Multilevel analysis between alcohol use trajectories: parent, peer, school, and neighborhood factors among Asian American adolescents

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Background and Significance

* Asian American population has been increasing among American ethnic groups in the last few decades

* In spite of their growing significance, health problems in the Asian American population remain under-researched (Ghosh, 2003; Price et al. 2002).

* Specifically, research on alcohol use behavior using longitudinal data is rare among Asian Americans

Background and Significance

* **Risk factors** of adolescent alcohol use

* **Parental alcohol use** and parent-adolescent relationships (Simons-Morton et al., 2001)

* **Peer alcohol use** also is a strong risk factor for alcohol use in late adolescence

Background and Significance

School factors: low academic achievement, lower level of school bonding, and school absence (Kaplan et al., 2003)

Neighborhood factors: economic deprivation, decreased social cohesion, and low collective efficacy (Brown, Phillips, & Ialongo, 2004)

Background and Significance
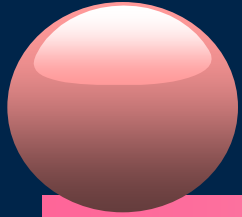
Community-Level Variables and Alcohol Use

Regarding **types of schools**, private school adolescents were 30% more likely to drink alcohol than those in public school

Regarding **location**, Adolescent substance use in rural or small towns was higher than that in urban areas

Purpose

To examine the influence of parental, peer, school, and neighborhood factors at the **individual-level**, and contextual factors at **community-level** (school & neighborhood) on **alcohol use trajectories** among Asian American adolescents from grades 7 to 12

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Conceptual Framework

Individual Levels

Socio-demographic factors

Parental factors
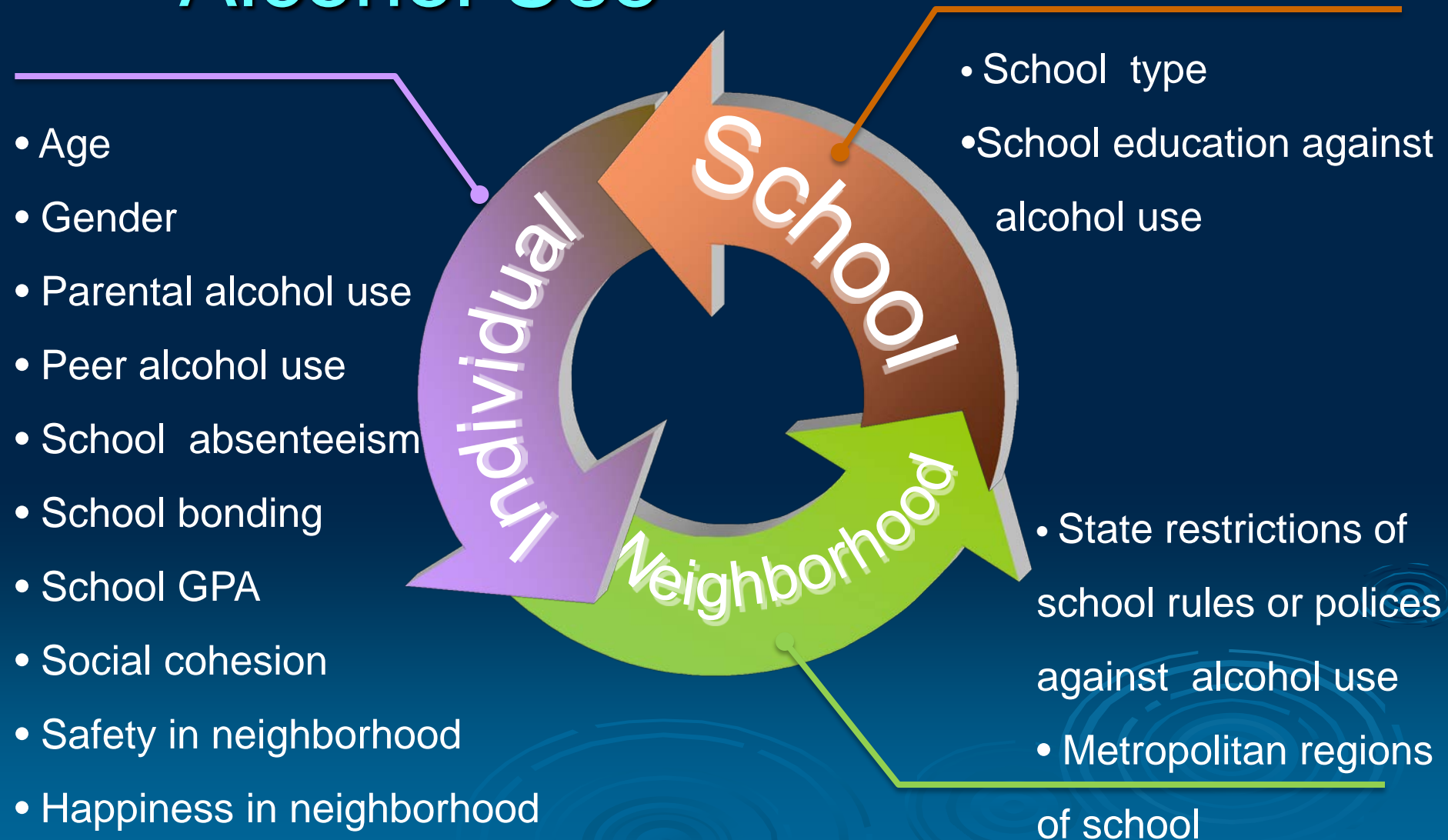
Peer factors

School factors

Neighborhood factors

Community Levels

School factors

Neighborhood factors

Alcohol Use
(frequency * quantity)

Three Level Determinants of Alcohol Use

- Age
- Gender
- Parental alcohol use
- Peer alcohol use
- School absenteeism
- School bonding
- School GPA
- Social cohesion
- Safety in neighborhood
- Happiness in neighborhood

Individual

School

- School type
- School education against alcohol use

Neighborhood

- State restrictions of school rules or polices against alcohol use
- Metropolitan regions of school

Research Questions

* Are adolescent alcohol use behaviors associated with individual level determinants of alcohol use (parental and peer alcohol use) among Asian American adolescents?

* Are adolescent alcohol use behaviors associated with individual level determinants of alcohol use (parental-adolescent relationships and peer-adolescent relationships) among Asian American adolescents?

* Are adolescent alcohol use behaviors associated with school factors at individual-level (school absenteeism, school bonding, GPA) among Asian American adolescents?

Research Questions

* Are adolescent alcohol use behaviors associated with neighborhood factors at individual-level (social cohesion, safety in neighborhood, happiness in neighborhood) among Asian American adolescents?

* Are adolescent alcohol use behaviors associated with school-level determinants of alcohol use (school type and school education programs)?

* Are adolescent alcohol use behaviors associated with neighborhood-level determinants of alcohol use (State policies of school rules against alcohol use, school location)?

Methodology

1 Sample

National Longitudinal Study of Health (Add Health data)

2 Design

Participants: Asian American adolescents
Wave I : 1582 respondents
Wave II: 1088 respondents

3 Age

- mean age of sample: 16.01 years in Wave I
                        16.58 in Wave II
- Wave I: males-824 (52.08%) ,
              females- 758 (47.92%)
- Wave II: males-556 (51%)
              females-533 (49%) (unweighted number)

Data analysis

1 **National Longitudinal Study of Health** **(Add Health data)** for the **secondary data analyses: Wave I & Wave II data**

2 Data were collected from the United States with a **stratified cluster sampling design** In order to reflect the clustering and stratification, **sampling weights** were used

3 Survey analysis procedures in the **SAS and Stata** were used to handle the **sampling weights and the complex sample design**

Data analysis

4 To deal with item non-response and attrition in a longitudinal study, the **multiple imputation** method using **IVEware** was used (Raghunathan, Lepkowski, VanHoewyk, & Solenerger, 2001)

5 For an inferential statistical analysis, **Hierarchical Linear Model program (HLM: three level)** was used to estimate growth trajectories for each individual

6 **Multilevel analysis and three -level Linear Hierarchical multiple regression analysis** employed by HLM: to define the determinants of alcohol use over time

Methods: Measures Individual-level variables

Alcohol use : frequency and quantity of alcohol use

Parental factors
Parent alcohol use for fathers and mothers was measured by one item obtained from each parent: "How often do you drink alcohol?"

Adolescent–parent relationships:
Cronbach's *alpha:*adolescent-mother relationship :
: 0.85 in Wave I, and 0.84 in Wave II
Cronbach' *alpha:*adolescent-father relationship
: 0.88 in Wave I, and 0.86 in Wave II

Methods: Measures Individual-level variables

Peer Factors: **Peer alcohol-**assessed by a single item: "Of your 3 best friends, how many drink alcohol at least once a month?" Responses ranged from "no friends" (0) to "three friends" (3). The higher scores indicated that adolescents having more friends who drink alcohol

Peer-adolescent relationships-measured by a single item: "How much do you feel that your friends care about you?" Responses ranged from "not at all" (0) to "very much" (5).
A higher score represented a closer relationship with friends.

Methods: Measures Individual-level variables

* **School factors:** **School absenteeism without excuse** measured by one item (Higher scores ➔frequent school absenteeism)

* **School bonding** scale included 6 items (Higher scores ➔ greater school bonding) Cronbach's alpha: 0.71 in Wave I, 0.72 in Wave II

* **Academic achievement:** English or language arts, mathematics, history or social studies, science (Higher scores ➔ a better grade point average) Cronbach's alpha: 0.79 in Wave I, 0.76 in Wave II.

Methods: Measures Individual-level variables

Neighborhood factors
Neighborhood social cohesion: 3 items
(higher scores ➔ higher levels of social cohesion)
Cronbach's alpha: 0.62 in Wave I, 0.63 in Wave II

Adolescents' perceptions of safety in their neighborhood: a single item

Adolescents' perceptions of their own personal happiness with living in their neighborhood: a single item

Methods: Measures community-level variables

* **Community-Level Variables:** all adolescents in the same school ➔ same values Variables from Wave I data

* **Types of schools:** private, catholic & public schools **Metropolitan location of schools:** urban, suburban and rural (urban - a reference group)

* **School health policies and programs** (School Health Policies and Programs Study, 1995) : schools' educational programs on alcohol state policy on alcohol use

Methods: Measures

Background variables: age, gender and SES
Age: measured by the interview completion date, and a participant's date of birth at Wave I. (age = int ((interview date-birth date)/365.25))

Gender: coded as males=1 and females=2

Socioeconomic status: measured by parental education. Whoever had the highest level of education, the father or mother, was chosen for parental education level (Hussong & Hicks, 2003)

Results: father's alcohol use

➤ Adolescents having fathers who drank alcohol frequently drank 7.5 % more on average than their counterparts whose fathers did not drink alcohol, controlling for other variables ($p < 0.01$)

➤ Adolescents having mothers who drank alcohol drank 5.6% more than their counterparts whose mothers did not drink alcohol on average, controlling for other variables

Alcohol use over time by father's alcohol use
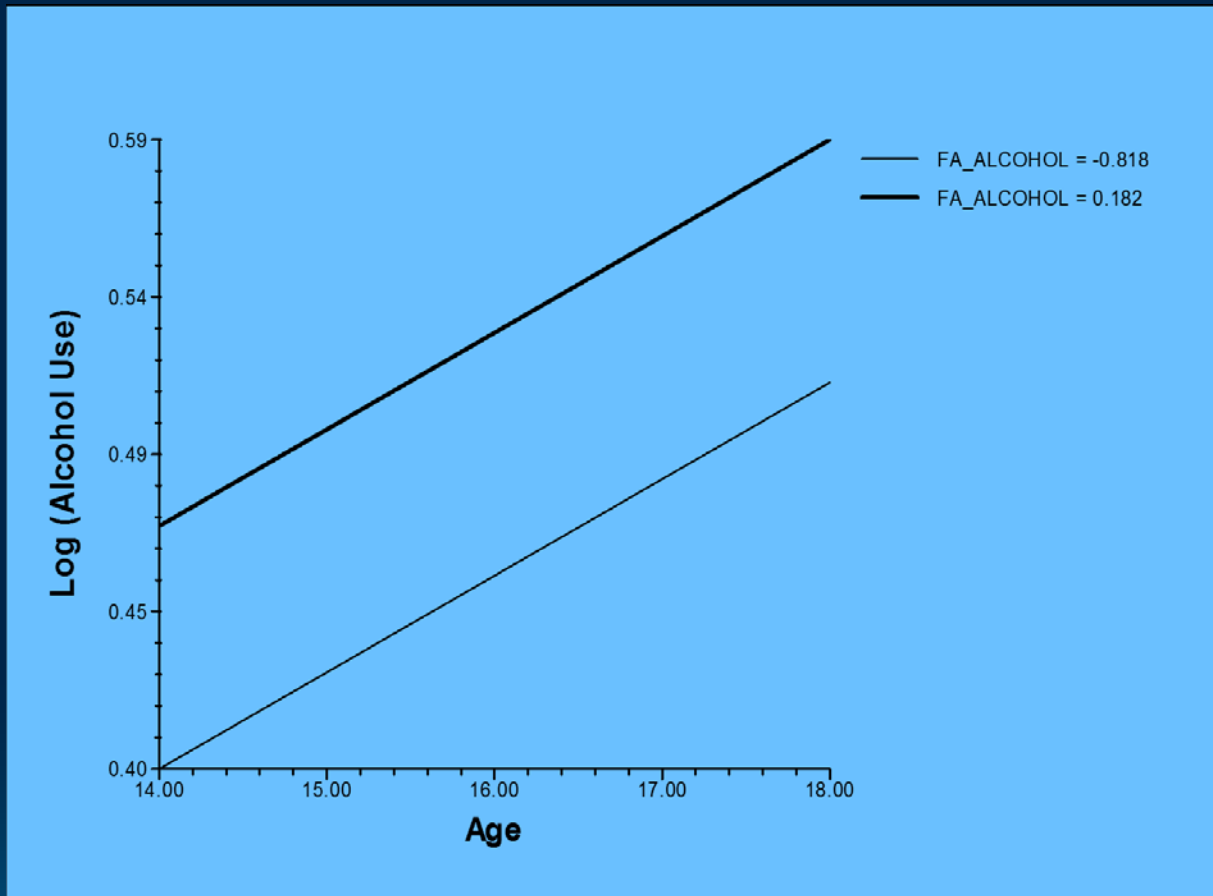
> Figure 4.2. Alcohol use (quantity and frequency) over time by father's alcohol use
 * FA_ALCOHOL: father's alcohol use (25th and 75th percentiles were used)
> FA_ALCOHOL = -0.818: 25th percentile value
> FA_ALCOHOL = 0.182: 75th percentile value

Results: Peer alcohol use

➢ Peer alcohol use was strongly significantly associated with adolescent alcohol use. An increment in the number of best friends who drank alcohol at least once a month increased the expected alcohol use of adolescents by 35.5 % ($p<0.001$), controlling for other variables

Alcohol use over time by peer alcohol use
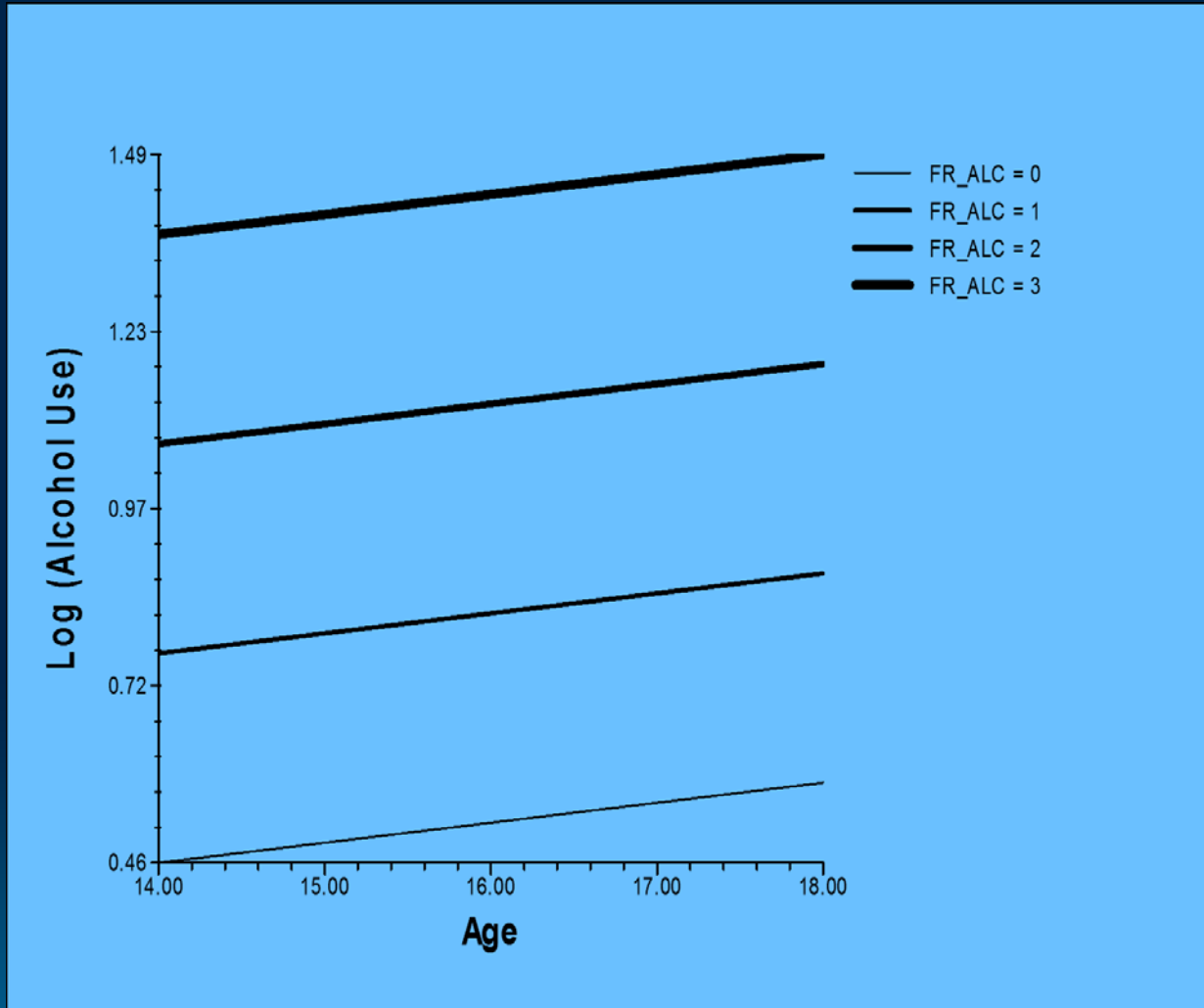
> Figure 4.3. Alcohol use (quantity and frequency) over time by peer alcohol use

> *FR_ALC: a number of peer who drinks alcohol use

Results: adolescent-parent relationship

➢ A one-unit increase in the adolescent-father relationship measure decreased the expected alcohol use of adolescents by 7 % (p<0.1), controlling for other covariates

➢ Adolescent-mother relationship and the friends' caring :not significant associations with adolescent alcohol use

Results: Individual Level

➢ School factors: a one day increment in the number of **school absent days** increases the expected alcohol use by 1.3% ($p<0.001$)

➢ A unit increase in **school bonding** decreases alcohol use on average by 11.6% ($p<0.01$)

➢

➢ A one-unit increase in **GPA** decreases alcohol use by 8.0 % ($p<0.05$) on average, controlling other covariates

➢ **Perceived neighborhood factors**: social cohesion, perceived safety in the neighborhood and happiness living in the neighborhood: not significant with alcohol use

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Alcohol use over time by school bonding
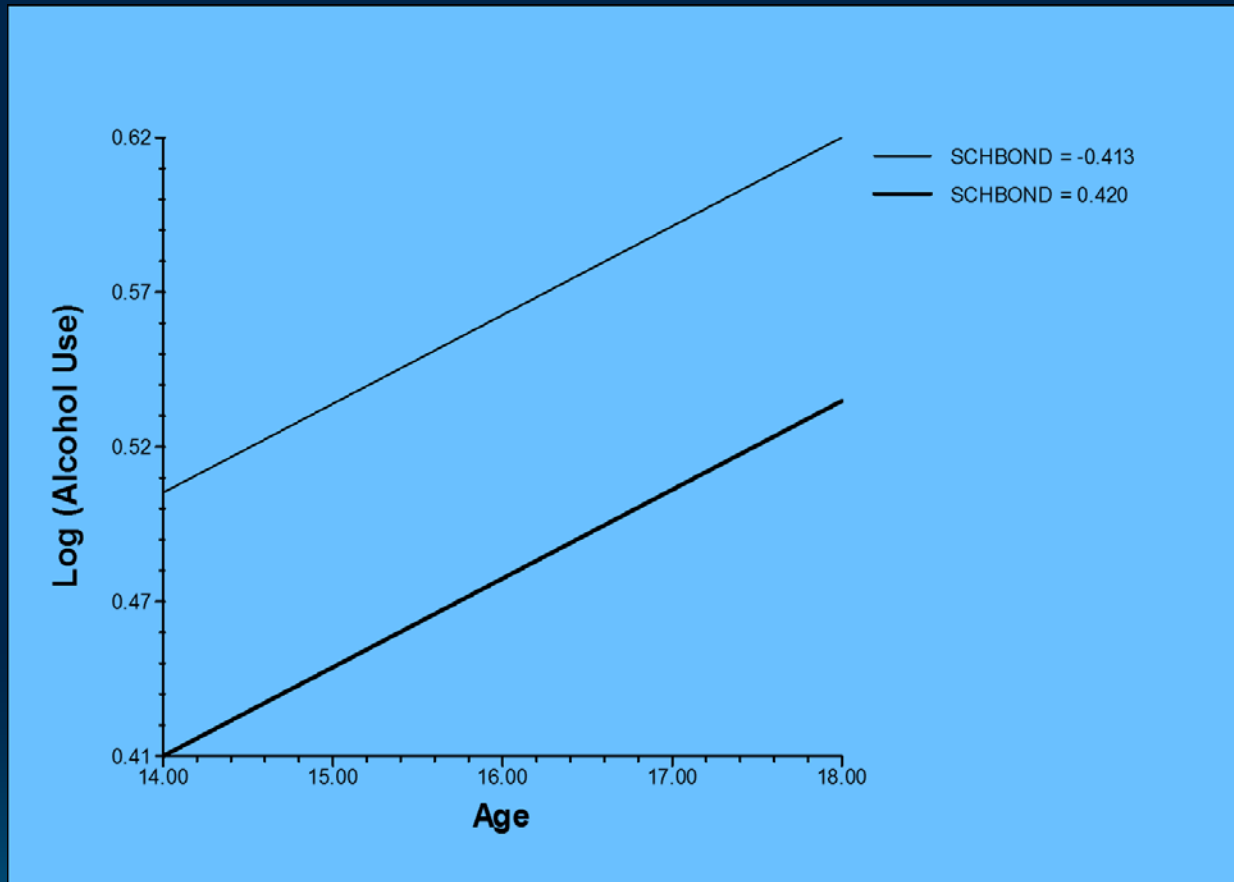
- ➢ Figure 4.4. Alcohol use (quantity and frequency) over time by school bonding
- ➢ * SCHBOND: school bonding (25th and 75th percentiles were used)
- ➢   SCHBOND= -0.413: 25th percentile value
- ➢   SCHBOND= 0.420: 75th percentile value

Results

➢ Community-Level variables

➢ At the school level, students attending catholic schools drank 1.17 times ($p<0.1$) as much as their counterparts attending a public school (reference group), controlling for other covariates.

➢ Regions such as urban, suburban and rural: not significant

➢ School required alcohol prevention education and State recommendation that schools or school districts include rules against alcohol and drug: not significant

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Conclusion

➤ The results can contribute to a better understanding of alcohol use behavior among Asian American adolescents

➤

➤ Since longitudinal studies of alcohol use in Asian American adolescents are limited in number, the results provide important information on predictors of alcohol use in this population.

Discussions & Implication

Longitudinal studies of alcohol use in Asian American adolescents are limited in number : provide important information on predictors of alcohol use

Identification of growth curve trajectories of alcohol use: provide better understanding on predictors of alcohol use

These findings suggest that **cultural** factors and alcohol use determinants must be considered when designing interventions and education against alcohol use for Asian American adolescents

Discussions & Implications

The strongest aspect of this study is the framework using **multilevel analyses**, which includes both individual-level and community-level variables

The findings of the multilevel analysis using **longitudinal data** can be helpful for developing **comprehensive prevention programs** against alcohol use: benefit to school nurses & those who work in adolescent health

Predictors of alcohol use based on **developmental stages** provides **important information** for the development of prevention and education programs for Asian American adolescents

Limitations

Secondary data analyses: variable selection was restricted

Not examine alcohol use in **subgroups** of Asian American adolescents: each subgroup may have different cultural backgrounds

Future Implications

Future studies: should explore **heavy drinking and binge drinking** using longitudinal data

Focused on **subpopulations** of Asian American adolescents

Future Implications

Variable centered approach but research on **patterns of trajectories** needs to be carried out for further understanding of alcohol use as having different antecedent factors : **Multiple trajectories o**ffer a method to define risk factors

Paucity of longitudinal studies of Asian American adolescents: **more research using longitudinal data** needs to promote health and to reduce risky behaviors