

**Pre-marital sex and health outcomes among Taiwanese youth:  
Peer influence and contextual effect**

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**ABSTRACT**

We used data from Taiwan Youth Project in 2004 and 2007 (N=3,530) to explore peer influence and the contextual effect on pre-marital sex as well as on health status of youth for two birth cohorts at their respective age of 20. Logistic regressions first assess the association of perception of friends' sexual behaviors and youth's own sex-related experience and attitude with pre-marital sex (e.g. had premarital sex and inconsistent condom use). Then, the models examine the relative importance of perception of friends' sexual behaviors, youth's own sex-related experience and attitude, and contextual factors on pre-marital sex, after adjusting for individual and family characteristics. Lastly, we analyze the relationship of pre-marital sex with youth health status (e.g. self-rated health and substance use). Analyses indicate that perception of friends' sexual behaviors was positively associated with pre-marital sex, which, in turn, was a salient linkage to health status of youth. Effects of the contextual variables were significant on pre-marital sex but their associations were not significant on all indicators of health status. These findings demonstrate the important role of peers and contexts and suggest health promotion programs for youth needed to take friendship networks and contexts into consideration.

## INTRODUCTION

A rising prevalence of early sexual debut among youth has been witnessed in Taiwan and around the world for the past decade. Early sexual debut is known to increase the risks of teenage pregnancy, maternal and perinatal mortality, and sexually transmitted infections (STIs), including HIV. HIV/AIDS prevention campaigns have identified premarital sex behavior as one of major risky behaviors among youth (Cheluget, Baltazar, Orege, Ibrahim, Marum, & Stover, 2006; Kirungi, Musinguzi, Madraa, Mulumba, Callejja, Ghys et al., 2006; Mahomva, Greby, Dube, Mugurungi, Hargrove, Rosen et al., 2006; Smith, 2004). Comparatively, little is known about what mechanisms shape premarital sex behaviors among youth (Campbell, 2003) and even less in the context of Asian countries such as Taiwan.

Previous studies that have identified the factors associated with early onset of sexual activity among youth include individual socio-demographic factors, such as age, gender, educational status, and race/ethnicity (Cuffee, Hallfors, & Waller, 2007; Mott, Fondell, Hu, Kowaleski-Jones, & Menaghan, 1996; Simbayi, Chauveau, & Shisana, 2004; Stallworth *et al.*, 2004), interpersonal factors related to knowledge, attitudes, beliefs, and expectations (Lammers, Ireland, Resnick, & Blum, 2000; Simbayi *et al.*, 2004; Steele, Bukusi, Cohen, Shell-Duncan, & Holmes, 2006; Upadhyay *et al.* 2006), and family structure and parental involvement (Aspy *et al.*, 2007; Babalola, Tambashe, & Vondrasek, 2005; Lammers *et al.*, 2000; Mott *et al.*, 1996; Stallworth *et al.*, 2004). A few studies have also highlighted the importance of school environment, peer influence, social context, and community involvement (Barnett & Parkhurst, 2005; Chiao & Mishra 2009; Gregson, Terceira, Mushati, Nyamukapa, & Campbell, 2004; Mensch, Clark, Lloyd, & Erulkar, 2001), but our understanding of such contextual factors in affecting youth sexual behavior remains limited.

In the present study, we focus on the role of perception of friends' sexual behaviors, youth's own sex-related experience and attitude, schooling, and community participation in pre-marital sex (such as premarital sex engagement and inconsistent or no condom use), which, in turn, may be associated with their health behavior and status, measured by substance use and self-rated health. As presented in Figure 1 about our analytical framework, we first describe the prevalence in pre-marital sex and assess the association of perception of friends' sexual behaviors and youth's own sex-related experience and attitude with pre-marital sex among never married youth in Taiwan using data from three-city surveys conducted in 2004 and 2007. We then examine how perception of peers' behaviors, youth's own experience and attitude, school attendance, community participation, and other selected socioeconomic and contextual factors influence pre-marital sex. Lastly, we analyze the relationship of pre-marital sex with youth health behavior and status.

<Figure 1 about here>

## METHODS

### *Data*

Data were from two Taiwan Youth Project (TYP) surveys, conducted in 2004 and 2007. The TYP surveys used a multi-stage sampling frame to obtain a school-based representative sample of junior high students in three areas of Taipei city, Taipei county, and Yi-Lan county. The first stage of the design was based on the level of urbanization. Taipei city was divided into three strata, Taipei county into three strata, and Yi-Lan county into two strata. The second stage was based on the number of students registered in each stratum to determine the numbers of schools selected in each stratum. The final 40 schools were chosen, including 16 schools from Taipei city, 15 schools from Taipei county, and 9 schools from Yi-Lan county. In each school, two classes were randomly selected from each grade and all students of selected classes were interviewed. Baseline interviews were conducted in 2000 with the annual follow-up surveys to 2009. A total of two-cohorts of students were 2,696 of 7th grade students (the first year of the junior high) and 2,890 of 9th grade students (last year of the junior high) in 2000. Regarding ethical considerations, all survey procedures are approved by the ethical review boards of Institute of Sociology, Academic Sinica, Taiwan.

The TYP surveys collected data on a wide range of understanding the growth trajectory of the youth and focusing on three main social mechanisms of adolescent development: family, school, and community as well as their interplays. Analysis in this study focused on never married youth aged 20 years included in the two TYP surveys. The numbers of youth included in the analysis were: 1,816 in 2004 from older cohort and 1,714 in 2007 from younger cohort.

### *Measures*

The measures of *pre-marital sex* outcome were having premarital sex and inconsistent or no condom use. Premarital sex was defined as never married youth who ever had sexual intercourse. This information was obtained directly from the questionnaire, "Have you ever had sex?" The outcome was coded dichotomously, where never married youth ever having sex coded as 1 and never coded 0. Inconsistent or no condom use was defined as sexually experienced never married youth who did not use condoms or used condoms inconsistently when they had sex. This measure was based the following question, "How often do you use condoms when you have vaginal sex?" Responses ranged from never to always and the variable was coded as 0=consistent if always as response and 1=no or inconsistent use if other responses were obtained (Kerrigan et al 2003; Morisky et al 2002).

The first sets of main explanatory variables were related to peer influence and youth sex-related experience, exposure, and attitude. Peer influence was measured by perception of

friends' sexual behaviors. This information was obtained by asking the youth what proportion of their best friends had sex. Youth's sex-related experience, exposure, and attitude were measured by three dichotomous variables: dating (ever vs. never), exposure to pornography (ever vs. never in the past year), and attitude to premarital sex (accepted vs. unaccepted). The second sets of main explanatory variables were related to contextual factors: school attendance, community participation, and cultural exposure. The measure of community participation was based the questionnaire asking the youth whether the youth participated in any one of three types of community activities, namely club, religious, or volunteering social groups in the past year. The variable was coded as 1 if the youth participated in any one of community activities and others coded as 0. Measures of cultural exposure were assessed by favorite music of youth (Muñoz-Laboy et al 2008). Three specific types of music were examined: Western pop music, Japanese pop music, and Taiwanese pop music. Control variables of individual and family characteristics included sex, birth cohort, family structure, and geographical region.

### *Analysis*

We examined peer influence and contextual effect on pre-marital sex and, in turn, these relationships may be contributed to substance use and health status of youth. We began with bivariate analyses that characterized the prevalence of premarital sex engagement for all 3,530 never married youth and the prevalence of inconsistent or no condom use for 786 sexually active and never married youth. Then, binary outcomes were employed by multivariate logistic regression, reported as an adjusted odds ratio (aOR) controlling for sample clustering effects. Pre-marital sex was analyzed using 2-part models. First, logistic regression models were used to assess the odds of having premarital sex engagement among 3,530 youth. Second, logistic regression models were used to assess the odds of inconsistent or no condom use in the sample of 786 sexually active youth.

We also employed a sequential modeling strategy to differentiate the relative effects of peer vs. context on pre-marital sex. Model 1 included variables of perception of friends' sexual behaviors and youth's own sex-related experience and attitude to examine the independent effect of peer influence on pre-marital sex. Model 2 included variables of school attendance, community participation, and cultural exposure to examine the independent effect of contextual factors on pre-marital sex. The final Model 3 included variables in Models 1 and 2 to assess the relative effects of peer vs. contextual influence, even adjusting for individual and family characteristics.

In order to understand the correlations of pre-marital sex with health status, multivariate logistic regression models were conducted to estimate adjusted effects (odds ratios) of

pre-marital sex, peer and contextual influences, and other selected socioeconomic and family characteristics on youth's health status, separately for self-reporting poor health, smoking, and drinking. All models accounted for sample clustering in the survey design with STATA 9.0 (StataCorp 2005).

## RESULTS

Table 1 shows the sample characteristics and the prevalence of pre-marital sex by selected characteristics. The sample consisted of 56% not knowing any best friends who had sex, 33% knowing less than half of their best friends who had sex, and 11% knowing half or more best friends who had sex. Fifty-seven percent of never married youth had a dating experience. About one-fifth had exposed to pornography in past year. Sixty-six percent of never married youth reported an accepting attitude to premarital sex. In addition to contextual factors, over three-fourths currently enrolled in school. Twenty-eight percent of never married youth had participated in a community activity in the past year. The sample consisted of 49% who favored Western pop music, 22% favoring Japanese pop music, and 12% favoring Taiwanese pop music.

Among all 3,530 never married youth twenty-two percent reported having had sex. The premarital sex prevalence with each category of variables related to peer's and youth's sex experience, exposure, and attitude was found to be higher among youth knowing half or more best friends who had sex (72%), having dating experience (38%), having pornography exposure (35%), and having an accepting attitude to premarital sex (32%). The prevalence of premarital sex within each category of context variables was also found to be higher among youth who were not enrolled in school (38%), those who had no community participation (24%), and those who favored Taiwanese pop music (30%).

Of these sexually active youth, more than half (56%) reported no or inconsistent condom use. The proportion of never married youth reporting that they did not use condoms consistently was higher among sexually active youth who knew half or more best friends who had sex (67%), those who exposed to pornography (64%), and those who had an accepting attitude toward premarital sex (57%). The proportion reporting no or inconsistent condom use within each category of contextual variables was higher among sexually active youth who were not enrolled in school and those who did not participate in a community activity.

<Table 1 about here>

### Factors Associated with Pre-marital Sex

In Table 2, logistic regression models with robust standard errors accounted for complex survey design. The adjusted odds ratios (aOR) were estimated to adjust for clustering of

youth in the same classroom. The estimates of odds ratios were the likelihoods of pre-marital sex behaviors of the youth with certain sex-related perception, experience, and attitude of youth and contextual properties using logics of 2-part models with progressive adjustments.

*Premarital sex behavior.* All never married youth sample was included in the first part of models with progressive adjustments in Models 1-3 to estimate relative effects of perception of peers' behaviors, youth's own experience and attitude, school attendance, and community participation on the likelihoods of having had premarital sex, adjusting for other selected socioeconomic and contextual factors. Model 1 shows a significant effect of peer influence and youth sex-related experience, exposure, and attitude on premarital sex engagement. A greater proportion of youth knowing their best friends who had sex was associated with higher odds of premarital sex behavior. Youth who had dating experience and exposed to pornography were also much more likely to engage in premarital sex than their counterparts. Yet, individual unaccepted attitude toward premarital sex was associated with lower odds of premarital sex behavior (aOR=0.15;  $p<0.01$ ).

Results from Model 2 demonstrate a significant contextual influence on likelihoods of premarital sex engagement. Not-in-school youth were 2.66 times more likely to engage in premarital sex than in-school youth. Community participation and Japanese pop music exposure were associated with significantly lower odds of premarital sex engagement. Model 3 tests the effects of peer influence, youth sex-related characteristics, and context effect, adjusting for individual backgrounds. This addition did not alter the associations of peer influence, context effect, and premarital sex behavior, indicating their independent effects on the likelihoods of premarital sex engagement.

*No or inconsistent condom use.* The sexually active youth sample was included in the second part of the models with progressive adjustments in Models 1-3. As in the case of premarital sex behavior, Model 1 shows that knowing greater proportion of best friends who had sex and youth's pornography exposure were significantly associated with increased likelihood of risky sexual behaviors measured here by no or inconsistent condom use. Among these sexual active youth, Model 2 demonstrated school attendance and community participation decreased the likelihood of inconsistent condom use. Model 3 tests the effect of peer influence and contextual effects. Compared to the results from Models 1 and 2, this addition did not produce appreciably changes in peer influence and context effect, even after controlling for individual backgrounds.

<Table 2 about here>

### Pre-marital Sex and Health Outcome

Table 3 presents logistic regression models with the adjusted odds ratios (aOR) that estimated the likelihoods of self-rated poor health, drinking, and smoking of youth with certain sex-related perception, experience, and attitude and contextual properties using logics of 2-part models, separately for premarital sex and inconsistent condom use. among never married youth, with other factors controlled, premarital sex engagement was significantly associated with higher odds of reporting poor health outcomes, including self-rated poor health, smoking, and drinking. Among sexually-experienced never married youth, with other factors controlled, inconsistent condom use was associated with higher odds of likelihood of self-rated poor and smoking, but not with drinking.

<Table 3 about here>

Our preliminary results suggest perception of friends' sexual behaviors was positively associated with pre-marital sex, which, in turn, had a salient linkage to health outcomes of youth. In addition, contextual factors substantially contribute their effects on pre-marital sex and some of health outcomes of youth. These preliminary findings warrant our further investigation to model interaction terms of perception of best friends' sexual behaviors with youth' own experience and attitude to test for potential differential effects of peer influence in youth experience and attitude on pre-marital sex as well as health outcomes.

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Figure 1. The Conceptual Model

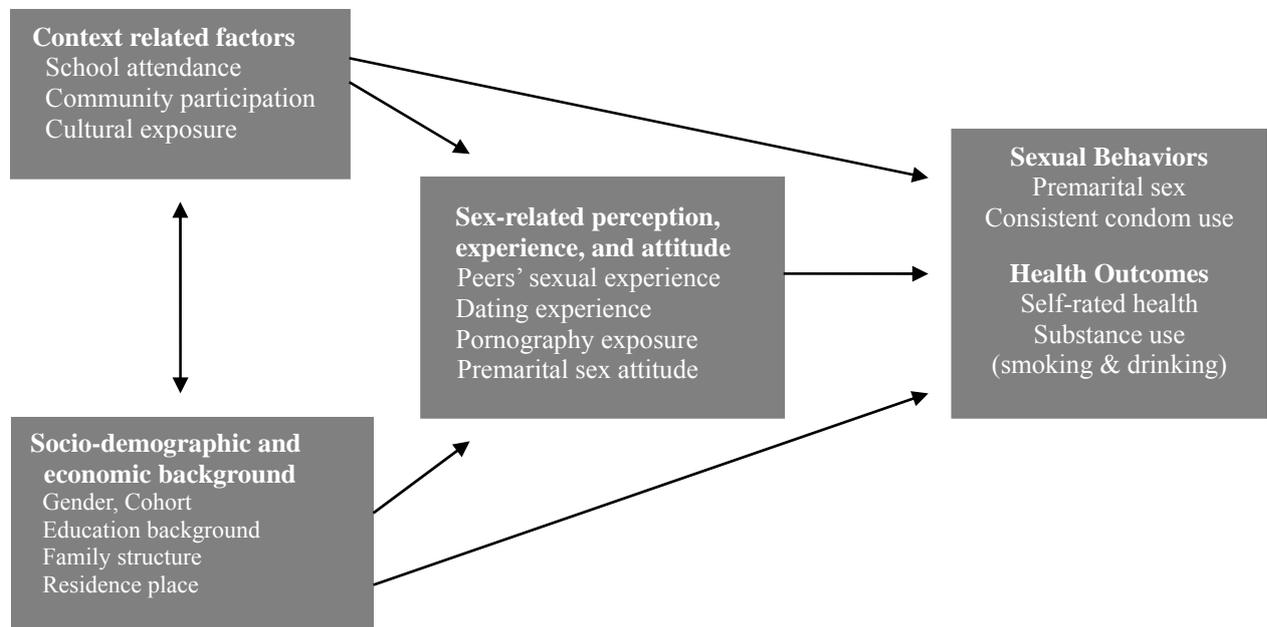


Table 1. Percentage distribution of never married youth, by selected characteristics used in the present study, Taiwan Youth Project 2004/2007

<i>Characteristic</i>	<b>Total</b>	<b>Pre-marital sex</b>	
	% (n=3,530)	Had premarital sex (n=3,530)	Inconsistent or no condom use (n=786)
<b>Sex-related perception, experience, and attitude</b>			
Knowing proportions of best friends who ever had sex			
None or unknown	56.15	9.00	50.56
Less than half	32.75	28.55	50.76
Half or greater	11.10	72.12	66.55
Dating			
Ever	57.11	38.43	56.36
Never	42.87	1.06	56.25
Pornography exposure in past year			
Ever	19.26	35.20	64.02
Never	80.74	19.36	53.02
Attitudes toward premarital sex			
Accepted	65.76	32.18	56.80
Unaccepted	34.16	3.57	47.62
Missing	0.09	33.33	100.00
<b>Context related factors</b>			
Current school enrollment			
Enrolled	78.21	18.06	53.54
Not enrolled	21.70	38.04	61.03
Missing	0.09	33.33	100.00
Community participation			
Ever	27.69	18.55	48.33
Never	72.31	23.89	58.75
<i>Cultural exposure: favorite music</i>			
Western pop music			
Ever	49.13	22.63	56.15
Never	50.87	22.20	56.57
Japanese pop music			
Ever	22.35	13.96	56.36
Never	77.65	24.84	56.36
Taiwanese pop music			
Ever	11.83	29.50	54.10
Never	88.17	21.46	56.78
<b>Socio-demographic and economic background</b>			
Gender			
Male	50.38	27.42	57.11
Female	49.62	17.32	55.15
Birth cohort			
Younger	48.60	25.45	58.56
Older	51.40	19.54	53.67

*Note:* Percentage may not add up to 100 due to rounding.

Table 1. Continued

<i>Characteristic</i>	<b>Total</b>	<b>Pre-marital sex</b>	
	% (n=3,530)	Had premarital sex (n=3,530)	Inconsistent or no condom use (n=786)
<b>Socio-demographic and economic background (continued)</b>			
Ever divorced of biological parents			
Ever	8.77	36.25	60.71
Never	91.23	21.08	55.64
Residence place			
Taipei city	37.42	22.06	57.93
Taipei county	37.30	22.81	53.20
Yilan county	25.28	22.33	58.79
<b>Health outcomes</b>			
Self-rated poor health			
Poor	14.84	30.21	64.33
Not poor	85.16	21.05	54.37
Smoking for last week			
Yes	15.06	54.05	63.29
No	84.94	16.80	52.40
Drinking for last month			
Yes	27.52	36.91	58.82
No	72.48	16.91	54.31
<b>Total</b>	<b>100.0</b>	<b>22.41</b>	<b>56.36</b>

*Note:* Percentage may not add up to 100 due to rounding.

Table 2. Results from 2-part logistic regression models predicting premarital sex among never married youth (n=3,525) and predicting inconsistent or no condom use among sexually active youth (n=786)

Explanatory variables	Model 1		Model 2		Model 3	
	aOR for having premarital sex	aOR for inconsistent or no condom use	aOR for having premarital sex	aOR for inconsistent or no condom use	aOR for having premarital sex	aOR for inconsistent or no condom use
<b>Sex-related perception, experience, and attitude</b>						
Knowing proportions of best friends who ever had sex (ref= None or unknown)						
Less than half	2.46**	0.98			2.57**	1.05
Half or greater	14.92**	1.89**			13.89**	1.92**
Ever dating (ref=never)	52.93**	1.22			54.80**	1.19
Pornography exposure in past year (ref=no)	1.88**	1.56**			2.03**	1.83**
Accepting premarital sex (ref=Agreed)						
Disagreed	0.15**	0.79			0.16**	0.87
<b>Context related factors</b>						
No school enrollment (ref=Enrolled in school)			2.66**	1.35 <sup>‡</sup>	1.94**	1.29
Community participation (ref=never)			0.75**	0.67*	0.82	0.66**
Cultural exposure: favorite music						
Western pop music (ref=no)			0.96	0.95	0.76*	0.82
Japanese pop music (ref=no)			0.50**	0.995	0.48**	0.87
Taiwanese pop music (ref=no)			1.10	0.87	0.999	0.79
<b>Socio-demographic &amp; economic background</b>						
Gender (ref=male)						
Female					0.82	1.15
Birth cohort (ref=older)						
Younger					1.36**	1.29 <sup>‡</sup>
Ever divorced of biological parents (ref=no)					1.93**	1.23
Residence place (ref= Taipei city)						
Taipei county					1.13	0.87
Yilan county					1.01	1.13
<b>Model statistics</b>						
Wald $\chi^2$ (df)	613.46 (5)	30.47 (5)	173.31 (5)	11.93 (5)	641.12 (15)	43.79 (15)
Pseudo-R <sup>2</sup>	0.4173	0.0256	0.0469	0.0095	0.4412	0.0406

Note: All logistic regression models adjust for sampling cluster; aOR represents adjusted odds ratios for sample cluster; <sup>‡</sup>p<0.10; \*p<0.05; \*\*p<0.01

Table 3. Results from 2-part logistic regression models predicting self-rated poor health and substance abuse, having premarital sex as an explanatory variable among never married Taiwanese youth (n=3,525) and having inconsistent or no condom use as an explanatory variable among sexually active Taiwanese never married youth (n=786)

<i>Explanatory variables</i>	<b>Self rated Health</b>		<b>Substance Use</b>			
	<b>Predicting self-rated poor health</b>		<b>Predicting ever smoking</b>		<b>Predicting ever drinking</b>	
	aOR (inclusion of premarital sex variable)	aOR (inclusion of inconsistent or no condom use variable)	aOR (inclusion of premarital sex variable)	aOR (inclusion of inconsistent or no condom use variable)	aOR (inclusion of premarital sex variable)	aOR (inclusion of inconsistent or no condom use variable)
<b>Premarital sex outcome</b>						
Premarital sex engagement (ref=no)	1.26 <sup>‡</sup>		2.15**		1.37**	
Inconsistent or no condom use (ref=consistent)		1.33 <sup>‡</sup>		1.36 <sup>‡</sup>		1.07
<b>Sex-related perception, experience, and attitude</b>						
Knowing proportions of best friends who ever had sex (ref= None or unknown)						
Less than half	1.24 <sup>‡</sup>	1.16	1.44**	0.996	1.66**	1.47*
Half or greater	2.08**	1.97**	2.96**	2.07**	2.23**	2.22**
Ever dating (ref=never)	1.01	0.43	1.60**	1.27	1.48**	1.45
Pornography exposure in past year (ref=no)	1.55**	1.69*	1.02	1.30	1.71**	1.38 <sup>‡</sup>
Accepting premarital sex (ref=Agreed)						
Disagreed	1.10	0.93	0.63**	1.67	0.68**	1.35
<b>Context related factors</b>						
No school enrollment (ref=Enrolled in school)	1.18	1.33	3.46**	2.25**	1.07	1.08
Community participation (ref=never)	0.87	1.04	0.72**	0.60*	0.95	0.83
Cultural exposure: favorite music						
Western pop music (ref=no)	0.93	1.21	1.00	0.82	1.18 <sup>‡</sup>	1.17
Japanese pop music (ref=no)	1.14	1.50	0.53**	0.39**	0.91	0.92
Taiwanese pop music (ref=no)	0.71 <sup>‡</sup>	0.75	1.33	1.06	1.31*	1.07
<b>Model statistics</b>						
Wald $\chi^2$ (df)	88.21 (16)	58.38 (16)	741.11 (16)	164.41 (16)	374.99 (16)	34.08 (16)
Pseudo-R <sup>2</sup>	0.0289	0.0562	0.2527	0.1348	0.0832	0.0283

Note: Logistic regression models adjust for sampling cluster; aOR represents adjusted odds ratios for sample cluster; <sup>‡</sup>p<0.10; \*p<0.05; \*\*p<0.01

All models also controlled for socio-demographic and economic background variables (including gender, birth cohort, ever divorced of biological parents, residence place).