2013 was called to cancelation in a few areas. While we are not specifically interested in this policy design

and state power relationships implanted in the system for this specific study, the effects of hukou system on the spatial development of community are significant. It without doubt severely restricted mobility. The job sponsors of a new hukou registration almost all are professional and state-sponsored. The rule of obtaining local hukou varies but almost all require job attainment and years of residence. And in big cities where migrants see more labor positions available, hukou requires much more than a job sponsor and years of residence. After the 1980's, despite that the registration system still exists to date, relaxed practices of this registration system (which included regular check of documents and deportation, absolute restriction of merchandise and services to only appropriate registration holders, criminalization of unauthorized migrants, dissuasion through media driven stigma) resulted in massive exchange of population between cities and rural areas, as well as between cities themselves. A series of reforms by the communist regimes in the 80s had lifted many regulations on employment and travel, hence facilitated the phenomenal growth of the migrant population in the post-communist world (Jandl, 2007). China as of today has an official estimate of 158 million lowly skilled rural-urban labor migrants (National Bureau of Statistics, 2012), often referred to as the "floating population" because they could not easily relocate permanently yet due to the registration system. Other estimates suggest this population may be even twice as large. Nevertheless, the retraction of previous policies aiming at dispelling and criminalizing could not respond timely to their arrival. When hukou barriers couple with income inequality, millions of low-skill laborers reside in the marginal enclaves of big cities based on native-place networks and occupational clustering, which has an impact on neighborhoods and community life.

### *1.2.2 The Surge of Internal Migration*

A variety of new consequences on neighborhood structure, residential area, and community organization have developed. As I have mentioned, important changes were not only brought to the cities by rural-urban migrants, similarly important and extensive new phenomena in neighborhood/community structure naturally also occurred to the emigrated rural areas. With the massive scale of emigration, many rural areas are undergoing a population depletion. Even provinces which were first modernized and have retained industrial advantages throughout the last fifty years, e.g. the three provinces of Manchuria, have seen a net population loss for many consecutive years. Young people in rural Manchuria would either move to local metropolitans such as Mukden or Harbin, or even further to Beijing, while older people, or the children left behind by young couples, stay in the village. Traditional rural China, just like many other traditional social units, has been typically labeled by sociologists as a mechanic solidary society, one that based on strong and stable intra-local ties, or a hierarchy of relationships based on the distance level of bloodline (Fei, Hamilton, & Wang, 1992). With the decisive blow of the Cultural Revolution, this ideal type is already very incomplete. Scholars have found that during the Cultural Revolution the importance of kinship was partially superseded by Marxism-inspired class in a commune (Ahn, 1975). After the Reform, it is harder and harder for rural residents to organize community lives based on traditional kinship. This is simply a logical consequence of the dwindling youth population in the rural areas, although the large amount of literature discusses how today's rural emigrants still organize their social and economic life based on kinship (L. J. C. Ma & Xiang, 1998). Being less able to mobilize enough human capital to develop local community and organize social life,

emigrating areas also have seen a decline in collective efficacy and social capital, which in turn may shed light on the increasing social problems in rural China. Novel religions or cults, and new commercial modes such as the notorious pyramid scheme, are only two examples of social forces that have seized the opportunity to fill the spiritual or trust vacuum caused by rural demographic depletion.

### *1.2.3 Two-Way Changes of Ethnic Segregation*

A common assumption by travelers and non-specialists is that China has a homogeneous population just as Japan and Korea. But China has a visible heterogeneous populace, which may not totally reflect in each minority group's absolute size. There are 55 officially recognized minority groups in China according to its adopted Stalinist scheme of classification. The largest group—Zhuang along the southern border—makes up only 1.27% percent in 2010, the next few largest groups, such as Hui, Manchu, Uyghur, are only about 0.8% in the country. Although Han majority constitute 91% of the entire populace, there are several important reasons to not disregard the significance of ethnic minorities in Chinese community life.

First, the distribution of ethnic minorities is not equal across the country. While people from eastern coastal cities have little contact with ethnic alters, many other parts of China are significantly exposed to diverse lifestyles. Take Beijing for example, the capital city has the largest Manchu, Korean, Evenk, Darwur population outside Manchuria, and the largest Mongolian population outside Inner Mongolia. Many other provinces and cities away from inland and southern coast resemble Beijing in this manner. The entire northeast became of part of modern China due to collaboration between Manchurian groups and Han migrants. The entire northwest has long been



familiar with multiethnic living and the shifting conflicts/collaboration among Muslim Hui and Turkic people and religiously diverse Mongolic and Han people. Thus, many regions of China have higher concentrations of ethnic minorities who occupy a visible place in community life.

Second, although the absolute size of ethnic minorities is small, actual visibility of ethnic minorities is high and contact between different groups is also higher. The higher-than-probability contact is possible because ethnic minorities usually occupy special niche in local economic and social life. Not all Chinese know Islam or a Mongolic word, but almost everyone knows the location of a Hui halal restaurant within ten miles, and memorizes from textbooks what is a stereotypical Mongolian dress. As pointed out by numerous scholars such as Dru Gladney (1998), Kristian Petersen (2006), Mingke Wang (1998), the experience and memory of ethnic others in China is highly infused in stylized and politicized daily interactions and narratives, and such accounts and encounters of ethnic others is anything but scarce. Part of this “rare but intensive” inter-group visibility comes from the political and historical importance of some non-Han groups throughout the history of China. Thus, awareness of ethnic minorities is high in China.

A third reason also explains why ethnic minorities often occupy a special niche in Chinese social life. China has been ruled by the Han ruling class only in half of its history, in an intermittent but long period of the history it was ruled by different Turkic, Siberian, Mongolic groups such as the Mongolians, Xianbei, Khitans, Manchu, and the proto-Turks. Han in the south also significantly interbred by force or marriage with Hmong, proto-Viet, and Austronesian populace, to the extent that geneticists now found a good portion of southern Han are genetically closer to Southeast Asians than to northern

Chinese (R. Du, Xiao, & Cavalli-Sforza, 1997). As a result of the perpetual subjugation by nomadic others and subjugating southern minorities, Han memory and narratives about the ethnic others is very rich and overrides their realistic experiences.

As sociologists and criminologists explore the role of ethnic diversity in shaping the pattern of neighborhood organization, the same principle will naturally apply to our context. It is important to understand the distribution of ethnic groups within communities as these may have implications for community life. During the communist regime, interethnic relationships had undergone extensive reshaping. On one hand, brutal suppression of nationalism through the means of massacre, exile, and secret detention was often deployed in Xinjiang and several ethnically dense areas. “Reactionary” or “anti-revolution” were two common categories to incriminate ethnic minorities as an alleged nationalist rioter. At the same time, the regime had encouraged migration into ethnic minority areas and artificially created new patterns of community living by centralized housing allocation and commune construction. This new strategy had sometimes made multi-ethnic neighborhoods the only possible option for previously segregated populations. In Urumqi or Yinchuan, Uyghurs had to live side by side with Han, or a Han would have no choice if his neighbor is a Hui. Daily work and leisure activities were also highly centrally organized, and as a result contact and exposure to ethnic others was extremely high under such management. Although the cost of romanticizing interethnic relationships during this era is ignoring frequent interethnic conflicts and brutal suppression of the minorities, benign attitudes and significant exposure to ethnic others was higher than today.

After the Reform, another new pattern of inter-ethnic relationship has appeared. Previous contact between different ethnic groups was largely restricted to Han contact with minorities in ethnic minority areas, or to the urban residents whose work unit received many ethnic minority employees assigned by the government. After the Reform, contact between different groups is rarely a result of the planned economy. People see and interact with other groups because of economic necessity. Seasonal cotton pickers go to Xinjiang every summer, and they may interact with Uyghur farmers or establish business ties with Uyghur cadre and businessmen. Uyghurs and Hui from many northwestern provinces also came to the east coast to start restaurants or handcraft businesses, and they became more familiar with supply chain workers and customers. Some of these relationships may facilitate mutual trust, but some may create hostility. The majority and minority groups permeated into each other, and the old imagination of a “concentrated remote ethnic area” no longer applies in contemporary China. Nowadays, ordinary people are more likely to find a person of other ethnicity in their neighborhoods. But at the same time, due to the withdrawal of the planned economy, the chance of Han encountering an ethnic minority is heavily conditional on types of occupation and types of community.

#### *1.2.4 The Decline of Centralized Housing and Commune*

Another feature that distinguishes China’s neighborhood composition and distribution (and generally that of all former Soviet countries) from other countries is the communes and state allocation of housing. Before the reform, in the countryside, workers were organized not to the unit of village but to commune, a close-knit unit of production based on ascribed membership which collectively mobilized productive activities and

distributed income resources. To make no mistake, this arraignment of community living is not entirely novel to the Eastern world. It already existed under oriental feudalism. When distinguishing the Asiatic mode of production from the classical European mode which has proceeded successively from slavery to capitalism, Marx and Engels attributed an important characteristic to community-individual relationship in Asian societies: all property is commune-owned and individual is the community's property (*allgemeine Sklaverei*). Marxism, the official ideology of China to date, posits that "in the Asiatic form there is no private property, but only individual possession; the community is properly speaking the real proprietor, hence property only as communal property... Since the individual in this form never becomes an owner but only a possessor, he is at bottom himself the property, the slave of that which embodies the unity of the community" (Shiozawa, 1990). To what extent this commune-based neighborhood interaction extends the existing Asiatic mode of production is subject to another debate, but the pre-1980s neighborhood structure was without doubt different from the previous organization. First because the communist regime of China had been a major breakup from the feudalism heritage, one of its main tasks was to shake off the "backward" ideology and means of production. Second, even if community-personal relationships under both historical Asiatic mode and the communist rule were based on collective ownership, the collective unit under communism is no longer family or kinship but rather the class-based commune. However, since the Reform, both kinship-based community and the class-conscientious commune started to slowly disappear. Nowadays, the commune has gradually faded as vestige, and its control over mobility and production is very weak.

In the city, the distribution of housing was managed through work units, which received state funds according to centralized quotas and standards. People of similar occupation, worked in the same unit, and usually resided together as a result of having work units to mediate the state provision of housing. The work unit mediated housing allocation had several lingering effects on community formation: the ties inside neighborhood were considered relatively stronger compared to self-initiated residency choices in the western countries because inhabitants were very homogenous and shared extensive common activities, including work. Residential turnover rates were very low. It was impossible to trade one's current residence without affirmation from several superior departments, and the centralized plan of urban development basically negated the possibility of such affirmation. As a common trait of the planned economy, there was a severe shortage of goods under such a system, including housing. A large number of residents had to share apartments or dormitories with others. Market reforms of the 1980s changed the situation significantly, and the residential distribution of the previous four decades also began to reshape. Before the 1980s, more than 90% of the housing provisions came from the state budget, this figure fell to under 20% in 1988 (Zhu, 2000). As the state relinquished the responsibility of housing provision to work units and individuals, residential inequality emerged. As people became able to self-select into different types of neighborhoods based on cultural attraction, costs, resources nearby, etc, residential segregation became inevitable. Take Xi'an as an example, its east side has received more than 3 million migrants and refugees from central China. The native people of Xibei culture feared the reportedly rising criminal acts of the new people and started an exodus, which gradually made Xi'an a divided town of different cultures and

limited its ability to exercise collective efficacy in alienated neighborhoods. Similar processes happened to many other cities simultaneously during this period of time, such as Beijing's south side, Hangzhou's east side, Canton's African quarters, etc... This is a reason why China's neighborhood structure can have fascinating contributions to substance use: the developmental impact on neighborhoods in China has brought significant changes, how would these changes combined with the legacy from the past patterns of neighborhood composition influence the pattern of substance use among Chinese citizens? Supposedly, the pattern of substance use behaviors differs China from other countries, but what is the community's role in the alignment and interaction with these differences?

### **1.3 Substance Use in Chinese Societies**

#### *1.3.1 A Brief History of Substance Use in China*

Since there have been many changes in the Chinese society since the Reform, we may expect that these societal changes have affected the substance use of Chinese citizens. Substance use is prevalent in China, as everywhere else, an almost ubiquitous practice adopted in various forms. Smoking tobacco, poppy opium, alcohol drinking, or chewing tobacco, betel, or other alkaline substances, are not merely popular in different areas but also carry significant cultural and habitual connotations closely related to class, ethnic identity, and patriarchal gender boundaries. In the last two to three decades, synthetic substances such as methamphetamine appeared and replaced their precedents in popularity, making these new drugs quite "in line" with the global drug trafficking mode (Kelly et al., 2014; Kelly, Liu, Zhang, Hao, & Wang, 2013). Even in communities with

strict prohibitions against certain substances, with prominent examples such as Hui and Uyghurs, the use of other types of substances has not been intimidated by a religious prohibition on alcohol: alternatives always appear to find leeway notwithstanding policy regulation or cultural sanctions, as khat chewing, tobacco smoking, and hashish smoking have taken an indispensable role in the historic Muslim cultural life, and tobacco smoking and injection drug use among Hui and Uyghurs are no less rare than the rest of Chinese folks (T. X. Chu & Levy, 2005).

The formation of the modern nation state of China is ironically coupled with addictive substances. Opium was already widely consumed by people from many social backgrounds when western colonialists knocked through China's border with cannons and galleys and dumped even more refined opium products to revert the trade deficit from buying China's tea (yet another "soft" addiction). The traumatic memory is so penetrating that the official textbook calls the first defeat of the Middle Kingdom the "Opium War", but the trauma has fostered a modern identity in the Chinese nation and replaced the old imperial worldview. Like the function of primal state-building found among contemporary militant groups (Merz, 2008), opium was at first cultivated by communists in their northwest stronghold to finance party organs and partisan combats, as well as to develop mutually beneficial relationships with local warlords during the exchange. Yet, after the communists seized power they directed harsh drug campaigns, in which opium was to blame for the evils of bourgeoisie (Y. Zheng, 2005).

The majority Han Chinese, were well-known by themselves, ethnic others, and western missionaries for their trenchant quest for substances even before the coming of colonists, albeit such a quest for substances is repeatedly demonized, characterized, or fit

to propaganda for various purposes including identity formation, political mobilization, nationalist fervor, and market expansion. For example, for Hui people, the subtle way to distinguish themselves from Han is heavily leveraged by daily practices involving substances. Han are said to be drinkers, while a Hui house is drunkard-free; but Han reserve the exotic trade of hookah for Hui. Social class coupled with ethnic lines has tinted the consumption of substances with a color of distinction and differentiation. As Douglas noted, the ingestion of materials into our bodies conveys profound symbolic messages to establish a boundary between “us” and other (Douglas, 2002). Opium, stereotypically depicted as a disease with Chinese flavor, has a more complex and fascinating biography of vacillating between social strata. Before poppy opium trade and consumption was extremely politicized to counter colonialism threats and economic deficits by the Manchurian court, opium enjoyed a favored status that symbolized prestige as a conspicuous consumption, and evolved a series of delicate techniques and etiquette for usage (Dikötter, Laamann, & Xun, 2002). Outside of Mainland China, opium was considered a vehicle of identity immersed in the matrix of ethnicity and social class: in Dutch colonial Malaysia, opium was at first considered a substance used mainly by Chinese, then colonialists realize the drug was popular among various groups: Indonesian coolies, Chinese merchants and mandarin, and some Dutch businessman and professionals (Gerritsen, 2000). Regulations over opium also closely intertwined with how the major consumers were perceived: it was only when opium use diffused beyond the hands of aristocrats and artisans did the Manchurian court find it a serious “national illness” (Y. Zheng, 2005); and federal and state governments of the U.S. did not start a series of opium regulation or prohibition until many white Americans, especially



housewives, had up taken the drug to self-medicate under the alleged influence from the conspiring Chinese laborers. Before that, opium products were frequently employed as a medical elixir and an entertainment too casual to raise suspicion (Campbell, 2000; Haller & Haller, 1974). In these variety of ways, China has a long history associated with substance use going back many centuries.

### *1.3.2 Normative Use of Substance*

The normative status of substance use is found among many societies, and China is no exception. Smoking and drinking are widely accepted and sometimes encouraged in China. Swidler (1986) argued that culture constitutes an elastic reservoir for individuals to choose according to their needs when values are in conflict. Smoking and drinking are well-embedded in the Chinese culture. Historically, tobacco was prescribed to people as medicament because of its assumed function to balance the corporeal air system (*qi*) in the philosophy of Chinese traditional medicine (Y. Du, 2000). Besides its assumed medical benefit, the quick and vast acceptance of tobacco in China was closely associated with the phenomenological meaning of smoke (air, or *qi*) found in Chinese folk religion's evil dispelling ceremony (Dikötter et al., 2002). This mythical form of belief persists, and culminated in the most recent 2003 SARS outbreak when people circulated the message that smoking cigarettes and burning incense can prevent SARS (Tai & Sun, 2011). A study on self-exempting beliefs among Chinese informs us that the most common self-exempting beliefs about smoking among Chinese male include the importance of cigarette in social and cultural etiquette (X. Y. Yang, Kelly, & Yang, 2014). Because people tend to be self-aggregating as the principle of homophily convincingly demonstrates, substance use is deeply embedded in a substrata series of codes of belief

and conduct, such substrata may be class, subculture, gender, age cohort, etc. For example, one study indicated many black Americans label tobacco smoking with a “white thing” (Mark Nichter, 2003), and the users of different illicit drugs can be grouped distinctively according to their taste of leisure activities (Vuolo, Uggen, & Lageson, 2014). Largely weaved into a system of patriarchy, Chinese males routinely employ the phenomenon of courtesy smoking and gifting cigarettes, where cigarettes are used in daily interactions among men, for welcoming guests, or as a bribe (S. Ma et al., 2008; Z.C. Rich & Xiao, 2011). It is all too often for men to become acquainted with each other by offering a cigarette. Many such conversations would be easier to go smoothly in the camouflage of smoke. Studies show that smoking is prevalent even among Chinese physicians (Y. Jiang et al., 2007), although ordinary people look up to physicians as role models to express their support of tobacco control (X. Y. Yang, Anderson, & Yang, 2014).

If smoking cigarettes is not strongly stigmatized among Chinese men, drinking alcohol can be considered in a status of institutional endorsement, even for women. Like smoking, drinking alcohol serves as means to foster friendship, to facilitate cooperation at all levels, to celebrate various ceremonial occasions, and to entertain leisure activities, including those that involve sexual risk behaviors. There are numerous popular wisdom quotes and classic poetry from Chinese society that confess the importance of alcohol, such as: “one talks truth after drinking”, “a thousand shots for a bosom friend”, “for shallow relationships lick a little, deep relationships bottoms up”, “where to hang-over tonight, willow beach, morning breezes a waning moon”.

Smoking and drinking is normative in many settings beyond youth culture, entertainment venues, and work units, such behaviors also exist in other occasions. One example is the educational institution. Resembling the Greek culture in the U.S., Chinese high school students and college students often participate in the celebratory form of drinking for marking the end of a semester, birthday of a supervisor, passing of an exam, etc... The one more distinctive difference from the American Greek culture, however, is that such celebratory drinking typically involves hierarchy. A professor, supervisor, or director from the same class or major of the celebrating students will often participate and drink with all of them. Before the recent legislation of a smoking-ban on campuses smokers may smoke during a lecture, but mainly professors have this privilege. The hierarchy and expected behaviors manifested during substance use prepares students with appropriate knowledge before going for employment or graduate school, in which a stricter division of hierarchy and its associated etiquette of substance use are enforced. Like anywhere else in human society, substance use in China is anything but spontaneous, automatic, purely individual, and undifferentiated by social roles. The influence of social forces on these behaviors is considerable.

### *1.3.3 Can Nature Account for Substance Use?*

First of all, it is important to consider that there are important biological and genetic factors influencing how much a person can tolerate drinking and smoking. But the biological importance does not override the powerful social impetus behind substance use, because what we see in China does not entirely confirm geneticists' expectations. At a population level, Chinese people should have lower levels of alcohol tolerance and drink less due to their probability to lack certain enzymes. The liver enzymes ADH

(alcohol dehydrogenase) and ALDH (aldehyde dehydrogenase) are used by our bodies to break down the chemical compound of ethanol alcohol and acetaldehyde, the latter of which is a carcinogen. For almost a third of East Asians, a specific ALDH2 enzyme is lacking to metabolize fully the carcinogen in alcoholic beverages, so that one immediate phenomenon called “Asian flush” from this deficiency is that their face would turn reddish after a few drinks (Brooks, Enoch, Goldman, Li, & Yokoyama, 2009). Therefore, the risk of developing alcoholic dependency should be lower for East Asians, because the overarching discomfort of drinking surpasses its euphoria. However, such adaptive defenses evolved against alcoholism is unequally distributed across regional and ethnic boundaries. Scientists found such a deficiency in enzyme is closely related to certain alleles associated with historical rice domestication, possibly due to the evolutionary advantage against converting rice storage for wasteful alcohol consumption. As the consequence, difference between modes of production also created an ethnic divide of alcohol use underlined by genetic distances: Korean, Japanese, southern Han Chinese, groups that first cultivated rice are much more likely to exhibit an inability to metabolize alcohol than Mongolian, northern Han Chinese, Manchurian, and Tibetan, who historically consumed mainly wheat products (Peng et al., 2010; Shen et al., 1997). Despite this genetic difference, it is surprising to see how little studies have compared the multilevel variation of drinking behaviors across China to bridge the gap between the genetic and the social.

On the other hand, although the discomfort of drinking among many Asians has initially managed to create cultural codes that foster courtesy drinking instead of binges, changes in the economic and social structure of Chinese society have mismatched the

need for drinking and the capacity to handle it--both socioeconomic capacity and a biological one. The institutional endorsement of drinking has gradually taken a toll on the health of Chinese citizens. Market sales of alcohol are a state-monopolized transaction, and it has increased more than 50-fold since 1952. Additionally, alcohol dependence has risen to the third most prevalent mental illness (Cochrane, Chen, Conigrave, & Hao, 2003). As the traditional prescriptive norms of drinking have dramatically changed, especially for the multitude of migrants, alcohol drinking can become a vehicle to facilitate group participation into deviant settings (D. Lin et al., 2005). An unexplored area is then how the rapid social and market changes brought in a visible series of disruptions that too channeled alcohol and tobacco use from the traditional settings of family and commune to the settings of deviance. This dissertation will examine how changes in work, status, and community in Chinese society influence substance use.

#### **1.4 Outline of the Dissertation**

Studies on many interesting topics can make a good use of the resourceful context of post-Reform China for the extensive social changes and innovations in communal life that take place on daily basis there. We as an academic community have long strove to understand the dynamic interplay between social changes and individual substance use behaviors because substance use is profoundly a collectively learnt, initiated, and maintained behavior involving the participation of other social beings and there is rarely an essentially lone drug. As we are familiar with, most current studies on substance use behaviors have adopted the research paradigm that views substance use from an overwhelmingly psychological and individualistic perspective where social conditions constitute a peripheral and dispensable role in affecting individual behaviors. However,

the individualistic paradigm faces a hard problem when explaining how does individual psychological predispositions to certain substances aggregate to population-level use pattern and why does such pattern respond when the external social conditions changes. A socially focused perspective on substance use can answer these questions without relying on too many additional precarious assumptions about the psychosomatic process. This dissertation project focuses on substance use during this era of rapid changes. It will engage with three prominent social phenomena and their relationships with substance use and explore social changes and behaviors with a sociological focus and certain methodological advancement.

The second chapter coming up next, will discuss the dataset used for this project, primarily the nature of the survey design and sampling frame. Chapter 2 will also introduce readers to the basic methodological strategies employed by the subsequent analyses, such as how will I deal with missing data, the basic formulae of the analytical methods including survival analysis, diagonal reference modeling, and hierarchical modeling.

The third chapter provides a descriptive overview of the data, where readers will see how did the occupational class of the sampled population change between 1991 and 2011, whether smoking and drinking has decreased in China, the basic distributions of a variety of individual and community level factors such as income, economic modernization, ethnicity, among others. This will give the reader a general idea of how China has changed in recent decades.

The fourth chapter considers an intriguing research question in the health and labor literature: how does substance use affect employment. Although on surface,

substance use does not seem to impress us with an image of a productive and diligent worker, many have argued that substance use may be an important social tool to improve one's position in the workforce. Using survival analysis on the hazards of unemployment over twenty years in China, I will show in this chapter that drinking is actually a protective factor against unemployment for both men and women, although smoking and heavy drinking do not offer a such advantage.

The fifth chapter tackles the relationship between social stratification and substance use from another angle: how social mobility, especially upward mobility, changes the frequency of drinking and smoking between 1991 and 2011. I will attempt to disentangle the two often confounded but theoretically divergent mechanisms that may occur when social mobility changes behavioral outcomes: assimilation effect and mobility effect. When a person joins a new group in the social strata, this person may adopt a new behavior because more people in this new group do so, and s/he was subjected to the force of assimilation. At the same time, s/he may equally adopt this behavior because the mobility process has introduced more or less stress, better or worse self-esteem, cultural shock, etc., also known to scholars as the independent mobility effect. I will show in this chapter that upwardly mobile people are assimilated into the drinking pattern of the class at their destination, but upwardly mobile people's smoking behavior shows no assimilation effect. Independent mobility effect increases smoking, but not drinking. Upward mobility, however, does not increase heavy drinking and heavy smoking, through either assimilation effect or mobility effect.

The sixth chapter turns to another aspect of important social changes during the Reform era—changes in the modernization development in neighborhoods. Local and

trans-local community characteristics prove to have a very strong impact on individual wellbeing, and I ask here how China's rapid modernization may affect substance use. I will demonstrate in this chapter the multifaceted nature of modernization, and that its relatively conditional forces depend on individual income and gender. Such interesting interactions include that economic modernization and social modernization elevated the risk of drinking for females but lowered it for males, the poor living in unequal communities smoked and drank than their counterparts living in more equal communities, and that high level economic modernization amplified the harmful effect of income on smoking. I have also tested the famous social disorganization theory with five commonly used indicators (female-headed household, poverty rate, residential turnover, ethnic heterogeneity, and population density) to explore whether substance use in China can be also conceptualized as an outcome of neighborhood disorganization. There is little to no evidence supporting the theoretical expectations, to which I have given detailed explanations in this chapter.

The final chapter summarizes the overall findings of this dissertation project, and dares to offer some policy and research implications and suggestions to other scholars.



## CHAPTER 2 METHODOLOGIES

### 2.1 The Dataset: China Health and Nutrition Survey

This study uses a collected panel dataset, China Health and Nutrition Survey (CHNS). CHNS is a continuing collaborative project conducted by multiple institutions between China and the United States since 1989, including University of North Carolina Population Center and the Chinese Ministry of Public Health. The survey uses multi-stage random cluster sampling to cover nine provinces of China. Counties of the nine provinces were stratified by income to yield four counties from each provinces. The survey had initially 190 units until 1997 when a new province and several counties were added to produce a total of 4,400 households and 19,000 respondents to date.

Since the first wave in 1989 with individual, household and community survey, subsequently additional panels were collected respectively in 1991, 1993, 1997, 2000, 2004, 2006, 2009, and 2011. In 1989, only young adults and preschoolers were sampled owing to some funding issues. At the wave of 1997, new households and communities were added to replace those were lost from attrition, and a province was temporarily suspended when it could not participate until returned in 2000, thus made the complete longitudinal panel pool smaller than the entire participation pool. Overall, according to the definition that “subjects participated in previous surveys remaining in the current survey”, the response rates were 88% at individual level and 90% at household level;

defined by “subjects participated in 1989 and remaining in 2006”, response rates were respectively 63% and 69% (Popkin, Du, Zhai et al. 2010). Other than interview questions answered by individuals, household head, and community officials or representatives, CHNS also provides spatial coordinates and GPS data, fasting blood for respondents more than 7 years old, and toenail biomarkers for respondents more than 2 years old. Due to the lack of identification of communities, I have to rely on what CHNS provides for sample weights.

The covered nine provinces (in Figure 2.1) vary substantially to represent a wide range of developmental characteristics of China. These nine provinces east to the Aigun-Tengchong Line are all considered as the China proper, whereas the larger area of western China comprising of non-Han or non-traditional Han was not included into the sample, thus limits our ability to investigate topics that involves substantial ethnic and cultural variations. However, it is important to also acknowledge that the China proper consists of 95% of the entire population, which can assuage most of the representativeness concerns. Household migrated to other places were not followed. This can be a limitation when scholars attempt to trace how personal migration history is relevant to the research, but remedies are feasible. For example, propensity weight based on the likelihood of emigrating has been used to compensate under-sampling.



Figure 2.1

### 2.1.1 Measurement

CHNS has many variables potentially suitable for the purpose of this study, and they are recorded at both individual and community level. The survey has a separate community questionnaire at each wave, enabling multilevel analysis. At community level, it provides very detailed infrastructure and economic information, including the availability of a series of public health facilities, cigarette and alcohol price, community's demography.

### 2.1.2 Individual-level Sampling

One advantage of CHNH is its elaborated measurement of wealth, income, property, occupation, power, education, and other social status variables. Social strata can be constructed to test the relationship between social class and the style of substance use.

For adult who completed the questionnaires, the following questions were administered: type of household registration (rural, urban), date of birth (record calendar date), age, sex (male, female), father and mother live in household (“does your father/mother lives in this household”: yes, no), marital status (never married, married, divorced, widowed, separated), years of education (1-6 years elementary school, 1-3 years middle school, 1-3 high school, 1-3 technical school, 1-6 college/university or more) highest level of education, ongoing education (yes, no); then s/he proceeded to answer occupation and labor questions: whether in labor pool (yes, no), the sum of salary and bonus (“what was your monthly salary plus subsidies and bonuses”), type of occupation (senior professional/technical worker, junior professional/technical worker, administrator/manager/executive, office staff, famer/fisherman, skilled worker, non-skilled worker, army or police officer, ordinary soldier or policeman, driver, service worker, athlete or artist, other), employment position (self-employed and owner-manager with employees, self-employed and independent operator with no employees, works for another person or enterprise, contractor with other people, temporary worker, paid family worker, unpaid family worker, other), ownership of the work unit (government department, state owned, small collective enterprise, large collective enterprise, family contracted, private, foreign owened), work unit size (less than 20 people, 20-100, bigger than 100), time of working and time of child care at home (record months and days).

Substance use dependent variable are measured by the quantity of cigarettes smoked per day and the frequency of alcohol drinking (almost every day, 3-4 times a week, 1-2 times a week, 1-2 times a month, no more than once a month).

### 2.1.3 *Community-level Sampling*

The community survey has a remarkable variety of information: type of administrative district (choose from city neighborhood, suburban neighborhood, town neighborhood, rural village), population of the location (record exact numbers), population and area of the county/city (record numbers and square kilometers), number of private enterprise (“how many private enterprises are in this village/neighborhood”, record numbers), percentage of work force (record percentages for “agricultural activities, worked out of town for >1 month last year, works in enterprises employing >20 people, in enterprises employing <20 people”), number of different types of businesses (“how many businesses are operating in this village/neighborhood”: fast food, indoor restaurant, outdoor food stalls, mobile food carts, bakeries, bars that sell alcohol beverages, ice cream parlors, fruit stores, cafés, internet bars), typical wages (“what is the daily wage for this occupation in the village/neighborhood”: ordinary male worker, ordinary female worker, primary school teacher, middle school teacher, nanny, ordinary construction worker), location and distance to buy cigarettes/alcohol (record name and distance in kilometers), composition of ethnic groups (record percentages of “Han, Hmong, Buyi, Manchu, Tujia, other”), health facilities to utilize when in need (and “where is this facility”: in this village/neighborhood, in this city but a different neighborhood, in another village/city; “how far away is this facility”: record the actual distance in kilometers; “how many doctors does this facility have”).

Several indicators of modernity were also provided by CHNS based on a variety of measures available in the survey. Economic modernization level is measured by types of enterprises, number of people working in an enterprise, ratio of third industry to

second or first industry, free market, etc. Social modernization is captured by measures including: number of phones, availability of newspaper and magazines, number of schools, health facilities, etc. Income inequality, another outstanding feature of China's rapid modernization, is aggregated with individual level income information by Gini Coefficient, which is defined as  $G = 1 - 2 \sum_1^n \frac{(n+1-i)X_i}{n \sum_1^n x_i}$ . To capture ethnic heterogeneity of a community, a Simpson's Diversity Index is used and defined as  $1 - \sum_{i=1}^k n_i(n_i - 1)/n(n - 1)$ , where the relative size of  $i$ th ethnicity in  $k$ th community increase the overall heterogeneity when it is more equal to the relative size of other ethnicities. Population turnover rate is measured by the percentage of individuals left a community at each subsequent wave; population density is simply dividing population by community area.

## 2.2 Analysis Prospectus

### 2.2.1 *Mixed-effect Modeling*

In view of the research questions, analytical strategies of this study principally focus on mixed-effect modeling. No matter it is analysis on longitudinal panel study or multilevel research where clustering effects are strong, the development of mixed-effect model has led to the hope that errors due to the false small variances between vectors from the same cluster can be technically eliminated. Modern sampling technique enabled complex sample to reduce budget and increase the feasibility of selecting a pool of subjects from a large population even when each subject was selected not entirely independently and randomly. Such techniques, known as clustered sampling, stratified sampling, complex sampling, require advanced pre-survey design, weighting strategies,

post-stratification, and finally non-traditional modeling that assumes sample probability is unequal and distribution not independent and singular. For illustration using the Raudenbush and Bryk (2002) symbols, as scholars use the counterfactual causal framework, which basically infers to using random assignment to create factual and counterfactual situations, to estimate the difference of effect on an outcome of a control experiment (0) from a treatment experiment (1), we obtained the basic equation for treatment effect as:  $y_{ig} = a + b_1G + b_2X + e_{ig}$ , where  $g$  is 0 for “control” neighborhood and 1 for “treatment” neighborhood,  $X$  equals individual characteristics such as body mass index. Under normal, independent, singular, random assumption, it is able to estimate the change of treatment effect of neighborhood ( $\delta$ ) conditioning on individual characteristics:  $\bar{\delta} = b_1|X$ , with the assumption of the independence between selected variables and errors:  $E(e_{ig}|X) = 0$ . But people are often clustered by neighborhood  $G$ , selecting them is no longer random, and the vectors in the matrix of individual characteristics and neighborhoods will not be linearly independent, and thus a matrix inverse does not exist to let basic multivariate computations be reasonable because it does not have eigenvectors  $\lambda$  or eigenvalues  $\varepsilon$ . The within-group independence assumption  $E(\varepsilon\varepsilon'|X) = \sigma^2I$  is not satisfied, where  $\sigma$  is standard deviation and  $I$  no longer identity matrix of the original.

The utility of mixed-effect modeling, aka multilevel modeling, hierarchical modeling, is used exactly to deal with the above problem. The first step is to identify the magnitude of inter-cluster effect by fitting a simple unconditional equation:  $y_{ig} = a_g + e_{ig}$ , where  $a_g$  is simply the mean of neighborhood values of concern. Because this

neighborhood mean is clustered, it may have unequal variance across neighborhood, we arrive at what was called the second level equation  $a_g = a^* + u_g$ , where  $a^*$  is grand mean of all neighborhoods and  $u_g$  is the error of the  $g$ th neighborhood. Then we add individual variables into the equation and investigate how much neighborhood variance  $u_g$  can be reduced, if there was any:  $y_{ig} = a^* + \mathbf{bX} + u_g + e_{ig}$ , where  $X$  is a vector of individual variables and  $b$  is a vector of coefficients. The assumption of this second-level equation is similar to first-level equation in form  $E(u_g|X) = 0$ .

The final step is to explain why now individuals are not confounded within neighborhood, namely, people cluster in neighborhood of what characteristics (fixed effect)? Instead of treating neighborhood variance merely as deviation from grand mean  $a_g = a^* + u_g$ , neighborhood variables  $N$  are added so that  $a_g = a^* + \mathbf{bN} + u_g$ . Substitute this into the random-effect model in the above paragraph to get  $y_{ig} = a^* + \mathbf{bX} + \mathbf{bN} + u_g + e_{ig}$ . One may now look at  $b$  vector of coefficients to determine meaningful influences on the outcome variable, and the change of  $u_g, e_{ig}$  to determine how suitably does the model explain second-level and first-level differences respectively.

### 2.2.2 Log-linear Model

Survival analysis will be employed to test the hypotheses regarding the normative use of substance in China. If drinking and smoking has normative functions in a society and is encouraged by the efforts to integrate new members into social hierarchies, then it must have certain functional consequences for people who do not abide with the normative expectations. The CHNS provides more than two decades of panel data to see whether drinkers and smokers perform differently within this social institution.



Survival analysis is a special case of log-linear modeling, in which the time-to-event counts are the dependent variable. Everyone will gradually meet the condition that satisfies the event's occurrence. Death, disease, getting old, birth, these are inevitable events for all human. Unemployment, marriage, promotion, demotion, these are events that will happen to some people but not everyone, depending on individual background characteristics. With survival analysis, we are able to test what characteristics effectively influence the hazard rate of meeting an event. The hazard rate of having an event at time  $t$

is:  $h(t) = -\frac{dS(t)}{S(t)}$ , where  $S$  is a cumulative probability of surviving that event at time  $t$ :

$S(t) = \exp[-\int_0^t h(u)du]$ . As we can see, hazard rate is a point-estimate determined by cumulative survival probability. For discrete measurement usually found in a panel data, the exponential of hazard rate can be easily interpreted in the same manner as interpreting odds ratio.

Realistic data are used to approximate different type of survival curve, such as exponential (accelerated chance as time advances), Weibull (curved as time advances), linear, and others. Cox proportional model is a favorite tool used by scholars to generalize survival analysis, it is specified as:  $h(t, \mathbf{X}) = h_0(t)e^{\sum_i \beta_i X_i}$ , where  $X$  is a vector of covariate,  $h_0(t)$  is the baseline hazard involving  $t$  but not  $X$ 's. It is also possible to use time-dependent  $X$ 's by extending the above model to:  $h(t, X(t)) = h_0(t)e^{\sum_i \beta_i X_i + \sum_j \delta_j X_j(t)}$ . Here, another coefficient delta allows  $X$ 's to change with time  $t$ . In practice, for example, the hazard rate of unemployment is a function of baseline hazard  $h_0(t)$ , smoking, smoking-time interaction at each time point, plus any number of covariates.

While survival analysis tells us how substance use shapes the likelihood of social mobility, it does not tell us how moving into different strata changes substance use behaviors. If upward mobility requires the normative use of tobacco and alcohol, then, becoming a manager from a technician position is a journey to “drink up” one’s way. This is an important hypothesis that I will also examine in this manuscript: how the change of social stratum has contributed to substance use at population level. Consider a two-way table with origin social class as rows and destination class as columns, if  $y$  is the substance use measured at  $r$  row and  $c$  column. Formula  $\log(y_{rc}) = \lambda + \lambda^r + \lambda^c + \lambda^{rc}$  is a saturated model that should explain fully the left-hand side by row effect, column effect, and their interaction. However, the saturated model has zero degree of freedom, thus numerous ways of constraints have been proposed by scholars to modify this log linear model to tailor for different theoretical needs. Because social class is better to be regarded as an ordinal scale, I will use diagonal reference model to test how upward mobility changes smoking and drinking among Chinese. This model is widely used and the best accepted latest configuration to solve identification problems in analyzing the responses to status inconsistency (Hendrickx, De Graaf, Lammers, & Ultee, 1993; Houle & Martin, 2011). Its basic form is:

$$\hat{\mu}_{ij} = \mu + p v_o + (1 - p) v_d$$

which is actually an extension of the first equation in the above paragraph. Here, the effect of origin class  $v_o$  is complementary to the effect of destination class  $v_d$  on a same scale, since they are weighted by a common factor of  $p$ , which lies within an interval of 0-1. Weighting factor  $p$  can be expressed as  $\frac{e^{\delta_k}}{e^{\delta_k} + e^{\delta_{k+1}}}$ , where  $\delta_k$  is the overall marginal

effects of  $k$  types of movement. This will allow different effects for upward movement and downward movement, see (Peter Clifford & Anthony Francis Heath, 1993; Turner & Firth, 2007a). This configuration is adopted because we want to know whether the influence of recent social class is more important than the original one, meanwhile how important is the change *per se* (which can be added to this formula as a covariate). For more discussion on its technical development, see (Hendrickx et al., 1993; Turner & Firth, 2007a, 2007b).

Most data management and realization of the statistical analyses described above were conducted in Stata 13 and R. The three most central R packages employed are: “gnm”, “glmer”, and “survival”.

### 2.2.3 *Sample Weights*

The sample is further weighted by the author through post-stratification by a combination of gender and household number. Post-stratification weight  $w$  is the inversed probability  $p$  of being randomly chosen in a sampling unit, and  $p$  equals  $\sum \frac{n_{jk}}{N_{jk}}$ . For example, if K county has in fact 200 women and 200 men (a ratio of 1:1) from 100 households, while in the sample K county has 30 women and 20 men from 10 households, the post-stratification weight for women would be a reduction by  $2/3$ .

Another method to compensate and identify missing data is propensity score matching (). This method compares the treatment group (e.g. dropouts) and control group (e.g. remainders) by a vector of chosen characteristics (e.g. gender, age, health status). It calculates for everyone a likelihood of being in the treatment group, the inverse of which can then be used as propensity weight to magnify those who were likely to drop but

nevertheless stayed, or used as a covariate to control for the missing data bias as suggested by Heckman Correction(Heckman, 1977). Propensity score  $e$  for  $i$ th individual based on  $k$  covariates equals  $\Pr(T = 1|X_1 + X_2 + \dots X_k)$ , and propensity score for the untreated group ( $T=0$ ) is exactly  $1/(1-e_i)$ . The covariates used in this study for matching missing vs. non-missing substance use status are: gender, race, income, quintile income gap, household turnover, urban area.

## **CHAPTER 3 DESCRIPTIONS OF SUBSTANCE USE AND SOCIOECONOMIC CHANGE IN CHINA**

Before engaging different theoretical approaches on the subject, it helps to first clarify the shifting contextual fabrics of China between 1989 and 2011, the change of the country's socioeconomic situations, as well as the pace of modernization, substance use, and the trend of unemployment over the course. This brief chapter provides an overview of changes found in the CHNS dataset. A grip on these statistics is a fundamental step before marching to the analysis of the related mechanisms that underlie the discussion of how social changes in Chinese society relate to patterns of substance use among Chinese.

### **3.1 Demographic Background**

First, we must consider information on changes in the basic demographic background as divided by CHNS' survey waves. This contains the key demographic landscape of people recruited in this large longitudinal sample, including gender, age, education and income status, household size, etc. With more than 8 waves of repeated sampling tracking the respondents, I will only show three important intermittent time points, 1991, 2000 and 2011, to save space but can still present a relatively comprehensive understanding of the CHNS sample and how their lives have changed during these two decades of the Reform period.

According to Table 3.1 and Figure 3.1.1, people do earn much more in RMB as time passes. The trend of log-transformed income by gender is shown in Figure 3.1.1. Although women earn slightly less than men do, the speed of acceleration in income for both genders is similar. In 2011, Chinese earned almost six times more than they did in 1991. However, due to the impact of inflation and the changes in exchange rate, the money of yesterday may have much less reference value today. I have also calculated the equivalent values in USD in the parentheses according to the concurrent exchange rate between RMB and USD. Again, by consulting the U.S. Bureau of Labor Statistics' inflation calculator<sup>2</sup>, we have found that the Chinese people from our sample had an average annual income of \$753 in terms of today's USD in 1991, of \$1,010 in today's USD in 2000, and of \$2,378 in today's USD in 2011. Therefore, even after adjusting inflation and exchange rate, the improvement in the quality of life for the average Chinese citizen as measured by income is apparent.

There is also an uprising trend in education during this time period. The average level of education moved from elementary school (value=1) closer to junior high (value=2). The increase is relatively small because our sample consists of the adult population, and most adults are less likely to change their educational path once participating regularly in the work force. Nevertheless, average education level has increased very visibly for both men and women. On average, a man in 1991 would not have graduated junior high, but an average man in 2011 already had junior high school diploma. An average woman in 1991 barely graduated elementary school, but by 2011

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<sup>2</sup> [www.bls.gov/data/inflation\\_calculator.htm](http://www.bls.gov/data/inflation_calculator.htm).

she would have received elementary education. The growth in education is considerable for the younger generations.

Males made up 48% of the sample, a rate that only slightly decreased in 2011. Today's serious concern over the distorted gender ratio at birth in China has not manifested in this dataset due to the time period it was collected. In Table 3.1, about 86% belong to ethnic Han, but according to Figure 3.1.3, this proportion varies between urban and rural areas. Urban areas, including cities and county township, had higher proportion of residents as Han majority than in rural areas, reflecting the reality that many ethnic minorities live in marginal urban or rural areas of China.

As shown by Table 3.1, the overall trends of substance use in terms of smoking and drinking were slowly decreasing as time passed. But in the last chapter, we have read about the gender pattern of the status quo of substance use. Here in Figure 3.1.4 and 3.1.5, we can visually understand that the decreasing trend of smoking and drinking does not equally reflect in both genders. In Figure 3.1.4, female average number of cigarettes does not obviously dip. Even for men, there is a series of fluctuations in both drinking level and smoking quantity. When it comes to heavy substance use, defined by smoking at least 10 cigarettes a day and daily drinking, the female rate of heavy smoking actually slightly rose. We will explore the gender effects on substance use in later chapters and explain the paradoxical divergence of substance use rates by genders.

### **3.2 A Landscape of Social Mobility**

Of all the abiding collective memories of the post-Reform Chinese society, one that has provoked divergent views among common people is the massive layoffs of state-owned enterprise workers, also known as *Xiagang* (off-duty “employment”). During the

decade between the 1990s and 2000s, after the privatization and market reform of state-owned enterprises, close to 30 million industry workers were laid off in a series of institutional restructuring actions (Yuanzheng Cao, Qian, & Weingast, 1999). We see this growth in unemployment reflected in the data as there is significant increase in unemployment among the sample in 2011 compared to 1991. This series of laying off former industrial workers eased the economic and labor burden for faster development in modern technology, because most of these laid-off workers used to be employed in the over-supplied heavy industry that suffered from inefficient bureaucracy and backward technology. Yet, for the unemployed workers, their quality of life plummeted in a system with little welfare or unemployment benefits. Many remained unemployed and live on meager alms; some have turned to illicit ways of living. A major portion of women working in prostitution came from the unemployed former industrial workers. Some tried human smuggling to Japan, Russia, Europe, and even North America (Huang & Pan, 2003; Tucker et al., 2005). Many underground societies and gangs sprang up out of the same group of people during this period of time. Thus, the changes in unemployment have had some negative effects on Chinese society, but it is not clear how the large-scale unemployment relates to the substance use of Chinese people.

But the same era also marked a great advancement in social mobility, which broke the previous class-based restrictions on educational and occupational opportunities. Before the Reform, the socialist system of China had in practice frozen the upward mobility of those with a bourgeois background, and suppressed the migratory movement of rural people through the household registration system, which strictly regulated who could work and live in the cities (Cheng & Selden, 1994; X. Wu & Treiman, 2007).



Fortunately, the Reform has *de facto* broken down many such restrictions in spite of enduring policies (F. Chen & Korinek, 2010; Zhu, 2000). Table 3.1 also demonstrates how the demographic composition of several occupation classes changed between 1991 and 2011. As described above, a shocking shift can be found in the unemployment rate in this sample, which rose from 7.4% to 27.8%. The rapid growth in unemployment rate is actually not counter-intuitive if we explore the distribution of classes in Table 3.2. Most unemployed people in 2011 used to be farmers and workers in 1991. This phenomenon confirms the severity of the massive layoffs and the plight of rural development in the post-Reform China, where the rural population and former socialist industrial workers made up a considerable portion of the entire population yet fell victim to the Reform's harsh experiments. In chapter 4, we will discuss why and how substance use may protect one against the risk of being laid off. As expected, more people have retired as they age during the course.

As described above, we also see the average number of cigarettes smoked and average drinking level dropped over the two decades. Since this sample consists of the same adult respondents followed-up across panels, we suspect that the dropping substance use may be attributed to aging. As will be demonstrated next in Chapter 5, the retirees consumed less substance, and so did the unemployed people, the growth of whom in absolute size was one important reason for the dropping of substance use.

### **3.3 Community Development**

One strength of the CHNS data for this study is its inclusion of a myriad of community-level variables reported separately from individual respondents by community administrators and by official records. Even a superficial reading of media

reports on China over the last many years can leave us an impression of awe-inspiring changes. Such changes occur at many levels, from the cultural atmosphere to standard of living, but more frequently, changes happen to the way neighborhoods and communities are organized. As discussed in Chapter 1, the previous socialist system of residential area planning and housing allocation has been largely replaced by a hybrid commercial mechanism. Both previously rural and urban areas have undergone tremendous modernization and urbanization, which have increased the size of institutional resources and challenged traditional living arrangements.

Table 3.2 contains such communal information. Social modernization is an index measured by the provision of preschool for children under 3 years old, the availability of health insurance for women and children, the proportion of households with treated water, as well as the proportion of residential areas without the presence of excreta. This composed indicator illustrates the extent to which a community is able to provide its residents with institutional resources and a sanitary and healthy living environment. Economic modernization is another index measured by the typical wage for a manual labor, the proportion of people working in non-agricultural sectors, as well as the number of large stores and supermarkets in a community. These two dimensional indices of modernization have both doubled and tripled every ten and twenty years respectively from 1991 to 2011. Such development happened in both rural and urban areas at a roughly similar speed as shown in Figure 3.1.6 and 3.1.7, although rural areas still lagged behind urban areas by a considerable margin.

At the same time, prevalence of people living below the poverty line continued to decrease from 23.1% to only 4.5%, with the fastest decline occurring between 1994 and

1997 (Figure 3.1.8). Initially, more people lived under poverty line in rural areas, but the rural-urban gap in terms of poverty had been closing. Since urban poverty rate had not increased, this closing gap can be attributed to fast eradication of poverty among the rural residents in China. Income inequality measured by the Gini coefficient in Figure 3.1.9 shows considerable fluctuation over the twenty years, with a general increasing trend in inequality. Rural income inequality is actually consistently higher than urban income inequality, possibly due to the sensitivity to the rare high income persons in rural communities where overall income level is very low. Compared to other community measurements which were prepared by the survey administrators, the Gini coefficient was constructed among the respondents in the sample, thus readers need to note that this Gini coefficient may contain sampling errors because sample attribution, if not occurred randomly, may change the overall distribution of income in a community.

In Table 3.1, one may recall that population density has slowly increased. But an in-depth look into the rural-urban difference in Figure 3.1.10 appreciates further elaboration. While population density has dramatically increased in urban sampling sites, rural population density remains at the similar level in 2001 as it was in 1991. In fact, rural population density had dropped during the 90s and early 2000s before it bounced back. This stark contrast points towards the urbanization process in China: it involves a unidirectional population movement from rural areas to cities, where most rural people now work as cheap laborers. The physical movement of the population is another remarkable feature of modernization, which we can prove with an increasing turnover rate in Table 3.1 and Figure 3.1.11. In 1991, 8% of the sample respondents from the previous wave of 1989 were dropped due to the relocation out of their former residences.

In 2000, 11% of the respondents relocated from where they had resided in 1997. In 2011, 21% relocated from their earlier residences in 2009. There is a clear trend of a growing mobile population in China, and residential turnover is more dramatic in rural areas than in cities. We will see how these community characteristics can have a strong impact on individual substance use in Chapter 6.

### **3.4 Overview**

China has certainly undergone a series of tremendous social changes as we have witnessed together in the CHNS data in this brief descriptive chapter. We found that much of the country's population have escaped poverty, enjoyed better income and received more education, and its communities are now considerably modernized in economic and social aspects. But at the same time, issues such as inequality, urban-rural duality, the decay of the rural, and female substance use also emerged. The rural areas had lost population during the 90s and early 2000s, the population density was still very stagnantly growing by 2011. There were also greater income inequality and residential turnover rate in the rural sites, not to mention their lower social and economic modernization level, which were still rapidly growing despite their distance behind the urban areas. Female smoking has not decreased like among men, there is even slightly more female heavy smokers. Male substance uses and heavy use also involve several points of fluctuation and changes over the time periods for us to explain. These changes and variations offer us abundant potentials to explore in the subsequent chapters.

### 3.5 Tables and Figures

Table 3.1 Descriptive Statistics by Three Major Time Points

	1991		2000		2011	
	Mean/percent	s.d.	Mean/percent	s.d.	Mean/percent	s.d.
Annual income (¥)	2,264 (\$427)	287(\$54)	6,014(\$724)	848(\$102)	14,697(\$2,227)	2,297(\$348)
Highest education (0= elementary, 2=junior high, 6=above college)	1.1	1.2	1.5	1.3	1.6	1.4
Gender (male)	48%		48%		47%	
Han majority	86%		87%		87%	
Class						
Unemployed	7.4%		16.2%		27.8%	
Worker	16.9%		13.1%		13.3%	
Self-employ	8.1%		12.6%		11.6%	
Owner	4.6%		2.9%		1.9%	
Farmer	54.5%		42.4%		27.7%	
Retiree	8.4%		12.3%		17.5%	
Cigarettes	5.4	8.9	4.9	8.9	4.6	8.9
Drinking frequency	1.2	1.7	1.2	1.8	1.1	1.8
Modern social	4.9	3.2	7.6	3.6	10.5	4.8
Modern economy	2.5	1.9	4.6	3.2	6.9	3.1
Poverty rate	23.1%		7.6%		4.5%	

Table 3.1 continued

Gini inequality	.057	.016	.061	.019	.060	.020
Population density	5.77	1.26	5.80	1.38	5.93	1.37
Residential turnover	8%		11%		21%	

Table 3.2 Two-way Table of Occupational Class Distribution Between 1991 and 2011

	2011						
1991	Unemployed	Workers	Self-emp	Owners	Farmers	Retiree	Total
Unemployed	103	21	16	1	33	17	191
Workers	125	159	77	18	52	169	600
Self-employ	59	30	78	11	24	69	271
Owners	29	13	13	7	26	39	127
Farmers	854	238	190	13	1107	63	2465
Retiree	10	1	-	-	4	75	90
Total	1260	672	484	75	1316	441	4263

Figure 3.1 Means and 95% Confidence Intervals Over Survey Waves

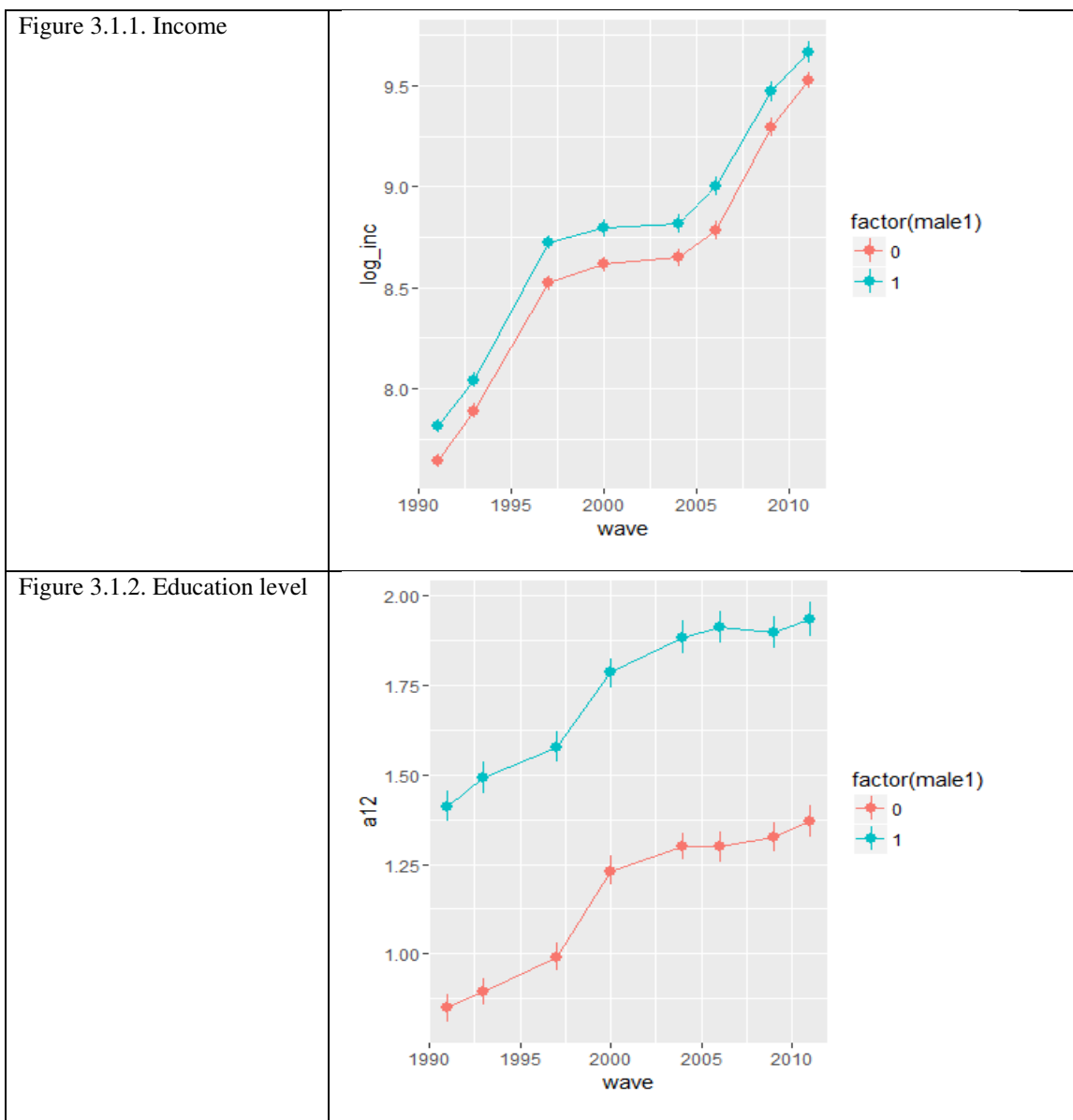


Figure 3.1 continued

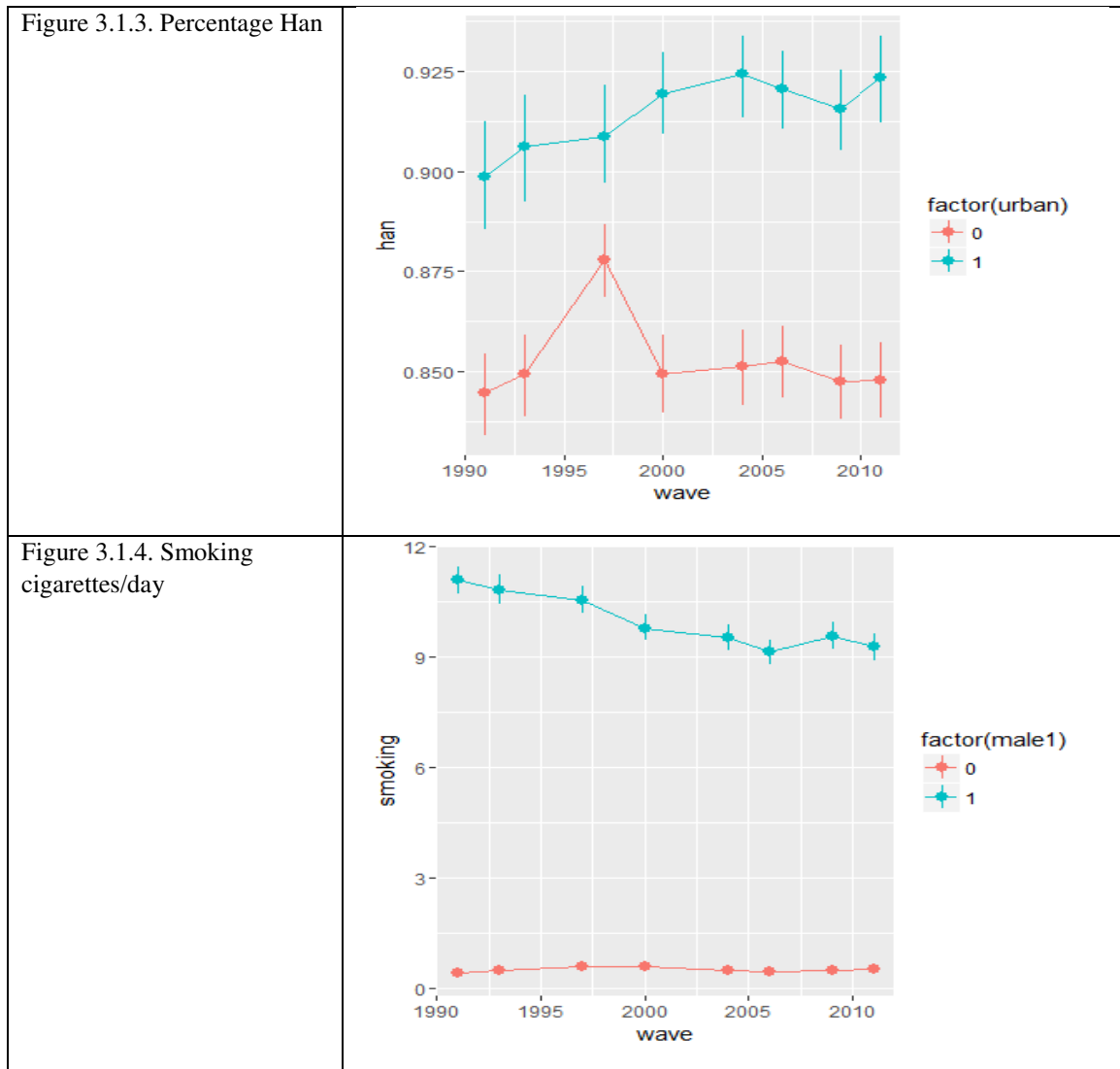




Figure 3.1 continued

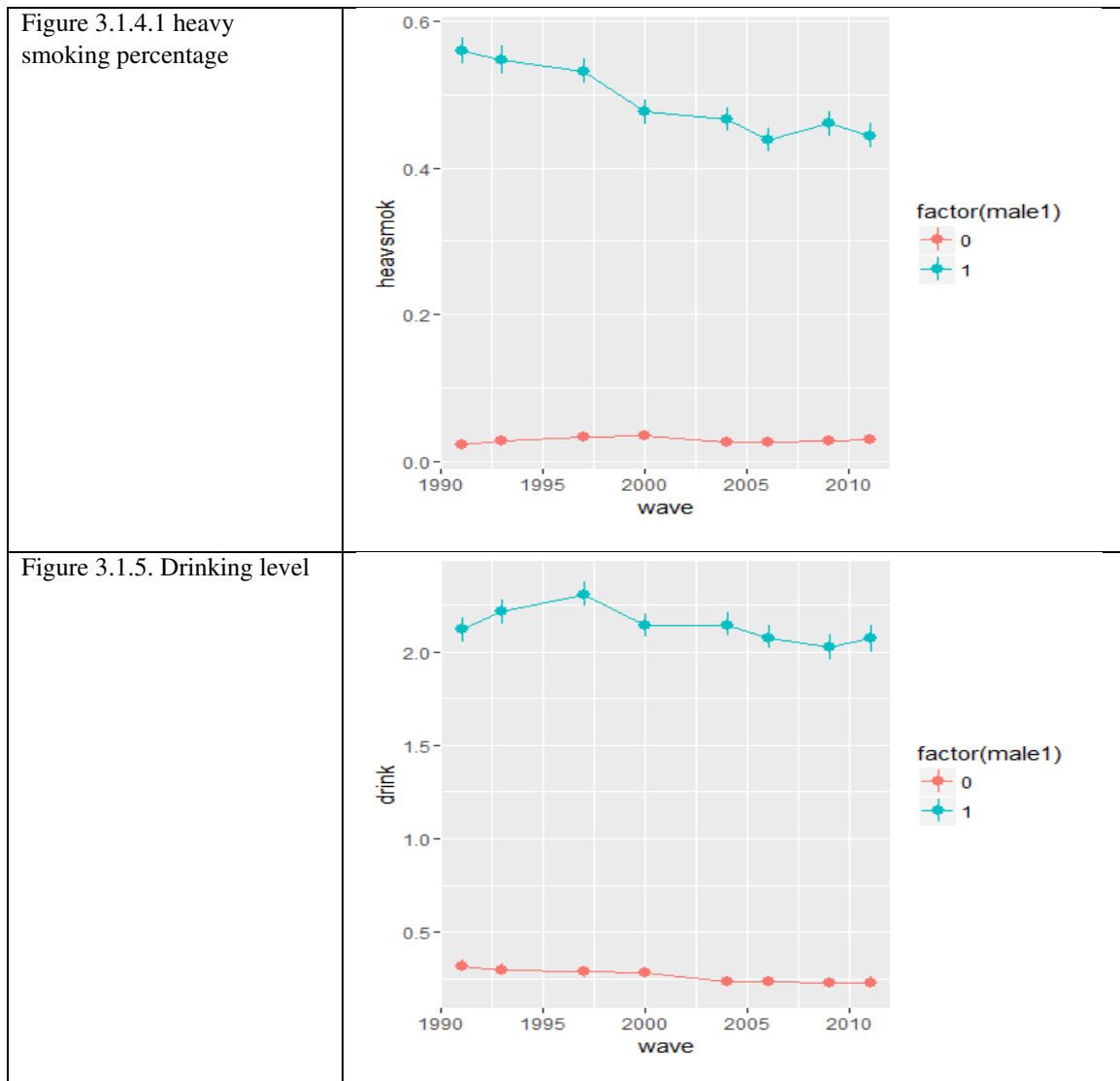


Figure 3.1 continued

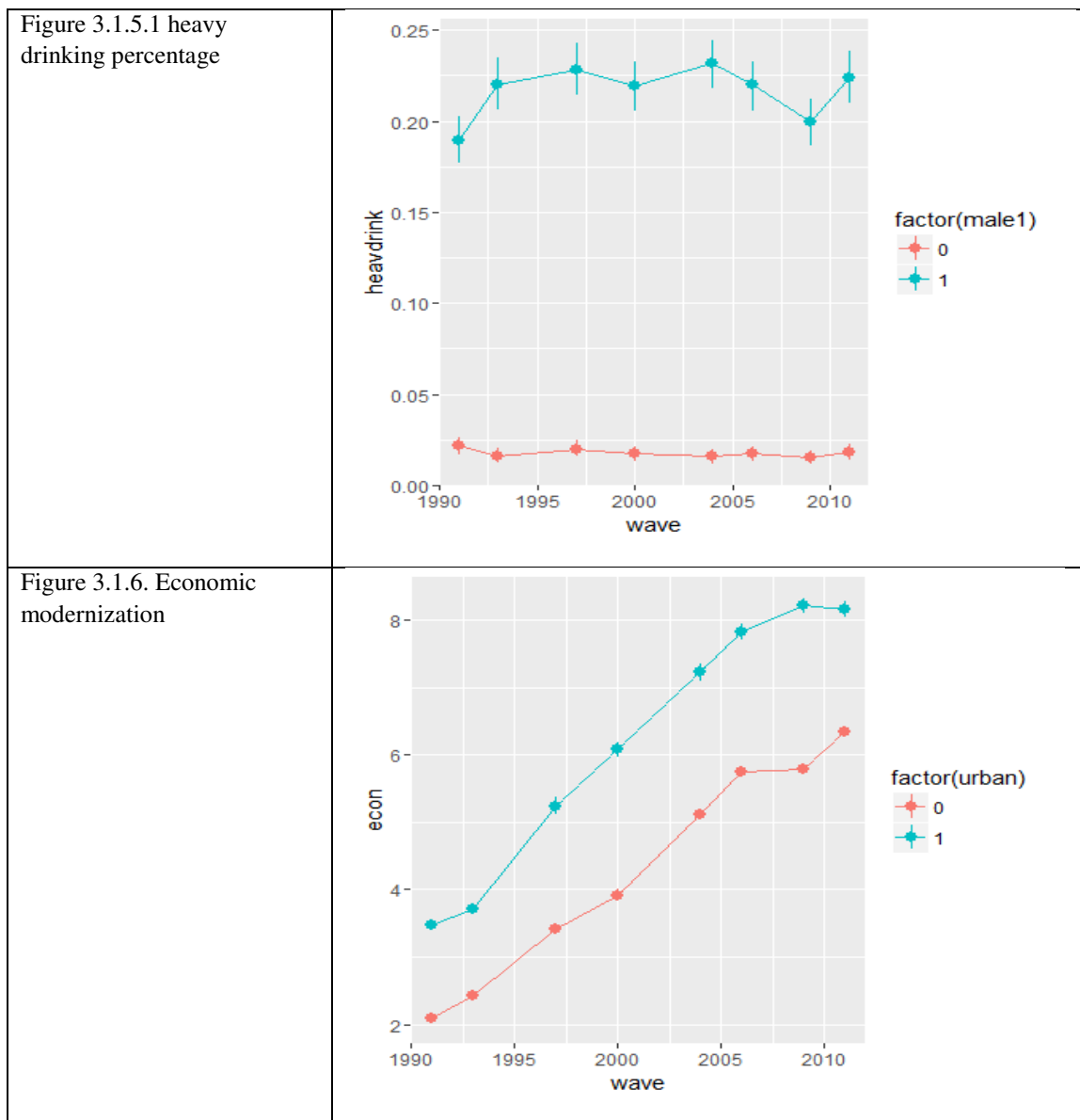


Figure 3.1 continued

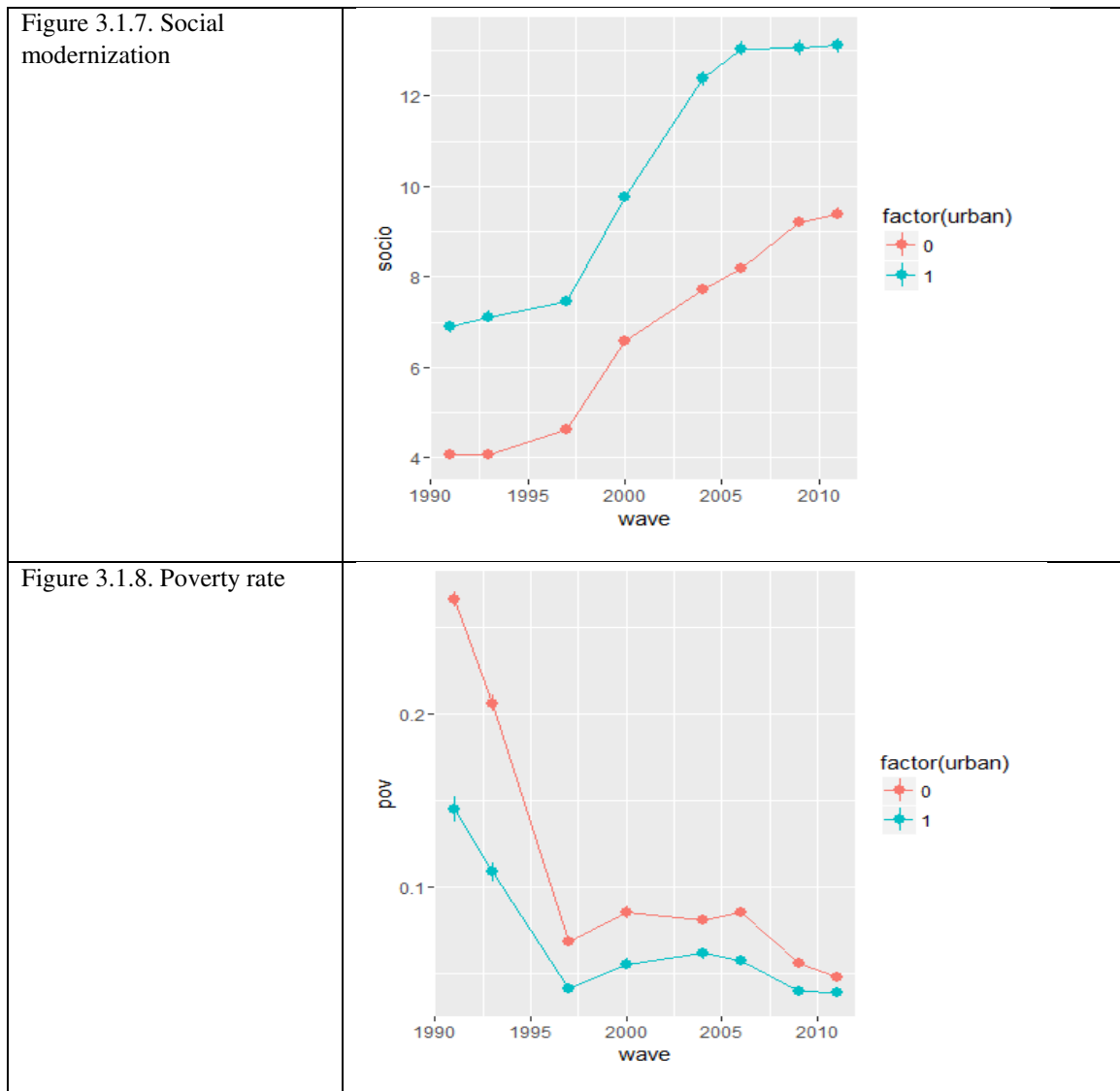


Figure 3.1 continued

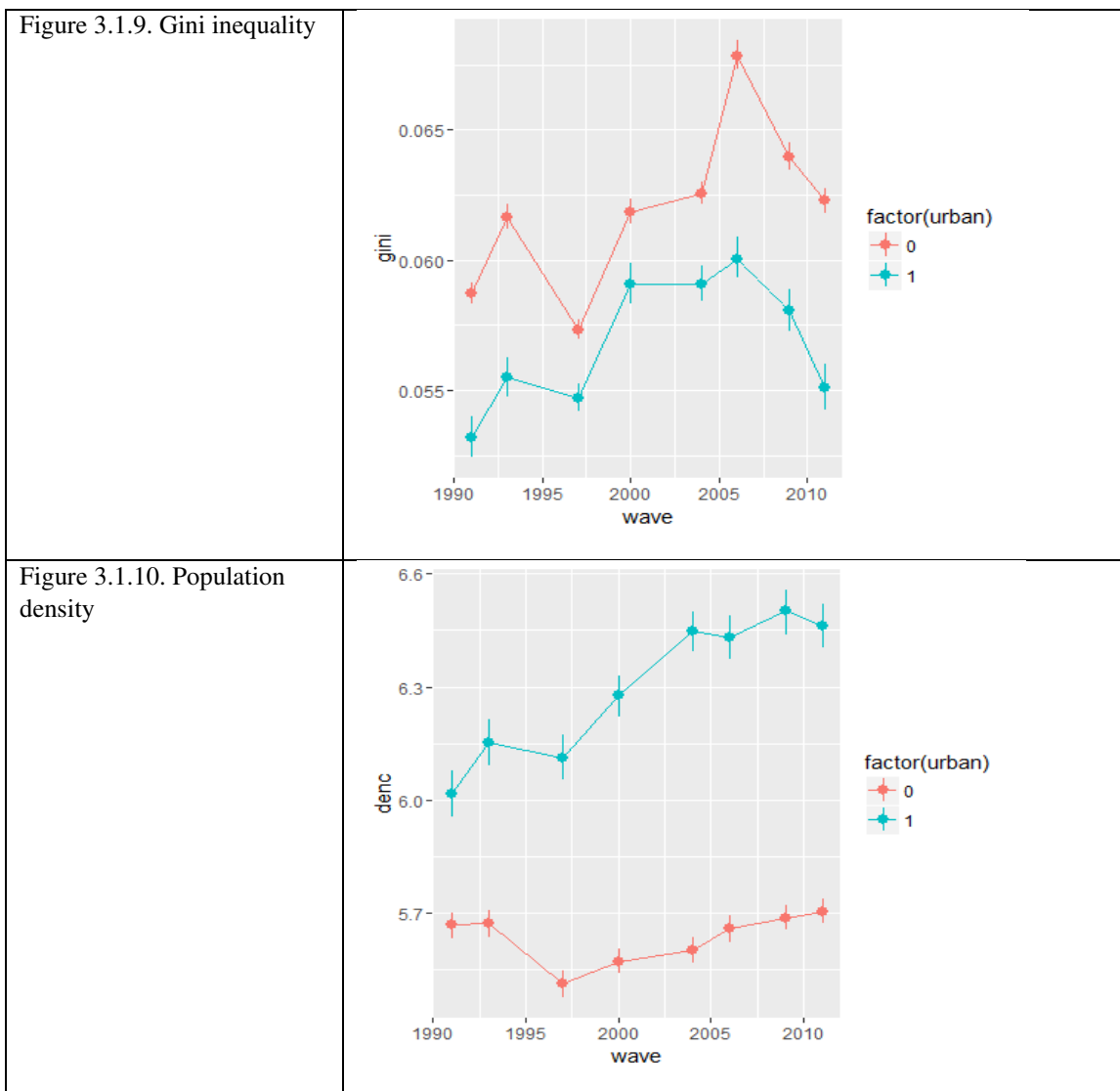
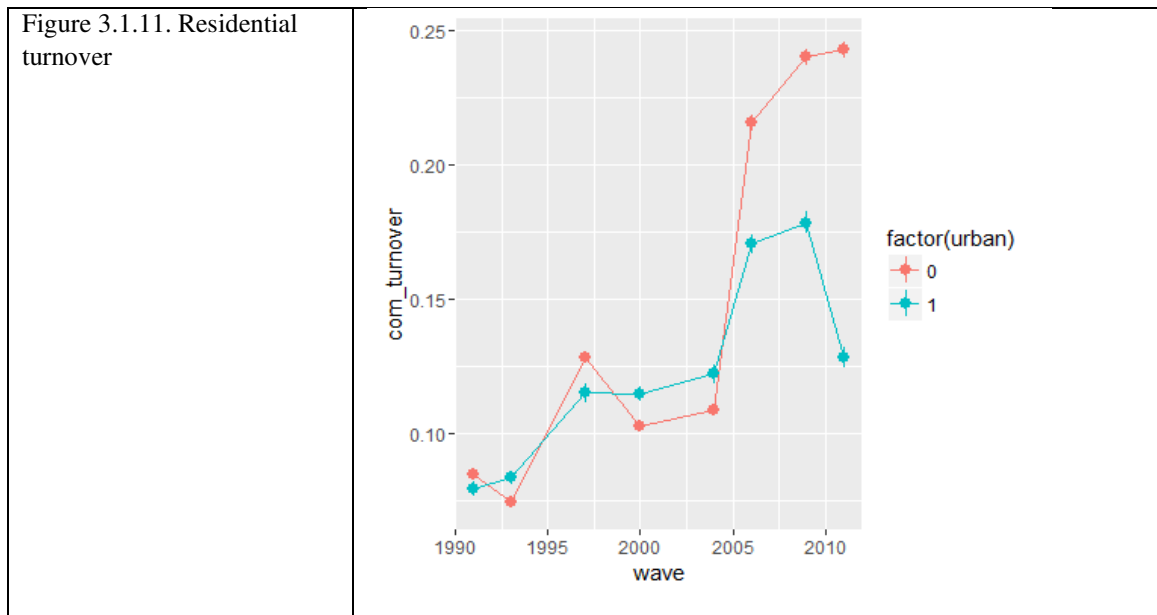


Figure 3.1 continued



## CHAPTER 4 A SURVIVAL ANALYSIS OF SUBSTANCE USE AND UNEMPLOYMENT IN POST-REFORM CHINA

### 4.1 Introduction

As described earlier, there have been prominent changes the labor force and occupational structure of Chinese society during the reform period. It is important to consider how these relate to substance use. With a significant proportion of the Chinese population, especially Chinese men, being current alcohol drinkers (84% men and 30% women (Hao, Chen, & Su, 2005)) and cigarette smokers (57% among men and 7% among women(T. Yang et al., 2015)), people are primarily concerned about the impact of these intoxicating substances on economic productivity, which is arguably the most pressing issue in a modern society. In today's world, productive output and input measurable by common economic interests are the overriding theme for both policies at macro level and encompassing ideologies in daily life. Contemporary notions of health are often understood in terms of the costs and risks to one's ability to be productive in work (Marcuse, 1964); patient-doctor settings are functional mimics of a rehabilitation bureaucracy whose sole aim is to assist temporary delinquents to resume their normal responsibility (T. Parsons, 1975). Today's health care system is also fully calculated and operated on the basis of cost and benefit and its relationship to the economic sector, effectively defining physical health and life quality by the utility of human capital (Anderson, 1990; Shilling, 2002). Due to the importance of health in the labor market, the

state, employers, and workers alike, have stimulated an academic interest in understanding the impact of substance use on economic productivities.

## 4.2 Literature Review

### 4.2.1 *Does Substance Use Lead to Unemployment?*

At the first sight, this question may sound naïve since the popular imagery of substance use is often one that depicts tragedies and chaos. We are all too familiar with wide circulated reports of drunken spouses abusing family members, of smoking employees causing millions in health services, or of young people failing proper education due to drugs. There are indeed studies to verify these phenomena, but at the same time, as I will show later, substance use can be used to leverage social capital and expand one's networking opportunities, which may ultimately lead to better outcomes for some in the work force. These considerations make the thesis on the negative effects of substance use in the work force inconclusive. The purpose of the current study is to demonstrate the extent to which substance use influences employment stability over the long term.

Smoking is found to concentrate among people of lower socioeconomic background in some European countries (Duncan, Jones, & Moon, 1999; Vuolo, 2012). As the wisdom of social disorganization theory (a theory analyzed in a later chapter) tells, the neighborhood proportion of unemployment is often associated with smoking, drinking, and a variety of other deviances (Hill & Angel, 2005; Sampson, 2012). Thus, unemployment is associated with substance use at this level. The risk of being unemployed is found to be two to three times higher among smokers in an Italian study

(De Vogli & Santinello, 2005). Both moderate and heavy smoking trajectories during adolescence are predictor of midlife unemployment for a New York population (Brook, Zhang, Burke, & Brook, 2014). Heavy drinking is especially harmful to one's likelihood of being in the workforce at various life stages (Gruber, DiClemente, Anderson, & Lodicio, 1996; MacDonald & Shields, 2004). Therefore, the literature indicates that drinking and smoking, particularly for heavy usage, pose greater risks for users to face unemployment.

#### *4.2.2 How Substance Use May Damage Employment Stability*

It is not very difficult to reason how substance use could lead to incapacity in the workforce. First of all, the most common source of blame people look to is the biological one. Psychiatrists have long indicated that chronic exposure to alcohol and tobacco will alter certain neurological functions and the way endocrine responses operate to stimuli. For example, problem drinkers may not be able to perceive an alert at the workplace as emergent as others do, thus manifesting this lack of alertness to supervisors as irresponsibility. The urge to fulfill another timely delivery of nicotine to brain is now a major source of violation of workplace regulations by smoking employees in countries with strict tobacco bans (Fichtenberg & Glantz, 2002). The conflict between smoking urges and a workplace tobacco ban then elevates the risk of being laid off. Numerous psychiatric studies have also found that people who report problem drinking and heavy smoking behaviors are more likely to have comorbidity of several other mental wellbeing issues such as obsessive compulsive disorder, mood disorder, psychosis, and more (Agrawal, Heath, & Lynskey, 2011; Agrawal & Lynskey, 2008; Sher, Martinez, & Littlefield, 2010). Their problem substance behaviors directly relate to incapability to



hold a stable job, which then worsens the symptoms and starts a malicious cycle between poverty and mental health problems (Janlert, 1997).

Alternatively, certain lifestyle preferences associated with a substance using subculture is considered as another contribution to potential unemployment risk among users. Even for substance users who do not manifest any problematic behaviors perceptible to employers and coworkers, they are still more likely to identify with certain deviant subcultural aesthetic and lifestyle worldviews that are counterproductive to modern industry and rebellious against puritanical values which emphasize delayed gratification, accumulation of wealth, and the priority of work. It is well known to cultural sociologists that cultural tastes and substance use are related. For example, marijuana smokers listen to a genre of music different from cocaine smokers, and their drug preferences again depart from pop music listeners (Vuolo et al., 2014). As a result of acculturation into different clusters of worldviews, substance use can shape not only physiological responses but also individual's attitudinal and behavioral responses in the workforce. Using Mertonian classifications based on their aspirations and achievement in a modern labor economy, Tropicman (1986) has interestingly shown that drinkers can be sorted into wine drinkers, liquor drinkers, beer drinkers, and abstinence on the basis of these factors. Sociologists demonstrated how people in modern society adopt subterranean values and deviant subculture in face of unsurmountable burden of a mechanical lifestyle aiming at ceaseless production and consumption (Cloward & Ohlin, 1960; Cohen, 1955; Young, 1971). As Protestant work ethics gradually devolve to an iron cage in the "soulless" capitalist world, the function of taking drugs evolves into a relief of existential burden, "a social area where hedonistic and expressive values to the fore,

replacing the bureaucratic rules of the workplace” (Young, 1971). Thus, drinkers and smokers of this day often adopt non-conforming attitudes towards mundane affairs and authorities (Cloward & Ohlin, 1960; A. K. Cohen, 1955), which costs them of the same opportunities to stay in line with normative expectations.

A final reason for why substance use could damage one’s employment lies in the beholders. Using substances could be of no real consequence yet still becomes an issue because the gatekeepers perceive it to be an issue. Certain religious institutions may heavily regulate the use of substance and exclude its users from the right of working, living, celebrating, etc. Historically, anti-Catholicism sentiments had led to the Temperance Movement and discrimination against immigrants simultaneously (Jenkins, 2003). Limitations on holding certain jobs for Christians and Hindus living in Islamic countries is a result of attempting to preserve the purity law against drinkers (Hamarneh, 1972). Even in secular situations, the state has overtaken the health and spiritual guidance formerly afforded mostly by religion and regulates penalties towards substance users by a variety of means. Drinking and smoking is now restricted to only some physical spots in many countries. Smokers and drinkers often get increased monetary punishment through “sin tax” or higher insurance expenses. They often become stigmatized by campaigns directly or indirectly targeting their behaviors in the name of public good (Stuber, Galea, & Link, 2009; Stuber, Galea, & Link, 2008). As sociologist Howard Becker’s seminal works have shown, stigmatized people is created by rule-making and the infraction thereof (Howard S. Becker, 1953; Howard S Becker, 1963). When breach of the rule occurs, people in the outsider camp bear the accusations and are dealt with measures aiming at correcting the consequences of rule infraction. Stigma is one most common property ascribed to these

outsiders (unclean smokers, violent drinkers, lazy potheads, etc.) and stigmatization a process to control their influence. Stigma can constitute a fundamental force driving health inequality through damaging the self-esteem of the stigmatized persons, increasing their stress level, isolating them both socially and economically (Hatzenbuehler, Phelan, & Link, 2013). After all, status-loss is the ultimate consequence of labeling the possessors of stigmatized traits (Link & Phelan, 2001). Substance users who do not accept corrections under such overwhelming pressure may subject to poverty and mental health issues (De Vogli & Santinello, 2005), some may resort to subcultures for self-affirmation (Bayer & Stuber, 2005; Room, 2005; Thompson, Pearce, & Barnett, 2007), these all may encumber employment stability.

#### *4.2.3 Evidence Substance Use Promotes Employment Stability*

Although the counterproductive impact of substance use on employment may at first appear to be apparent, scholars in drug research disagree that substance use is always harmful in terms of productivity and social standing. While there is an indisputable amount of empirical support for the negative aspects of substance use, substance use does not have to be à priori a behavior that harms one's social standing and performance. After all, it requires a long logical stretch to infer a drug's latent consequences only by its psychoactive effects.

Mainstream perception of substances' social consequences is an ignorance of the fluctuating nature and complicated history of any give substance. Almost all substances were initially produced or invented for the intention of enhancing people's performance of certain tasks or functions, especially for medicine, instead of a purely leisure purpose which predominates the contemporary depiction of substance use. Methamphetamine was

synthesized to help with sleepless marching in the battlefields of World War Two (Weisheit & White, 2009); Opium, Morphine, and Cannabis were used in place of each other for a variety of medical functions (Haller & Haller, 1974); Ecstasy came into being for psychotherapy against the broad background of an increasing number of mental health diagnoses in the modern society. The perception that substance use is associated with poor social and economic performance is very likely distorted because policing strategies, policy makers, and media have more frequently attended to the underclass (A. Stevens, 2009, 2010).

Studies from Health Economics have shown that drinking can also be associated with moderate to high social standing and higher income, true for both cross-person comparison (Bethany L Peters & Stringham, 2006) and within-person longitudinal change (Bethany L. Peters, 2004). Two meta-analyses and general reviews showed that drinking is associated with higher wages while those who do not drink are at risk of earning less (Lye & Hirschberg, 2010; Srivastava, 2013). Even heavy drinkers enjoyed as much as a 12 percent premium in wages according to some studies (Auld, 2005; Hamilton & Hamilton, 1997). Although smoking was found to be associated with a penalty in wages and employment in certain western countries (Auld, 2005; Brook et al., 2014; Y. L. Lee, 1999), it was likely so only because tobacco smoking had become an emerging stigma in some Western countries since the end of the last century (Poland, 1998; Stuber et al., 2008; Warner, 2009). How smoking affects job stability in countries like China is much more complicated. In China, where the current study is focused, smoking and drinking are both commonly associated with higher income (X. Y. Yang, Anderson, et al., 2014; X. Y. Yang, Kelly, et al., 2014; J. Y. Zhang, Chan, Fong, Malone,

& Lam, 2012). Studies over diverse geographical areas in China also indicate that drinking, at least in its moderate form, is associated with higher income and higher education even after accounting for gender differences (Millwood et al., 2013; B. Wu, Mao, Rockett, & Yue, 2008). It is typical to encounter smokers and drinkers among the well-educated and financially established populace, especially official cadres, intellectuals, and businessmen. Even among medical professionals, smoking prevalence is as high as over 40% for male Chinese physicians, not very different from lay people who supposedly know less about the harm (Y. Jiang et al., 2007; Yao, Ong, Lee, Jiang, & Mao, 2009). Given these associations between substance use and earnings, it is also important to consider whether substance use may relate to employment stability.

#### *4.2.4 How Substance Use May Promote Employment Stability*

One important mechanism through which substance use may promote employment stability and prevent unemployment is the role of social capital. Essentially, all drugs are social drugs, there is no lone drug in human society. As Becker fascinatingly demonstrated, even with its undeniable physiological effects, a drug's recreational value and somatic pleasure needs to be learned and appreciated in a gradual process of socialization within user circles (Howard S. Becker, 1953). Drinking and smoking are carriages of social activities, they can be used to build solidarity and flaunt social standing even among mainstream groups. Just as that taking Benzedrine to stay alert will likely boost test score the next day, bringing high-end cigarettes as a gift will likely reward the givers with the receiver's appreciation and potential resources (Z.C. Rich & Xiao, 2011), and a bar-night will likely make two formerly strangers connected.

Drinkers and smokers can utilize their substance use as a fulcrum to leverage significant advantages in social exchange and networking activities. A gesture to offer light to another smoker is a very strong active symbol that transmits signals of emotional energy and mutual trust (Collins, 2014). Alternatively, abstinent people are more likely to decline participating in such activities or even not to be invited. One study has demonstrated that marginal increases in purchasing tobacco and alcohol lead to a surge in social activities, although substance purchases divert household funds from that basic expenditures in education and food (H. Wang, Sindelar, & Busch, 2006). At the same time, scholars have made convincing cases that social networking activities are important for finding jobs and boosting income. Social capital is a relational product brought by occupying critical positions in a social network and maintaining reciprocal ties with other actors who possess resources. Better social capital can generate more information for job seekers, reserve opportunities to certain insiders, and boost co-workers' productivity (Burt, 2001; Granovetter, 1973; N. Lin, 2002). A meta-analysis showed that drinking is associated with higher wages primarily because people who drink also have larger social networks and social capital (Lye & Hirschberg, 2010; Srivastava, 2013). Compared to drinkers, abstinent people are reported to have lower social skills and are more likely to be isolated, and consequentially, their employment stability will be harmed when employers screen candidate workers by collegiality criteria (Leifman, Köhlhorn, Allebeck, Andreasson, & Romelsjö, 1995; Bethany L Peters & Stringham, 2006).

Second, it is important to distinguish moderate use of substances for socializing purposes from heavy use. There is evidence that heavy drinkers do not earn more than abstainers; they may actually do worse. For example, a wage premium for drinkers is

found to be effective only for moderate drinkers in many studies (Auld, 2005; MacDonald & Shields, 2001; Bethany L Peters & Stringham, 2006). In another study, even though heavy drinkers only earn less than moderate drinkers, they attain lower education returns on wages than abstainers (Hamilton & Hamilton, 1997). Per the definition of problem drinking, many heavy drinkers do suffer from psychological issues that significantly increase their risk of unemployment (MacDonald & Shields, 2004). While moderate use of tobacco and alcohol may deliver the networking and social exchange benefits discussed in details above, people often only need to consume a limited quantity of substances in order to achieve these goals. For example, Skog (1980) found larger social network size among moderate drinkers, compared to both abstainers and heavy drinkers. As is true with other types of consumption, the marginal return of rewards from drinking and smoking for social purposes will gradually decline as one consumes more. When cost surpasses benefit, heavy users will no longer enjoy the premium as moderate users do. Although human psychological wellbeing does not easily divide into absolute pathological categories, there indeed are empirically proven psychiatric criteria for confirming symptoms and treatment cut-off points for substance abuse as opposed to regular substance use (Agrawal et al., 2011; Sher et al., 2010). Therefore, some of the facilitative effects of substance use on job stability should primarily benefit moderate users but not heavy users.

#### *4.2.5 The Normative Status of Gender-Patterned Substance Use in Contemporary China*

Aside from physiological effects, most mechanisms for substance use to influence labor performance relate to how mainstream norms accept a substance. For alcohol to be

an effective lubricant in a crowd, people need to acknowledge their action is permissible in the context; for participants to exchange cigarettes as if business cards, both parties need to be smokers, or at least understand the value of smoking in the context and humbly refuse with a good excuse. In short, if the perceived norm of smoking and drinking has not been established, it is impossible for people to utilize a substance for their social promotion. However, China is a place where drinking and smoking are considered very normative in both informal and formal settings.

Historically, tobacco was prescribed to people as medicament because of its assumed function to balance the corporeal air system (qi) in the philosophy of Chinese traditional medicine (Du 2000). Besides its assumed medical benefit, the quick and vast acceptance of tobacco in China was closely associated with the phenomenological meaning of smoke (air, or qi) found in Chinese folk religion's evil dispelling ceremony (Dikötter et al., 2002). A study on self-exempting beliefs among Chinese informs us that the most common self-exempting beliefs about smoking among Chinese males include the importance of cigarettes in social and cultural etiquette (X. Y. Yang, Kelly, et al., 2014). Largely weaved into a system of patriarchy, Chinese males routinely employ the phenomenon of courtesy smoking and gifting cigarettes, where cigarettes are used in daily interactions among men, welcoming guests, or as a bribe (S. Ma et al., 2008; Z.C. Rich & Xiao, 2011). Similar to smoking, drinking alcohol serves as means to foster friendship, to facilitate cooperation at all levels, and to celebrate various ceremonial occasions. A complicated set of drinking etiquettes has existed since antiquity to regulate and direct how men and women, hierarchical superiors and subordinates, elders and youngsters, should drink. In contemporary China, both men and women realize that in



order to meet the expectations in workplaces and family, they have the very need to use alcohol to fulfill social functions (Cochrane et al., 2003; Hao et al., 2005).

Although the acceptance and normative encouragement to use alcohol and tobacco products is widespread in Chinese society, a considerable gap between genders exist in terms of the quantity and quality of substance use. While close to half of all Chinese males are smokers, only 5% females smoke. Additionally, Chinese women are half as likely to drink as men do (Millwood et al., 2013; G. Yang et al., 1999). Even when females drink, their drinking bears a different connotation, including ritual submission, companionship provision, manifestation of motherhood, etc. In a patriarchy, economic and labor relationship in the workplace is predominately organized around the set of rules concerning preserving the order hierarchy between sexes and classes. Females may not benefit from the same behaviors that reward males for their proper manifestation of bravery, risk-taking, initiatives, and non-conformity.

Despite significant improvement in women's rights and dramatic change from the traditional arrangement of gender relationships, contemporary Chinese society is characterized by a patriarchy that conveys differential expectations and evaluations, particularly in the standard of deviance and the rewarding mechanism regulating the labor pool. Chinese women are found to be less likely to move upward in job market, but more likely to terminate a job involuntarily, and this gap between women and men grew bigger during the Reform (Yang Cao & Hu, 2007; F. Chen & Korinek, 2010). At the present time, several social movements in China call for the return of traditional gender and family norms, including officially sponsored Confucianism reactionaries and the grass-root Han nationalists. In the social sphere of substance use, women are presented with

ambivalent standards that both require and fear their drinking. Therefore, scenarios where men drink to acquaint useful others may present less opportunity to a female drinker. Women are also more often considered as vulnerable objects to be rescued from second-hand smoking (Campbell, 2000; X. Y. Yang, Anderson, et al., 2014). In addition to the very low prevalence of female smoking, the sanction against female smoking may forestall the possibility that their social networking and capital building in the workplace may benefit significantly from smoking cigarettes.

### 4.3 Research Hypotheses

So far, two contradictory phenomena exist: on one hand, substance use is sometimes significantly associated with unemployment and social demotion in some studies; but at the same time, substance use can be a carrier of social status and a tool to accumulate social capital, and thus can facilitate occupational stability. Hence, it is legitimate to ask how will substance use affect employment stability in contemporary China, where both smoking and drinking have numerous symbolic connotations. Therefore, I propose to directly test a hypothesis on substance use and its alternative: whether substance use facilitates employment stability over long term, or it damages employment stability. Although I may not test for all the possible mechanisms that substance use leads to employment stability, I will also distinguish whether substance use affects employment differently for heavy users, moderate users, and abstainers.

Specifically:

*H1: Tobacco smoking or alcohol drinking, respectively, decreases the risk of being laid off, as compared to abstainers.*

*H2: Heavy smoking and drinking respectively increase the risk of being laid off, as compared to abstainers.*

## **4.4 Methodology**

### *4.4.1 Measurement*

Cigarette smoking was measured by the quantity smoked per day, coding zero for non-smokers and capping the maximum at 50 cigarettes per day. Drinking was measured by the survey as a six-points ordinal question of “how often did you drink beer or any alcoholic beverage”. Answers to this question range from not drinking, “less than once a month”, “once or twice a month”, “once or twice a week”, “three to four times a week”, to “drink every day”. Those who smoke more than 10 cigarettes (half pack) a day or drink alcohol every day were designated as heavy users. The cut-off is consulted with the variables’ distribution and existing literature. Unemployment events refer to any report of “unemployed” on occupational status at a survey wave, retirement is not considered as unemployment. Control variables included baseline income in 1991 Yuan, gender, highest completed degree of education, ethnicity, communal collective efficacy measured by mutual childcare, community ethnic heterogeneity, rural residency, and a Heckman’s correction for selection bias which came from an estimated probability of survey attribution (see details in Chapter 2).

Both time-lagged substance use status and baseline substance use status are used in separate models to predict the hazards of unemployment event over time, with controlling for a set of baseline demographic and neighborhood background covariates. Treating the independent variable with time lags helps scholars deal with temporal auto-

correlation:  $x_t$  may be closely correlated with  $y_t$  at time  $t$  only because  $x_{t-1}$  at an earlier point  $t-1$  has lagged influence on  $y_t$ . By using both types of substance use measures, we can be more confident about the true effects of substance use on employment, and vice versa.

#### 4.4.2 *Statistical Analysis*

I employ survival analysis, also known to sociologists as event-history analysis, on unemployment events reported in a person's follow-up surveys. A Cox proportional hazard model is one specific survival analytical model adopted in this study for its generalizability and compatibility with discrete time event (Kleinbaum & Klein, 2006). Details of survival analysis were discussed in Chapter 2's "log-linear models" section.

### 4.5 Results

Table 4.1 and 4.2 presents the number of events occurred at each time gap and the cumulative rate of surviving unemployment by baseline substance use status and gender in 1991. Figure 4.1 and 4.2 then visualize the percentage of those who had never been unemployed over two decades in the survey, categorized by groups. For example, between 1991 and 1993 (time period 1), among all 6,167 female non-drinkers, 738 had the unemployment event happened to them (12%). During the same period, among the 620 female drinkers, 95 had experienced unemployed (15%). As evident in Table 4.1 and also in Figure 4.1, one can see the survival rate of unemployment is higher for non-drinkers, females and males alike, in the first three periods. But the gap was getting closer and reversed since period 4, when both female and male drinkers were less likely to get laid off, and the cumulative survival rate in the end is higher for drinkers of both genders.

The final survival rate is 25% for drinking women and only 19% for non-drinking women, it is 38% for drinking men and only 28% for non-drinking men. Drinking appears to be a protective factor against long-term risk of unemployment compared to abstinence.

In contrast to drinking, unemployment risk is not diminished for all smokers. Smokers do not unanimously enjoy higher cumulative survival rate, because the gender difference in smoking is very large. Male smokers constantly had a higher survival rate during all periods as compared to male non-smokers, but female smokers always had lower survival rate than non-smokers. In Figure 4.2, the cumulative rate curve is quite different for the two genders. The survival rate of male smokers (purple line) is always above that of male non-smokers (blue line), while female smokers (pink line) always had a much lower survival rate compared to non-smokers (red line). We can infer from this descriptive survival history that while smoking men were less likely to be laid off, smoking women had much higher risk of unemployment compared to abstinent women.

To specifically test the descriptive phenomenon observed above, I used the Cox proportional hazard model to treat the hazard event (unemployment) as the dependent variable and baseline substance use status as the focal independent variables together with a series of relevant control covariates. In Table 4.3, drinking proves to be a favorable factor for employment stability. Being a drinker reduces the odds of getting laid off by a factor of 0.86. There is not a significant gender-drinking interaction, which indicates the favorable effect of drinking on social mobility exists to the same extent for both genders. Being a smoker, on the other hand, increases the odds of unemployment by a factor of 1.56. However, there is a strong gender-smoking interaction on mobility (-.56,

$p < .001$ ). With all other variables remaining constant, a male smoker's odds ratio of being laid off is 0.71 ( $1.56 * 0.57 * 0.8$ ) compared to a male non-smoker's 0.8 ( $1 * 1 * 0.8$ ), 0.71 compared with a female non-smoker's default odds of 1 ( $1 * 1 * 1$ ), and 0.71 compared with a female smoker's 1.56 ( $1.56 * 1 * 1$ ). Put into perspective, a smoking man is only 89% ( $0.71/0.8$ ) as likely to be unemployed as an abstinent man would be, and he is only half ( $0.71/1.56$ ) as likely to be unemployed as a smoking woman would be, even though smoking per se is a risk factor for unemployment. This confirms the earlier observation that smoking is a consequential behavior in the workforce but also highly patterned by gender. Male smokers had better employment stability but female smokers' employment tends to become more unstable, even after controlling for background characteristics such as income, education, urbanity, communal environment, etc.

The last column of Table 4.3 presents the same model configuration except Heckman's probability variable. In chapter 2 we have discussed that this variable is the likelihood that a person may miss the survey based on the matched characteristics with those who de facto missed it, this variable was included to control for self-selection effects that often bias the censored data in survival analyses. In Table 4.4, this variable is significantly associated with unemployment events (1.11,  $p < .001$ ), meaning that the missing data were indeed more likely to come from the people we cannot track due to unemployment. However, the two models including and excluding Heckman Correction show no difference in other aspects. The magnitude and direction of the coefficients of drinking and smoking, their interactions with gender, are extremely close in both models. This relieves the concern that the people missing from the data were dramatically different in terms of smoking and drinking effect.

The above model only generalizes how substance use as a whole affects unemployment, while we know that heavy use of substances can be qualitatively different from moderate usage. Table 4.4 presents another similar analysis but with heavy drinking and heavy smoking as focal independent variables. When restricting substance use to heavy users, drinking no longer reduces the risk of unemployment, instead, such association is not significant in either direction. Heavy smoking defined as smoking more than ten cigarettes per day still increases unemployment events, similar to the previous model but the magnitude of odds ratio is now slightly larger (.51,  $p < .01$ ). There is still a significant interaction between gender and heavy smoking, putting female smokers in a more dangerous situation but makes male smokers advantageous. Despite heavy smoking, smoking males, whose odds ratio of unemployment is  $0.67(1.66 * 0.77 * 0.53)$ , still enjoyed lower risk of unemployment compared to non-smoking females. Even compared with non-smoking men, whose odds ratio is now  $0.77(1 * 0.77 * 1)$ , heavy-smoking men enjoyed a premium of occupational stability.

The previous model uses baseline substance use information in 1991, and thus could not test the impact of time-varying substance use. It is possible for drinkers to quit drinking, and smokers to quit smoking, and their subsequent abstinence will have a different impact on employment stability. So far we have proven that even substance use dated far back to 1991 had a lingering impact on cumulative rate of unemployment over two decades, we do not know whether substance use measured at each time period has similar impact on unemployment. Furthermore, it is still methodologically insufficient to simply have a series of time varying variables, because a significant association between substance use in 1995 and unemployment in 1995 does not distinguish causal order of

this relationship. It is well possible that unemployment causes drinking while drinking also affects unemployment. Therefore, I treated the time-varying substance use variables with a one-unit time lag. By doing this—predicting unemployment at time  $t$  with substance use at time  $t-1$ —the causal order can be more confidently assessed.

Table 4.5 presents how time-lagged drinking status (any use versus heavy use) affects subsequent unemployment hazards estimated by the Cox model. Drinking in general, once again, leads to lower hazards of experiencing an unemployment event ( $-.08$ ,  $p < .001$ ) after controlling for baseline income, gender, education, and communal factors. Translating into an odds ratio, a drinker is only 92% as likely to experience unemployment as a non-drinker. The risk for a male to be laid off at any time is almost only a third as for a female ( $OR = .34$ ,  $p < .001$ ). Han majority Chinese are more likely to be laid off than minorities ( $.32$ ,  $p < .001$ ), people living in rural areas are safer than urban residents ( $-.09$ ,  $p < .05$ ), and people living in a caring community as measured by mutual childcare also have lower risk of unemployment ( $-.12$ ,  $p < .05$ ). Unsurprisingly, baseline education and income also reduce the risk of unemployment. These estimates were not very different with or without the presence of Heckman's Correction, suggesting the model is very unlikely biased by missing information. When the focal variable changes to heavy drinking, we fail to find a significant time-order effect of heavy drinking on unemployment, implicitly suggesting that the heavy users of alcohol may be substantially different from regular users in the workforce. In other words, moderate drinkers enjoyed an advantage in employment stability, but heavy drinking did not yield such benefit.

The same modeling conducted for time-lagged smoking status in Table 4.6 does not show any significant effects of smoking on unemployment, although the direction of



the effects of other variables remain similar to that in Table 4.5. Any use of tobacco has a negative but non-significant association with unemployment, while heavy usage has a positive but non-significant association. We can conclude that time-lagged drinking is a protective act against unemployment but time-lagged smoking is not specifically associated with unemployment after controlling for covariates. Selection effect by attrition does not constitute a major bias, given the close resemblance between models with and without Heckman's correction.

#### **4.6 Summary**

This study sets out to ask how substance use affects subsequent employment stability in contemporary post-Reform China between 1991 and 2011. The two most common licit forms of substances, alcohol and tobacco, are widely consumed and circulated among different sectors of the population and the market. In the literature of Health Economics and Sociology of Health, contrasting theories and observations exist on the effects of substance use on productive performance. On one hand, some consider that consuming substances can potentially lead to addiction and irreversible neurological damages in the long run. Established addictive behaviors interfere with decision making, forcing individuals to choose immediate gratification and short-term reward over continuing investment in career and productivity (Agrawal et al., 2011; Sher et al., 2010). Substance use is often an integrative component of certain non-conforming subcultures, and people learn and reinforce the use of substances via participating at least partially in these subcultures. Even when they do not belong to any concrete organization, the cultural affinity can be shared by repeated observation and internalization of significant symbols that transmit subterranean values (Fine & Kleinman, 1979; Young, 1971).

Therefore, the acculturation into a rebellious and hedonistic cultural system can be another factor behind substance users' potential incapacity for employment stability.

However, other scholars contend that using substances may improve employment stability because substances are often used to socialize rather than for solo recreation. People consume alcoholic beverages and cigarettes in daily life for a variety of social functions that cannot be reduced to physiological phenomena. People drink to obtain their social networking opportunities, exchange cigarettes to gain symbolic solidarity with formerly distant others, or perform a set of drinking and smoking etiquettes to strengthen existing social and symbolic hierarchy and the benefits thereof (Collins, 2014; Dikötter et al., 2002). Many have shown that drinkers and smokers tend to have larger social networks than the abstinent people (Lye & Hirschberg, 2010; Bethany L Peters & Stringham, 2006; Srivastava, 2013). For the exact reason because of which social capital and networks are extremely important for job searching and employment stability, substance use may improve employment stability. In contemporary China, exchanging expensive alcoholic and tobacco products as gifts is also an unsuspecting way of bribery between hierarchical superiors and subordinates, an ice breaker between strangers, and a desirable form of showing hospitality between kin (A. Chu, Jiang, & Glantz, 2011; Zachary C Rich, Hu, & Xiao, 2014; Z.C. Rich & Xiao, 2011; Yan, 1996). In this study, we have demonstrated through a series of survival analyses that alcohol drinking in baseline year 1991 reduces the hazards of unemployment in the long run, and this protective effect works for both men and women alike since there is not a gender-drinking interaction. Rerunning the model using fixed-effects by taking time-lagged difference on the dependent variable also showed similar effect: drinking at precedent

wave reduces unemployment risk at subsequent wave. We can conclude that drinking is actually a protective factor against unemployment for men and women alike, even after considering demographic and neighborhood characteristics.

Nevertheless, smoking in baseline year was not a significant factor associated with subsequent unemployment hazards. This is largely due to a strong gender pattern which has confounded the uniform effect of smoking on employment stability. Scholars have intensively argued for the importance of gender in determining the extent to which a behavior is accepted as normal in a society. As many other behaviors, substance use carries considerably different symbolic meanings for the two different genders. Substances can be utilized by some females as an expression of independence and non-conformity to patriarchy, while for others it negotiates identity and the boundary between the private and the public (Campbell, 2000; Eriksen, 1999). Unlike female drinking, smoking is even less common among women, and is often negatively labeled in contemporary Chinese society. Although smoking is sometimes considered as a symbol of greater independence under the influence of the second-wave feminism (Elkind, 1985; Gilbert, 2007), contemporary China has witnessed a return to traditional gender definitions after the socialist mandate of equality was practically terminated in every sphere (Yang Cao & Hu, 2007; W. Zheng, 2005). Therefore, it is natural to expect under such prevailing conditions that there may be two different norms governing how men and women should use tobacco: while it provides employment benefits to males, such advantage does not exist for females, whose smoking instead is penalized in terms of employment stability. In this study, we have shown that smoking possesses different roles in the workforce between men and women: while smoking in baseline year is associated

with subsequent unemployment hazards, there is a strong gender-smoking interaction that divides its impact between men and women. When men smoke, and even smoke heavily, they still enjoy lower odds of unemployment compared to non-smokers of both genders. But when women smoke, the odds of unemployment is greatly elevated—two-fold higher risk compared to smoking men.

At the same time, it is essential to distinguish general substance use and heavy substance use. While substances may reward the users with more socializing opportunities to accumulate their social capital, in which case the usage is rationally and socially motivated, the marginal return of benefits by smoking and drinking, as well as many other behaviors, gradually decreases as the behaviors become more frequent and will start to be negative after reaching an equilibrium where costs surpass benefits (G. S. Becker, 1976). For heavy users of alcohol and tobacco, or those who are clinically addicted, their consumption easily leads to the side of negative return. Other than rational choice and cost/benefit theory, a wealth of literature in the sociological study on stigma and discrimination also suggests a distinctive status of heavy substance users in the population. Because deviance is socially constructed by one group of people to set apart another group who supposedly infract rules and transgress the boundaries of purity, the deviant individuals are attached to labels denoting their outstanding status, which adversely affects the ways they will be perceived and received in a variety of settings (Akers, 1996; Howard S. Becker, 1953; Howard S Becker, 1963; Kleinman & Hall-Clifford, 2009). The boundary separating normative use and heavy use of tobacco and alcohol is very fluid and flexible, especially in an era of medicalization, and the sometimes arbitrary labeling of pathological behaviors carries dramatic impact on the

stigmatized individuals. Many scholars have found that the stigmatized status of smoking that emerged in the global anti-tobacco campaign has isolated hard-core smokers from socializing with others and seeking professional assistance (Bayer & Stuber, 2005; Poland, 1998; Room, 2005; Warner, 2009). The inimical portrayal of heavy smokers and drinkers can also deprive them of normal channels in the workforce. Previous scholarship has demonstrated the lack of wage and employment premium for heavy drinkers and smokers (Bethany L Peters & Stringham, 2006; Skog, 1980; Srivastava, 2013).

These theories are important ones to explain the phenomenon found in the current study. While drinking in baseline year reduces subsequent likelihood of unemployment, such a suppressive effect does not exist for heavy drinking. While baseline substance use status captures a static image of substance using pattern at population level, people could stop or start drinking and smoking at any time in their life. It is possible that heavy drinking's effect is more detectable, therefore we have also used time-lagged measurement for heavy drinking. Nevertheless, the beneficial impact of general drinking on employment stability in the next wave still does not hold true for heavy drinkers. We conclude that while smoking is patterned primarily by gender, drinking has distinctively different effects on employment based on the intensity of the usage. Overall, smoking, whether in general or heavy form, helps men with employment stability but damages that for women; drinking, on the other hand, reduces unemployment hazards only when measured in general form but not as heavy usage, and does so for both genders.

Considering these effects of substance use in the workforce, sometimes the simple strategies deployed by health education initiatives can be futile to combat prevalent smoking and drinking phenomena in China. In fact, many do not drink or smoke for

recreational purposes but out of obligation. One's employment prospect may be compromised if without drinking and smoking, especially for men. At the same time, creating comprehensive regulation on tobacco and alcohol, especially through stigmatizing users' social image, may bring about a paradoxical situation for the users, who now face double pressure from the workplace's substance use culture and from the public efforts to counter this norm. It is possible, after many years of strong implementation of health policies, that the remaining drinkers and smokers will be those without negotiation power in the workplace, while those in higher positions within the hierarchy will have more freedom to renounce drinking or smoking for social purposes.

## 4.7 Tables and Figures

Table 4.1 Survival Rate by Baseline Drinking Status and Gender

Time event period	# at risk	# event	Cumulative survival rate	95% C.I.
female abstinent				
1	6167	738	.88	.87-.89
2	5429	1303	.67	.66-.68
3	4050	783	.54	.53-.55
4	2956	1190	.32	.31-.25
5	1591	395	.24	.23-.25
6	983	226	.19	.18-.20
female drinkers				
1	620	95	.85	.82-.88
2	524	159	.59	.55-.63
3	355	48	.51	.47-.55
4	285	85	.36	.32-.40
5	184	29	.30	.26-.34
6	141	25	.25	.21-.29
Male abstinent				
1	3807	250	.93	.93-.94
2	3557	604	.78	.76-.79
3	2893	388	.67	.66-.69
4	2289	826	.43	.41-.45
5	1309	295	.33	.32-.35
6	773	130	.28	.26-.29
Male drinkers				
1	3244	269	.92	.91-.93
2	2975	576	.74	.73-.76
3	2363	258	.66	.64-.68

Table 4.1 continued

4	1957	412	.52	.50-.54
5	1372	169	.46	.44-.47
6	1051	181	.38	.36-.40

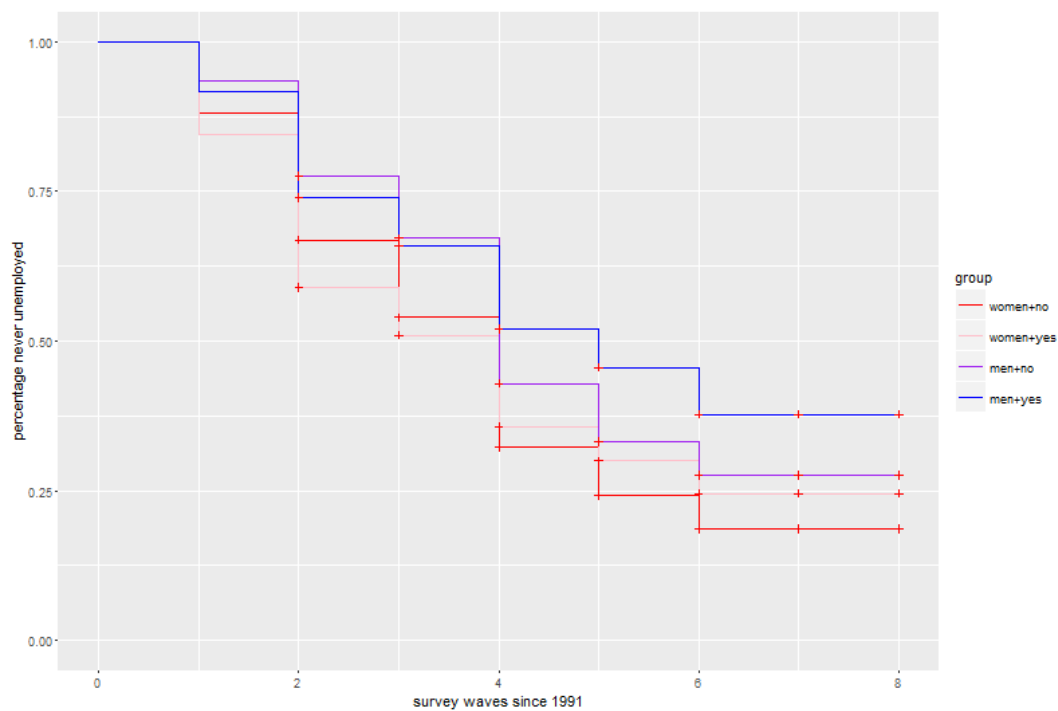


Figure 4.1 Survival Curve by Drinking Status and Gender

Table 4.2 Survival Rate by Baseline Smoking Status and Gender

Time-event period	# at risk	# event	Cumulative survival rate	95% C.I.
female abstinent				
1	4660	725	.84	.83-.86
2	3935	1107	.61	.59-.62



Table 4.2 continued

3	2764	552	.49	.47-.50
4	2028	618	.34	.32-.35
5	1285	224	.28	.27-.29
6	924	168	.23	.22-.24
female smokers				
1	112	26	.77	.69-.85
2	85	34	.34	.26-.44
3	48	12	.34	.36-.44
4	36	17	.18	.12-.27
5	19	2	.16	.10-.24
6	14	6	.09	.05-.17
Male abstinent				
1	1724	184	.89	.88-.91
2	1540	335	.70	.68-.72
3	1178	163	.60	.58-.63
4	928	248	.44	.42-.47
5	613	.72	.39	.37-.41
6	458	68	.33	.31-.37
Male smokers				
1	2843	280	.90	.89-.91
2	2563	524	.72	.70-.73
3	1997	229	.64	.70-.73
4	1639	318	.51	.49-.53
5	1175	151	.45	.43-.47
6	912	141	.38	.36-.40

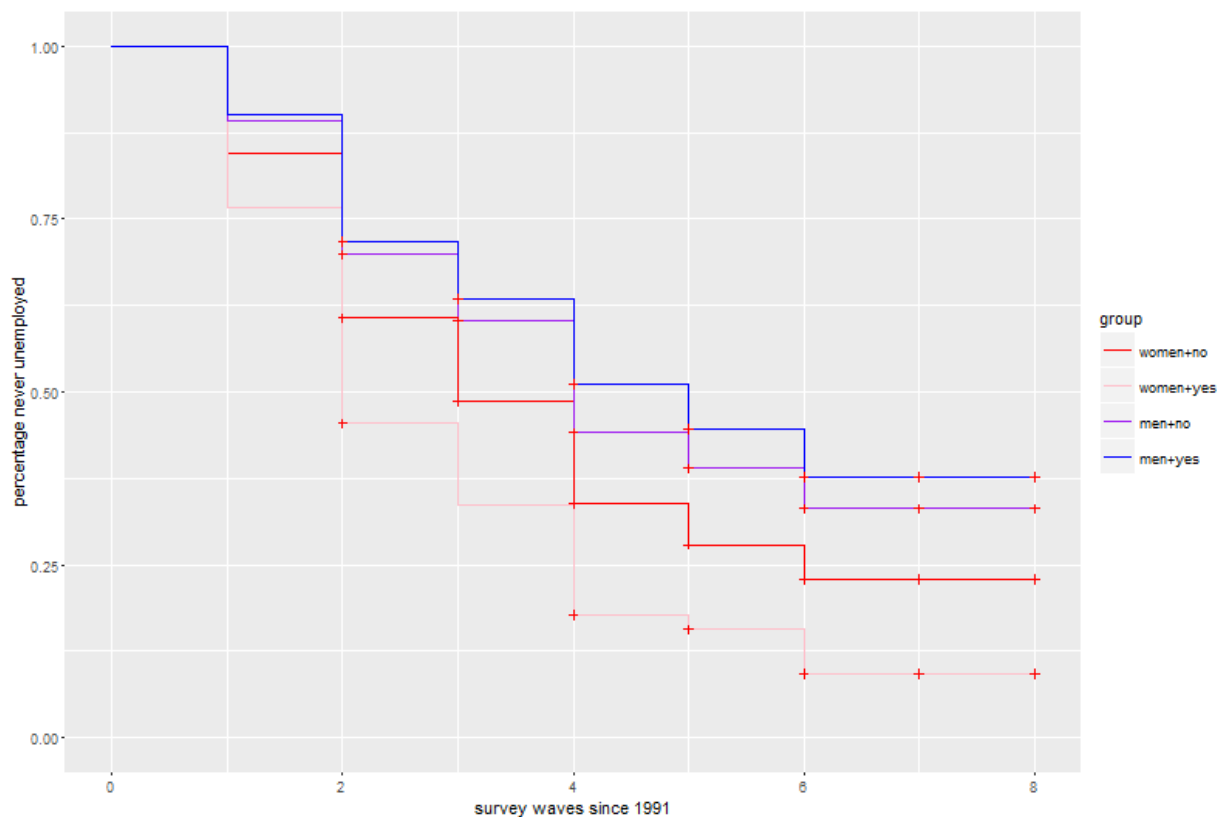


Figure 4.2 Survival Curve by Smoking Status and Gender

Table 4.3 Cox Proportional Hazards Model of Unemployment Based on Time-Invariant Baseline Substance Use

	Coefficients	Hazard Odds Ratio	95% C.I. of Hazard	Coefficients w/o Heckman's adjustment
Drinking	-.15*	.86	.77-.97	-.15*
Smoking	.47***	1.56	1.29-1.98	.45***
Male	-.23***	.80	.73-.87	-.26***
Income	-.01	.99	.96-1.02	.004
Han	.09	1.09	.99-1.20	-.06
Education	-.07***	.93	.91-.96	-.03

Table 4.3 continued

Rural residency	-.17***	.84	.78-.90	-.24***
Communal childcare	-.01	.99	.88-1.11	.10
Ethnic diversity	-.13	.87	.73-1.05	-.03
Drinking X male	.07	1.08	.93-1.25	.06
Smoking X male	-.56***	.57	.45-.72	-.56***
Heckman's Correction	1.11***	3.03	2.41-3.81	-
R2	.05			.04

Symbols of significance test: \*p<.05, \*\*p<.01, \*\*\*p<.001

Table 4.4 Cox Proportional Hazards Model of Unemployment Based on Time-Invariant Baseline Heavy Substance Use

	Coefficients	Hazard Odds Ratio	95% C.I. of Hazard	Coefficients w/o Heckman's adjustment
Heavy drinking	.13	1.14	.85-1.53	.11
Heavy smoking	.51**	1.66	1.19-2.32	.51**
Male	-.26***	.77	.72-.82	-.30***
Income	-.01	.98	.96-1.01	.01
Han	.10*	1.11	1.01-1.21	-.05
Education	-.07***	.93	.91-.96	-.03*
Rural residency	-.16***	.85	.79-.91	-.23***
Communal childcare	-.01	.99	.88-1.11	.11
Ethnic diversity	-.12	.88	.74-1.06	-.02
Drinking X male	-.09	.91	.66-1.26	-.08

Table 4.4 continued

Smoking X male	-.64***	.53	.37-.75	-.65***
Heckman's Correction	1.11***	3.03	2.41-3.81	
R2	.04			.03

Table 4.5 Cox Proportional Hazards Model of Unemployment Based on Time-Variant Drinking Status of One Wave Lag ( $X_{t-1}$ )

	Coefficients	Hazard Odds Ratio	95% C.I. of Hazard	Coefficients w/o Heckman's adjustment	Coefficients	Hazard OR	95% CI of Hazard	Coeff. w/o Heckman's adjustment
<b>Any drinking</b>	-.08*	.92	.85-.99	-.10**				
<b>Heavy drinking</b>					-.04	.96	.87-1.07	-.05
Male	-.18***	.34	.79-.89	-.20***	-.20***	.82	.77-.86	-.23***
Income	-.03*	.97	.94-.99	-.02	-.03*	.97	.94-.99	-.03
Han	.32***	1.38	1.25-1.51	.20***	.33***	1.39	1.26-1.53	.21***
Education	-.05***	.95	.93-.98	-.02	-.05***	.95	.92-.97	-.03*
Rural residency	-.09*	.92	.86-.98	-.14***	-.08*	.92	.86-.98	-.14***
Communal childcare	-.12*	.88	.79-.99	-.02	-.12*	.88	.79-.99	-.02
Ethnic diversity	.09	1.09	.92-1.29	.14	.09	1.09	.92-1.30	.14
Heckman's Correction	.83***	2.29	1.83-2.86		.84***	2.32	1.86-2.90	
R2	.04			.03	.04			.03
N	46,284							

Symbols of significance test: \*p<.05, \*\*p<.01, \*\*\*p<.001

Table 4.6 Cox Proportional Hazards Model of Unemployment Based on Time-Variant Smoking Status of One Wave Lag ( $X_{t-1}$ )

	Coefficients	Hazard Odds Ratio	95% C.I. of Hazard	Coefficients w/o Heckman's adjustment	Coefficients	Hazard Odds Ratio	95% C.I. of Hazard	Coefficients w/o Heckman's adjustment
<b>Any smoking</b>	-0.02	.99	.89-1.11	-0.02				
<b>Heavy smoking</b>					.03	1.03	.92-1.15	.02
Male	-.25***	.78	.70-.86	-.28***	-.26***	.77	.70-.84	-.30***
Income	-.03	.97	.93-1.01	-.02	-.03	.97	.93-1.0	-.02
Han	.39***	1.48	1.29-1.70	.27***	.39***	1.48	1.29-1.70	.27***
Education	-.07***	.94	.90-.97	-.04*	-.07***	.93	.90-.97	-.04*
Rural residency	-.15***	.86	.78-.94	-.21***	-.15***	.86	.78-.93	-.21***
Communal childcare	-.06	.94	.81-1.09	.03	-.06	.94	.81-1.09	.03
Ethnic diversity	.12	1.13	.89-1.43	.19	.12	1.12	.88-1.43	.19
Heckman's Correction	.98***	2.65	1.89-3.72		.98***	2.66	1.89-3.73	
R2	.05			.04	.05			.04
N	28,251							

Symbols of significance test: \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

## **CHAPTER 5 SOCIAL MOBILITY AND SUBSTANCE USE: HOW ADVANCEMENT IN CLASS LEADS TO SMOKING AND DRINKING IN CHINA**

### **5.1 Introduction**

Sociologists in the subfields of health and inequalities, public health professionals as well as health care workers are all interested in uncovering the extent to which changes in one's social and economic position affect substance use behaviors, to which the harms of many chronic and acute illnesses are attributed. In a rapidly changing society, social mobility is not merely an issue concerning the macro structure in economic and social stratification; it also closely relates to a variety of human behaviors and well-being types (P. M. Blau, 1956; Breen & Hayes, 1996; P. Clifford & A. F. Heath, 1993; Hout & Goldstein, 1994; Sorokin, 1959; Van der Slik, De Graaf, & Gerris, 2002). Especially since the late modernity, the fluid nature of constant social transition renders the force of change extremely powerful and realistic for individuals.

The experiences of transition and involvement in mobility, either upward or downward, are only becoming stronger for people in post-socialist countries like China. In twenty years, China went from having 90% of its population working or living in the agricultural sector, to less than 50% by the year 2014. Between 1995 and 2000, after the privatization and market reform of state-owned enterprises, close to 30 million industry workers were laid off in a series of institutional restructuring efforts (Yuanzheng Cao et

al., 1999). At the same time, a smaller sector of the population became increasingly wealthy to the extent that they account for more than 20% of global luxury goods sales, and half of the luxury market growth (A. Kim, Remy, & Schmidt, 2014). While some scholars have investigated the effects of increased social mobility during this period primarily on economic and educational attainment (Bian & Ang, 1997; Yang Cao & Hu, 2007; Cheng & Selden, 1994), and some have discussed the structural trend of social mobility that links pre-Reform era to its current status (X. Wu & Treiman, 2007; X. Zhou, Tuma, & Moen, 1996), few have taken the path to health behaviors, and to our knowledge, none has looked into how social mobility during China's post-Reform era has affected substance use behaviors.

Filling the gap of such research is not the sole motivation behind this study. More importantly, we have also realized the existence of certain paradoxical conditions that may challenge our traditional knowledge in the substance use literature, specifically, the kind linking substance use to lower socioeconomic status and downward (or supposedly stressful) mobility in social strata. First, smoking and drinking do not necessarily concentrate in lower social strata, which is the case for studies across many different national contexts (Auld, 2005; Hamilton & Hamilton, 1997; Lye & Hirschberg, 2010; B. Wu et al., 2008). The issue is more complicated in China, because social smoking and ritual drinking are common phenomena permeating the high-income and prominent-status social circles (Benedict, 2011; Dikötter et al., 2002; Z.C. Rich & Xiao, 2011). Second, existing studies have not been able to differentiate the independent effects of assimilation and mobility, namely, whether social mobility's impact on substance use is a result of undergoing mobile events *per se* or one that is caused by structural assimilation

of movers into their destination class (Goldthorpe, 2005; Hendrickx et al., 1993; Sobel, 1981). This is a question that used to puzzle scholars in similar studies on political attitudes, fertility or psychological stress, but has not been addressed for the substance use scholarship. Third, unlike some other behaviors, substance use's contingency on social class and mobility is further complicated by affordability from the demand side. Extensive evidence now shows that monetary costs in the forms of taxation, income, and pricing will influence how people consume alcohol and tobacco (Srivastava, 2013; Wakefield & Chaloupka, 2000). With considerable betterment in living standards and wealth accumulation in Chinese society, it is essential to part mobility effects from income effects. In this study, we have employed Diagonal Reference Modeling (Dref) on a twenty-year panel data, China Health and Nutrition Survey (CHNS), to overcome these substantive problems.

## **5.2 Literature Review**

### *5.2.1 Assimilation in Social Mobility*

In the tradition of social mobility scholarship, Blau first made the theoretical case that the heterogeneous composition of a population can make movers similar to their peers in the destination class simply because of a structural shift of the population. Movers have to adopt the destination class' attitudes and behaviors out of the need of conformity, social bonds, or secured prestige (P. Blau, 1977; P. M. Blau, 1956). The relationship between social class and measurable outcomes is not simply a result of mobility but is rather seen as the "outcome of a process of status attainment" (Goldthorpe, 2005). The similar perspective was termed acculturation or assimilation into



destination effects and was brought into practice thanks to continuing advancement in the decomposition techniques of log-linear models (Hendrickx et al., 1993; Sobel, 1981; Turner & Firth, 2007b). The empirical studies employing this strategy have investigated the effects of social mobility and assimilation on fertility, political attitudes, and mental stress (P. Clifford & A. F. Heath, 1993; Houle & Martin, 2011; Hout & Goldstein, 1994; Sobel, 1981). But there is no reason to doubt that the same pattern also exists in substance use, since substance use is much a class-based health and deviant behavior.

Although substance use, even in its licit forms, is often discussed in light of deviance and the harmful effects on health and behaviors, scholars are well aware of the fact that substance use does not necessarily concentrate among the underprivileged groups. The perception that substance use is associated with poor social and economic performance is very likely distorted because policing strategies, policy makers, and media more frequently attend to the underclass (Campbell, 2000; Chalfin & McCrary, in press; A. Stevens, 2009, 2010; Stuntz, 1998). Meanwhile, new techniques for testing the chemical components in sewage systems ironically show that a similar quantity of substance residues sometimes exist in both rich and poor neighborhoods' wastewaters (Frost, Griffiths, & Fanelli, 2008). China has a long tradition of class-based substance use. Opium first attained prestigious fame in the imperial court, was widely used among literati and mandarins long before it earned stigma from consumption among the lower classes (Y. Zheng, 2005). Alcohol and tobacco also had a prominent history of serving positively received social functions in China. They were served in religious ceremonies (Y. Du, 2000), as medicament (Benedict, 2011), and for boosting group solidarity (Dikötter et al., 2002).

In contemporary China, alcohol and tobacco are heavily used across social classes. A set of rituals and etiquettes of smoking and drinking has been developed to signify one's social standing and a symbolic order of hierarchy. The existing literature has also documented a great amount of evidence showing that both drinking alcohol and smoking tobacco are routinely and normatively used by contemporary Chinese to improve their social capital and help with socializing events (Cochrane et al., 2003; S. Ma et al., 2008; X. Y. Yang, Kelly, et al., 2014; J. Y. Zhang et al., 2012). If people intend to move to an upper class, their behaviors need to be similar with the destination class rather than their origin class. Even if they do not intentionally change behavioral patterns, they may still be influenced after the movement even has occurred. This so-termed assimilation effect, constitutes a very important part of mechanisms in the mobility process (Goldthorpe, 2005). In our context, subjected to the mounting need for drinking and smoking in business culture and among the officialdom (Dikötter et al., 2002; Hao et al., 2005; Z.C. Rich & Xiao, 2011). Consequently, previously abstinent people may start to drink and smoke once they move upward to the higher social ladder, if such a practice prevails and the occupants of higher social classes were already largely smokers and drinkers.

On the other hand, heavy substance use carries substantially different connotations than general drinking and smoking. While people may be subject to the need for substance to participate in social events, there is little reason they should be dependent on substances. The social function of substances requires certain levels of consumption, but surpassing the normative expectation of such levels may elicit stigma, as well as physically and mentally harm one's health (Howard S Becker, 1963; Room,

2005). The negative results of stigma and worse health will surpass the rewards of social drinking and smoking once consumption gets heavy, and this situation should be naturally avoided by social aspirants. Thus, the assimilation effect may not hold similarly true for upward movers' heavy drinking and smoking behaviors. This leads to our first hypothesis:

*H1: Upwardly mobile people's overall drinking and smoking behaviors will resemble those in their destination social class more than their origin class. But, (H1.1) upwardly mobile people's heavy drinking and smoking will resemble those in their origin social class more than their destination class.*

### 5.2.2 *Independent Mobility Effect*

While socially mobile individuals are often fundamentally transformed in their behaviors by assimilation and the influence of their destination class, a social mobility event in itself can have an independent and significantly different effect from assimilation. The process by which life events and transition cause stress and lead to observable adaptive responses has been well formulated in the social psychology scholarship. Social mobility in itself can put individuals in an unfamiliar environment, forcing adaptation to new rules, behavioral modes, and cultural norms (Sorokin, 1959). In order to build up new interpersonal connections, new comers often need to forgo previous relationships in exchange for recognition (P. M. Blau, 1956). Clifford and Heath (1993) have similarly demonstrated two sources of class-based voting behaviors among demoted individuals, which separated class ideologies from the demotion process *per se*.

A vast wealth of literature is devoted to uncovering the impact of mobility on health and substance use behaviors. Scholars have shown that moving into farming or

manual occupations increases mental stress (Houle & Martin, 2011). Downward mobility or non-mobility, according to some studies, is associated with more drinking (Hart, Smith, Upton, & Watt, 2009), smoking (Ribet et al., 2003), and cardiovascular diseases (Hart, Davey Smith, & Blane, 1998). Migration processes, both geographically mobile and socially mobile, prove to be a substantial factor for a variety of social and behavioral outcomes including substance use (Elder et al., 2000; T. Yang et al., 2009), health risk behaviors (Muñoz-Laboy, Hirsch, & Quispe-Lazaro, 2009; X. Y. Yang, Kelly, & Yang, 2015), and stress (Farley, Galves, Dickinson, & Perez, 2005). Even when one's socioeconomic standing has considerably improved, subjugation in a new symbolic and cultural order may still thwart self-esteem (Pajo, 2008). This string of literature implies an increase in substance use when one moves vertically in the social ladder.

Most studies on mobility's effect on substance use, including many mentioned above, adopted an approach to the movement event or magnitude of mobility without accounting for the assimilation process that simultaneously takes place. The independent contribution of mobility is therefore confounded by the structural assimilation into destination groups (Hendrickx et al., 1993; Sobel, 1981): people may drink more only because the average drinking level in their new class is higher, not because of the mobility-induced stress or any other byproducts. At the same time, social substance use may persist and later also become a means to deal with stress, thus blurring the boundary between social use (part of the assimilation effect) and addictive use (Mimi Nichter, 2015). We expected to see a higher level of substance use among higher class Chinese, and hypothesized (above) that upwardly mobile people to resemble their new peers in smoking and drinking behaviors. The rest of the effects of social mobility can then be

attributed to the independent mobility factor – i.e. the act of moving. With higher levels of stress and adaptive responses during social mobile events, people may use more substances as a relief:

*H2: After accounting for the relative importance of origin and destination class's assimilation, a positive increase in social mobility will be associated with more drinking and smoking, and also (H2.1) with higher prevalence of heavy smoking and heavy drinking.*

### 5.2.3 Purchase Power and Income Effect

Previous studies on substance use and mobility have largely marginalized the impact of income on substance use, owing to a tradition that regards substance use as impulsive and addictive, which infers a lesser role of the rational use of monetary resources. However, scholars now understand that public policies aiming at influencing population-level substance use, especially licit substance use, can utilize insights from taxation, income effect, and other monetary measures. For example, taxation on tobacco products proves to be an effective measure to advocate against smoking (Wakefield & Chaloupka, 2000).

Behind these policies lies a simple logic: disposable wealth is a scarce resource ready to be rationally allocated into a diverse pool of expenditures. When people have more money, given that their basic living is satisfied, they will spend more in social and recreational activities, which easily includes substance use (H. Wang et al., 2006; Xin et al., 2009). On the other hand, when disposable wealth decreases due to taxation, higher medical insurance premiums, or fines, which are often imposed on smokers and drinkers, they may consume less such substances. There is a curved but apparent relationship

between alcohol consumption and household income (Auld, 2005; Srivastava, 2013). With other things being equal, it is likely for smokers and drinkers to increase consumption when their disposable income surges, and to decrease it when disposable income plunges (Buchmueller & Zuvekas, 1998; Srivastava, 2013). Such income effects will potentially confound the extent to which social mobility across classes affects substance use, because an increase in social class by the standard of prestige or occupational category will almost always leads to considerable changes in income (Wright & Perrone, 1977). In this study, we test whether there is an independent and different income effect by exploring the interaction between mobility and change in income in hypothesis three:

*H3: after accounting for the relative importance of assimilation, a positive increase in income is associated with higher level of smoking and drinking, but (H3.1) with lower prevalence of heavy smoking and drinking.*

### **5.3 Methodologies**

#### *5.3.1 Sample*

This study uses a collected panel dataset, China Health and Nutrition Survey (CHNS), a continuing collaborative project conducted by multiple institutions between China and the United States since 1989, including University of North Carolina Population Center and the Chinese Ministry of Public Health. The survey uses multi-stage random cluster sampling to cover nine provinces of China. Counties of the nine provinces were stratified by income to yield four counties from each provinces. Since the first wave in 1989 with individual, household and community survey, subsequently

additional panels were collected respectively in 1991, 1993, 1997, 2000, 2004, 2006, 2009, and 2011. We have adopted wave 1991, the first wave when substance use information was collected, and wave 2011 to construct social mobility in occupational classes.

### 5.3.2 *Measurement*

#### 5.3.2.1 Class and Prestige

Most existing studies on social mobility and substance use are found in Health Economics, where mobility is measured as the changing levels of wages or wealth. Others divide individuals into simplified nominal categories such as upper class, middle class, and lower class. But the economic approach to measuring social class is extremely limited by its blindness to the fact that wealth is not an essence but a mere reflection of inter-class relationships (Wright & Perrone, 1977). Few to none have employed systematic sociological classification of social status, in which both means of production and prestige are emphasized.

As in most post-socialist countries, China's Marxist classification of classes does not only have long lasting impact on everyone's sense of belonging and economic position, such classification also was the basis of an encompassing welfare system. Therefore, I have categorized social classes based on whether one owns at least partially the unit where s/he works at and one's labor relationship (being employed, independent, or employing others). From a variety of occupations, five classes were constructed by this criteria: the unemployed, workers, the self-employed, owners, farmers, and the retired. A prestige score assigned to each category was constructed on the basis of Li's study on

Chinese occupational prestige and economic status (C. Li, 2005). This codification derived from an empirical verification of occupational prestige rankings among mainland Chinese in the 2000s, in which the typical unemployed have prestige score of 25, workers have 60, self-employed have 55, owners have 75, farmers have 32, and the retired were assigned the average of 49. Based on this codification, upward mobility refers to a standard deviation increase (+15) in class prestige, and downward mobility refers to a standard deviation reduction (-15) in class prestige. Absolute change in class prestige will then be used as an independent variable measuring social mobility effect, in addition to assimilation effects (Hendrickx et al., 1993). Each group's average income was measured in contemporary Yuan and was normalized by logarithm.

#### 5.3.2.2 Measuring Substance Use

We use two types of variable for substance use: the number of cigarettes smoked in 2011 and drinking level in 2011, when the last survey wave was collected; the absolute difference between the said substance use measures in 1991 and in 2011, e.g., subtracting cigarette quantity in 2011 by cigarette quantity in 1991. The first form of measurement allows us to test how social mobility and substance use's end-outcome were related. The second type of measurement, however, is often used in a fixed-effects model to take out the unobserved individual effects by analyzing only the within-person differences—metaphorically, comparing someone against himself. Taking the first-difference between time points solves the problem of omitted within-individual information, it also helps scholars deal with temporal auto-correlation (Firebaugh, 2008; Raudenbush & Bryk, 2002). By using both types of substance use measures, we can be more confident about the true effects of social mobility on substance use, and vice versa. Heavy smoking and



drinking status was assigned to smokers consuming more than 10 cigarettes per day and drinkers consuming alcoholic beverages every day.

### 5.3.3 Analytical Approach

Scholars with interests in social mobility had long tried to separate two different mechanisms in a directional movement: that caused by mobility itself and that by assimilation. It is possible to see behavioral changes because the movement per se is stress-inducing, or simply because people resemble the peers in the destination group at which they arrive. Sociologists have solved this issue by using a variety of methods developed for tabulated social class categories (Goldthorpe, 2005), including diagonal reference modeling, which we employ in this study (Hendrickx et al., 1993). This method widely used today for decomposing social mobility effects allows for two separate types of parameters: a weighting matrix for the effects of class categories, and vectors of covariates. The weight matrix has a different scale for row and column marginal values, thus telling readers whether original or destination class has stronger impact on the dependent variable. Researchers can also incorporate covariates as needed to control for extraneous influences, and test the effect of absolute mobility such as the change of prestige between original and destination classes, the change of typical income levels, etc.

Its basic form is:

$$\hat{\mu}_{ij} = \mu + p v_o + (1 - p) v_d$$

where, the effect of origin class  $v_o$  is complementary to the effect of destination class  $v_d$  on a same scale, since they are weighted by a common factor of  $p$ , which lies within an

interval of 0-1. Weighting factor  $p$  can be expressed as  $\frac{e^{\delta_k}}{e^{\delta_k} + e^{\delta_{k+1}}}$ , where  $\delta_k$  is the overall marginal effects of  $k$  types of movement. This will allow different effects for upward movement and downward movement, (see (Peter Clifford & Anthony Francis Heath, 1993; Turner & Firth, 2007a). This configuration is adopted because we want to know whether the influence of recent social class is more important than the original one, meanwhile considering how important is the change per se (which can be added to this formula as a covariate). For more discussion on its technical development, see (Hendrickx et al., 1993; Turner & Firth, 2007a, 2007b).

Realization of the statistical analyses described above were conducted with the “gnm” package of R (Turner & Firth, 2007b).

## 5.4 Results

### 5.4.1 Contingency Tables of Substance Use and Social Class Between 1991 and 2011

Before analyzing the effect of social mobility on substance use, we should first understand how substance use changed with social class at two distal time points. We can find such information in two-way contingency Table 5.1. The marginal count for columns shows that the owner class has the highest level of smoking in 2011 (9.01), followed by the self-employed class (7.10) and then by workers (6.19). Unemployed people smoke even less than farmers (3.34 < 4.34), while retired people smoke also minimally (3.49). Row marginal counts tell a similar story in year 1991 that owners smoked the most, followed by workers and the self-employed, although farmers smoked more than the unemployed in that year. Recall the prestige scores mentioned earlier, owners have the highest prestige in China, followed orderly by workers, the self-employed, retired people,

farmers, and the unemployed. While the retired may smoke less due to seniority and health concerns, the descriptive table here suggests a close relationship between the prestige of one's social class and smoking. The picture of social class and drinking in 2011 is largely the same with that of smoking: owners drink the most, followed in descending order by workers, the self-employed, farmers, the unemployed, and retired people.

While Table 5.1's contingency table summarizes the group-averages of smoking and drinking in 2011, Table 5.2 shows the temporal changes of both behaviors from 1991 to 2011, and thus accounts for the possibility that some people smoke or drink more in 2011 only because they started off at a higher level or due to any omitted unknown personal characteristics. This two-way table helps visualize how changes (or immobility) of social class are distributed in terms of substance use. For example, all unemployed people had decreased smoking by 2.24 cigarettes in 2011, no matter what their previous class was. But for unemployed people who later became farmers in 2011, they have reduced smoking by 3.2 cigarettes, while unemployed people who became self-employed in 2011 increased it by 3 cigarettes. Retired people and farmers in 2011 also respectively cut back 2.53 and 1.52 cigarettes on average, no matter what their previous class was.

Temporal relative changes in drinking between 1991 and 2011 show a similar picture as smoking, as confirmed by information in Table 5.2's lower part. In 2011, only the retired and unemployed people have reduced drinking levels, while others have all increased drinking, among whom owners, workers, and the self-employed stand out highest again. The increase of smoking and drinking over twenty years among these three classes is especially enormous considering that the overall change among all populations

is  $-.67$  for smoking and only  $.07$  for drinking. When an unemployed person returned to the workforce by becoming a worker, his or her drinking level would increase by  $0.25$ , or  $0.45$  if becoming self-employed. The largest increase of drinking level is seen among workers of 1991 who became owners in 2011, their change in drinking level is  $1.01$ . The biggest reduction in drinking is seen among retirees who remained retired in 2011, their drinking decreased by  $1.43$  ordinal level. To systematically test how social mobility in either direction influences substance uses, we now turn to the findings of diagonal reference models.

#### *5.4.2 Assimilation and Mobility Effects on Smoking and Drinking*

Table 5.3.1 presents diagonal reference models on smoking and drinking's end-outcomes in 2011. The dependent variables are the exact cell contents from Table 5.1. In the second column, diagonal count by classes shows that, compared to the unemployed, overall as a whole social class, workers ( $2.87$ ), self-employed ( $4.25$ ), owners ( $6.83$ ), all significantly smoked more. Farmers and the retired did not smoke differently than the unemployed people. Unsurprisingly, males smoke much more cigarettes than females ( $8.51$ ).

The delta parameters in the upper section were used to calculate the gamma weights for marginal effects, namely, how important were destination class and origin class for substance use. These parameters were further separated by mobility directions in terms of prestige, based on the assumption that the effects of joining a new class may differ among upward movers, downward movers, and the stable people. Gamma weights in each same mobility group should add up to 1, weight greater than  $0.5$  indicates closer similarity with that group's dependent variable. Thus, for the first smoking model, there

is no evidence to support that upward movers' smoking quantity resembles their destination group more than origin group (.24<.75). Instead, downward movers had become more similar to their destination group than origin group (.85>.16).

The model in column 3 with the inclusion of change in prestige, change in income, and their interaction term, considers the independent mobility and income effect aside from class assimilation. This model generated significantly better fit indices, judging by AIC and chi-square change. After controlling for these mobility variables, most diagonal social classes no longer differ significantly from the unemployed in terms of smoking in 2011, with an exception for retirees, who smoke 6.25 less cigarettes than the unemployed. Males still smoke significantly more than females, holding a lead of 8.53 cigarettes. The main terms of prestige and income are not significant statistically, but there is a significant and negative interaction between the two, indicating the opposite direction of their conditional effects. Substantively, this interaction term suggests that when someone experienced a large raise in both income and prestige, s/he will be smoking less. But when someone experienced discrepantly a large raise in income but smaller raise of class prestige, or vice versa, s/he will be smoking more. Weights for destination classes still suggest an absence of assimilation into destination class for upward movers. We may conclude there is a curved impact of social mobility on smoking outcomes, but upward movers have not been assimilated to their destination class members who overall smoke more.

Columns 4 and 5 considers the same modeling for drinking in 2011 as the dependent variable. There is no proven independent mobility or income effect on drinking. However, the significant diagonal social class effects were nullified after

controlling for mobility variables, indicating that social class differences were effectively differences in prestige and income. Although the independent mobility effect does not lead to an increase in drinking, there is evidence that people who experienced upward mobility have become similar to their destination class in terms of drinking (.66>.34).

We now have moderate evidence to support the assimilation hypothesis for socially promoted people's drinking behavior, but the outcome variables measured in 2011 may suffer from omitted within-individual bias and auto-correlation. We now turn to fixed-effect models.

#### *5.4.3 Assimilation and Mobility Effects on Smoking and Drinking Changes*

Taking the first-difference of both dependent and independent variables except gender, which is considered time-invariant, the fixed-effect models were able to solve issues from omitted within-person variation. In Table 5.3.2, we found a significant mobility effect for smoking, but no assimilation effect for upward movers after controlling for the independent mobility and income effects. For every unit increase in prestige out of a scale of 100, one is expected smoke 0.18 more cigarettes. Consider that the standard deviation of the prestige scale is 15, one standard deviation rise in class prestige would lead to 2.7 more cigarettes. There is also a significant interaction of prestige with income. Whereas at higher levels of income or prestige, a rise in the other factor would reduce smoking. Overall, compared with the unemployed, workers (3.19), self-employed (2.41), and owners (4.53) had increased smoking over the twenty years, but retirees had reduced their usage (-5.54). By these two models, we confirm that social mobility is independently associated with a surge in smoking, but there is no assimilation effect for people who were socially promoted.

Contrary to findings on smoking, from the two fixed-effect drinking models in column four and five in Table 5.3.2, we see strong support for the assimilation effect among upward movers, support for an income effect, but no evidence for an independent social mobility effect. When controlling for independent social mobility, the class difference in drinking has disappeared. But in both models, there is a strong effect of assimilation into the destination class for all people, and especially for upward movers. Without controlling for independent mobility variables, 90% of a socially promoted person's drinking can be explained by the drinking situation in his/her new higher class. Even after controlling for income and mobility, 77% of the drinking change is accounted for by an upward mover's destination class. Disregarding overall class difference in drinking change, a rise in income significantly leads to increased drinking ( $\beta=.72$ ). When people earn more, they do seem to have stronger capacity to purchase alcoholic beverages.

#### *5.4.4 Comparing with Heavy Substance Use*

We expected heavy smoking and drinking to void the benefits of social mobility, due to potential physical, psychological, and social dysfunctions. Does increased social mobility lead to more heavy substance use? Does better income allow for more heavy substance use? Would upward mobile people learn to be heavy drinkers and smokers in an attempt to assimilate? These three questions were answered by the same modeling on heavy drinking and heavy smoking as presented by Table 5.4.1 and 5.4.2.

When smoking in 2011 was the dependent variable, results for heavy smoking is largely similar to general smoking level. Without adjusting for independent mobility and income variable, social classes of workers, the self-employed, and owners had more

heavy smokers than the unemployed class. After adjusting for mobility and income, overall class difference only significantly exists between the unemployed, farmers, and retirees. There is also a negative interaction between mobility change and income change, denoting the effect of each is opposite at a higher level of another. There is no apparent assimilation into destination effect for upwardly mobile people, as the weights are equal between origin and destination (.50). Models in column four and five of Table 5.4.1 failed to find significant overall class differences in regard to heavy drinking, there is neither a significant independent mobility or income effect. Upward movers' heavy drinking is very close to their origin class (.99) but minimally resembling their destination class (.01).

Whereas significant mobility effect was found for changes in general smoking, there is no mobility effect for heavy smoking. Whereas an assimilation effect was found for changes in general drinking, there is no assimilation into destination effect for heavy drinking. Even though a limited number of class differences still exist, at the very least, upward social mobility does not lead to heavy drinking or heavy smoking either via assimilation effect or independent mobility and income surge--the mechanisms that caused an increase in general drinking and smoking. The changes brought by social mobility to general substance use overall do not exist for heavy substance use.

## 5.5 Discussion

Since we have seen from the models a multitude of significant findings, it helps now to summarize and compare them. Research on social mobility has long faced a puzzle: mobility across social strata often has strong impact on a variety of manifested



outcomes, but it is very hard to determine the exact source of such impact. Two major effects can both contribute to behavioral changes after a social mobility process: while some people conform with or assimilate into their new destination, leading to adaptive behavioral changes, other people change their course of action irrespective of the overall condition in their destination classes, but as a direct result of the movement *per se*.

Diagonal reference modeling, one widely acknowledged decomposition strategy, was employed to solve this puzzle for social mobility and substance use in China. In this study, we have hypothesized two general propositions: since substance use enjoys certain normative status in contemporary China's workforce, upwardly mobile people are expected to become similar to their destination class in terms of smoking and drinking. We have also hypothesized that there is an independent social mobility effect and income effect to increase smoking and drinking, even after accounting for overall class differences and the assimilation effect, because mobility by itself could be stress-inducing and purchasing power may confound the degree to which one uses substance.

First and foremost, we have found a clear overall class difference in both smoking and drinking, where higher social classes have higher levels of use. When unadjusted for mobility and income, owners are the biggest smokers and drinkers, while the unemployed group members smoke and drink significantly less than workers, self-employed people, and owners. Unsurprisingly, retirees constitute the least likely user group. Referring to the assignment of prestige for all six social classes, the order of prestige ranking matches very closely with the substance use ranking. The ranking match between prestige and substance use remains valid even where only small difference between classes exists. For example, workers have slightly higher prestige than the self-employed (60>55) thanks to

the anti-bourgeoisie tradition, and accordingly, they also drink more than the self-employed, resonating with earlier scholarship on the alcohol pride among socialist workers (Transchel, 2006).

From descriptive statistics, we can see that when a person moved upward to a higher class, his/her smoking and drinking level would increase. The diagonal reference modeling has shown that drinking and smoking are subjected to different mechanisms in relation to social mobility. While social mobility increases smoking, there is no assimilation effect. Instead, the increase in smoking is caused by an independent mobility effect and income effect. Earlier scholars have already suggested the stress-inducing dimension of upward mobility (P. M. Blau, 1956; Sorokin, 1959). Since there was no evidence of a predominant assimilation into the destination class' smoking pattern, it is possible that upward mobility caused smoking through other mechanisms such as stress and individualistic motivations. On the other hand, there is an assimilation effect but no independent mobility effect for drinking. Upwardly mobile people follow the drinking pattern of their destination class, but they do not drink more by undergoing the mobility event *per se*.

In contemporary China, drinking itself is a socially mandatory act to perform one's identity and position in a hierarchical system. For the hierarchical subordinates in business settings and official spheres, escaping from the obligations of drinking and showing respect to other drinking parties is tantamount to inviting penalties (Cochrane et al., 2003; Hao et al., 2005). One could be severely marginalized in the workplace, or directly penalized financially for not drinking with business partners or colleagues. As described in the previous chapter, non-drinkers have a higher risk of unemployment over

time. Previous scholarship has also shown that non-drinkers receive less salaries and have smaller social networks compared to drinkers (Leifman et al., 1995; Lye & Hirschberg, 2010; Bethany L Peters & Stringham, 2006). In an attempt to fit into a social ladder, a man will often find himself competing for opportunities among other drinkers, and a woman will have to demonstrate her courtesy and submission by drinking along ritually. As a result of learning from and conforming with peers, one assimilates into his or her destination class.

While these are the drinking norms in contemporary Chinese society, an assimilation effect does not exist for smoking, very likely due to this behavior's enormous gender gap. In China, very few women smoke, and the prevailing cultural and political tone after the Nationalist regime had strove to combat against female's non-conforming behaviors including smoking cigarettes, leading to a cultural sanction against female smoking (Z.C. Rich & Xiao, 2011; X. Y. Yang, Anderson, et al., 2014; Y. Zhou, 1999). Although we have adjusted for the gender effect by using a control variable and taking fixed-effects to eliminate within individual variation, an assimilation effect is still non-existent among upward movers. This implies a lack of normative culture among higher social classes that demands new members to smoke at their level, in stark contrast to the overwhelmingly obligatory drinking culture across social classes. As a result, it is likely easier to modify the behavioral pattern of a smoker in the workplace than to do so on drinking because the force to assimilate into higher class's smoking pattern is weaker. When the social demand of smoking proves to be weaker, health professionals may be able to design strategies to assist smoking cessation and prevention without bringing uncertain risks to smokers' social relationships. However, for drinkers, cautions against

direct interventions should be heeded due to the necessary social functions derived from drinking, albeit sometimes involuntarily conducted by the drinkers themselves.

A rationalistic perspective regarding substance use as a form of recreation and socialization assumes that higher disposable wealth would lead to more expenditures on substances. Once again, we found this income effect has different impacts on smoking and drinking. Moreover, smoking's relationship with income is not linear, but instead conditional on social mobility. When a person experienced a big jump in upward social mobility, more income actually decreases smoking; but when s/he experienced a dive in mobility, income contributes to more cigarettes smoked. We may infer from this interactive association a social determinant of economic motivations. On the other hand, income significantly increases drinking, suggesting a rationale behind drinkers' purchasing power capacity: when one's income surges, his or her motivation to allocate disposable wealth towards alcoholic beverages also increases. Combined with previous evidence on smoking and drinking's different assimilation effects, we suspect that an informal understanding against smoking may have already formed in higher classes, and the recent series of tobacco-control legislations were a consequence rather than impetus of this palpable trend (X. Y. Yang, Anderson, et al., 2014). Although higher classes overall smoked more, a newly promoted person wouldn't be pressed to assimilate in terms of smoking, nor would s/he spend more money buying cigarettes. As a contrast, drinkers would both assimilate into their destination classes and spend more disposable money when it is available. In contemporary Chinese society, we suggest, drinking is a more universal class signifier than smoking.

Finally, it is important to distinguish moderate use of substances for socializing purposes from heavy use. While moderate use of tobacco and alcohol may deliver the networking and social exchange benefits as discussed earlier, people often only need to consume a limited quantity of substances in order to achieve these goals. For example, Skog (1980) found larger social network size among moderate drinkers, compared to both abstainers and heavy drinkers. Furthermore, constant heavy use of a substance exerts a damaging impact on human psychological health, which must be fervently avoided by social aspirants (Agrawal et al., 2011; Sher et al., 2010). Although the CHNS survey had not employed clinically standard criteria to assess heavy drinking, we used a cut-off of “drinking every day” to denote heavy drinking, and heavy smoking criteria was defined by “smoking above 10 cigarettes per day”. These criteria have likely contained most habitual drinkers with certain degree of dependency and captured most heavy users except under rare condition. This study can largely confirm that although social mobility generally leads to higher substance use, it does not lead to heavy use. We have failed to find either an assimilation effect or independent mobility effect for heavy smoking and drinking, neither was there a significant income premium on them. The overall class difference is no longer consistent. Unlike general drinking and smoking, the three higher social classes do not consist of more heavy users when compared with the unemployed group. While smoking and drinking in the workplace is an important public health issue, we can conclude most of such social smoking and drinking did not lead to heavy usage. Users in our sample may be well aware of the utilitarian aims of their drinking and smoking, while still firmly believing in the negative consequences of tobacco and alcohol, which deter them from consuming beyond what is socially necessary. In fact,

many studies have shown that intention to quit and necessity to persist often coexist for substance users: social reasons are the most frequently cited motivations to remain smoking in China, even among physicians (X. Y. Yang, Kelly, et al., 2014; Yao et al., 2009; J. Y. Zhang et al., 2012).

Overall, upward social mobility implies more drinking and smoking for social aspirants through assimilation, mobility, and income effects, although the increase does not exist for heavy forms of drinking and smoking. In a rapidly developing nation with a huge population size, this may pose a severe challenge for agents who endeavor to control the expansion of substance use. Not only will they need to consider adopting approaches that reform the workplace culture and social norms, policy makers and practitioners in social work and psychological counselling should also pay attention to the stress and adaptive behavioral responses that people often experience during the toiling mobility process.

## 5.6 Tables and Figures

Table 5.1 Contingency Table of Smoking and Drinking in 2011  
by Class in 1991 and 2011

2011 1991 smoking	<i>Unemployed</i>	<i>Workers</i>	<i>Self- employed</i>	<i>Owner</i>	<i>Farmer</i>	<i>Retired</i>	<i>Total</i>
<i>Unemployed</i>	4.86 (103)	4.9 (21)	5.25 (16)	0 (1)	2.10 (33)	2.52 (17)	3.95 (191)
<i>Workers</i>	4.06 (125)	5.69 (159)	8.54 (77)	11.72 (15)	5.59 (52)	2.74 (169)	5.73 (597)
<i>Self- employed</i>	1.37 (59)	6.62 (30)	6.56 (78)	9.8 (11)	4.27 (24)	3.01 (69)	4.92 (271)
<i>Owner</i>	3.46 (29)	9.17 (13)	11.52 (13)	15.33 (7)	5.46 (26)	6.90 (39)	7.20 (127)
<i>Farmer</i>	2.57 (854)	5.57 (238)	5.46 (190)	4.42 (13)	4.20 (1106)	4.20 (63)	4.32 (2464)
<i>Retired</i>	4.46 (10)	10 (1)	-	-	5.17 (94)	0.99 (63)	3.22 (168)
<i>Total</i>	3.34 (1180)	6.19 (462)	7.10 (374)	9.01 (47)	4.34 (1335)	3.49 (420)	5.03 (3818)
<b>Drinking</b>	<i>Unemployed</i>	<i>Workers</i>	<i>Self- employed</i>	<i>Owner</i>	<i>Farmer</i>	<i>Retired</i>	
<i>Unemployed</i>	0.37	1.17	0.95	0	0.92	0.96	.85
<i>Workers</i>	1.17	1.45	1.40	2.94	0.89	0.78	1.29
<i>Self- employed</i>	0.57	1.05	1.46	2.24	1.13	0.66	1.09
<i>Owner</i>	1.2	3.04	2.13	2.8	1.06	2	1.64
<i>Farmer</i>	0.66	1.49	1.26	1.47	1.14	0.59	1.05
<i>Retired</i>	1.38	2	-	-	2.5	0.19	1.03
<i>Total</i>	.87	1.51	1.38	2.15	1.14	.74	1.16

Cell frequency in the parentheses, same frequency for the drinking table.

Table 5.2 Contingency Table of Relative Changes in Smoking and Drinking from 1991 to 2011 by Classes

2011 1991 smoking	<i>Unemployed</i>	<i>Workers</i>	<i>Self- employed</i>	<i>Owner</i>	<i>Farmer</i>	<i>Retired</i>	<i>Total</i>
<i>Unemployed</i>	3.12 (103)	0.44 (21)	3 (16)	0 (1)	-3.20 (33)	0.17 (17)	(191)
<i>Workers</i>	-0.96 (125)	0.52 (159)	1.90 (77)	3.02 (15)	-2.49 (52)	-2.37 (169)	(597)
<i>Self- employed</i>	-3.11 (59)	3.13 (30)	-0.86 (78)	3.38 (11)	-0.52 (24)	-0.60 (69)	(271)
<i>Owner</i>	-4.86 (29)	3.25 (13)	4.06 (13)	4.67 (7)	-1.59 (26)	-4.36 (39)	(127)
<i>Farmer</i>	-2.10 (854)	1.13 (238)	1.40 (190)	-1 (13)	-0.54 (1106)	-2.44 (63)	(2464)
<i>Retired</i>	-8.10 (10)	- (1)	-	-	-2.25 (4)	-5.70 (75)	(168)
<i>Total</i>	-2.24 (1180)	1.49 (462)	1.61 (374)	1.93 (47)	-1.52 (1335)	-2.53 (420)	-.67 (3818)
<b>Drinking</b>	<i>Unemployed</i>	<i>Workers</i>	<i>Self- employed</i>	<i>Owner</i>	<i>Farmer</i>	<i>Retired</i>	<i>Total</i>
<i>Unemployed</i>	-0.03	0.25	0.45	-1	0.09	-0.13	.11
<i>Workers</i>	0.21	0.47	0.48	1.01	0.40	-0.09	.33
<i>Self- employed</i>	-0.54	0.07	0.25	0.4	0.09	-0.47	-.07
<i>Owner</i>	-0.08	0.75	0.47	0.67	-0.36	-0.34	.04
<i>Farmer</i>	-0.24	0.51	0.49	0.65	0.02	-0.50	.09
<i>Retired</i>	-0.04	2	-	-	0.67	-1.43	-.48
<i>Total</i>	-.12	.41	.42	.59	.08	-.45	.07

Cell frequency in the parentheses, same frequency for the drinking table.



Table 5.3.1

	Smoking in 2011	Smoking 2011	Drinking 2011	Drinking 2011
$\delta_{\text{no change origin}}$	-1.24	.11	-.29	-.26
$\delta_{\text{upward origin}}$	1.15	.26	.63	-.06
$\delta_{\text{downward origin}}$	.14	-.87	-.33	-10.31
$\delta_{\text{no change destination}}$	.57	-.50	.45	.44
$\delta_{\text{upward destination}}$	-1.79	-.03	-.46	-.12
$\delta_{\text{downward destination}}$	.09	.30	.16	9.85
<b>Weights for marginal effects:</b>				
$\gamma_{\text{no change origin}}$	.14 (.29)	.37 (.19)†	.32 (.25)	.33 (.26)
$\gamma_{\text{downward origin}}$	.16 (.13)	.24 (.15)	.22 (.12)	.01 (.01)
$\gamma_{\text{upward origin}}$	.75 (.18)†	.54 (.19)†	.59 (.19)†	.34 (.21)
$\gamma_{\text{no change destination}}$	.86 (.29)†	.63 (.19)†	.67 (.35)	.67 (.26)†
$\gamma_{\text{downward destination}}$	.85 (.13)†	.76 (.16)†	.78 (.12)†	.99 (.01)†
$\gamma_{\text{upward destination}}$	.24 (.17)	.46 (.19)†	.41 (.19)†	.66 (.21)†
<b>Diagonal classes (ref=unemployed):</b>				
<i>Worker</i>	2.87 (1.11)†	-.19 (1.69)	.79 (.25)†	.34 (.41)
<i>Self-employed</i>	4.25 (1.09)†	.93 (1.81)	.53 (.25)†	-.01 (.43)
<i>Owner</i>	6.83 (2.43)†	2.98 (2.5)	1.46 (.46)†	.82 (.52)
<i>Farmer</i>	.22 (.87)	-2.76 (1.64)	.13 (.22)	-.38 (.40)
<i>Retired</i>	-1.06 (1.10)	-6.25 (2.32)†	-.40 (.26)	-1.10 (.53)†
<b>Mobility effects</b>				
Change in prestige		.06 (.07)		-.01 (.01)
Change in income		2.61(1.63)		.59(.36)
Prestige X Income		-.04(.01)†		-.01(.01)
Male	8.51(.56)†	8.53 (.56)†	1.53(.12)†	1.52 (.12)†
AIC	1847.6	1846.1	912.0	915.0
Deviance, df	7306, 297	7129, 294( $\Delta X^2 < .001$ )	346.9, 297	343.5, 294 ( $\Delta X^2 = .33$ )

†: t value > 1.96 (estimate is at least 1.96 times of its standard error, or  $p < .05$ ).

Table 5.3.2

	Change in smoking	Change in smoking	Change in drinking	Change in drinking
$\delta_{\text{no change origin}}$	-.38	.34	-1.33	.43
$\delta_{\text{upward origin}}$	-.42	.04	.18	.33
$\delta_{\text{downward origin}}$	-1.56	-.41	-.08	-.33
$\delta_{\text{no change destination}}$	.37	-.83	.34	-.33
$\delta_{\text{upward destination}}$	.50	-.49	.71	.15
$\delta_{\text{downward destination}}$	1.55	.83	-.19	.63
<b>Weights for marginal effects:</b>				
$\gamma_{\text{no change origin}}$	.50 (.32)	.61 (.15) †	.16 (.33)	.42 (.24)
$\gamma_{\text{downward origin}}$	.01 (.01)	.39 (.16) †	.20 (.17) †	.24 (.17)
$\gamma_{\text{upward origin}}$	.28 (.24)	.72 (.18) †	.09 (.28)	.23 (.21)
$\gamma_{\text{no change destination}}$	.49 (.32)	.39 (.15) †	.84 (.33) †	.57 (.24) †
$\gamma_{\text{downward destination}}$	.99 (.01) †	.60 (.16) †	.80 (.16) †	.76 (.17) †
$\gamma_{\text{upward destination}}$	.62 (.21) †	.28 (.18)	.90 (.28) †	.77 (.22) †
<b>Diagonal classes (ref=unemployed):</b>				
<i>Worker</i>	4.29 (1.32) †	3.19 (1.43) †	.73 (.26) †	.11 (.41)
<i>Self-employed</i>	4.65 (1.33) †	2.41 (1.16) †	.50 (.24) †	-.13 (.42)
<i>Owner</i>	5.56 (1.97) †	4.53 (1.98) †	.89 (.36) †	.29 (.48)
<i>Farmer</i>	.95 (1.44)	-.70 (0.79)	.22 (.23)	-.36 (.37)
<i>Retired</i>	-.99 (1.21)	-5.54 (1.50) †	-.62 (.26) †	-1.60 (.53) †
<b>Mobility effects</b>				
Change in prestige		.18 (.09) †		-.01 (.01)
Change in income		.92(1.9)		.72(.37) †
Prestige X Income		-.05(.02) †		-.01(.01)
Male	-1.38 (.70) †	-1.18 (.69)	-.02(.12)	-.02 (.12)
AIC	1873.7	1866.1	911.3	912.4
Deviance, df	10192, 283	9668, 280 ( $\Delta X^2 < .001$ )	346.1, 297	340.6, 294 ( $\Delta X^2 = .20$ )

†: t value > 1.96 (estimate is at least 1.96 times of its standard error, or  $p < .05$ ).

Table 5.4.1

	Heavy smoking in 2011	Heavy smoking 2011	Heavy drinking 2011	Heavy drinking 2011
$\delta_{\text{no change origin}}$	.04	-.49	-1.78	-.13
$\delta_{\text{upward origin}}$	1.11	.72	12.0	8.99
$\delta_{\text{downward origin}}$	-.60	-.22	-11.2	-28.5
$\delta_{\text{no change destination}}$	.54	.19	1.74	.79
$\delta_{\text{upward destination}}$	-1.09	.05	-11.3	-9.12
$\delta_{\text{downward destination}}$	.07	.08	11.2	28.2
<b>Weights for marginal effects:</b>				
$\gamma_{\text{no change origin}}$	.38 (.20)	.34 (.16)†	.03 (.53)	.29 (1)
$\gamma_{\text{downward origin}}$	.15 (.11)	.27 (.16)	.001 (.001)	.01 (.01)
$\gamma_{\text{upward origin}}$	.84 (.17)†	.50 (.19)†	1 (.001) †	.99 (1)
$\gamma_{\text{no change destination}}$	.62 (.20)†	.66 (.16)†	.97 (.53)	.71 (.08)†
$\gamma_{\text{downward destination}}$	.85 (.11)†	.73 (.16)†	1 (1) †	.99 (.01)†
$\gamma_{\text{upward destination}}$	.15 (.17)	.50 (.19)†	.001 (.001)	.001 (1)
<b>Diagonal classes (ref=unemployed):</b>				
<i>Worker</i>	.11 (.06)†	-.07 (.10)	.01 (.04)	-.004 (.07)
<i>Self-employed</i>	.13 (.05)†	-.06 (.10)	.07 (.03)	.04 (.05)
<i>Owner</i>	.41 (.11)†	.14 (.13)	.02 (.07)	-.004 (.36)
<i>Farmer</i>	-.03 (.04)	-.22 (.09)†	-.004 (.03)	-.02 (.05)
<i>Retired</i>	-.06 (.06)	-.35 (.12)†	-.04 (.04)	-.11 (1)
<b>Mobility effects</b>				
Change in prestige		.004 (.003)		-.01(4.99)
Change in income		.14(.10)		.04(.06)
Prestige X Income		-.003(.001)†		-.004(3.71)
Male	.42(.03)†	.42 (.03)†	.16(.02) †	.16 (2.06)
AIC	16.90	11.48	-124.1	-118.67
Deviance, df	18.79, 297	18.1, 294( $\Delta X^2=.88$ )	11.95, 298	11.85, 294( $\Delta X^2=.99$ )

†: t value > 1.96 (estimate is at least 1.96 times of its standard error, or  $p < .05$ ).

Table 5.4.2

	Change in heavy smoking	Change in heavy smoking	Change in heavy drinking	Change in heavy drinking
$\delta_{\text{no change origin}}$	.27	2.31	.41	.25
$\delta_{\text{upward origin}}$	.05	7.23	.85	1.21
$\delta_{\text{downward origin}}$	-2.09	-1.97	-.95	-.42
$\delta_{\text{no change destination}}$	-.88	-2.16	.06	-.43
$\delta_{\text{upward destination}}$	-.09	-7.71	-.42	-.49
$\delta_{\text{downward destination}}$	2.22	1.96	.67	.35
<b>Weights for marginal effects:</b>				
$\gamma_{\text{no change origin}}$	.76 (.19)†	.99 (.21) †	.59 (.22) †	.66 (.23) †
$\gamma_{\text{downward origin}}$	.04 (.11)	.63 (.19) †	.22 (.21)	.47 (.28)
$\gamma_{\text{upward origin}}$	.79 (.18)†	.99 (.001) †	.83 (.25) †	.91 (.29) †
$\gamma_{\text{no change destination}}$	.24 (.19)	.12 (.21)	.41 (.22)	.34 (.23)
$\gamma_{\text{downward destination}}$	.96 (.11)†	.36 (.19)	.78 (.21)†	.52 (.28)
$\gamma_{\text{upward destination}}$	.21 (.19)	.001 (.001)	.16 (.25)	.09 (.29)
<b>Diagonal classes (ref=unemployed):</b>				
<i>Worker</i>	.06 (.07)	.06 (.08)	.12 (.05) †	.13 (.06) †
<i>Self-employed</i>	.08 (.06)	-.03 (.06)	.05 (.05)	.05 (.05)
<i>Owner</i>	.51 (.13) †	.42 (.12) †	.13 (.08)	.14 (.09)
<i>Farmer</i>	-.01 (.05)	-.06 (.06)	.05 (.04)	.06 (.04)
<i>Retired</i>	-.07 (.08)	-.23 (.11) †	-.09 (.06)	-.08 (.08)
<b>Mobility effects</b>				
Change in prestige		.01 (1)		-.01 (.01)
Change in income		-.13(1)		-.04(.05)
Prestige X Income		-.001(1)		-.01(.01)
Male	-.08 (.03) †	-.07 (.69)	.02(.02)	.02 (.12)
AIC	117.3	101.0	-112.8	-108.3
Deviance, df	25.2, 283	23.38, 280( $\Delta X^2=.61$ )	12.32, 297	12.26, 294( $\Delta X^2=.99$ )

†: t value > 1.96 (estimate is at least 1.96 times of its standard error, or  $p < .05$ ).

## CHAPTER 6 COMMUNITY DEVELOPMENT AND SUBSTANCE USE

### 6.1 Introduction

Historically, modernization has been a long process that powerfully reshaped the way of living in the global realm. Since its beginning, in the classical understanding of modernization, the process has not generated uniform and equal outcomes for all the areas and countries involved. Instead, a tremendous amount of socioeconomic disparities have been produced during its course. The equally creative and disruptive force exerted by modernization proves to be only stronger in later-developed countries such as China, India, Brazil, among others. As some development scholars argue, modernization is intrinsically a mechanism to divert resources (material or labor) to a few central positions (Polanyi, 1944; Snyder & Kick, 1979).

Modernization has created an essential force behind the changes in China's community structure, and such changes are not without consequences for substance use. Cities or provinces that enjoy advantageous infrastructure and those happen to produce the right resources, will attain the central position in development while others contribute to the improvement of the centrally positioned areas with unequal marginal returns for themselves (Moses, 1990; Shiozawa, 1990). Since community by itself is a considerable social force that could dramatically influence how people behave, community or the neighborhood as a unit assumes a rather pivotal role in the social studies of substance use.

Proshansky pointed out that social relations are constituted through space: “a substructure of the self-identity of the person consisting of broadly conceived cognitions about the physical world in which the individual lives... consisting of places, spaces and their properties which have served instrumentally in the satisfaction of the persons’ biological, psychological, social and cultural needs” (Proshansky, Fabian, & Kaminoff, 1983, p. 59). Therefore, people living in a section of the city may have a dramatically different substance use patterns compared to their peers in other neighborhoods. Similarly, studies have found the distribution of violent crimes can be deliberately changed by setting up certain venues that are conducive or protective of violence in the community, an example is bars versus recreation centers (Cochran, Rowan, Blount, Heide, & Sellers, 1999; Peterson, Krivo, & Harris, 2000). Under such community change, substance use becomes a social ecological issue. Urban ghettos, ethnic enclaves, impoverished villages, are frequently hit by the endemic of substance use. In such cases, the neighborhood environment proves to be a strong predictor of substance use, through the mechanism of stress (Hill & Angel, 2005), perceived disorder (Cresswell, 1992), and composition of entertainment venues and networks (Gruenewald, 2007; Sampson, 2012). Thus, many studies have shown that aspects of the community a person lives in can influence substance use beyond the influences of the personal characteristics of the individual.

China has undergone radical market economy transformation in the last two decades. As discussed in detail and at many levels in earlier chapters, even within the same city or village, apparent differences in residential segregation, social development, institutional resources, and facilities have rapidly emerged since the Chinese Economic Reform in the 1980s. At the institutional level, there is an apparent regional variation in

China's substance policies and the ways they are implemented (T. Yang et al., 2015; H. Zhou, 2000). Across neighborhoods, economic inequality and social disorganization proved to be at the heart of many types of deviance and crimes. Not only do people from a poverty-stricken community suffer from the lack of material goods, they also turn to engage in deviant behaviors such as substance use as a subcultural response to mainstream mandates (Ilan, 2015; Young, 1971). Over the past decade, overwhelmed by the changing community development and rapid residential movement, many transient communities in China have become hubs of rising deviance and crimes (X. Y. Yang et al., 2015; Zheng, 2009). However, as what will be shown next, antitheses to the negative impact of modernization on substance use also exist extensively. One can expect both ambiguity and variance in community influences on substance use as modernization intensifies community-level economic and social development in contemporary China. In this chapter, we will test this little explored phenomenon of social change: how modernization and other community characteristics affect substance use in combination with individual characteristics.

## **6.2 Literature Review**

A remaining issue the current literature could not directly inform us about is the direction in which modernization changes substance use. Although we have discussed at length the important and obvious impact of modernization on community-level social and economic changes, how do these changes relate to substance use? While modernization negatively impacts some underprivileged communities and drives residents thereof to resort to relief via drinking and smoking, other better-off communities owing to their great institutional resources to advantageous position may instead see less stress-induced

substance use. Furthermore, interlocked confounding factors can be simultaneously present during the modernization process in a community. While economic development and marketization may create income inequality at certain levels, the progress of living standards brought by the advancement is apparent. The same can be said regarding the availability of social services, which often depends heavily on monetary investment brought about by development. Therefore, modernization's impact on substance use is not homogenous across communities, and each community may have a unique response to the same social stimulus, thus warranting a reconsideration of the impact of modernization on substance use through the lens of a community-level investigation.

#### *6.2.1 Economic Modernization on Substance Use*

Modernization has almost eradicated extreme poverty in most industrial countries of the world. Even the standard of living of a contemporary routine manual worker is beyond the imagination of a gentleman of the 18th century, who could be aspiring to the luxury of regular baths. The stress process thesis proposes that substance use is caused by stress. Subjugated to long term life strains including economic strains and the resulting deprivation in social support, self-efficacy and sense of mastery will be severely undermined and psychological stress elevated (Pearlin, Menaghan, Lieberman, & Mullan, 1981). The endocrine secretion system will then also respond in certain ways to desire temporary relief through regulated substance intake (Kiecolt-Glaser, 1999; Monroe & Simons, 1991). Consequentially, people consume alcohol and use drugs as a palliative means to escape anxiety and depression or other sources of stress (Farley et al., 2005; Hill & Angel, 2005). Therefore, by eradicating the want of material goods, modernization should have eased substance use in the direction anticipated by the stress process thesis.



However, other scholars and a body of research have suggested that modernization may directly or indirectly increase population-level substance use through economic expansion, especially the laissez faire marketization during China's Reform. Since the Reform, China has undergone a fast-paced economic liberalization, and studies have also observed a positive correlation between growth and substance use (Ruhm, 2005; A. R. A. Stevens & Caan, 2008). Commercial venues quickly multiply during the economic boom; the production and transaction of all goods flock to fill the enlarged market, especially if the area under consideration has undergone a period of commodity shortage. As night clubs, restaurants, dive bars, vendor stalls, supermarkets appear in multitudes in the post-Reform China, acquiring alcohol and tobacco has been never easier, particularly as more citizens become able to afford such goods. When the focus on economic growth outpaces all others, deviance may emerge out of the imbalance between the desire for such pursuits and the possibility to realize it, not only at meso-level as suggested by Merton's strain theory, but also at the structural level where deviance becomes a response to institutional anomie (Rosenfeld & Messner, 2013). Frankfurt School theorists also caution us against the assumption that the expansion of substance sales is a natural response to higher demand. Instead, the modern economy often manufactures the demand for consumption through instilling hegemonic cultural images of the perceived superiority of possessing certain products (Marcuse, 1964). Recently, an increasing amount of research on corporation's active engagement in promoting substance use and its favorable legislations has emerged (A. Chu et al., 2011; Ngok & Li, 2010; Y. Yang et al., 2010). For example, many provincial and local governments in China welcome the sudden marketization by relying on the tobacco harvest and cigarette

production for their economy (T. Yang et al., 2015). As a result, in pursuit of faster economic growth, they created policy barriers to prevent health intervention while promoting tobacco sales among susceptible consumers. Studies on other post-communist former Soviet countries also found that increased consumption of tobacco concentrated in countries and regions that experienced more privatization and received more economic investment between 1990 and 2000 (Gilmore & McKee, 2004; Perlman, Bobak, Gilmore, & McKee, 2007). This widespread developmental and health phenomenon leads us to the first hypothesis on the role of economic modernization:

*H1: Economic modernization at the community level is positively associated with smoking and drinking, net of the effects of individual characteristics.*

### 6.2.2 Social Modernization on Substance Use

Despite the arguments presented above, admittedly, another facet of modernization may have a strong suppressive effect on population-level substance use, thanks to the social services, health facilities, and sanitary improvements it provides to the public. Were it not for the modernization, public health and its related social services would not be a possible mainstream toolkit to manage health issues perceived necessary by a modern state. The modern welfare system and investment in public goods have not only produced visible material outcomes, but also awareness against the perceived harm to the generalized public (Anderson, 1990; Bambra, 2007; Bayer & Stuber, 2005).

Substance use is an obvious target for the modern social system's regulations of perceived harm. Today, tobacco smoking is actively banned from public spaces in many Chinese cities since new legislation in 2015. Despite the suspicious earnestness at local administrative levels, public health practitioners and social workers at universities and

CDCs have formed a strong force behind this legislation for long (Ngok & Li, 2010; T Yang, Yang, Lv, Zhao, & Ke, 2009).

Social modernization may not only affect tobacco use. Alcohol used to be much more tolerated in China than in many Western countries and most southern and western Asian countries where age, time, and location of drinking can all be regulated. At present, however, modern social services have started to provide addiction cessation, alcohol-induced violence help centers, self-help brochures, specialized clinics, and many other institutional resources for concerned drinkers and their families. Had there not been a modernization in social services, the institutional efforts and growing awareness concerning substance use may not have emerged as a strong intervening force in the public sphere and on individual behaviors alike.

Secondly, the social dimension of modernization constitutes the foundation of a lifestyle that depends on organic solidarity, or a cohesion consolidated not by participation in risk-taking rituals, which are manifested in substance use. Urbanized and individualistic lifestyle does not permit certain types of ritual drinking and smoking, which used to be an important manner to consolidate a community in both social and religious senses. Sociologists and anthropologists are familiar with the ritualistic substance use of pre-modern days. Whether it was “drink Soma and become immortal” as described by early Hindu classic *Rig Veda*, or the “black drink” and psychedelic mushrooms used by Native Americans in purification ceremonies, or Saint Paul’s metaphor of “drunk with holy spirit”, traditional religious and social events were imbued with substances. When Marx wrote “such things as smoking, drinking, eating, etc., are no longer means of contact or means that bring them together. Association, society and

conversation, which again has association as its end, are enough for them” (Marx, 1844/1977), he was describing the extent to which modern workers formed their identity around a new organized social order. The entire modernization project is seen as a process shifting our habitual engagement from that of kinship and traditions to one around voluntary communal life in the public space.

Contemporary scholars have extensively documented how public life and civic engagement can reduce deviant activities and the lack thereof contributes to perceived disorder, substance use, violence, and low trust among residents (P. E. Becker & Dhingra, 2001; M. R. Lee & Bartkowski, 2004; Sampson, 2012; Sampson & Raudenbush, 2004). Through regulating daily affairs, looking out for neighbors, offering mutual help when needed, and deterring suspicious conducts, voluntary participation in civic activities strengthens communal collective efficacy and reduces deviance (Browning, Feinberg, & Dietz, 2004; Sampson, Raudenbush, & Earls, 1997). If modern social services offer an alternative method for people to socialize, the need to fit in a group by using substances may be less stringent in a more socially modernized neighborhood, where men and women are presented with the freedom to choose a lifestyle, and their public engagement is growingly voluntary and civic.

*H2: Social modernization at community level is negatively associated with smoking and drinking, net of the effects of individual and neighborhood characteristics.*

### 6.2.3 *Inequality and Substance Use*

Absolute economic status does not reveal whether all members can equally benefit from the rapid development. In such a situation, the socioeconomic inequality that has emerged under rapid modernization and industrialization could also constitute a risk

factor for substance use. As economist Angus Deaton stated: “when inequality is the handmaiden of progress, we make a serious mistake if look only at average progress. I tell the story of material progress, but the story is one of both growth and inequality, not just income, but health too” (Deaton, 2015, p. 16). The different neighborhoods of the same county or city face dramatically divergent socioecological arrangements and life opportunities. In his revealing account of global development and health disparities, Richard Wilkinson showed that once basic level of economic prosperity is attained, the more unequal in income distribution a country is, the worse it performs in national health status (Wilkinson, 2002). Scholars holding the similar opinion argued that inequality detracts social cohesion and the ability to mobilize collective resources for the provision of public goods, which ultimately damages a society’s overall level of health and mental wellbeing (Kawachi & Berkman, 2000; Navarro, 1999; Scambler & Higgs, 1999). Under modern capitalist economic mode of production, economic neoliberalism’s unprecedented demand for relaxed standards and loose regulations over transaction and trade has stipulated a consequential dismantle of welfare provision system as well as other institutional maintenance of public goods in countries adopting neoliberal economic policies. While economy measured by the raw volume of productivity improves dramatically, the accompanying withdrawal of the state and public forces from the health arena is harmful to both health status and societal income equality (Coburn, 2000; Kawachi & Kennedy, 1999). Inequality by itself, damages every citizen’s health. It permits unrestricted domination of the economic sector over others, and subjects individual choice of health behavior to the market force and each person’s own

idiosyncratic health beliefs that could have been improved by adequate public health and welfare system. This leads to our third hypothesis:

*H3: Income inequality, measured as Gini Coefficient, at the community level is positively associated with smoking and drinking, net of the effects of individual characteristics.*

Under high level of inequality, people are often burdened by underclass identities, symbols that induce further deviance, greater opportunities outside the mainstream economic channel, as well as stigma and discriminatory attention (Ilan, 2015; Wilson, 1987). While on the other hand, advantaged who people harvest the economic outputs of cheaper labors, enjoy unfettered social and educational services afforded by segregation. Not only do they have the personal and institutional resources to solve problems in their neighborhoods, the advantaged people can also easily escape a dilapidated neighborhood and leave the problems to others (Krivo, Peterson, & Kuhl, 2009; Skogan, 1986). When alcohol outlets heavily concentrate in the South and West Chicago, for example, residents of the gentrified northern area become immune to such influences due to developed middle class identity and a reduced exposure opportunity. The same is not true in poorer neighborhoods.

Unlike the stress process thesis presented in the last section, some scholars have pointed out the fact that stress is induced by the relative social status in a hierarchy rather than long term deprivation, and this relative subordination is correlated to substance use (Houle & Martin, 2011; Kiecolt-Glaser, 1999; Monroe & Simons, 1991). As early as in the 80s, Blau's study pointed out poverty was not a direct cause of crime when inequality is controlled for (J. R. Blau & Blau, 1982). Psychologists have shown that a wide range of risk taking behaviors are practiced in response to the perceived uncertainty in a

changing environment, which, ironically, leads rational individuals to pursue immediate gratification and instant reward (Heikkinen, Patja, & Jallinoja, 2010; Helweg-Larsen & Nielsen, 2009; Houle & Martin, 2011; Slovic, 2001). Sociologists demonstrated how lower class people adopt subterranean values and deviant subcultures in the face of insurmountable inequality (Cloward & Ohlin, 1960; A. K. Cohen, 1955; Young, 1971). For the British working class youths who were deprived of a stable worker identity, risk-taking and violent behaviors served to preserve self-esteem in front of the rich that they cannot toil to become (Ilan, 2015). Taking drugs, drinking alcohol, spraying graffiti are all but a way to express such frustration, not out of absolute poverty but out of their relatively underprivileged social standing (Massey & Brodmann, 2014; Room, 2005).

Between 1981 and 2009, population under extreme poverty measured as \$2 daily sustenance declined from 80% to less than 10% in China; meanwhile, income inequality measured by Gini index contrarily jumped more than twofold (S. Li & Sicular, 2014), suggesting that Chinese society has become much more unequal. While China's purchasing power parity is only slightly above the world average, a smaller sector of the population have become increasingly wealthy to the extent that they account for more than 20% of global luxury goods sales, and half of the growing luxury market (A. Kim et al., 2014). The privatization of previously public goods and free services has imposed heavy tolls on producers of raw materials but enriched those engaged in rent-seeking transactions (Meng, Gregory, & Wang, 2005). The question then becomes this: under such tremendous level of inequality, both in absolute size and relative acceleration from the previous era, would substance use also increase as a result? Following the logic of the relative deprivation thesis, we hypothesize that income inequality within the

neighborhood make poor people use substances much more than wealthier people. In technical words, at higher level of community inequality, the association of income with smoking and drinking is negative.

*H3.1: Relative to independent income and independent inequality effects, the interaction between individual income and community-level income inequality is negative for smoking and drinking.*

#### *6.2.4 Interaction Between Gender and Modernization*

Perhaps the single strongest predictor of a person's smoking and drinking behaviors is also a very obvious one: one's gender. Men are much more likely than women to smoke tobacco and drink alcohol, as well as consume illicit drugs. This gendered pattern of substance use holds largely true in the global literature, but even more so among the Chinese. While close to half of all Chinese males are smokers, only 5% females smoke. Chinese women are half as likely to drink as men do (Millwood et al., 2013; G. Yang et al., 1999). Drinking is considered a manly act across many cultural contexts (Elder et al., 2000; Lahelma, Kangas, & Manderbacka, 1995), and this is also true in China. Even when females drink, their drinking bears a different connotation, including ritual submission, companionship provision, manifestation of motherhood, etc. Modern policy makers have made use of this gendered foundation to intervene on substance use in the name of protecting women and children (Campbell, 2000; Dostrovsky, 2005).

However, this gendered pattern is by no means a universal and inherent feature of human nature, and there is a great variation of the gender ratio of substance use across countries. Comparing China with other post-communist countries such as Russia,



Ukraine, and Kazakhstan, the gender-patterned smoking and drinking is much more pronounced in China (Romaniello & Starks, 2009). Women in Germany, the United Kingdom, and the U.S. are as likely to smoke as men. Female smoking prevalence is a third of that of men in Russia, but only a tenth in China. Gender differences in drinking also exist at different levels across cultures, but they have been very unsatisfactorily explained by the current academic focus on genetic and biological moderation (Holmila & Raitasalo, 2005).

One mechanism that has already altered the gendered pattern of substance use to a considerable extent is modernization in China. While modernization may decrease male substance use through weakened gender roles, it increases substance use among women. Currently, substance use is still a heavily gendered issue in China, with more male smokers and drinkers than female; however, as a society modernizes, gender similarities in terms of substance use would converge as gender equality improves. At this stage of modernization, substance is a less significant symbol that displays masculinity, and risk-taking behaviors are less heavily rewarded. The need to demonstrate masculinity through substance use is therefore less demanding for men (Eriksen, 1999). On the other hand, smoking for young women has lately become a popular practice suggestive of liberalism and Westernization, a tool used to negotiate for more independence and power during inter-gender interactions (Elkind, 1985; Gilbert, 2007). A study investigated all countries' smoking prevalence and found that female smoking is predicted by a country's gender equality in employment (A. R. A. Stevens & Caan, 2008). Since the right to work and financial security are established for women, traditional gender norms are less powerful in regulating and enforcing the behaviors deemed appropriate for both genders.

Another possible mechanism leading to converging substance use patterns between men and women has to do with stress (Lennon & Rosenfield, 1992) and exposure opportunity in an advanced modern society (Holmila & Raitasalo, 2005; Roche & Deehan, 2002). Gabrielle Glaser's recent report on America's hidden drunken mothers is a vivid depiction of one consequence of the stressful work-life imbalance in modern society (Glaser, 2014). As women take up jobs outside, they simultaneously take up the stress caused by the new dual role and more opportunities to be exposed to substances. At workplaces, there are more chances of social events where alcohol and cigarettes are offered, and it would only require pure deduction to see how a person will become more susceptible to drinking or smoking in scenarios with increased exposure.

The socialist regime of China had forced many breakthroughs for women's rights, such as equal salary, long maternity leave, greater presence of women in all occupational sectors of the society, as well as the decline of infanticides of female babies (W. Zheng, 2005). During the post-Reform era, despite the fact that some women have resumed their traditional role and returned to the domestic sphere (Yang Cao & Hu, 2007), the modernized economy has nevertheless created vast opportunities to break down the gender gap of gaining access to higher and more independent income sources, especially for China's 150 million rural-urban migrants. Being now able to have access to modernized ideas and policies in the cities, in addition to a worker's identity that has long emphasized equality and liberalism, migrants have revolutionized their sexual behaviors, gender relations, living arrangements, substance use, and many other formerly sensitive topics (Hoy, 2007; E. Ma & Ling 'Helen' Cheng, 2005; National Bureau of Statistics, 2012). The changes associated with migration from rural to urban locations can uproot

ties to the traditional gender norms. Therefore, as a response to the overall impact of modernization on gender equality, we hypothesize a reversed interaction between individual gender and community modernization:

*H4.1: There is a negative interaction between gender and community economic modernization on drinking and smoking, net of their independent main effects and other covariates. Women are more likely to drink and smoke in communities of better development in modern economy, but men are less likely to drink and smoke in such communities.*

*H4.2: There is also a negative interaction between gender and community social modernization, net of their independent main effects and other covariates. Women are more likely to drink and smoke in communities of better development in modern social services, but men are less likely to drink and smoke in such communities.*

#### *6.2.5 Interaction Between Income and Modernization*

Confirmed by many existing empirical studies on China's drinking and smoking issues, income tends to be positively associated with substance use. Income is positively related to smoking status and frequency in different research settings from both northern and southern China (X. Chen et al., 2004; Pan, 2004; T. Yang et al., 2008; T. Yang et al., 2009; X. Y. Yang, Kelly, et al., 2014). The same pattern holds for alcohol drinking. In a study comparing China and the U.S., scientists found better socioeconomic status contributed to more smoking and drinking for the Chinese (S. Kim, Symons, & Popkin, 2004). Another study found drinking and smoking to be related with high paying jobs even though education was negatively related to substance use (Siegrist, Bernhardt, Feng, & Schettler, 1990). Overall, drinking is found to prevail among many classes in both

rural and urban China, and income increases people's drinking likelihood and volume (Millwood et al., 2013; B. Wu et al., 2008).

Such trends between income and substance use, often unconfirmed by studies set in Western societies, could hardly elicit surprise once we have understood the normative status of alcohol and tobacco in contemporary Chinese society. The previous two empirical chapters have fairly elaborated discussion on the extent to which Chinese regard and use alcohol and tobacco as tool for moving in the social strata and for utilizing their ritualistic functions in the workplace. Higher income often coincides with higher social class, and people in the higher class, as well as those aspire to join a higher class, are subject to greater pressure of interaction via the means of social drinking and social smoking (Cochrane et al., 2003; S. Ma et al., 2008; Zachary C Rich et al., 2014).

Another straightforward mechanism linking income to higher substance use lies in the rational allocation of disposable income. With other things being equal, it is likely for smokers and drinkers to increase consumption when their disposable income surges, and to decrease when disposable income plunges (Buchmueller & Zuvekas, 1998; Srivastava, 2013). This phenomenon has also been confirmed by the previous chapter where we had seen an income effect for drinking that was independent of class mobility. As a result, one may expect income as a risk factor of substance use in this context.

However, the income effect may be heavily conditional on the level of other social forces. In the last chapter, we confirmed that income interacted with prestige changes, and its effect was also different between people who moved up and people who moved down. At the individual level, social class determines how much does one need to spend on substances to enter the competitive mobility arena—higher class occupants may

need much less effort than the aspirants. In this chapter, I will focus on the importance of community-level modernization, which has arguably changed the long-confirmed income influence on substance use through several ways: economic modernization has enlarged the opportunities to purchase substance; economic modernization has accelerated the need to purchase substance; social modernization has mitigated both the need and opportunities to purchase substances.

While economic modernization by itself has expanded the scale of free market economy, privatization, and availability of substance sellers, some of these effects only become effective when there are people who can afford the growing size of substance economy. When income approaches subsistence level, one barely has disposable wealth to acquire substances even when the availability is widespread and the promotion of substance is strong, unless s/he acquires it through illegal means. At the same time, the speed of economic growth is often correlated with pace of social mobility, if only the barrier between the heterogeneous population is not absolute (P. Blau, 1977). Most people have faced the opportunities and pressure of changing their occupation and social class during the Reform era, a significant historic change departing from the rigid classification of society before the 80s (X. Wu & Treiman, 2007). Therefore, the need to use substances as social tools in exchange for a better position in the mobility dynamics is greater when rapid economic modernization takes place, independent of the latter's own impact on substance use. On contrary, in a stable society where growth in economic scale, complexity of infrastructures, investment in social and economic advancement remain relatively slower, the need to purchase substances for social purposes will be correspondingly weaker. Very few studies have ever explored this moderation of

modernization by income, save some that discovered greater divergence of health inequalities marked among the post-Reform cohorts of China (F. Chen, Yang, & Liu, 2010; Schafer & Kwon, 2012). Thus, we arrive at the first interaction hypothesis between income and economic modernization:

*H5.1: There is a positive interaction between income and community economic modernization on drinking and smoking, net of their independent main effects and other covariates. There is a larger effect of income on drinking and smoking in communities with better development in economic modernization.*

Modernization in social services, on the other hand, may offer a different role for the utility of income. As argued in earlier section, social modernization provides alternative types of social activities, often manifesting in public engagement, civic participation, and improved institutional resources. These activities differ from traditional socialization occasions based on niches of class and kinship. If people find less stringent need to fit in a restricted group and greater freedom of choosing the types of public life, there will be similarly less need to purchase substances for socialization purposes. In addition, through establishing modern health facilities that more or less aim at reducing the perceived public health concerns such as smoking and drinking, social modernization also reduces the opportunities that one may spend on substances. Therefore, the second hypothesis states:

*H5.2: There is a negative interaction between income and community social modernization on drinking and smoking, net of their independent main effects and other covariates. There is a weaker effect of income on drinking and smoking in communities of better development in social modernization.*

### 6.2.6 *Social Disorganization*

A prominent theory in urban sociology and the studies of neighborhood phenomena is social disorganization theory. Modernization has produced differential distribution in institutional resources and created communities with unequal levels of social organization. The Chicago School scholars who first realized the social disorganization theory did so against the broad backdrop of urbanization and unequal development in the city's ecology. Concentrated poverty, high demographic heterogeneity, and frequent residential turnover, hallmarked a typical socially disorganized community where substance use prevails (Bursik, 1988; Shaw & McKay, 1969). Later modernization in the service-based industry, as Wilson has argued, further exacerbated the limited workforce opportunities for inner city dwellers and led some to adopt an alternative deviant lifestyle (Wilson, 1987). Concentrated poverty limits the capacity to leverage resources and combat social problems in the community. In case of population heterogeneity, inter-group barriers exist due to different values and attitudes, the ability to exercise control over infringement to communal interests and settle dispute is severely weakened. Similarly, too frequent residential turnover takes away the possibility to establish attachment, collaboration, and agents of social control (Sampson & Groves, 1989; Wacquant & Wilson, 1989). Population density as another important disorganization variable contributes to evaluated exposure to crime targets (L. E. Cohen & Felson, 1979; Osgood & Chambers, 2000).

Social disorganization theory, as well as a subsequent branch focusing on lower collective efficacy as a result of social disorganization, has made a tremendous breakthrough in explaining a variety of deviance behaviors including but not limited to

substance use. Unequal development generated differential access to institutional resources such as social service facilities, public goods, educational and recreational facilities, which contributes to social disorganization in some locations. Bursik and Grasmik (1993; 1993) distinguished three levels of mechanisms at which disorganization increases deviance: direct control among primary relationships, the parochial system of control--local interpersonal networks and the interlocking of local institutions, and external relationships between community and public institutions. Inability to utilize institutional resources that are otherwise provided to residents of more privileged communities proves to be an underlying mechanism to decrease collective efficacy and social capital (Morenoff, Sampson, & Raudenbush, 2001; Robert J Sampson, Jeffrey D Morenoff, & Thomas Gannon-Rowley, 2002), which in turn creates more substance use behaviors. In the context of China's rapid modernization and overall reforms, we need to pay particular attention to the apparatus of institutional resources and its impact on substance use.

Despite the potential applications of social disorganization theory to deviance and health behaviors, there are a very limited quantity of studies extending the test to Chinese society. Some studies by Messner and Zhang and others were able to examine neighborhood characteristics and crimes based on social disorganization theory s (S. Jiang, Wang, & Lambert, 2010; L. Zhang, Messner, & Liu, 2007, 2008). These studies focused on criminal activities and policing in the broader criminal justice scope of social control by the justice and public forces. But one issue is that certain aspects of social disorganization may have very different implications for Chinese society, and this makes its application to licit substance use maladjusted. For example, drinking and smoking



indoors and in public is not a misdemeanor or only informally discouraged in China; stronger social control does not relate to the organization of a neighborhood but instead may constitute a compensation for the withdrawal of governmental power, a phenomenon also seen in the U.S (Bursik, 1988). Many seemingly disorganized communities in China (as measured via higher residential turnover, greater neighborhood poverty, etc...) are controlled by local networks based on ethnicity or geographical origin. The current study is, to my knowledge, the first to critically examine the role of social disorganization factors on substance use in China. Per the theory, we expect to see:

*H6: Indicators of social disorganization, including ethnic heterogeneity, residential turnover rate, female-headed household rate, poverty rate, and population density, are associated with higher drinking and smoking, after adjusting for individual and urban-rural differences.*

### 6.3 Methodology

Systematic investigation into the modernization's role in substance use at the community level in China is underdeveloped. Modernization's differential impact among communities and areas, make it harder to draw a universal conclusion. As I have argued, modernization may influence how substance use is patterned via changing economic conditions, inequality, and social services. Such influences also can be captured by their interactions with individual gender and income.

I will use a specific type of mixed-effect modeling—the growth curve model—to analyze the specified hypotheses with time nested within individual persons and individuals within their communities. Regular linear regression fails to minimize unbiased variance when sampling units were themselves clustered within larger

aggregated units, since it assumes independent identical distribution for the sample. Growth curve modeling first allows a unique growth trajectory for each individual, deriving more accurate variance from partial pooling. It then applies the same logic to individuals who were sampled from their geographical communities (Raudenbush & Bryk, 2002). I have discussed this specific methodology in more detail in Chapter 2 for interested readers, as well as the sampling weight. The major analysis tool is a popular mixed-effect package “lme” in R (Bates, Mächler, Bolker, & Walker, 2014).

### *6.3.1 Measurement*

Several indicators of modernity were provided by the CHNS dataset based on a variety of measures available in the survey. These were pooled by CHNS researchers into indices of modernization. Economic modernization level is measured by several indicators including the typical wage for a manual worker, number of people working in non-agricultural sectors, and the number of large stores and supermarkets (indicating modernization of markets for goods). Social modernization is captured by four measures including: provision of preschool for children under 3 years old, availability of health insurance for women and children, proportion of households with treated water, and proportion of the residential area without excreta present. These indicators were reported by official records or community administrators, rather than aggregated from household surveys of individuals. They were used to construct indices of urbanization by the CHNS, but are equally legitimate to measure modernization when controlling for rural-urban differences (Jones-Smith & Popkin, 2010; Monda, Gordon-Larsen, Stevens, & Popkin, 2007). Income inequality, another outstanding feature of China’s rapid modernization, is

aggregated with individual level income information by Gini Coefficient, defined as:  $G =$

$$1 - 2 \sum_1^n \frac{(n+1-i)X_i}{n \sum_1^n x_i}.$$

I have adopted the mainstream measures for testing social disorganization theory. They are neighborhood poverty, ethnic heterogeneity, residential turnover rate, population density, and female-headed households in the community. Community-level poverty is measured by Foster-Greer-Thorbeck index:  $FGT = \frac{1}{N} \sum_{i=1}^H \frac{z-y_i}{z}$ , where  $z$  is the poverty threshold defined as the bottom quintile of community income,  $N$  is the number of people in the community,  $H$  is the number of the poor (those below  $z$  criteria), and  $y_i$  is the income of each individual  $i$ . To capture ethnic heterogeneity of a community, a Simpson's Diversity Index is used and defined as  $1 - \sum_{i=1}^k n_i(n_i - 1)/n(n - 1)$ , where the relative size of  $i$ th ethnicity in  $k$ th community increases the overall heterogeneity when it gets closer the relative size of other ethnicities. In practice, this diversity index reaches its lowest when Han is the absolute majority. Population turnover rate is measured by the percentage of individuals in the sample who left a community at each subsequent wave. Population density is simply dividing population by community area. Female-headed household is defined as a female being reported as "household head" from the three types of household relationship: "household head", "spouse", and "parents." I then constructed the communal level variable as the percentage of female-headed households in a community. A dichotomous variable indicating the rural versus urban status of the community is used to account for rurality.

For individual characteristics, we have adopted the fundamental socioeconomic and demographic measures including: income measured in yearly Yuan, education

measured by highest degree completed, ethnicity (dichotomy of Han or ethnic minority), gender, as well as occupational class categorized per a socialist context into the unemployed, workers, self-employed, owners, farmers, and retirees.

## 6.4 Results

### 6.4.1 *Drinking*

First we look at the results for drinking, a more prevalent practice of substance use in modern China. Figure 6.1.1 features descriptive outcomes from a latent trajectory modeling based on the changes of drinking level in the sample. The current modeling gives the best classification of latent trajectory groups in terms of both goodness of fit and parsimonious interpretability. Evidently, there are four types of drinkers in China over the last two decades. The first group comprising 17.3% of all people is a “moderate drinker” group that has a consistent moderate level of drinking across all waves. The second group comprising 53.1% people can be called the “abstinent group” who have never drunk. A total of 10.1% people drank at very low level or did not drink in the beginning, but gradually increased as time progresses, they may be called the “growing people”. The fourth group—“experienced drinkers”—already drank regularly at earlier waves and have kept the behavior with moderate fluctuation. We conclude there are apparently heterogeneous groups of (non)drinkers whose behaviors were subject to a diverse range of impacts exerted by their respective community and individual characteristics.

The first model in Table 6.1.1 is an unconditional growth model with only time variable and a random intercept that also varies with the second and third level units. The

negative term of wave (-.004,  $p < .05$ ) shows a slightly declining trend of drinking over the years. In this baseline model, variance at the individual level  $\tau_{00}$  is largest as 1.71, at the community level  $\tau_{00}$  is 0.1, while wave variance after accounting for growth effect is only .001. The difference of drinking is the greatest at the individual level than temporal or community level. Intraclass correlation coefficient (ICC)<sup>3</sup> for individual level indicates that 31% of all differences of drinking behavior exist at individual level.

In the second model, individual-level characteristics including income, education, ethnicity, and class were introduced, as well as economic modernization as the community level factor. As with the existing literature, income is to increase substance use but for education among Chinese, the negative coefficient for education is not statistically significant. Han majority drink at lower frequency, and males drink much more than females. Consistent with findings from Chapter 3, all classes other than retirees were much more likely to drink when compared with unemployed persons. This model reinforces the previous conclusions from Chapter 3 that drinking is a normative activity encouraged or enforced in the labor market and general social hierarchy. It is the people with higher income and social standing that drink, rather than those fitting the stereotypical image of irresponsible lazy drinkers. However, refuting hypothesis 1, economic modernization, measured by typical standard wages, percentage of non-agricultural sector, number of supermarkets and stores, is negatively associated with drinking. The better developed a community is in economic sector, the less its populace drinks. The first hypothesis that economic modernization elevates individual drinking

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<sup>3</sup>  $ICC_i = \tau_i / (\tau_i + \tau_{i2} + \dots + \tau_j + \epsilon)$ .

level is thus refuted. The proportional reduction of error (PRE) for variances tells how much the addition of new variables explains the dependent variable, in comparison to the previous model<sup>4</sup>. The PRE at community level is minimal, but very large at the individual level. Almost 50% of individual variances were explained by the addition of individual socioeconomic and demographic information ( $0.49 = (1.71-.87)/1.71$ ). Judging by AIC and BIC, the current model is a significant improvement over the baseline unconditional model.

Model 3 tested individually the effect of social modernization on drinking, which does not turn out to be a significant effect at 0.05 p-value. With equal number of parameters but one less significant coefficient, model 3 has a slightly lower fitness than model 2, judging by both AIC, BIC, and the PREs. We cannot confirm hypothesis 2 that social modernization reduces drinking. Model 4 tested and found a significant effect of inequality on drinking. Income inequality in the community is negatively associated with drinking. The more unequal a community is, the less its members drink, which refutes the hypothesis H3, which proposes that inequality is detrimental to good health behaviors. In model 5 where all three variables were jointly tested, we still see the two negative associations of economic modernization and inequality. We now have to accept the rejection of hypothesis 1 and 3. The fact that inequality and economic modernization are both negatively associated with drinking leads to the suspicion that all aspects of modernization may contribute to less drinking. However, interesting nuances will not be shown until we find the conditional nature of modernization in the interactive models.

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<sup>4</sup>  $PRE = (\tau_{m1} - \tau_{m2})/\tau_{m1}$ .

As argued earlier, community modernization development may not just directly influence substance use, it can exert considerable influence through differential roles of individual socioeconomics and gender. The first model in Table 6.1.2 adds interaction terms between gender and economic modernization, social modernization, and inequality, so to test hypothesis H4.1 and H4.2. These hypotheses serve to answer substantive questions: Did economic and social modernization increase female drinking more than they did to male drinking due to the changing gender pattern in a modern society? We can give affirmative answers to these two research questions based on the significant and negative interactions between modernization and gender. When gender equals male, every one-unit increase of economic modernization leads to 0.02 reduction in the five levels of drinking, and every one-unit increase of social modernization reduces 0.01 drinking level. The first two interactive plots in Figure 6.1.2 visualized such contrasting effects of modernization between genders. Hypothesis H4.1 and H4.2 expected the traditional substance pattern to be reversed when modernization takes place due to changed gender norms and the nature of women's working lives. Modernization may change gender role definitions, the acceptability of female drinking, and the opportunities women have access to alcohol, and here we have shown the exact pattern. Modernization in both economic and social realms increases female drinking while reduces male drinking.

Hypothesis 3.1 asks whether poor people living in an unequal neighborhood are more likely to drink than the richer people thereof because of relative deprivation, or whether the rich smoke less in unequal neighborhoods. Hypothesis H5.1 and H5.2 expect to see income's effect to be stronger in economically modernized communities, but

weaker in socially modernized communities. We have found evidence for H5.2, weak evidence for H3.1, but no evidence for H5.1: the interaction between social modernization and income is significantly negative, between inequality and income is marginally significant at p level of 0.07, but not significant between economic modernization and income. The last two interactive plots in Figure 6.1.2 show that in a community with one standard deviation higher level of social modernization, the slope of income is much flatter than in a community with one standard deviation lower level of inequality. Similarly, at the lower end of income, a person living in high inequality community (blue line) would drink more than someone living in a low inequality community (red line). Therefore, even though community inequality is negative associated with drinking, poor people living in an unequal community drink more than if they live in a more egalitarian community. In addition, the incremental effect of income on drinking is suppressed in a socially modernized community.

#### 6.4.2 *Smoking*

Latent mixture modeling based on best goodness of fit and parsimony has generated four classes of smoking trajectories from 1991 to 2011 as seen in Figure 6.2.1 (the 1989 survey did not request smoking information). Compared with drinking trajectory groups, there is more heterogeneity in smoking. While most people, save the “growing group”, either do not drink or drinking is relatively stable, there are “increasing”, “decreasing”, and stable groups in terms of smoking. A total of 57.9% people had never smoked over the entire course of consecutive surveys, while 16.9% people had kept smoking at high frequency (at least 15 cigarettes per day) throughout years. A smaller group of 11.6% reported to smoke about 10 cigarettes per day in the first



two waves, but their smoking quantity continued to decrease to almost zero in 2011. Another contrasting group with 13.7% people smoked 5 cigarettes a day in 1991, but they had gradually increased the quantity to approximately 10 cigarettes by the last survey wave. Therefore, there is not a uniform growth pattern among all people, and we are interested in exploring what communal and individual factors have caused such a diverse range of smoking behaviors.

Similar to Table 6.1.1, model 1 in Table 6.2.1 presents an unconditional growth model with only random intercept and a wave indicator. There is a slightly declining trend of smoking as time progresses in the entire sample, although some population sector had increased smoking as we have seen in Figure 6.2.1. Individual-level variance is 49.2, and community-level variance is 1.5. Using these estimates as a comparison, subsequent models with individual and community modernization variable has reduced the variance at individual level by 43%. Models 2 and 3 reduce variances at the community level by 4%, model 4 reduces less than 1% due to non-significant addition of a parameter, and model 5 reduces variances at the community level by as much as 13%. This indicates that 13% of community's differential impacts on smoking came from only three variables: economic modernization, social modernization, and inequality. Substantively, income is found to increase smoking, while higher education decreases smoking. Being male is a large risk factor for smoking. All classes except the retired smoke more than the unemployed, confirming Chapter 4's findings. Among community modernization and inequality variables, both economic and social modernization were independently associated with less smoking. But in the full model 5, only social modernization is still significantly associated with less smoking. The insignificance of

economic modernization in the full model perhaps can be attributed to the confounding influences between the three closely related factors during modernization. We have only found support for hypothesis 2: social modernization is negatively associated with one type of substance use—smoking ( $-.02, p<.05$ ). There is still no support to hypothesis 1 and 3, which proposes a positive relationship between economic modernization, inequality, and substance use.

Adding interaction terms in Table 6.2.2, all individual characteristics remain similarly effective as in Table 6.2.1. For smoking, none of the gender interactions were significant at 0.05 level or even marginally significant, this is a stark contrast to drinking. We suspect the gender pattern against female smoking is much stronger than against female drinking, so strong that even modernization processes could not alter it significantly. However, all interactions between modernization factors and income were significant and point to the expectations of the hypotheses (H3.1, H5.1, H5.2).

The interaction between inequality and income is negative ( $-2.5, p<.05$ ), between social modernization and income is negative ( $-.03, p<.01$ ), between economic modernization and income is positive ( $.03, p<.05$ ). For smoking, as was for drinking, a poor person living in a less equal community (blue line in the last Figure 6.2.2) is much more likely to smoke and smoke more, in contrast to another person with similarly low income but living a more equal community (red line). The incremental effect of income on smoking is largely suppressed by social modernization. The second graph in Figure 6.2.2 has a blue line representing communities with one higher standard deviation of modernization in social services, the slope of income on smoking is almost flat in comparison with the red line, which represents communities with lower social

modernization. In contrast, the slope of income is much steeper in communities with one higher standard deviation of economic modernization. Subtracting variances of the current model from the full model in Table 6.2.1, the interactions between community variables and income account for 4% more of community variance in smoking.

### 6.4.3 *Social Disorganization*

A bivariate correlation matrix of social disorganization variables and substance use status is recorded in Table 6.3. We can derive some straightforward relationships and get an intuitive understanding about neighborhood social disorganization and substance use. First of all, smoking is strongly correlated with drinking (.42,  $p < .001$ ), so is heavy smoking and heavy drinking (.37,  $p < .001$ ). General smoking and general drinking are all associated with less female-headed households, less population density, lower population turnover rate, and lower poverty rate. They have different directions in association with urban residence, but these raw correlations already tell a different story than the theory suggested: social disorganization may not contribute to general and licit substance use. The parameters in parentheses indicate associations with heavy drinking and heavy smoking. For heavy drinking, residential turnover rate contributes to more heavy drinking, but poverty rate still reduces it. For heavy smoking, there are also divergent roles of different disorganization variables: population density and female-headed households are negatively correlated with heavy smoking, but the rates of residential turnover and poverty are positively correlated with it. Given that general use of licit substances has dramatically different connotation than heavy substance use, the same social disorganization factor may naturally bear different consequences on them. Some of such divergent effects are evident in bivariate correlation, we now turn to hierarchical

regression to see whether social disorganization variables predict general or heavy use of substances after controlling for confounding factors and unequal variances arise from sample units.

In Table 6.4, results from models for both drinking and heavy drinking suggest weak confirmation of social disorganization theory. Residential turnover rate, measured by the percentage of the sample left the same community in a subsequent wave, significantly leads to higher drinking level (.15,  $p < .05$ ) and more heavy drinking (.04,  $p < .01$ ). But poverty rate is negatively associated with both drinking (-.40,  $p < .001$ ) and heavy drinking (-.07,  $p < .001$ ), rejecting social disorganization theory's prediction that poverty in a community poses risk for deviant behaviors, at least, not in the case of drinking. There is even less evidence to support the theory based on the findings from smoking and heavy smoking. Population density is negatively associated with smoking (-.17,  $p < .001$ ) and heavy smoking (-.004,  $p < .05$ ), while the general literature detailed that density increases deviance and victimization due to increased exposure and less effective social control. Although drinking and smoking are strongly correlated, drinking is more prevalent in urban settings (.17,  $p < .001$ ) while smoking is less common in urban areas (-.58,  $p < .01$ ). While heavy substance use should depart from general use in health impact and symbolic connotation, the differences between heavy use and general use as seen in our models are more in extent than in nature. There are only some coefficient magnitude and significance differences between heavy drinking and general drinking, and between heavy smoking and general smoking.

## 6.5 Summary

Both smoking and drinking are subject to significant communal and individual factors, as we have seen in the last few models. Although they are different types of substances and involve different manners and motivations of using, smoking and drinking do share many commonalities. Although drinking is much more acceptable and even encouraged under specific circumstances for women, they nevertheless drink much less than men, just as they also smoke less than men. Both drinking and smoking are marks of more advantaged social standing measured by income and occupation class. This is not too surprising since we have already discussed the normativity and necessity of drinking and smoking for upward mobility and socializing in contemporary China, and tested empirically in Chapter 3 and 4 the extent to which drinking and smoking prevent unemployment events and are associated with higher occupational classes. Development to achieve economic and social modernization since the Reform after the 80s has brought about enormous changes to the communal living in contemporary Chinese society, and some related to substance use.

### 6.5.1 *Economic and Social Modernization*

Some development sociologists posit rapid economic development may lead to adverse health outcomes through stress and increased exposure opportunities brought by a large number of new substance outlets under the booming economy. But we failed to find economic modernization to increase substance use, instead, it reduced drinking according to the models. One theoretical linkage behind the refuted economic modernization hypothesis argues that economic development creates greater exposure opportunities, as bars and night clubs multiply during this time period. This study did find

alcohol outlets measured by stores selling alcohol products to be associated with more individual drinking, but tobacco outlets did not contribute to individual smoking levels, therefore only partially supported the exposure opportunity argument. An explanation offered by observers of substance use could be the ubiquity of tobacco products. A community does not need a large store stocking cigarettes to provide a sufficient supply of tobacco. Cigarettes are being sold in a variety of outlets ranging from street stalls to convenience markets in contemporary China, and buyers need no sophisticated information to access to any seller. Therefore, exposure to substances is no more widespread than it was in the past, after controlling for people's purchasing power.

Even when alcohol outlets in a community was found to be associated with more drinking, the economic modernization may still reduce drinking by providing new rewarding jobs, the liberty of choosing occupation and trades, more satisfactory workplace experiences, which ultimately lowered stress levels and the social obligation to drink. The post-Reform life for Chinese represents both challenge and liberty. Not only were millions lifted out of poverty, they now are also presented with new lifestyles that loosen many previous obligations, one of which is using substance as an important way to celebrate and socialize.

At the same time, the hypothesis 2 is supported by this study: social modernization is associated with a lower level of smoking. In communities with more medical insurance, preschool, and higher sanitary standards, people may smoke less likely due to rising awareness and concerns regarding health prevention, long-term investment, delayed gratification, attention to education rather than hedonism, and many other changing psychological and cultural processes connecting the broader

developmental environment and manifested in individual behaviors. More than changing the normative sanctions regarding smoking and drinking, social modernization also provides alternative means of engaging in public life than what traditional lifestyle afforded through collective participation in substance use. The type of strong ties and mechanical solidarity based on kinship, work unit, and place of origin have gradually faded in modern China. In its place, people spend more time in civic and voluntary public life where substance use is marginalized or even prohibited. Overall, if substance use is considered as a problem for concerned personnel, they may consider modernizing the society both economically and socially to combat the problem.

#### *6.5.2 Health Disparities During Modernization*

Income has been consistently found to relate to higher smoking and drinking phenomenon in China (X. Chen et al., 2004; Pan, 2004; Siegrist et al., 1990; B. Wu et al., 2008). Income can increase substance use through very rational motivations: people tend to spend more on recreation and socialization utilities when basic needs are satisfied. Licit substance possess tremendous social functions in the contemporary social world of China, spending on alcohol and tobacco, sharing them as social lubricant, and sending them as gifts can be regarded as a form of investment (Z.C. Rich & Xiao, 2011). Therefore, the need to allocate disposable wealth to substance purchases also depends on situational contexts: whether such need to predominant, whether other people will value the collective participation in substance use, whether hierarchical inequality in class and occupation mandates lower class occupants to use substances as symbolic gifts.

Therefore, we have anticipated to see a significant amount of interactions between modernization factors and income. Whereas economic modernization may amplify the

positive income effect by providing burgeoning substance sales (the opportunity) and more social mobility events (the demand), community-level modernization in social services may suppress the income effect because such communities see better investment in health facilities, civic engagement, and sanitary standards. The interaction between communal income inequality and individual income was also hypothesized to be negative because the poor will have greater need to cater to higher classes via social smoking and drinking, and the greater amount of stress they endure via relative deprivations also leads to more substance use (Hill & Angel, 2005; Liu, 2003). All these three hypotheses were confirmed except that the interaction between economic modernization and income was significant exclusively for smoking after controlling for other covariates.

Rapid development in the post-Reform China has created health disparities by introducing varying levels and dimensions of modernization in communities. Some have already noted the relationship between fast GDP growth and substance use (A. R. A. Stevens & Caan, 2008). To further previous scholarship, we have shown that development is not unidimensional. In main effect models, we have seen social modernization to reduce smoking, and economic modernization and inequality to reduce drinking. But now we also touch base with where health disparities emerged: the effects of all three common aspects of modernization—the economic, the social, and inequality—influence our health behaviors through the moderation of income, and vice versa. While income increases substance use, its incremental effect significantly depends on community modernization and inequality: the positive income effect is suppressed in communities with higher levels of social modernization and inequality, but is amplified by economic modernization. Men tend to use substance much more than women do, but



both economic and social modernization cause women to drink more without bringing the same increase to men. Part of the reason relates to women's new position in a modern society.

### 6.5.3 *Changing Gender Roles*

As women get better education and equal opportunity in the workplace, gender roles have changed in numerous ways. This study showed both social and economic modernization interact with gender in a manner that women will drink more in modernized communities, but male drinking levels decrease as social and economic modernization progress. Although the same interactions for smoking were not significant statistically, the reason of which we attribute to the much stronger cultural sanction against female smoking, the direction of the effects is the same: both economic and social modernization has elevated the risk for women but reduced it for men. At the very least, both hypothesis 4.1 and 4.2 are confirmed for drinking.

Smoking and drinking in contemporary modern China can help construct an independent and liberalized female identity, while the need to demonstrate masculinity through risk taking and substance use is simultaneously less urgent (Elkind, 1985; Gilbert, 2007). Today's China has witnessed tremendous transformation in gender roles and the patriarchy, experiences of men and women drinking together at entertainment occasions, a business meeting, or even official gatherings is common and frequent. Younger women particularly pursue what was not formerly permitted to show off independence and disdain for traditionalism. Licit substance use then becomes the most convenient and easily accessible token not deprived of pleasure while demonstrating this modernistic identity.

Female and male substance use behaviors may also converge because women now face a higher level of exposure to substances and stressful work-home imbalance, owing to their entrance into the workplace while bearing multiple social roles at one time. Earlier studies on other health and behavioral issues have long suggested an ironic phenomenon: economic liberalization and converged gender division of labor could reduce mental health and physical wellbeing for women, at least when other gendered norms were not simultaneously relaxed (Artazcoz, Benach, Borrell, & Cortès, 2004; Lennon & Rosenfield, 1992). This is especially true when women are able to enter the pool of economic competition freely but unequal and discriminating treatment and underserved rewards are still ingrained, which further deteriorates their sense of self-efficacy and mental wellbeing (Banerjee, 2014; Umberson, Chen, House, Hopkins, & Slaten, 1996).

#### *6.5.4 Social Disorganization Theory*

The current study has also focally tested social disorganization theory. The theory, built upon the academic tradition of urban ecology, contends that the chaotic condition in many transitioning zones was responsible for rampant deviance and crimes. The disorganized neighborhoods have little power to control perceived issues due to weak informal control, low surveillance, and weak assertion of values among residents, and they were characterized by high level of residential instability, ethnic heterogeneity, family disruption, poverty, and dense habitation (Bursik, 1988; Sampson, 2002). The core message of the theory reflects the importance of place on individual behaviors. We hypothesized that community social disorganization variables would increase drinking and smoking. However, findings from the neighborhood disorganization variables did not

support what the theory has predicted. Only residential turnover rate was consistently associated with drinking and heavy drinking, most other factors were not significantly associated with either forms of drinking and smoking, and poverty rate even reduced drinking and heavy drinking.

Rather than outright refuting the long-standing theory, we suggest the inaccuracy of categorizing certain phenomenon as deviant, which in this case pertains to substance use. As we have discussed at length in previous chapters, especially chapter 1 and chapter 3, smoking and drinking in China are often a symbol of social standing and liberalization, they also signify purchasing power in a market filled with luxury gift products of tobacco and alcohol. Instead of being a token of deviance and rebellion against the mainstream society, the status of a substance lies rather on the other side of the line: it manifests conformity and success in the mainstream society. Even though we also found modernization to reduce substance use, it does so rather by a cultural and institutional mechanism such as changing gender roles or providing health resources than by legalistic penalization, following the latter would directly assume a deviant nature of substance use. We thus caution against a perspective that unreflectively treats substance use, especially its licit forms, as deviance and a target for eradication.

Moreover, as pointed by critics, many behaviors can unfold in places outside of residential neighborhoods where most conventional survey, including ours, took place (Robert J. Sampson, Jeffrey D. Morenoff, & Thomas Gannon-Rowley, 2002). Smoking and drinking, heavily influenced by social motivations, may well likely occur in public spaces other than in residential neighborhoods. For the same reason, many have proposed to pay more attention to the design of neighborhood sampling frame based on

“street logic”, because bloc face and census track sometimes arbitrarily and artificially divide a natural neighborhood into heterogeneous parts (Coulton, Korbin, Chan, & Su, 2001; Sampson, 2012), especially when people’s social networks traverse across street boundaries (Morenoff et al., 2001).

Another possibility why the theory was not supported by our models lies in the nature and history of China’s neighborhood arrangement and urban planning. Unlike capitalist democratic countries, on which most studies of social disorganization theory were based, China still undergoes a series of experiments with residential planning. The theory at its core assumes broader freedom in the choice of residence, at least when unrestricted by sources. Only on this condition, immigrants could have settled in ghettos, richer people could have joined the “white flight”, and people of different cultures could have mixed in certain communities. Although admittedly China has moved largely in the same direction since the liberalization of property ownership, the many key aspects of social disorganization theory face limitation in the Chinese context. There is internal migration on large scale, ethnic minorities do exist in large numbers, and poverty is indeed a real problem until today, but many regulations have prevented migration from turning into full-on residential instability in the cities, prevented ethnic others from living in mixed neighborhood, and prevented prevalent poverty from becoming concentrated poverty. Still tight control of the household registration system (hukou system) realistically restricts many migrants to specific types of residence and areas (Möbrant, 2006). It also shapes ethnic minorities to reside with their ethnic members instead of freely mixing with Han, and the much familiar scenario becomes segregation rather than heterogeneity (Gladney, 1998). Commercial housing only gradually appeared since the

mid-90s, and the household registration system still limits the ability of free will to chase what money can buy. Often the poor and the rich, so long as they belong to the same work unit or political camp, live side by side and send children to the same public school, a socialist tradition that has been little altered by the market reform (Logan, Bian, & Bian, 1999; X. Wu & Treiman, 2007). Therefore, the very extent to which the key variables of social disorganization theory can capture the neighborhood condition of deviance in China is seriously doubted, so is whether licit substance use can be considered as deviance.

Overall, this study has provided a fuller image of community-level development and disorganization on substance use during the twenty years of the post-Reform China. Modernization process as a whole has contributed to less smoking and drinking, but its effects are very divergent depending on one's gender and income. Health disparities in terms of substance use may become a realistic concern for people living with a number of combinations of neighborhood factors and individual characteristics. Such groups as the low income people living in high inequality communities, high income people living under high economic modernization, and women living under high economic and social modernization, face greater risks of substance use. Rapid rise of modernization in China proves to possess undeniably strong and far reaching influences on people's substance use behaviors, reflecting the importance of understanding the process of economic and social organization within communities for our behavioral outcomes.

### 6.6 Tables and Figures

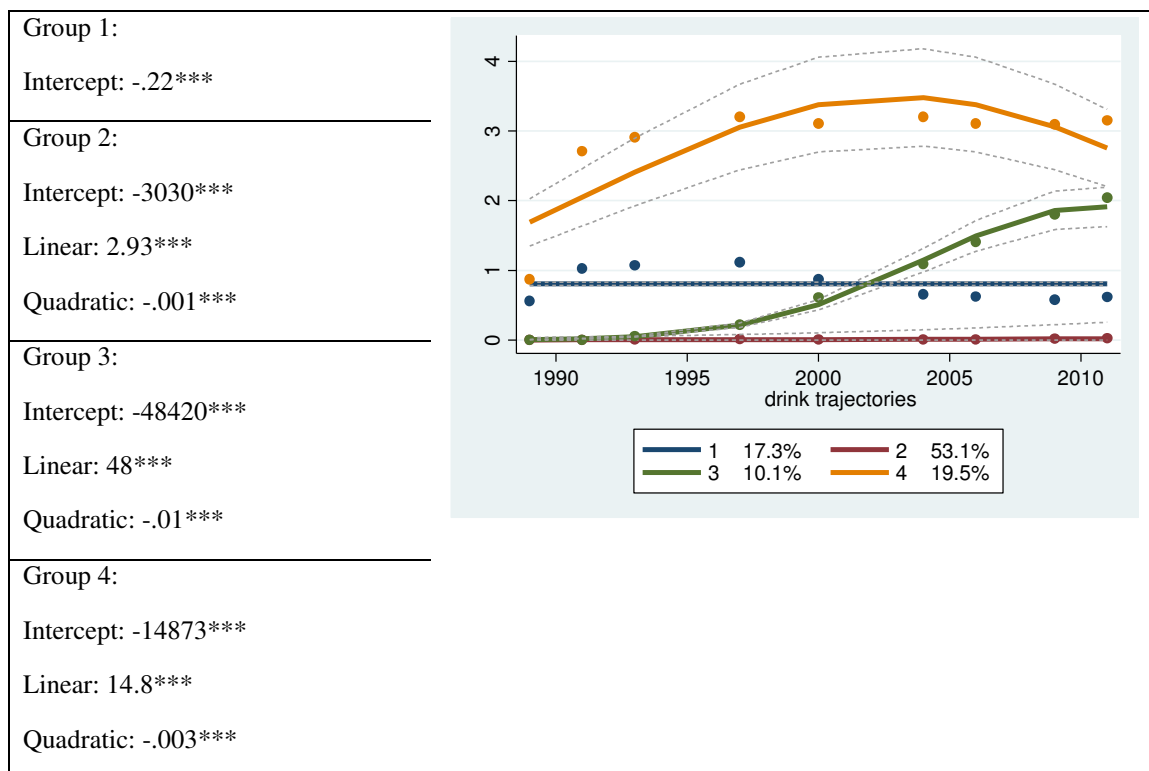


Figure 6.1.1

Table 6.1.1 Drinking Models

	Unconditional model 1		Model 2		Model 3		Model 4		Full model 5	
	Estimates	s.e.	Est.	s.e.	Est.	s.e.	Est.	s.e.	Est.	s.e.
<b>Time variable:</b>	-.004*	.002	.001	.002	.001	.002	.001	.002	.001	.001
<b>Wave</b>										1
<b>Individual variables</b>										
Income			.03***	.01	.03***	.01	.04***	.01	.04***	.006
Education			-.001	.008	-.001	.007	-.002	.01	-.01	.01

Table 6.1.1 continued

Gender		1.86***	.02	1.86***	.02	1.86***	.02	1.86***	.02
Han		-.09*	.04	-.09*	.05	-.09*	.05	-.09*	.05
Class (unemp)									
<i>Worker</i>		.15***	.02	.14***	.03	.14***	.03	.13***	.02
<i>Self-employ</i>		.15***	.03	.12***	.02	.12***	.02	.15***	.03
<i>Owner</i>		.33***	.04	.33***	.04	.32***	.04	.31***	.04
<i>Farmer</i>		.12***	.02	.12***	.03	.11***	.03	.12***	.02
<i>Retiree</i>		-.10***	.03	-.10***	.00	-1.3***	.36	-.11***	.03
					2				
<b>Community variables</b>									
Modern economy		-.01**	.00					-.01**	.00
			3						3
Modern social				-.001	.00			.002	.00
					2				2
Inequality						-	.36	-1.24***	.37
						1.27***			
AIC	212267	198799		198807		197548		197636	
BIC	212321	198942		198950		197690		197797	
Deviance, df	212239, 6	198767,1 6		198775,1 6		197516, 16		197509,1 8	
Residual	3.62	3.57		3.57		3.57		3.57	
Time variance $\tau_{00}$	.002	.002		.002		.002		.002	
Individual variance $\tau_{00}$	1.71	.87		.87		.87		.87	
Community variance $\tau_{00}$	.10	.11		.11		.10		.10	
N1, N2, N3	8,12432, 235	8,12376,2 35		8,12376,2 35		8,12374 ,235		8,12374,2 35	

Significance level: \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , all are two-tailed tests based on t-values.

Table 6.1.2 Interaction of Individual and Communal Variables on Drinking

Drinking	Interaction model 1		Interaction model 2	
	Est.	s.e.	Est.	s.e.
<b>Time variable: Wave</b>	.001	.001	.001	.001
<b>Individual variables</b>				
Income	.04***	.01	.05***	.01
Education	-.003	.01	-.003	.01
Gender	1.87***	.03	1.86***	.02
Han	-.08*	.04	-.09	.05
Class (unemp)				
<i>Worker</i>	.13***	.03	.14***	.02
<i>Self-employ</i>	.14***	.03	.15***	.03
<i>Owner</i>	.32***	.04	.32***	.03
<i>Farmer</i>	.11***	.01	.12***	.02
<i>Retiree</i>	-.11***	.02	-.10***	.03
<b>Community variables</b>				
Modern economy	.006	.004	-.007*	.003
Modern social	.01*	.003	.01	.01
Inequality	-.61	.48	-1.02**	.04
Economy X gender	-.02***	.01		
Social X gender	-.01*	.004		
Inequality X gender	-.86	.68		
Economy X income			-.001	.001
Social X income			-.01***	.002
Inequality X income			-.46 <sup>†</sup>	.25
AIC	197225		197504	
BIC	197461		197710	
Deviance, df	197209,23		197458,23	
Residual	3.57		3.56	
Time variance $\tau_{00}$	.002		.002	
Individual variance $\tau_{00}$	.83		.86	
Community variance $\tau_{00}$	.03		.10	
N1, N2, N3	8,12374,235		8,12374,235	

Significance level: \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , <sup>†</sup> $p = .07$ , all are two-tailed tests based on t-values.



Figure 6.1.2 Interaction Between Individual and Community Characteristics

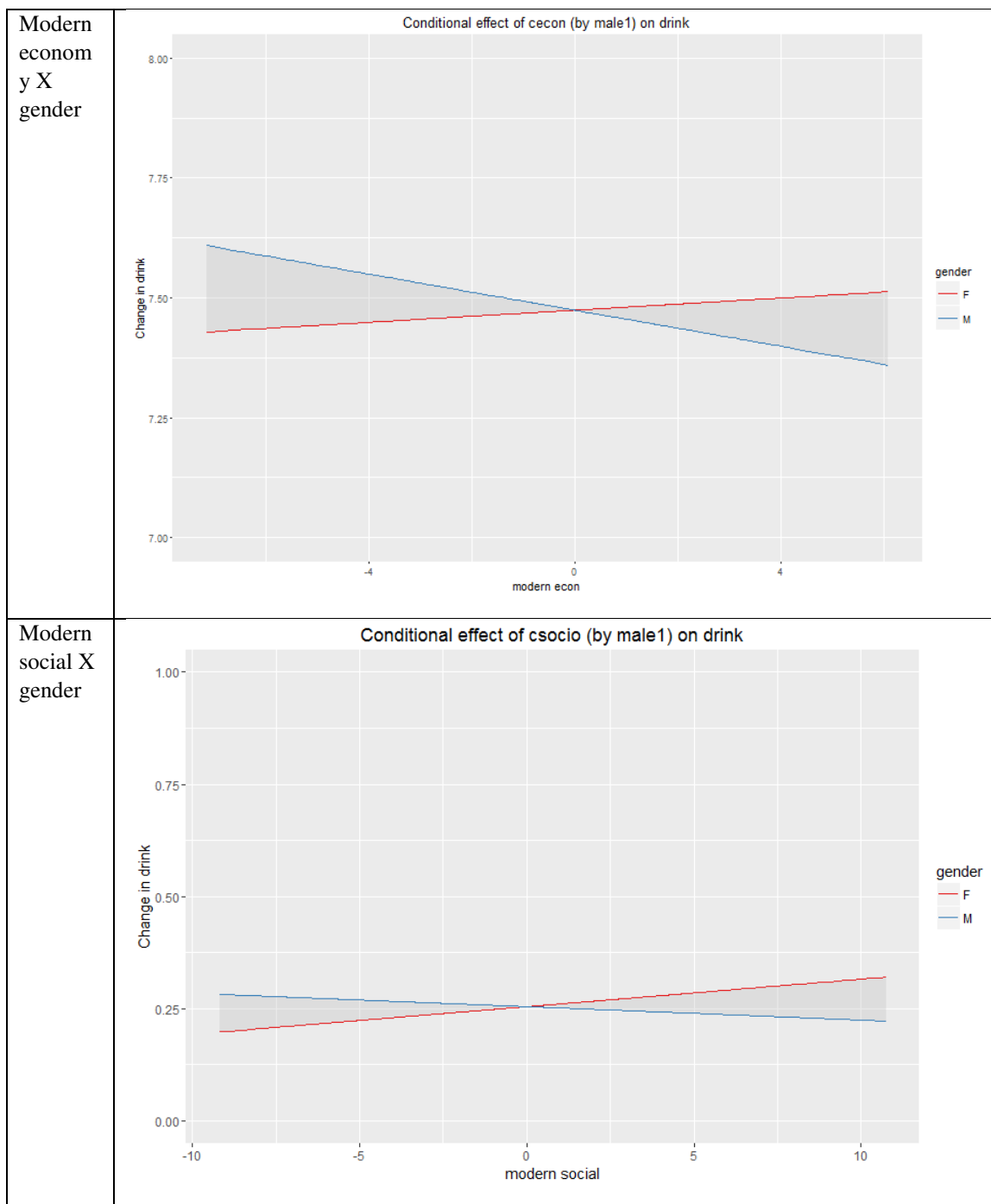
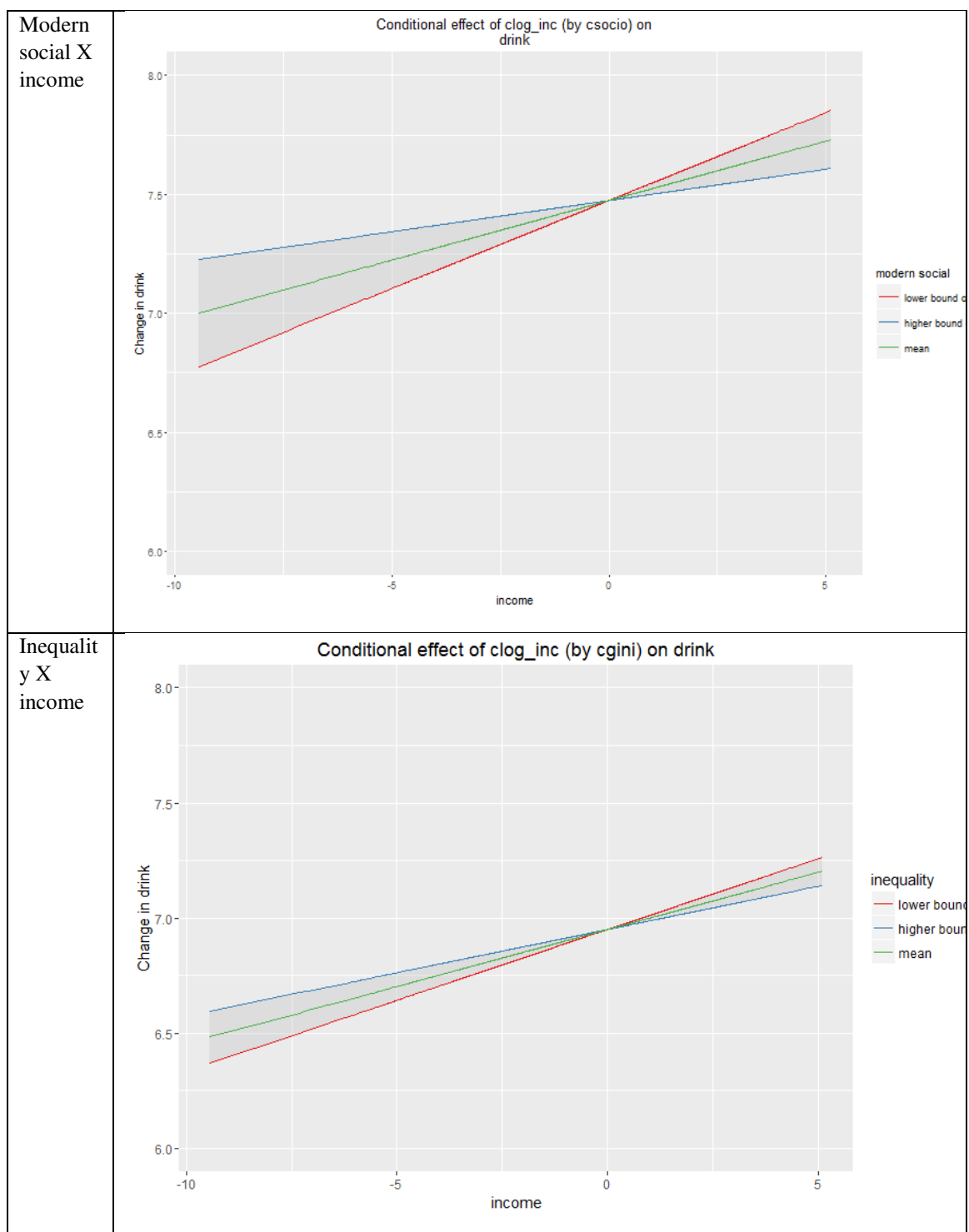


Figure 6.1.2 continued



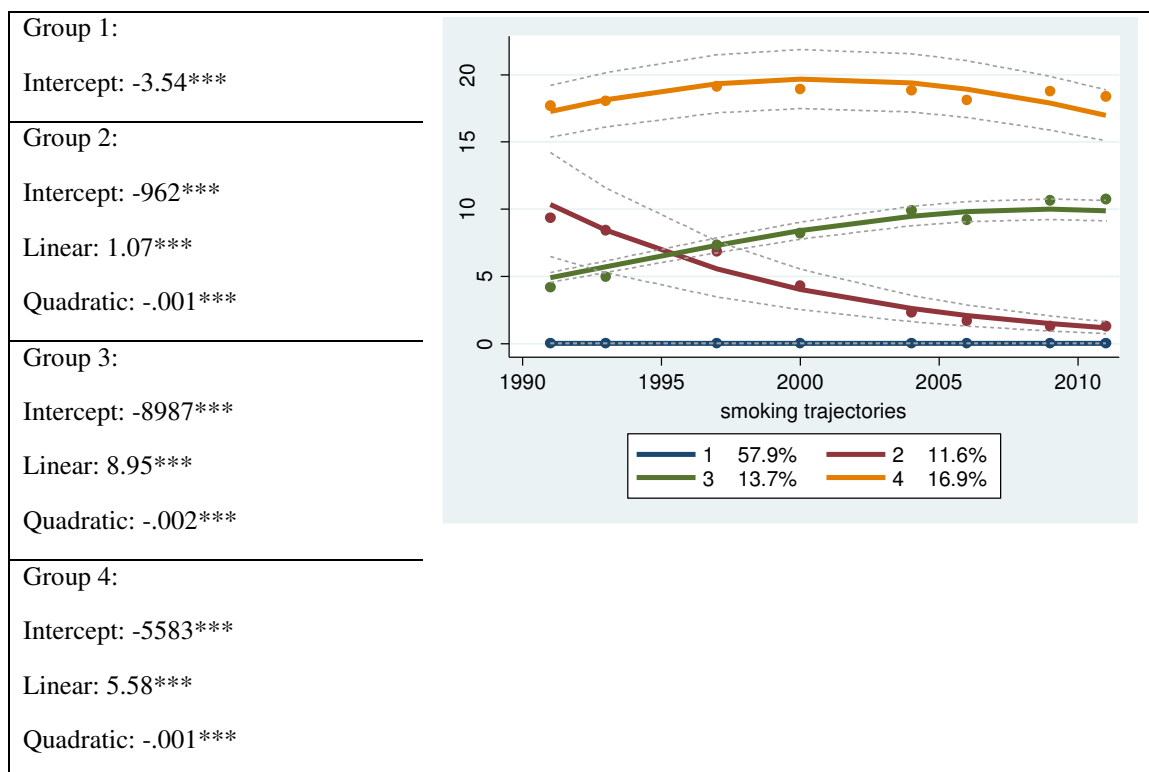


Figure 6.2.1

Table 6.2.1 Smoking Models

	Unconditional model 1		Model 2		Model 3		Model 4		Full model 5	
	Estimates	s.e.	Est.	s.e.	Est.	s.e.	Est.	s.e.	Est.	s.e.
<b>Time variable:</b>	-.06***	.00	-.04***	.01	-.04***	.01	-.04***	.01	-.04***	.01
<b>Wave</b>		1								
<b>Individual variables</b>										
Income			.06*	.03	.11**	.03	.11**	.03	.11**	.03
Education			-.08	.04	-.08*	.04	-.09*	.04	-.09*	.04
Gender			9.08***	.11	9.08***	.11	9.08***	.11	9.07***	.11
Han			.04	.22	.05	.23	.04	.22	.06	.22

Table 6.2.1 continued

Class (unemp)									
<i>Worker</i>		.71***	.11	.71***	.11	.68***	.11	.69***	.12
<i>Self-employ</i>		.65***	.12	.66***	.12	.68***	.12	.64**	.12
<i>Owner</i>		1.23***	.18	1.23***	.18	1.19***	.18	1.20***	.18
<i>Farmer</i>		.56***	.09	.56***	.09	.57***	.09	.55***	.09
<i>Retiree</i>		-.67***	.12	-.67***	.12	-.72***	.12	-.69***	.12
<b>Community variables</b>									
Modern economy		-.03**	.013					-.02	.01
Modern social				-.03*	.011			-.02*	.01
Inequality						1.62	1.68	1.96	1.68
AIC	373189	360871	360870	358480	358474				
BIC	373242	361013	361012	358622	358634				
Deviance, df	373177,6	360839,16	360838,16	358448,16	358438,18				
Residual	74.35	74.2	74.2	74.2	74.2				
Time variance $\tau_{00}$	.01	.01	.01	.01	.01				
Individual variance $\tau_{00}$	49.15	28.14	28.14	28.14	28.14				
Community variance $\tau_{00}$	1.47	1.41	1.41	1.46	1.34				
N1, N2, N3	8,12432,235	8,12370,235	8,12370,235	8,12368,235	8,12368,235				

Significance level: \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , all are two-tailed tests based on t-values.

Table 6.2.2 Interaction of Individual and Communal Variables on Drinking

Smoking	Interaction model 1		Interaction model 2	
	Est.	s.e.	Est.	s.e.
<b>Time variable: Wave</b>	-.04***	.01	-.04***	.01
<b>Individual variables</b>				
Income	.10***	.03	.13**	.04
Education	-.07	.04	-.09*	.04
Gender	9.12***	.21	9.08***	.11
Han	.23	.21	.05	.22
<b>Class (unemp)</b>				
<i>Worker</i>	.70***	.12	.69***	.11
<i>Self-employ</i>	.63***	.12	.63***	.12
<i>Owner</i>	1.27***	.19	1.2***	.18
<i>Farmer</i>	.52***	.09	.58***	.09
<i>Retiree</i>	-.64***	.12	-.68***	.12
<b>Community variables</b>				
Modern economy	-.001	.02	-.03*	.01
Modern social	-.001	.01	-.01	.01
Inequality	.06	2.23	2.68	1.73
Economy X gender	-.03	.03		
Social X gender	-.02	.02		
Inequality X gender	2.75	3.28		
Economy X income			.03*	.01
Social X income			-.03**	.01
Inequality X income			-2.50*	1.2
AIC	357925		358427	
BIC	358130		358632	
Deviance, df	357879,23		358381,23	
Residual	74.2		74.0	
Time variance $\tau_{00}$	.01		.01	
Individual variance $\tau_{00}$	25.99		28.07	
Community variance $\tau_{00}$	.00		1.28	
N1, N2, N3	8,12368,235		8,12368,235	

Significance level: \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , all are two-tailed tests based on t-values.

Figure 6.2.2

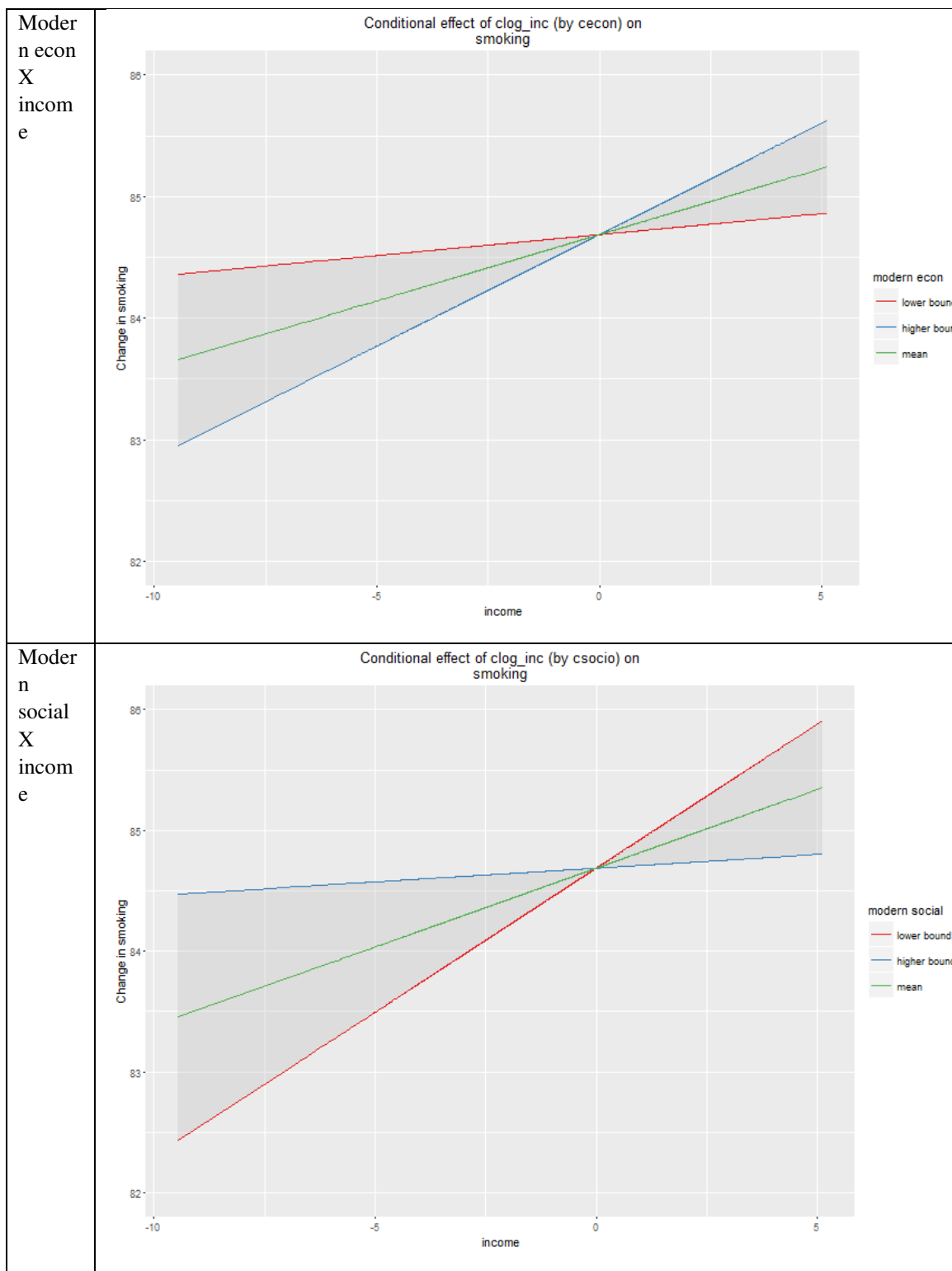


Figure 6.2.2 continued

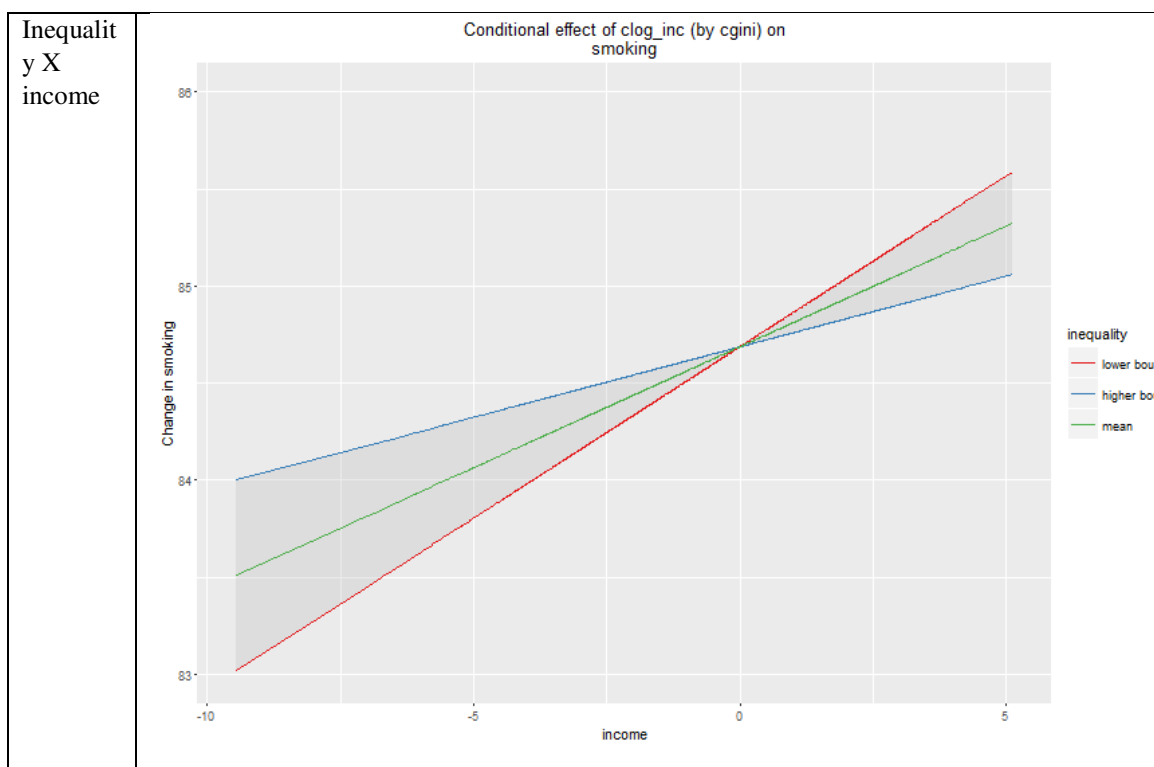


Table 6.3 Bivariate Correlation Among Social Disorganization and Substance Variables

	Drinking (&heavy)	Smoking (&heavy)	Urban	Density	Female headed	Residential turnover	Poverty rate
Smoking (&heavy)	.42*** (.37***)						
Urban	.03*** (- .01)	-.04*** (- .06***)					
Density	-.002 (.01)	-.05*** (- .04***)	.23***				
Female headed household	-.01** (.004)	-.06*** (- .07***)	.42***	.32***			
Residential turnover	-.03*** (.07***)	-.01*** (.02***)	-	-.003	.05***		
Poverty rate	-.05*** (- .03***)	-.01** (.04***)	-	-.17***	-.06***	.08***	

Table 6.3 continued

Ethnic heterogeneity	.01 (.01)	.004 (.006)	-	-	-.05***	.04***	.02***
			.07***	.06***			

Correlation with heavy drinking and smoking in parenthesis. Significance level: \*p<.05, \*\*p<.01, \*\*\*p<.001

Table 6.4 Social Disorganization and Substance Use

	Drinking		Heavy drinking		Smoking		Heavy smoking	
	Est.	s.e.	Est.	s.e.	Est.	s.e.	Est.	s.e.
<b>Time variable:</b>	.001	.002	.001**	.000	-.04***	.01	-.001*	.00
<b>Wave</b>								
<b>Individual variables</b>								
Income	.03***	.01	.004***	.001	.05*	.02	.001	.001
Education	-.001	.008	-.01***	.002	-.08*	.04	-.001	.002
Gender	1.85***	.02	.20***	.004	9.12***	.11	.31***	.01
Han	-.09	.05	-.007	.01	.14	.25	.02	.01
<b>Class (unemp)</b>								
<i>Worker</i>	.14***	.02	.01	.01	.76***	.12	.04***	.01
<i>Self-employ</i>	.15***	.03	.01*	.01	.66***	.12	.03***	.01
<i>Owner</i>	.32***	.04	.04***	.01	1.27***	.19	.05***	.01
<i>Farmer</i>	.14***	.02	.02***	.004	.54***	.09	.03***	.004
<i>Retiree</i>	-.10***	.03	.005	.006	-.64***	.13	-.03***	.01
<b>Community variables</b>								
Urban	.17***	.05	.01	.01	-.58**	.22	-.02**	.01
Density	-.01	.01	.00	.00	-.17***	.05	-.004*	.002
Residential turnover	.15*	.07	.04**	.01	-.58	.34	-.01	.01



Table 6.4 continued

Female headed households	-.10	.27	.02	.05	.82	1.22	.04	.05
Ethnic diversity	.14	.13	.02	.02	.37	.55	.01	.02
Poverty rate	-.40***	.06	-.07***	.01	-.26	.30	.02	.01
Substance sale	.05**	.02	.01	.01	.06	.08	.001	.004
Deviance	190510	19658		345816		26566		
Residual	3.60	.16		75.5		.17		
Time variance $\tau_{00}$	.001	.00		.01		.00		
Individual variance $\tau_{00}$	.86	.029		28.2		.043		
Community variance $\tau_{00}$	.10	.003		1.38		.002		
N1, N2, N3	8,11965,221	8,11965,221		8,11964,221		8,11964,221		

Significance level: \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , all are two-tailed tests based on t-values.

## CHAPTER 7 CONCLUSION

### 7.1 Background and Contributions

This dissertation project explores three major dimensions of social change and their relationship with substance use during the past twenty years of China's structural reform in economic and social institutions. Social change to a large degree like this one bears a magnificent impact on almost every aspect of an ordinary citizen's life. Such change is not only important because of the banal reason that China has the largest population in the globe, it is also one of only few that has experimented an entire overhaul of economic and social institutions while preserving previous political alignment and yet still achieved successful advancement in terms of economy, quality of life, scientific and academic breakthrough, and other indicators of a modern nation.

The human race has never lived free of psychoactive substances, and the extent to which we live without them lies between the boundaries of legality. Whether licit or illicit, we use substances mostly to boost sociality, performance, or likability so that others may bond with us. Even in the most prohibitive places, certain Sharia law countries for example, substances that subtly escaped the condemnation of religious texts have become replacement substances and are widely used, such as hashish, khat, and tobacco. Most scientific studies on substance use concentrate in a few fields such as public health, psychiatry, and medicine. The potency of social and interpersonal factors,

rather than endogenous neural and psychological factors, has attracted relatively less attention in studies, although attention is deserved. Substance use intrinsically is a learned social behavior that aims to create alternative forms of socialization, and there is rarely any lone drug use that does not involve other participants in consumption (Howard S. Becker, 1953; J. T. Parsons, Kelly, & Weiser, 2007; Peretti-Watel & Moatti, 2006).

As described earlier, China too has a long and trenchant history of substance use. Historians and anthropologists have kept good records of the cultural basis of substance use in China (Dikötter et al., 2002; Hao et al., 2005; Y. Zheng, 2005). But as a social behavior, substance use must have been subjected to a very strong influence of the makeup of social contexts, which again underwent dramatic changes since the Reform. After the end of 1970s when Mao died, new leaders of the Communist Party experimented with a series of liberal policies in both economic and social realms, allowing private enterprises to help develop key industries and ordinary people to work and live by their own choices and abilities. There are too many fundamental changes to be exhaustively enumerated, the more important social changes related to community development and substance use belong in three major categories: an emerging neighborhood importance due to the more liberal choice of residence; more dramatic social mobility and inequality; rapid modernization. This dissertation provides new research on these issues.

The primary interest of this dissertation is how does substance use in the past twenty years correspond with related social changes. Specifically, there are three individual studies in this dissertation, each explores one dimension of social change and its association with substance use. First, we have seen how substance use could be a

protective factor against unemployment over the long term, especially against the background of massive layoffs among former socialist industrial workers and landless peasants during this period. Second, another chapter discussed how social mobility (i.e. changes in a person's social position in society) contributed to substance use. And finally, we have seen the changes caused to substance use by economic and social modernization, as well as considered the social disorganization aspects of community change. Being the first and innovative research is not the sole contribution of these chapters. More importantly, they laid the groundwork and showed the importance of social changes in both individual and community levels on substance use, which are regarded by many primarily as a psychological phenomenon and in China it is mostly the domain of psychiatrists.

## **7.2 Substance Use and the Hazards of Unemployment**

Perhaps under the impression of media portrayal of drinkers and smokers, common sense predicts that drinking and smoking will damage one's career opportunities, leading to unemployment and perpetual job changing. Admittedly, consuming psychoactive substances has the potential of forming addiction and developing a reward mechanism that leads to the seeking of instant gratification instead of long-term investment, and this is the fact why many studies do have evidence that drinkers and smokers suffer from limited opportunities in the labor force. But it is also likely that the obvious physical impact of alcohol and tobacco on labor performance only exists for heavy users, while general usage may alternatively do a favor. Many scholars, from both sociology and health economics, have shown that drinkers have larger social networks and better social capital in comparison to the abstinent. As a result, they also

received higher wages than those who do not drink (Bethany L. Peters, 2004; Bethany L. Peters & Stringham, 2006; Srivastava, 2013). This mechanism is not actually too surprising. On daily basis, the primary reason for most people to drink or smoke is to create and maintain social ties. Not only does toasting connect strangers to friends, sharing cigarettes and drinking together also signify symbolic solidarity and cross the rigid boundary of hierarchy (Collins, 2014). The social functions of substance use constitute a powerful tool to facilitate social interaction and promotion.

Through the discourse of this project, we have described previous studies on the drinking and smoking culture in China. Particularly in business occasions and among the officialdom, drinking and smoking have almost become an informally recognized ceremony of reception. In this context where informal ties (*guanxi*) are extremely important for searching for a job and maintaining it (Bian & Ang, 1997), it is then very important to be able to drink and smoke with business partners or bureaucratic supervisors, an obligation that even health excuses could not exempt oneself from. For the same reason, those abstinent from drinking and smoking, may face some penalties in the workforce, whose ultimate form is unemployment.

Among the many previous studies on substance use and unemployment, few have considered the special contextual prerequisites for social consumption of alcohol and tobacco in China. Among the few studies that did address social smoking and drinking in China, even fewer used a longitudinal dataset which can clarify the casual relationship and eliminate pseudo-effects brought by auto-correlation. I have employed survival analysis on unemployment hazards with substance use measured in both the baseline wave as well as each wave preceding the dependent variable. This research design can

largely rule out the causal order concern, self-selection bias, and the issue of temporal auto-correlation. As we have seen, general drinking protected against unemployment risk for both men and women, while smoking, even heavy smoking, only protected men but penalized women. However, heavy drinking was not a significant factor against unemployment hazards. The results were consistent no matter if I controlled for individual and neighborhood characteristics, as well as the Heckman Correction for selection bias. This chapter helps us to see a contextualized image of substance use in the Reform era China: not only did substance use have premium in the workforce, this premium also heavily interacted with gender in the case of smoking.

The stronger norms against female smoking, I suggest, is the primary cause of this gender pattern in smoking's effect in the workplace. While both men and women may utilize alcohol to boost their chance in social events, and eventually build up social capital, smoking women had not always enjoyed the substance culture in China's workplace. A considerable gap between genders exist in terms of the quantity and quality of substance use. While close to half of all Chinese males are smokers, only 5% of females smoke (G. Yang et al., 1999). In a patriarchy, economic and labor relationships in the workplace are predominately organized around the set of rules concerning preserving the order of hierarchy between sexes and classes. Females may not benefit from the same behaviors that reward males for their proper manifestation of bravery, risk-taking, initiatives, and non-conformity. Despite significant improvement in women's rights and dramatic change from the traditional arrangement of gender relationships, contemporary Chinese society remains characterized by a patriarchy that conveys differential expectations and evaluations for men and women. One of the many realms

where expectations and evaluations differ by gender regulates substance use behaviors such as smoking and drinking. Therefore, the sanction against female smoking may forestall the possibility that their social networking and capital building in the workplace may benefit significantly from smoking cigarettes.

### **7.3 Social Mobility and Substance Use**

As described above, certain forms of substance use protect people from unemployment hazards. We have seen this protective effect especially in general drinking, which had an impact on both males and females. Following the same logic but to accomplish a fuller image of the relationship between substance use and social class, one may ask how it works in an alternative form: whether and how social mobility causes substance use.

Previous literature on social mobility, stratification, and substance use, largely focused on the static influence of class on substance use using cross-sectional comparisons of various kinds. Having divergent findings regarding the same issue is unavoidable when only static and concurrent investigation is available. As a result, while many found drinking and smoking more prevalent among the lower classes, others have arrived at the exact opposite conclusion, i.e. that higher classes more frequently consume substances, or at least no less often than the poor (A. Stevens, 2010). However, it was also important to consider that if we separate heavy use from general use, the scenario may dramatically change. In addition, when a person moves from one class to another, the outcome behaviors will not only depend on class-specific sources of influence, but also be subjected to the social mobility process itself. Unfortunately, we know little about how social mobility, in addition to class, affects substance use.

To disentangle the class assimilation effect and mobility effect from the overall differential distribution of substance use among classes, diagonal reference modeling was employed as the decomposition strategy in this chapter. We have once again seen different mechanisms regulating drinking and smoking. Overall, higher classes smoked and drank more than lower classes in China. While people, especially those who moved upward in the class ladder, tend to assimilate into their destination class' drinking pattern, there was no assimilation effect for smoking among the upwardly mobile people. Instead, the independent mobility effect contributes to a higher level of smoking, suggesting that adaptive responses emerged during socially mobile events, perhaps including primarily stress, cultural shock, hardworking, and other things that characterize the efforts a newly rich person would need in order to catch up with the old rich, and these constitute the cause of more cigarette smoking when one moves upward in the social ladder. Having higher income contributed to more drinking but no more significant amount of smoking. We also failed to find a significant assimilation effect and mobility effect for heavy drinking and smoking. We conclude that drinking has more socially vested interests for social mobile people than smoking, given that people needed to assimilate into their new classes' drinking patterns, and such socially motivated substance use did not lead to heavy use, which would more concern the scholars and workers in health professions.

#### **7.4 Community Modern Development, Social Disorganization, and Substance Use**

While individual changes in the social classes and employment have been phenomenal over the twenty years of reform and development, what China seems to have impressed the world with primarily has been the country's fast modernization and rapid development into an upper middle income and urbanized industrial country. We have



seen in Chapter 3, the descriptive statistics demonstrated the marvelous pace the country achieved in reduction of poverty, climbing in the indices of both economic and social modernization, and experiencing dramatic changes in residential turnover and income inequality. The neighborhood structures—how communities organize citizens and provide them with institutional resources—have also undergone changes involving considerable impacts on individual substance use behaviors. However, no studies have yet utilized this precious case of societal changes and applied relevant community and neighborhood process theories to the explanation of substance use under community-level developmental changes.

Through multilevel modeling with a feature of growth curve analysis, this project was able to assess the influence from a higher ecological level, namely community level, without the biases of unequal variances of clustered individuals and different sub-sample sizes. We found all three indicators of the modernization process in contemporary China, i.e. economic modernization, social modernization, and income inequality, were negatively associated with individual substance use, reflecting a concurrent decrease of substance use with modernization development. But more importantly was how modernization differentially affected substance use when interacted with gender and individual income. Because we already knew that income and male gender are positively associated with both drinking and smoking, a phenomenon repeatedly confirmed by many other studies, whether and how community modernization changes this established individual-level income and gender pattern is an important thesis regarding the role of modernization in health behaviors.

We found there are certain “good” and “bad” dimensions of modernization, even though all dimensions have been growing together in the past twenty years. Economic modernization amplifies the income effect on substance use, making people with higher incomes smoke even more. Meanwhile, social modernization can mitigate the harmful effect of income, significantly suppressing the slope of income on both drinking and smoking. Especially for smoking, we found income only largely increases smoking in communities with a very low level of social modernization. Speaking of inequality, its negative interaction with individual income also confirms our hypothesis that poor people tend to use substances more than the rich do in an unequal community where the stress, frustration, and blocking of opportunities brought by income inequality principally affect the poor people.

Previous scholarship has also discussed at length how gender patterns of substance use can be subverted in modern culture where women earn greater social and economic freedom, as well as the stress accompanying such freedom (Elkind, 1985; Gilbert, 2007; Glaser, 2014; Perlman et al., 2007). This project confirms this hypothesis by pointing to the significant interactions between gender and modernization on drinking. The likelihood that a woman drinks and drinks more heavily is significantly elevated as the level of economic and social modernization of a community increases, while a man’s likelihood of drinking decreases. In a modernized economy, people of both gender should enjoy the same treatment and rewards by performing the same tasks. Compared to the economic and occupational structure in the past, women in the modern economy are much less considered as suitable for certain jobs but not others. Along with this growing opportunity, expectations of their performances and behaviors start to converge with that

of the men. At the same time, some scholars have realized that the continued demand for women to play a good role model as mothers and wives may not decrease simultaneously, and women may subject to extra loads of demands from both domestic and workplace forces (Glaser, 2014; Roche & Deehan, 2002). Women may also start to smoke and drink when internalized the liberalizing messages that women should break down the barriers imposed by gender norms to pursue self-determination. In this regard, women smoking may be considered by some as an act of resistance to the traditional norms. Therefore, although modernization as a whole decreases substance use, women could not benefit from this reduction as much as men could.

Although we cannot discover the similar interactions for smoking, owing to much more severe gender segregation in smoking than in drinking, it is not impossible to see the trend happening as the country further modernizes. For example, female smoking rate is higher in post-industrial countries of East Asia that share a similar cultural heritage in gender norms, such as South Korea and Japan. Between 5-10% of Korean women smoke cigarettes (Jee et al., 2009; Jung-Choi, Khang, & Cho, 2012), and more than 11% Japanese women are current smokers (Ng, Freeman, Fleming, & et al., 2014), both countries have a female smoking rate at least twice higher than in China. In advanced industrial countries outside East Asia, not only do scholars found that female smokers often cite equality and liberty to justify their own smoking (Gilbert, 2007), acculturation into western values is another long-observed factor to increase substance use among female Asian immigrants in the U.S (Choi, Rankin, Stewart, & Oka, 2008; Lopez-Gonzalez, Aravena, & Hummer, 2005; G. X. Ma et al., 2004). Thus, we have every

reason to speculate a higher smoking rate among Chinese women as the country further modernizes.

This project has not confirmed what the theoretical directions of social disorganization theory points to. Social disorganization theory argues when a community is loosely controlled by its own members, there will be greater incidence of crime and deviance. The initial three major factors proposed by sociologists to explain the weak capacity to organize a community are population heterogeneity, residential turnover rate, and concentrated poverty (Bursik, 1988), while later studies have also contributed other indicators to the theory at different ecological levels such as female-headed households, institutional resources, mutual trust, taking care of neighbors. In this project, among all the social disorganization variables employed, only residential turnover rate was significantly associated with one type of substance use, while others associations were either not significant or straightly contradicts the theory, such as density and poverty reducing drinking and smoking.

Rather than rejecting the theory's underlying assumption of neighborhood process and deviance, I have argued throughout this project that substance use cannot be considered as deviant behavior in certain contexts where the consumption is socially mandated and necessarily contributes to better social mobility. When people realize it is necessary to at least sip some alcohol drinks or puff without inhaling a cigarette at a business party or official meeting, such conducts are not deviant but rather expected behaviors. Second, conventional surveys may not capture full information regarding the loci and distribution of where smoking and drinking take place. Smoking and drinking, heavily influenced by social motivations, may well likely occur in public spaces other

than in those more heavily influenced by residential neighborhoods. In another major post-socialist country which China has been emulating and become structurally similar with, Russia, local deviances have turned from strictly street-based to venue-based as people have been increasingly attracted to and aggregate around restaurants, lottery booths, car and jewelry dealers, casinos, etc. since the late 1990s (Stephenson, 2015, p. 61). For the same reason, scholars have proposed to pay more attention to the design of neighborhood sampling frame based on “street logic” (Coulton et al., 2001; Sampson, 2012), especially when people’s social networks traverse across street boundaries (Morenoff et al., 2001).

### **7.5 Future Research**

This project provides an opportunity for future research from several disciplinary backgrounds not limited to sociology to delve into the multifaceted nature of substance use in developing countries with ever-renewing fabrics of social context. Over the last twenty years since the series of reforms aiming at revitalizing market economy and industrial productivity while preserving the ultimate state ownership of the economy and existing political system, China has subjected to a great deal of transitional social forces that have shaped every detail of people’s daily lives. People are unarguably much richer and better educated, the shortage economy that had plagued the public’s wellbeing has disappeared in this *de facto* capitalist country. Although the degree to which people ascend in the social ladder by merits and efforts is subject to debates, there is undoubtedly a greater extent of social mobility as well as physical mobility occurring in the country. The sale of licit substances including alcoholic beverage and tobacco products has gone through straight expansions until today.

Of the recent 8 years, affected by the 2008 financial crisis and its own inherent problems in the economic and political structure, China has slowed the pace of development, which has rendered this project a particularly timely examination on the social changes and substance use patterns during the gold years of the Reform. No country can keep two-digit growth forever, but it does not imply the meaningful research cannot discover new patterns of substance use, or other health behaviors, under the general environment of a slower economy. Instead, future research may well complement this project by investigating how community structure and individual behaviors change under relatively stagnant economies, or answering to what extent does social mobility exist and affect our behaviors when there are little tremendous social changes. China is unlikely the only country that may experience such rapid modernization and social changes, many others may gradually undergo the same process in regions like Africa or South America. A general pattern seen in contemporary world economic order is an urgent pursuit of economic growth measured by narrowly defined GDP. Notwithstanding the importance of economic development, we must also bear in mind what the imbalance between social development and economic development may bring to people's health behaviors. Policy makers should also pay attention to contextualized relationship between social changes and substance use, especially the culturally sensitive elements. Even among other similar countries such as Russia, India, and South Korea, emphasis on the types of modernization and the level of changes in community structure differ considerably from China, so are the substance use patterns in these nations. Both legal and cultural institutions have shaped the magnitude of substance use problems in India, where sanctions against drinking can sometimes mount to penal actions (Sharma, 1996).

On the other hand, the former socialist country which China had been emulating in myriad ways from entertainment to political infrastructure—Russia—has much greater divergence in substance use and an almost gender equal pattern of smoking (Perlman et al., 2007; Romaniello & Starks, 2009; Transchel, 2006). Understanding the variations within a possible universal pattern of social changes and substance use, can eventually lead to fascinating comparative findings.

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VITA

## VITA

### Xiaozhao Yousef Yang

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#### EDUCATION

Present-5/2016

##### **Ph.D. Candidate in Sociology**

Purdue University, West Lafayette, IN

Dissertation project: "Substance use and neighborhood changes under rapid development".

Committee: Brian C. Kelly (chair), Jack Spencer, James Anderson, Michael Vuolo

2012

##### **M.S. in Sociology**

Purdue University, West Lafayette, IN

Master Project: "The Influence of Self Exempting Beliefs and Social Networks on Daily Smoking".

Committee: Brian C. Kelly (chair), James Anderson, Michael Vuolo

2010

##### **LL.B. in Sociology**

Zhejiang University, Hangzhou, China

Magna cum Laude equivalent. Thesis: "Social Network Structure, Cultural Identity and Study Efficiency among College Students"

#### **Research Interests**

health and sexual behaviors; substance use; social networks; religion and health; the neighborhood effect; quantitative methodologies

#### **POSITIONS**

2016-

Assistant Professor, Murray State University

2013-2015

Editorial Assistant, *Journal Review of Religion and Chinese Society*, Brill Publishers.

2008 Social Worker, Rajabazar Education and Awareness Development Society, Kolkata, India.

## PUBLICATIONS

### Journal Articles

Tingzhong Yang, **Xiaozhao Y. Yang**, Randall R. Cottrell, Dan Wu, Shuhan Jiang, James G. Anderson (in press): Violent Injuries and Regional Correlates among Women in China: A National Representative Population Study. *European Journal of Public Health* doi:10.1093/eurpub/ckv193

XY Yang, BC Kelly, T Yang (2016): Together we have fun: native-place network and sexual risk behaviors among Chinese male rural-urban migrants. *Sociology of Health and Illness*, 38(4), 559-575

— Martin Levine Student Paper Award, Sociologist AIDS Network (SAN). 2014

Yang, X. Y. (2016). Is Social Status Related to Internet Pornography Use? Evidence from the Early 2000s in the United States. *Archives of Sexual Behavior*, 45(4), 997-1009.

Yang, T., Barnett, R., Rockett, I. R. H., **Yang, X. Y.**, Wu, D., Zheng, W., & Li, L. (2015). The impact of regional economic reliance on the tobacco industry on current smoking in China. *Health & Place*, 33(0), 159-171. doi:10.1016/j.healthplace.2014.12.015

Wang H, **Yang XY**, Yang T, Cottrell RR, Yu L, Feng X, Jiang S (2015): Socioeconomic inequalities and mental stress in individual and regional level: a twenty one cities study in China. *International Journal for Equity in Health*, 14(25), doi:10.1186/s12939-015-0152-4

Yang, X.Y., Kelly, B.C., Yang, T. (2014): The Influence of Self-Exempting Beliefs and Social Networks on Daily Smoking: A Mediation Relationship Explored. *Psychology of Addictive Behaviors*. doi: 10.1037/a0037176

— Bruce D. Johnson Award, Division of Drinking and Drugs, Society for the Study of Social Problems (SSSP). 2012

Brian C Kelly, Tieqiao Liu, **Xiaozhao Y. Yang**, Guanbai Zhang, Wei Hao, & Jichuan Wang. (2014): Perceived Risk of Methamphetamine among Chinese Methamphetamine Users. *International Journal of Drug Policy*, doi: 10.1016/j.drugpo.2014.05.007

Yang, X.Y., Anderson, J.G., Yang, T. (2014): Impact of Role Models and Policy Exposure on Support for Tobacco Control Policies in Hangzhou, China. *American Journal of Health Behavior*. 38(2):275-283

Yang, T., Cottrell, R. R., **Yang, X.**, & Liu, J. (2012). Commercial Sex Worker Use Among Male Chinese Rural-Urban Migrants. *American Journal of Health Behavior*, 36(1), 116-123.

Yang, T., Rockett, I.R., **Yang, X.**, Xu, X 2009: Patterns and Correlates of Stress among Rural Chinese Males: A Four-region Study, *Public Health*; 123,10: 694-698

Yang, T., Li, F., **Yang, X.**, Wu, Z., Feng, X., Wang, Y., et al. (2008). Smoking patterns and sociodemographic factors associated with tobacco use among Chinese rural male residents: a descriptive analysis. *BMC Public Health*, 8(1), 248-255.

### **Under Review**

Marijuana smoking at early midlife and the trajectories of social bonds. *Submitted*

### **In the Pipeline**

Fanhao Nie, XY Yang, Dan Olson: Context Matters: Exploring the Relationship between Religious Context and Underage Alcohol Consumption. (working paper)

XY Yang: social mobility and substance use: assimilation and mobility events among Chinese smokers and drinkers (working paper)

XY Yang: how substance use protects you from unemployment: a survival analysis of the post-Reform China from 1991 to 2011 (working paper)

XY Yang: Gang up with the regime: analyzing an historical Chinese gang with exponential random graph modeling (analysis done)

XY Yang, Fenggang Yang: Estimating hidden religious population among international students: an application of the network scale-up method. (analysis done)

### **AWARDS & FUNDING**

2015	Purdue University Graduate Government Travel Grant
2015	Walter Hirsch Dissertation Research Award, Purdue University
2015	Robert L. Eichhorn Fellowship in Medical Sociology, Department of Sociology, Purdue University
2014	Martin Levine Student Paper Award: "Together We Have Fun: native-place network and sexual risk behaviors among Chinese male rural-urban migrants", Sociologist AIDS Network (SAN)
2014-2015	Departmental student travel grant

- 2012 Bruce D. Johnson Award: “The Influence of Self-Exempting Beliefs and Social Networks on Daily Smoking: A Mediation Analysis of Chinese Males”, Division of Drinking and Drugs, Society for the Study of Social Problems (SSSP).
- 2012 International Scholarship Award, 19<sup>th</sup> International AIDS Conference, Washington, D.C.
- 2011 Lynn Fellowship, Purdue University
- 2010 Award of Excellent Bachelor Thesis: “Social Network Structure, Cultural Identity and Study Efficiency of College Students”. Zhejiang University
- 2009 “Cheap Haute Couturier” Prize, Global Innovation Tournament 2009, Stanford Technology Venture Program, Stanford University
- 2008 1<sup>st</sup> Place Award of Innovation and Research Scholarship for published paper “The Power of the Auteur Theory in Film”, Zhejiang University
- 2007 3<sup>rd</sup> Place Award of Undergraduate Paper Competition for paper “The Hidden Modernity in Monet and Baudelaire”, Humanities School, Zhejiang University

## **PRESENCE**

### **Presentations**

- Fanhao Nie, XY. Yang, Daniel VA. Olson: Context Matters: Exploring the Relationship between Religious Context and Underage Alcohol Consumption. SSSP 2016 Annual Meeting. Aug 21, Seattle, WA.
- Fenggang Yang, XY Yang, Luke Chao: Religious Change among Chinese Students in the United States. Annual Meeting of the Association for the Sociology of Religion. Aug 20, Seattle, WA.
- XY. Yang: Gang up with the Regime: folk construction of a historic rebel-gang. SSSP 2016 Annual Meeting. Aug 20, Seattle, WA.
- XY. Yang: Use of Marijuana at Early Midlife Explained by Different Life Trajectories of Social Bonds Since Adolescence. The 71st American Society of Criminology Annual Meeting. November 18, 2015. Washington, DC
- XY. Yang: Is Social Status Related to Internet Pornography use? Evidence from the Early 2000’s United States. 2015 American Sociological Association Annual Meeting. August 22, Chicago, IL.

Xiaozhao Y. Yang: Social bonding and smoking trajectories from adolescence to early adulthood in the U.S. 2014 Society for the Studies of Social Problems, August 15, San Francisco, CA.

Xiaozhao Y. Yang: Social Network Composition and Sexual Risk Behavior for Rural-urban Labor Migrants (<http://goo.gl/2FjTe7>). 2013 International Network for Social Network Analysis Conference, July 12-15. Xi'an, China.

Xiaozhao Y. Yang: Social networks and sexual risk behavior among Chinese male rural-urban migrant labors: social disorganization or subculture? 19<sup>th</sup> International AIDS Conference, July 23, 2012. Washington, D.C.

Xiaozhao Y. Yang: Trapped Desire: Urban Enclave, Housing Condition and Risky Sex for Rural-urban Labor Migrants. In 2012 ESE Symposium: Urban Rise: Footprints of A Global Civilization, October 16-17. West Lafayette, IN: Ecological Sciences and Engineering Symposium

### **Conference Service**

Session Chair, "Drugs and Alcohol" regular session, The 71st American Society of Criminology Annual Meeting. Nov 18, 2015. Washington, DC.

Session Presider, "Substance Use in the Life Course" thematic session, 2014 Society for the Study of Social Problems Annual Meeting. Aug 15, San Francisco, CA.

### **Other Talk(s)**

China Twenty Years After: community modernization and substance use. East Asia Workshop, University of Chicago. Feb 10<sup>th</sup> 2016

### **Media Appearance**

"Special communication: China's first historic efforts to develop a tobacco control advocacy workforce via schools of public health". *Tobacco control* (18-5, 2009):422-424.

### **TEACHING**

8/2015-	Instructor, Introduction to Sociology. Purdue University, West Lafayette.
5/2013-8/2013	Instructor, Social Problems. Purdue University, West Lafayette.
Summer 2013, 2015	Guest lecturer, Study Abroad program of the University of Evansville, IN.
2012-2014	Teaching Assistant: Sociology Intro, Social Problems, Sociology of Health, Social Psychology, Social Science Methods, etc.



## RESEARCH PROJECTS

- 2016 Co-PI of Purdue Chinese Culture Life Survey, with PI Fenggang Yang, Purdue University. *Survey design, IRB application, sampling, surveying, data management and analysis*
- 2011-2012 Research Assistant, project: Community-Based Study of Methamphetamine Use & HIV Risk in China. PI: Brian C. Kelly, Associate Professor of Dept. of Sociology at Purdue University. *Duties: managing interviews on methamphetamine use; qualitative data coding using Nvivo.*
- 7/2011 Surveyor leader, project: Facilitate MOH Endorsement of Tobacco Control Implementation. PI: Tingzhong Yang, Director of Research Center for Tobacco Control, Zhejiang University. *Duties: leading a team of five surveyors to complete 100 interviewer-administrated questionnaires for a clustered sampling mission.*
- 2009-2010 Research Assistant, for Tingzhong Yang, Professor of Dept. of Social Medicine, Zhejiang University. Participated project: A National Survey of Farmers Smoking in China, Build up Advocacy Capacity for Tobacco Control among Public Health Workforce in China, Bloomberg Initiative to Reduce Tobacco Use. *Duties: translating interviews and academic materials, interpreting English and other languages, data input and analyses.*

## SERVICES

- Editorial Board: *Review of Religion and Chinese Society*, Editorial Assistant (2013-2015)
- Journal Referee: *Social Forces, Archives of Sexual Behavior, American Journal of Health Behavior, PLoS One, Nicotine & Tobacco Research, Sexuality Research and Social Policy*

## Professional Memberships

- American Sociological Association
- Society for the Study of Social Problems
- Sociologist AIDS Network
- Center for Research on Young People's Health, Purdue University
- Center on Religion and Chinese Society, Purdue University
- Center for Research on Tobacco Control, Zhejiang University

### Professional Development

Webinar: Literature review with Nvivo and Endnote. QSR International. Summer 2015, qsrinternational.com

edX course with Harvard University School of Public Health, honor certificates obtained for: PH525.1x Statistics and R for Life Sciences; PH525.2x Matrix Algebra and Linear Models. Spring 2015, edX.org

Lifetime Student Membership reception. Sociologist AIDS Network business meeting, Aug 17, 2014, San Francisco, CA

External referee, "Building tobacco control policy for university campuses in China" conference, June 5, 2013, Hangzhou, China

### SKILLS

Languages

Mandarin

English

French and German (reading knowledge)

Software

Proficient use of Stata, R, Ucinet, Amos, Nvivo  
Microsoft Office

Dataset

Open to public: The General Social Survey; China Health and Nutrition Survey; The National Longitudinal Study of Adolescent to Adult Health

Proprietary: Purdue International Student Life and Culture Survey; Methamphetamine use and HIV risk in China survey; China Migrant Sexual Health Survey; Hangzhou urban resident tobacco use and attitude survey; China Health and Nutrition Survey-community data.

### References

Brian C. Kelly, Associate Professor of Sociology, Purdue University.

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