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After-School Supervision, Psychosocial Impact, and Adolescent Smoking and Alcohol Use in China

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We examined effects of self-care after school hours and psychosocial factors on cigarette smoking and alcohol use among adolescents in China. Survey data were obtained from 4734 7th and 11th grade students from seven cities across China. Students were queried about the frequency and quantity of unsupervised self-care after school in an average week. Tobacco and alcohol usage were also obtained. Odds ratios were calculated to determine the strength of association between unsupervised self-care after school and substance use. Results indicated that the amount of self-care after-school (how many days and how many hours per week) was significantly associated with increased risk for smoking and alcohol use among Chinese adolescents. These associations remained significant even after controlling for anxiety, depressive symptoms, and peer influence. The interaction between unsupervised self-care after school and peer influence indicated that unsupervised self-care after school is a stronger risk factor for smoking among

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adolescents with pro-smoking friends. The findings suggest that substance use prevention programs for youth in China should try to enhance parental monitoring. As it may not be feasible for families to revert to a lifestyle that includes supervision by relatives, other approaches such as organized after-school care are worthy of consideration.

KEY WORDS: Chinese adolescents; after-school supervision; cigarette smoking; alcohol use.

School-age children who regularly take care of themselves without adult supervision for part of the day, particularly during out-of-school hours, are commonly referred to as "latchkey children" (Galambos & Maggs, 1991; McAnarney, 1993; Richardson, Radziszewska, Dent, & Flay, 1993; Steinberg, Fletcher, & Darling, 1994). In the United States, approximately 7.6% of the 21.2 million children of employed women were in self-care at least part of the time during the day. This includes 3.7% of 5–11 years olds and 16.8% of all 12–14 year olds (Casper, Hawkins, & O'Connell, 1994; Mott, Crowe, Richardson, & Flay, 1999). Unsupervised self-care after school has become a public health concern, because evidence suggests that self-care after-school is significantly associated with problem behaviors, such as substance use, premature sexual activity, depression and poor school performance (Beck, Shattuck, Crump, & Simons-Morton, 1999; DiClemente, Wingood, & Crosby, 2001; Mulhall, Stone, & Stone, 1996; Steinberg et al., 1994).

Little is known about the impact of unsupervised self-care after school on problem behaviors of adolescents in other countries (Galambos & Maggs, 1991; Ledoux, Miller, Choquet, & Plant, 2002; Li, Fan, Stanton, Su, & Wu, 2003). In countries that have been undergoing dramatic changes in social and economic structure, such as China, information on prevalence of unsupervised children is sparse. Extended family members, especially for mobile families, are not as available to supervise children as they have been in the past. In addition, with little organized after-school care available, large numbers of children in China may be unsupervised between the end of the school day and the end of the parents' workday (Guo, 1995; Shen, Habicht, & Chang, 1996; Tang, 2000).

Studies done in the U.S. have suggested that the quantity of the self-care experience (i.e. how many days and how many hours per week) affects substance use among unsupervised adolescents (Mott et al., 1999; Richardson, Danley, & McGuigan, 1989; Richardson et al., 1993). Richardson et al. (1989) found that students left alone after school were more likely to engage in cigarette smoking and other substance use behaviors. One reason is that unsupervised adolescents during after-school hours are more likely to spend time with peers, whose influence has been shown to lead to increased substance use (Richardson et al., 1989; Unger, Rohrbach, Howard-Pitney, Ritt-Olson, & Mouttapa, 2001; Unger et al., 2002). Peers are believed to contribute to adolescent substance use, including smoking and alcohol, both directly and indirectly through several mechanisms: by modeling drug use, by shaping norms, attitudes, and values; by exposing the

adolescent to opportunities for drug use, by providing positive social reinforcement for attempted substance use.

Studies done in the U.S. have also suggested that children and adolescents who are unsupervised by adults during after-school hours are more likely to be anxious or depressed (Li, Feigelman, & Stanton, 2000; McAnarney, 1993; Mott et al., 1999; Steinberg et al., 1994). High levels of anxiety and depression are related to smoking and alcohol use among adolescents (Comeau, Steward, & Loba, 2001; Steward & Zeitlin, 1995). In the absence of parents or other adults to monitor adolescents' behavior, risk factors such as peer influence, anxiety, and depressive symptoms may become even more powerful.

In this study, we examined the impact of unsupervised self-care after school along with psychosocial factors, on adolescent cigarette smoking and alcohol use in seven cities within China. Specifically, we examined: 1) whether the amount of time left alone after-school affected the risk of smoking and alcohol use; and 2) whether peer influence, anxiety, and depressive symptoms modify the relationship between unsupervised self-care after school and cigarette smoking and alcohol use.

METHODS

Data Sources

The data are from a longitudinal investigation of tobacco use and lifestyle in seven of Mainland China's largest cities. The purpose of this "China Seven Cities Study" was to assess specific influences on tobacco use and related health behaviors as they might arise during the rapid, economic growth and subsequent social and cultural changes occurring in China as it moves towards a market economy. The geographically, economically, and culturally diverse cities participating in this research – Harbin and Shenyang (Northeast), Wuhan (Central), Chengdu and Kunming (Southwest), and Hangzhou and Qingdao (Coastal) – represent a broad spectrum of stages of economic development, thus providing a unique opportunity to study regional variations in the impact of westernization and modernization currently affecting China.

Participants

Data for the current analysis were obtained from a cross sectional study conducted in the seven cities between October 2001 and March 2002. The study population consists of 7th grade (middle school) students and 11th grade (high school) students from each city. All schools were chosen from the city district where the local government (Mayor's office) is situated. With the assistance of each

city's Education Committee, middle- and high schools within the local government district were randomly selected within a designated range of academic quality. Within each school, two classrooms were randomly selected and all students in those classes were invited to take the survey. Across the seven cities, a total of 2,310 7th grade middle school students and 2,702 11th grade high school students were invited to take part in the study. Of those, 3.6% of the middle-school students and 7.6% of the high school students either did not provide parental consent or were absent from school on the day of data collection. The remaining of 2,227 (96.4%) 7th grade students and 2,497 (92.4%) 11th grade students completed the survey and comprised the sample.

Procedure

All questionnaires were anonymous, and participants were asked not to provide any information that might identify them on the questionnaires. All students completed the questionnaire during class time. Classroom teachers were not present during the survey period, so that students would feel more at ease in responding to the questionnaire items. Seventh and eleventh grade students took home consent forms and questionnaires for their parents to complete; students returned the consent forms and questionnaires to their classroom teachers in sealed envelopes. Students were eligible to participate if their parents provided consent. To obtain student assent, we utilized an oral assent process with a standardized script. The consent procedure was approved by the university's Institutional Review Board and by the Institutional Review Board established in China for this research.

A trained public health employee in each city read the script, which appeared on the cover page of the youth version of the questionnaire, aloud verbatim to each class prior to questionnaire administration. The script explained the study objectives and procedures. Data collectors were prepared to answer questions that students had about the study or questionnaire. If a student said that he or she did not wish to be in the study, the data collector noted this on the class roster and dismissed the student from the survey administration even if the parent had signed a permission form. Both University of Southern California and Chinese Institutional Review Boards approved survey instruments and study procedures.

Survey Instruments

We developed a self-administered paper-and-pencil questionnaire for the survey. The questionnaire incorporated items from the U.S. Center for Disease Control's Behavioral Risk Factor Surveillance System, Youth Risk Behavioral System, 1995 Youth Risk Behavioral System, and the Transdisciplinary Tobacco

Use Research Center-Wuhan Smoking Trial Survey (Unger, Yan et al., 2001). The survey questionnaire was pilot tested in Wuhan in two schools that did not participate in the study. Questions addressed topics of tobacco use and dependence, cessation history, motivation to quit, exposure to smoking in the home and workplace, alcohol and drug use, STD/HIV risks, relevant psychological factors (anxiety, hostility, and depressive symptoms), health communication channels, public awareness of tobacco policies, individualism/collectivism, western influences, family structure, health-related attitudes and status, and developmental and demographic characteristics. Questionnaire items were translated from English to Mandarin, then back translated to English by translators fluent in both languages and trained in behavioral science theory and tobacco use research. To insure that each item captured the proper idiomatic language, each item in the Chinese version was reviewed for consensus by a group of bilingual tobacco researchers. The questionnaire contains approximately 50 items and took roughly 30 min to complete. The questionnaire booklets were printed in identical formats across all seven cities to insure consistency.

Measures

Lifetime Smoking Prevalence

Participants were asked, "Have you ever tried smoking, even a few puffs?" Participants answered "yes" or "no."

Thirty-Day Smoking Prevalence

Participants were asked, "Think about the last 30 days. On how many of these days did you smoke cigarettes?" Responses were coded on a 7-point scale ranging from "0 days" to "all 30 days". Because we expected responses to be bimodal, we followed previous studies in the U.S. (Independent Evaluation Consortium, Wave 1 Data, 1998; Independent Evaluation Consortium, Wave 2 Data 1998) that recoded this measure to a dichotomous variable. Responses were recoded as 0 days vs. one or more days.

Lifetime Alcohol Use Prevalence

Participants were asked, "During your life, on how many days have you had at least one drink of alcohol?" Responses were collected on a 7-point scale ranging from "0 days" to "100 or more days." This measure was also recoded to a dichotomous variable because its distribution was expected to be bimodal; responses were recoded as 0 days vs. one or more days.

Thirty-Day Drinking Prevalence

Participants were asked, "During the past 30 days, on how many of these days did you have at least one drink of alcohol? " Responses were collected on a 7-point scale ranging from "0 days" to "all 30 days". This measure was also recoded as 0 days vs. one or more days. The measures we adopted for this study to assess lifetime smoking and drinking as well as 30-day smoking and drinking have been widely used. Their validity has been verified in several previous studies (Johnson, MacKinnon, & Pentz, 1996; Pierce, Fiore, Novotny, Hatziandreu, & Davis, 1989; Stacy, Widaman, Hays, & DiMatteo, 1985; Sussman, Sun, McCuller, & Dent, 2003; Unger et al., 2002).

Unsupervised Self-Care After School

One question assessed unsupervised self-care after school, "Recall one day that you went home after school and no adult was home, how long did you spend time alone at home that day?" Previous research has shown the number of unsupervised hours after school to be a good predictor of drug use (Richardson et al., 1989; 1993). We constructed three categories based on number of hours left alone per day: 1) less than 1 h, 2) 1 to 3 hr, and 3) more than 3 hr. For the analyses that used dichotomized unsupervised self-care after school, the children who were left alone more than 1 hr per day were defined as unsupervised children.

Depressive Symptoms

A five-question scale was adapted from a translated version of the Center for Epidemiological Studies Depression Scale, CES-D (Radloff, 1977). CES-D is a 20-item self-report measure that uses 4-point scales to assess depressed mood over the past week. Numerous studies have indicated that it is a valid and reliable measure for assessing depressive symptoms among adolescents (Galaif, Chou, Sussman, & Dent, 1998; Schoenbach, Kaplan, Grimson, & Wagner, 1982). In pilot research, we administered a translated version of the full 20-item CES-D and used the initial factor method of principal components factor analysis to determine which five items to use in this survey. Consistent with suggestions from previous research using shorter forms of the CES-D scale (Galaif et al., 1998; Kohout, Berkman, Evans, & Cornoni-Huntley, 1993; Shrout & Yager, 1989), we chose the five items that had the highest factor loadings on the first factor, called "*depression*." The factor loadings for these items ranged from 0.72 to 0.81. Cronbach's alpha for these five items was 0.87. The correlation between this 5-item scale and the full 20-item scale was 0.89. To assess depressive symptoms, students were asked: "Think about how you felt during the past 7 days. On how

many of these days did you have trouble shaking off sad feelings?" "On how many of these days did you feel depressed?" "On how many of these days did you think your life had been a failure?" "On how many of these days did you feel lonely?" and "On how many of these days did you feel sad?" Response options ranged from: 1 = "0–1 day", 2 = "2–3 days", 3 = "4–5 days", and 4 = "6–7 days". Each student's score was the sum of the five responses, with a possible range of 5 to 20.

Anxiety

Five items adapted from the MMPI-A content scale for anxiety (Williams, Butcher, Ben-Porath, & Graham, 1992) were used to assess adolescent-reported anxiety. These five items were: "I frequently find myself worrying about something;" "Life is a strain for me much of the time;" "I feel nervous or upset about something or someone almost all the time;" "I have certainly had more than my share of things to worry about;" and "I have sometimes felt that difficulties were piling up so high that I could not overcome them." Students responded "yes" or "no" to these questions. Each student's score was the number of "yes" responses, with a possible range of 0 to 5. Cronbach's alpha for the anxiety scale was .73. Correlation between this 5-item scale and the full 18-item content scale for anxiety from the MMPI-A was 0.83.

Peer Influence

Two questions were used to assess peer influence. One question asked about peer attitude toward smoking, "How would your friends act toward you if you smoked cigarettes?" Responses were collected on a 4-point scale" "very unfriendly," "unfriendly," "friendly," and "very friendly." Responses with "very unfriendly" and "unfriendly" were recoded as negative attitude and responses with "friendly," and "very friendly" were collected as positive attitude. The other question asked about friends' smoking behavior, "How many of your good friends smoke cigarettes at least once a month?" Responses were rated on a 4-point scale: "none," "a few," "some," or "a lot." Responses with "a few," "some," or "a lot" were coded as having friends who smoked. We did not have items on friends' alcohol use.

Covariates

To control for confounding, the demographic variables of age, gender, city, and personal allowance were included in the analysis as covariates. Preliminary analysis for this study revealed significant differences in adolescent smoking

prevalence across the seven cities, which may be attributed to economic disparity. Therefore, city might confound the association between the predictor variables and smoking. Personal allowance was included as a covariate as measure of how much money adolescents carry. We assume that adolescents who are not constrained by lack of pocket money might be more likely to buy cigarettes and alcohol. Personal allowance was assessed with, "How much allowance per week do you have the freedom to spend any way you want?" Response options included " None," "1–5 Yuan," "6–10 Yuan," "11–20 Yuan," "21–30 Yuan," "31–40 Yuan," "41–50 Yuan," "51–70 Yuan," " 71–90 Yuan," and "More than 90 Yuan." Responses were recoded with 5 ordinal categories, "None," "1–20 Yuan," "21–50 Yuan," "51–90 Yuan," and "More than 90 Yuan." At the time of the survey, one Yuan was equivalent to approximately 12 U.S. cents. In China, a pack of 20 cigarettes made domestically cost approximately 2.5 Yuan, while cigarettes imported from foreign countries cost approximately 5 Yuan.

Data Analyses

Chi-square analyses were used to assess gender and age differences in the prevalence of smoking and drinking of alcohol. Univariate logistic regression analyses were performed to determine whether level of unsupervised self-care after school was associated with smoking or alcohol assumption, controlling for covariates. Odds ratios were calculated separately for 7th and 11th grade boys and girls. We used a stratified analysis because (1) adolescent substance use increases with age, both in the U. S. and in China (Independent Evaluation Consortium, Wave 1 Data, 1998; Unger, Rohrbach et al., 2001), and (2) smoking and alcohol use are gender-related social behaviors in China, in that prevalence rates for males are much higher than for females (Gong, Koplan, Feng, & Chen, 1995; Li, Fang, Stanton, Feigelman, & Dong, 1996; G. R. Liu, 1997; Liu et al., 2001).

Interactions

To determine whether the odds ratios are affected by psychosocial factors, we examined the interactions of unsupervised self-care after school with depressive symptoms, anxiety, and peer influence. A multivariate logistic regression model was then performed that examined main effects of supervision after school, depressive symptoms, anxiety, peer influence, and the covariates, and also the interaction terms of supervision *x* depression, supervision *x* anxiety, supervision *x* peer influence, and supervision *x* peer smoking. The predictors were entered into the regression model in a two-step process: first the set of main effects and then the set of interaction terms.

RESULTS

Demographic Characteristics

The mean age of the sample was 13.05 years old for 7th graders and 17.04 years old for the 11th graders, respectively. The sample consisted of approximately equal numbers of male and female participants for both grades (49.3% females in the 7th grade and 52.9% females in the 11th grade). The proportion of participants from each of the seven cities in China was also about equal.

Differences in Smoking and Drinking Prevalence by Demographic Characteristics

As shown in Table I, there were large gender differences in both lifetime smoking and 30-day smoking prevalence rates, with boys twice as likely to report having smoked at some time and 5 times more likely to have smoked in the past 30 days. Boys also were significantly more likely than girls to report lifetime and past 30-day alcohol use. However, the gender difference in alcohol use was not as large as the gender difference in smoking. In general, boys tended to have 10% higher prevalence rates than girls in both lifetime drinking and 30-day drinking.

There were significant differences in substance use between 7th graders and 11th graders. Students in the 11th grade were about three times more likely than

Table I. Smoking and Drinking Behavior by Demographic Characteristics

Variable	Lifetime smoking %	Past-30-day smoking %	Lifetime drinking %	Past-30-day drinking %
Gender				
Male	33.3	15.0	70.3	37.0
Female	15.8	3.4	60.2	27.5
p value	<0.001	<0.001	<0.001	<0.001
Grade				
7th	11.5	2.5	49.8	20.4
11th	35.8	14.9	78.6	42.5
p value	<0.001	<0.001	<0.001	<0.001
City				
Chengdu	32.9	15.3	73.1	32.2
Hangzhou	25.3	8.5	60.3	27.8
Shenyang	19.5	5.6	58.3	21.9
Wuhan	26.6	9.5	75.1	41.1
Harbin	27.7	10.4	62.1	37.3
Kunming	21.3	8.0	71.3	40.2
Qingdao	16.2	5.4	55.9	25.9
p value	<0.001	<0.001	<0.001	<0.001
Total	24.3	9.0	65.1	32.3

the 7th graders to have smoked at some time, and 7 times more likely to have smoked within the past 30 days. Significant grade differences were also found in lifetime drinking and 30-day drinking. Students in 11th grade were about 1.5 times more likely than the 7th graders to have drunk at some time, and were twice as likely to have drunk within the past 30 days.

The prevalence rates for smoking and drinking varied across cities. For lifetime smoking and past 30 day smoking, Chengdu has the highest prevalence rate, which is more than twice as high as that of the city with lowest prevalence rate, Oingdao. For lifetime drinking and past 30 days drinking, Wuhan has the highest prevalence, which is about 20% higher than the two cities with the lowest rates, Qingdao and Shenyang.

Associations between Unsupervised Self-Care After School and Substance Use

Logistic regression models were performed to calculate the odds ratios for lifetime smoking, past 30-day smoking, lifetime drinking, and 30-day drinking according to unsupervised self-care after school. All analyses were stratified by grade and gender and controlled for city and monetary allowance.

Table II shows the odds ratios for lifetime smoking and 30-day smoking as well as lifetime drinking and 30-day drinking, according to unsupervised self-care after school. Among 7th graders, students with 1–2 hr unsupervised after school were at increased risk of lifetime smoking and 30-day smoking. When the unsupervised hours increased to 3-4 hr, 7th grade girls were 5.5 times more likely to report lifetime smoking than girls who were supervised most of the time. Among unsupervised 7th graders, girls were at significantly higher risk for lifetime smoking relative to boys ($p < .05$).

Among 11th graders, the risk for lifetime smoking was also greater as unsupervised hours increased, compared to those who were supervised most of the time. For 30-day smoking, the increased unsupervised hours were associated with an increased risk for boys but not for girls. Boys with 1–2 hr unsupervised were 1.7 times more likely to smoke in the past 30 days, compared to their peers who received more hours of adult supervision after school.

In the logistic regression model (Table II), unsupervised self-care after school was significantly associated with an increased risk of lifetime drinking for both boys and girls in 7th grade. However, this association was significant for girls, but not for boys, in terms of 30-day drinking. When the unsupervised hours increased to 3–5 hr, the risk of lifetime drinking and 30-day drinking also increased for girls in 7th grade but not for boys. Among 11th graders, increased unsupervised hours were significantly associated with an increased risk of lifetime drinking and 30-day drinking for both boys and girls.

Table II. Univariate Adjusted Odds Ratios for Smoking/Drinking Behavior, According to Unsupervised Self-Care After School

	Lifetime Smoking		30-Day smoking		Lifetime drinking		30-Day drinking	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Unsupervised self-care			7th Grade boys					
0–<1 hr	1.00		1.00		1.00		1.00	
1–2 hr	1.59*	1.00, 2.53	1.33	0.54, 3.31	1.76**	1.19, 2.61	1.13	0.73, 1.75
3–5 hr	1.49	0.82, 2.72	0.39	0.05, 2.89	1.55	0.95, 2.55	1.62	0.96, 2.73
Unsupervised self-care			7th Grade girls					
0–<1 hr	1.00		1.00		1.00		1.00	
1–2 hr	2.66**	1.37, 5.19	2.63	0.48, 14.5	1.47*	1.03, 2.11	1.60*	1.03, 2.46
3–>5 hr	5.47***	2.87, 10.45	3.85	0.70, 21.29	2.17**	1.40, 3.36	1.76*	1.05, 2.93
Unsupervised self-care			11th Grade boys					
0–<1 hr	1.00		1.00		1.00		1.00	
1–2 hr	1.53**	1.10, 2.10	1.69**	1.19, 2.40	1.84*	1.13, 3.00	1.97***	1.42, 2.73
3–>5 hr	1.47*	1.06, 2.05	1.24	0.85, 1.81	1.23	0.79, 1.92	1.63**	1.17, 2.27
Unsupervised self-care			11th Grade girls					
0–<1 hr	1.00		1.00		1.00		1.00	
1–2 hr	1.17	0.82, 1.67	1.61	0.82, 3.14	1.25	0.89, 1.75	0.84	0.61, 1.15
3–>5 hr	1.90**	1.35, 2.67	1.83	0.94, 3.58	1.44*	1.00, 2.08	1.47*	1.07, 2.01

*$p<.05$,**$p<.01$,***$p<.0001$.

Odds Ratios Obtained from a Multivariate Logistic Regression Model

Table III shows the results of the multivariate logistic regression model. In this model, main effects and interaction terms were entered hierarchically after covariates. In general, unsupervised self-care after school, anxiety, depressive symptoms, and peer influence were significantly associated with smoking and drinking behaviors, after controlling for covariates and partialling out the effects of each predictor variable. This suggested that each variable was independently associated with smoking and drinking behaviors.

As shown in Table III, all of the covariates, including age, gender, personal allowance, and city, were significantly associated with lifetime smoking, 30-day smoking, lifetime drinking, and 30-day drinking.

After controlling for peer influences, anxiety, and depressive symptoms, students who reported less supervision after school were at a higher risk for lifetime smoking, lifetime drinking, and past 30-day drinking, but not for past-30-day smoking, relative to those who reported being supervised most of the time. These results are shown in Table III.

The results in Table III indicate that depression was significantly associated with an increased risk for lifetime smoking, 30-day smoking, lifetime drinking, and 30-day drinking. A similar pattern of results was observed for anxiety.

As shown in Table III, both peer attitude and peer smoking were significantly associated with an increased risk of lifetime smoking and past 30 day smoking. Peers' attitudes and behaviors were not included in the analyses of alcohol use, because these questions were specific to tobacco.

Interactions

The interaction terms of each predictor variable x unsupervised self-care after school were entered into the model hierarchically after the main effects. Figure 1 showed lifetime smoking prevalence by interactions between unsupervised self-care and peer attitudes toward smoking. It suggests unsupervised self-care after school is associated with increased risk for smoking even in the absence of peers' pro-smoking attitudes. The pattern of the interactions for 30-day smoking is the same.

DISCUSSION

Our study provides new information about the associations among unsupervised self-care after school and adolescent smoking and alcohol use in seven urban areas in China. The findings indicate that unsupervised self-care was significantly associated with increased risk for smoking and alcohol use among Chinese

Table III. Multivariate Logistic Regression Testing Associations Between Unsupervised Self-Care After School, Psychosocial Factors and Smoking/Drinking Behavior

	Lifetime smoking		30-Day smoking		Lifetime drinking		30-Day drinking	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Main effects								
Unsupervised self-care	1.25**	1.06, 1.48	1.17	0.90, 1.52	1.25***	1.08, 1.45	1.17	1.02, 1.35
Depression	1.68***	1.40, 2.02	1.38	1.03, 1.85	2.00***	1.73, 2.33	1.76***	1.52, 2.05
Anxiety	1.89***	1.51, 2.38	1.62	1.11, 2.37	1.34**	1.14, 1.57	1.53***	1.29, 1.83
Peer Influence								
Attitude	2.85***	2.39, 3.39	3.24***	2.45, 4.28				
Friend smoking	3.35***	2.62, 4.29	6.35***	4.82, 8.36				
Covariates								
Age	0.34***	0.29, 0.39	0.17***	0.13, 0.22	0.63***	0.55, 0.71	0.62***	0.54, 0.70
Gender	1.46***	1.41, 1.52	1.64***	1.52, 1.76	1.32***	1.28, 1.37	1.26***	1.22, 1.31
Personal Allowance	1.22***	1.12, 1.32	1.34***	1.20, 1.50	1.25***	1.15, 1.36	1.30***	1.21, 1.40
City	0.87***	0.84, 0.90	0.85***	0.80, 0.90	0.94***	0.91, 0.97	1.03	0.99, 1.06

Note. Adjusted by age, gender, city and personal allowance.
*$p<.05$,**$p<.01$,***$p<.0001$.

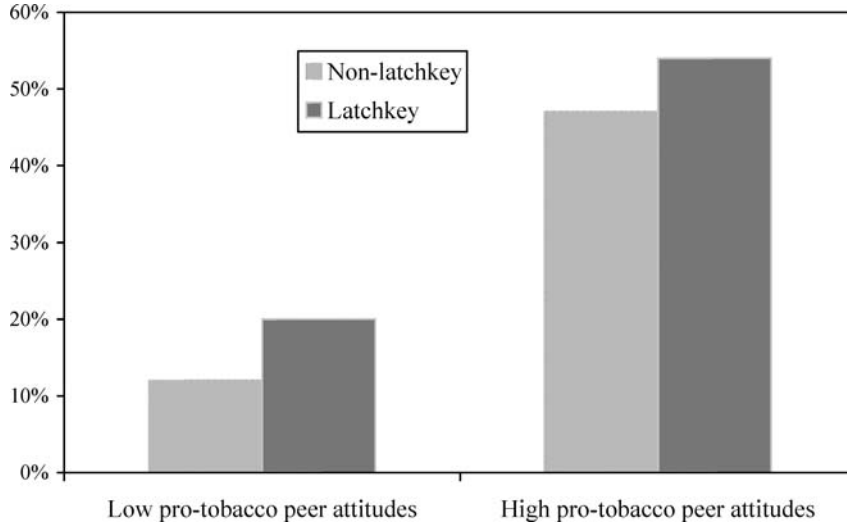

Fig. 1 Lifetime smoking prevalence by interactions between unsupervised self-care and peer influence toward smoking

adolescents. These associations remained significant even after controlling for anxiety, depression, peer attitudes, and friends' smoking. The significant interaction of unsupervised self-care after school and peers' attitude suggests that peers' favorite attitude toward smoking places self-care adolescents at increased risk for cigarette smoking.

The pattern of association linking the intensity of self-care to Chinese adolescent smoking and alcohol use in this study is consistent with the results of research done in the United States (Li et al., 2000; Mott et al., 1999; Mulhall et al., 1996; Richardson et al., 1993; Steinberg et al., 1994). Results of the present study indicate that the increased number of hours spent in self-care after-school was an important correlate of cigarette smoking and alcohol use among unsupervised children. This is particularly true for self-care girls, especially for girls in 7th grade in terms of lifetime smoking. For example, as the amount of self-care hours increased to 3 to 5 hr, the risk of lifetime smoking among 7th girls increased six-fold. This pattern provides support for the argument that girls who are distant from adult supervision, and particularly those who hang out with friends, may be at higher risk for interacting with more deviant peers and having more opportunities to experiment with tobacco and alcohol. In the unsupervised situations, girls might be more sensitive to freedom and may be more vulnerable to the opportunity to carry out forbidden behaviors, such as smoking and drinking. Further research is warranted to examine this gender difference in the association between unsupervised self-care after school and substance use.

Consistent with numerous previous studies, peer influence is a significant risk factor for Chinese adolescent cigarette smoking. Cross-cultural studies have found peer influences on substance use in some non-U.S. cultural contexts as well, including China (Pilgrim, Luo, Urberg, & Fang, 1999; Unger et al., 2002; Zhang, Wang, Zhao, & Vartiainen, 2000). In Unger et al. study (2002) of adolescents in California and Wuhan, China, peer influences on smoking behavior were equally strong in both samples; having a close friend who smoked increased the respondent's risk of smoking approximately fourfold. It is not surprising that peer influence is a very important determinant for Chinese adolescent smoking and drinking, given the cultural norm that offering cigarettes and alcohol is a socially acceptable gesture of hospitality (Liu et al., 1998; Yang et al., 1999). The significant interaction between unsupervised self-care after school and peer attitude in this study seems to support this speculation, in that those unsupervised adolescents who are influenced by peers' attitude toward smoking are more likely to smoke themselves.

There are several limitations to be considered. First, our measures of unsupervised self-care did not include specific settings. Such measures should be considered in the future work to enhance our understanding the mechanism of the relationship between unsupervised self-care after school and substance use. Examination of different settings may help to identify which situation is crucial for unsupervised children to be involved in risk behaviors. Second, future work should also assess the potential interactions between unsupervised self-care after school and parenting style, parent-child relations and communications. Parental awareness of their children's whereabouts after-school may provide a buffer against susceptibility to peer pressure. Third, this study involves a large sample of students in urban areas within China. The results might differ for adolescents living in rural areas in China, where the social environment and family structure are more traditional.

In summary, this study provides new information about the relationship between unsupervised self-care after school and substance use among Chinese adolescents. Our results suggest that being left unsupervised after school increases the risk for smoking and alcohol use among adolescents in China. Substance use prevention programs in China should try to enhance parental monitoring. As it may be unfeasible for families to revert to a lifestyle that includes supervision by relatives, other approaches such as organized after-school care are worthy of consideration.

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