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Substance Use Behavior among Early-Adolescent Asian American Girls: The Impact of Psychological and Family Factors

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Abstract

Confronting developmental tasks and challenges associated with bridging two different cultures, Asian American adolescent girls face increasing risks for substance use. Identifying risk and protective factors in this population is essential, particularly when those factors can inform preventive programs. Guided by family interaction theory, the present cross-sectional study explored the associations of psychological and familial factors with use of alcohol, prescription drugs, and other drugs among early-adolescent Asian American girls. Between August 2007 and March 2008, 135 pairs of Asian American girls (mean age 13.21 years, SD = 0.90) and their mothers (mean age 39.86 years, SD = 6.99) were recruited from 19 states that had significant Asian populations. Girls and mothers each completed an online survey. Relative to girls who did not use substances, girls who did had higher levels of depressive symptoms, perceived peer substance use, and maternal substance use. Multiple logistic regression modeling revealed that they also had significantly lower levels of body satisfaction, problem-solving ability, parental monitoring, mother-daughter communication, family involvement, and family rules about substance use. Household composition, acculturation, and academic achievement were not associated with girls' substance use. These findings point to directions for substance abuse prevention programming among Asian American girls.

Keywords

Asian Americans; substance use; female; adolescents; risk factors; family

Introduction

Substance use among Asian American adolescent girls is often masked by the gendered minority image model. Emerging evidence, however, reveals this issue is often invisible and suggests that substance use – such as alcohol, tobacco, marijuana, and illicit drug use – among Asian American adolescent girls may not be as low as assumed. Based on a nationally representative sample of Asian American adolescents, Hahm and colleagues (2004) found that the binge drinking rate of Asian girls in the U.S. (33.6%) was slightly higher than that of Asian boys (30.6%). Nakashima and Wong (2000) analyzed alcohol consumption of Korean American high school students and found that Korean American girls were just as likely as boys to both drink and misuse alcohol. Finally, in a study examining tobacco use, binge drinking, marijuana use, and other drug use among Asian

American adolescents, Hahm et al. (2008) found that girls who self-identified as sexual minority were more likely to use a broader range of substances compared with sexual majority Asian American girls.

Despite the alarming substance use figures, the etiology of substance use among Asian American adolescent girls has not been fully understood. In particular, most available literature has not explored gender-specific patterns (e.g., Hahm, Lahiff, and Guterman 2003; Wong, Klinge, and Price 2004; Price et al. 2002; Choi 2007; Choi, He, and Harachi 2008; Nakashima and Wong 2000; Kim, Zane, and Hong 2002). Because boys and girls follow different developmental trajectories and have a different set of maturational vulnerabilities, gender-specific research that explores the precursors of substance use can guide the design of tailored and effective prevention strategies to prevent or postpone substance use among Asian American adolescent girls.

The present study aimed to understand the relations of psychological and familial factors to early-adolescent Asian American girls' substance use. The transition from childhood to adulthood can be a difficult and risky period. Hormonal processes that begin in early adolescence trigger a series of physical, cognitive, emotional and social changes (Berk 2008). The interplay of gender roles and cultural expectations has the potential to exacerbate further the process for Asian American adolescent girls. Asian girls are often expected to be passive, subservient, and responsible for household chores and caretaking (Espiritu 2001; Lee 2001). American society expects Asian American girls exposed to American individualistic culture to value creativity, self-assertion, independence and self-actualization (Uba 2003). However, their parents are more likely to appreciate cohesive, collective and interdependent cultural values, and demand interdependence and cooperation (Uba 2003). Negotiating between the two fundamentally different cultures can pose a great challenge to Asian American girls. If their parents are unable or unwilling to help them manage the psychological challenges they face, Asian American girls are more likely to turn to their peers for behavioral codes and guidance and to engage in substance use (Hahm, Lahiff, and Guterman 2003). Asian American girls may believe that substance use is an acceptable strategy for alleviating stress and solving problems, to reestablish equilibrium and harmony while not causing a burden to others (D'Avanzo 1997).

Family interaction theory (Brook et al. 1990) may be particularly relevant to understanding substance use among Asian American adolescent girls. Integrating social learning, attachment, and deviant behavior theories, family interaction theory posits that adolescents' substance use originates from their psychological state, peer influences, and family characteristics (Brook et al. 2006; Brook, Richter, and Whiteman 2000). The theory recognizes that exposure to and interactions with valued individuals (i.e., peers and parents) who use substances can shape adolescents' self-efficacy to use or to resist substance use. Moreover, it underscores the importance of family processes in preventing adolescents from using substances. Accordingly, family interaction theory suggests that familial factors, such as the absence of parental drug use, strong parent-child attachment and communication, parental disapproval against using substances, and high levels of parental monitoring can serve as buffers against peer influence and psychological risks.

In the context of family interaction theory, we surveyed a sample of Asian girls and their mothers, and examined the relations of the psychological and family factors to girls' use of alcohol, cigarettes, prescription drugs, and inhalants. We hypothesized that girls' substance use would be positively related to acculturation, depressive symptoms, perceived peer substance use, maternal drinking and maternal cigarette smoking, and negatively associated with academic achievement, body satisfaction, problem-solving, self-efficacy, maternal

monitoring, mother-daughter communication, family involvement, and family rules about substance use.

Methods

Study Sample and Procedures

Study participants were recruited between August 2007 and March 2008. Considering low participation rates of Asian Americans in research studies (Sadler et al. 2010; Hussain-Gambles 2004), we used multiple recruitment methods, including advertisements on the major online classified services (e.g., www.craigslist.net) and flyers in mailings to targeted community social service and healthcare agencies (e.g., community centers, civic associations, health clinics, family service centers) to recruit a convenience sample of Asian teen girls and their mothers in 19 states that had significant Asian populations (i.e., Asian population was greater than 100,000 based on the 2000 U.S. Census [Barnes and Bennett 2002]). Before distributing the recruitment flyers, we contacted the agencies by phone, explained the study purposes, and answered any questions they had. Recruitment materials were sent to agencies that showed interest in promoting the study. Targeting Asian adolescent girls and their mothers, the recruitment materials directed prospective participants to a prescreening website that gave details about the study, specified inclusion criteria (i.e., girls needed to be Asian and aged from 11 to 14 years; active participation of girls and their mothers was required; and girls needed to have private access to a computer at home), and asked for contact information from those who wished to be sent informed consent forms. Signed consent forms were returned by 135 mother-daughter pairs. Over two-thirds (68.1%, $n = 92$) were recruited through the website advertisement, and 31.9% ($n = 43$) were from the community agencies. Each consenting mother and her assenting daughter received an individual username and password to access online surveys administered in English. Girls and mothers each received \$25 for completing the survey. The research protocol was approved by the university institutional review board.

Measures

The study surveys consisted of demographic questions and empirically validated scales concerning girls' substance use, girls' psychological factors, and their familial factors. For the Likert scales employed in the study, we reported the averaged scores, rather than the summed scores. The average of individual item scores of the scales was perfectly correlated with the sum of the item scores, as the sum of these individual scale items was identical to the averaged scores multiplied by the number of items involved. We used the average of item scores because the interpretation of an average was clearer than a sum when referring to the anchors of the Likert scales.

Demographics—Girls responded to questions that requested information on age and family composition (0 = single-parent household; 1 = two-parent household). Mothers reported their age, education (1 = less than high school or high school degree, 2 = college or university degree, to 3 = graduate degree) and employment status (0 = not employed; 1 = employed).

Girl substance use—Using items derived from the American Drug and Alcohol Survey (ADAS; Rocky Mountain Behavioral Institute 2003), girls reported if they had ever in the past 12 months had a whole alcoholic drink (i.e., beer, wine, malt liquor, wine coolers, sweet alcoholic drinks, mixed drinks, or hard liquor); ever took prescription drugs (e.g., Ritalin, Adderall, Vicodin, OxyContin, Xanax, Valium, Ambien, and Lunesta) just to get high; and ever used other drugs (i.e., cigarettes, inhalants, marijuana), where never used was coded as “0” and ever used was coded as “1”.

Acculturation—Based on prior acculturation measures developed for U.S. adolescents (Hahm, Lahiff, and Guterman 2004; Hahm, Lahiff, and Guterman 2003; Yu et al. 2003), we created an acculturation index. The index assessed girls' language spoken at home and their immigration status. English language use was assessed on a 5-point scale, ranging from 1 = "use of only Asian language at home" to 5 = "use of only English at home". Immigration generational status was assessed on a 5-point scale, with values of 1, 3, and 5 assigned to first (i.e., foreign-born girls of foreign-born parents), second (i.e., U.S.-born girls of at least one foreign-born parent) and third generation (i.e., U.S.-born girls of U.S. born parents), respectively. The scores of both scales were averaged (Cronbach's $\alpha = .81$).

Academic grades—Girls reported their overall average grade on a 4-point scale, from 1 = D's, 2 = C's, 3 = B's, to 4 = A's.

Body satisfaction—On a 5-item physical appearance subscale of the Self-Perception Profile for Adolescents (Harter 1988), girls specified the degree to which they were happy with the way they looked and with their height and weight. Illustrative is "I am happy with the way I look". Scores were averaged (Harter 1988; Thomson and Zand 2002). Possible scores ranged from 1 to 5, with higher scores reflecting greater body satisfaction (Cronbach's $\alpha = .86$).

Depressive symptoms—Girls rated their depressed mood, hedonic capacity (i.e., capacity for pleasure), vegetative functions (i.e., processes undertaken to maintain life), and interpersonal behaviors on the short version of the Children's Depression Inventory (CDI; Kovacs 1992) by endorsing one of three statements (e.g., "I'm sad once in a while," "I'm sad many times," "I'm sad all the time"). Possible responses ranged from 0 to 2. Scores for all four measures were averaged (Williams et al. 2002), with higher scores indicating more depressive symptoms (Cronbach's $\alpha = .89$).

Problem solving—Girls reported their problem solving skills on four items derived from the Problem-Solving Inventory, Approach-Avoidance Style subscale (Heppner and Petersen 1982) and indicated their tendency to either approach or avoid problem-solving activities on a 5-point scale. Illustrative is "When having a problem (like getting in trouble at school or home, or having a fight with a friend), how often do you do the first thing that you can think of to solve it?" We averaged the scores to form an overall problem-solving score (Haines and Williams 2003). Possible scores ranged from 1 to 5, with higher scores reflecting better problem-solving capacity (Cronbach's $\alpha = .82$).

Self-efficacy—Girls indicated their levels of self-efficacy by reporting their confidence in abstaining from substance use in situations associated with substance use on five items derived from the Alcohol Abstinence Self-Efficacy Scale (DiClemente et al. 1994). Sample items included questions such as, "I am confident that I won't use substances when I see others use at a party." Response choices ranged from 1 = not at all to 4 = extremely, with higher averaged scores (Friend and Pagano 2007) representing greater self-efficacy (Cronbach's $\alpha = .84$).

Perceived peer substance use—Girls estimated how many of their closest friends drank and how many of them got drunk on a 5-point scale (Johnston, O'Malley, and Bachman 2001), ranging from 0 = none of them to 4 = all of them. Illustrative is "How many of your friends drink alcohol at least once a week?" The scores were averaged (Eisen, Zellman, and Murray 2003) for this 2-item scale (Cronbach's $\alpha = .77$).

Mother current drinking and smoking behavior—Mothers reported the number of drinks they imbibed and the number of cigarettes they smoked during the past week. Illustrative is “In the last week, how many drinks of alcohol did you have?”.

Maternal monitoring—On the Parenting Practices Questionnaire (Gorman-Smith et al. 1996), mothers indicated their parental monitoring on a 5-item measure, and reported their awareness of daughter’s whereabouts, activities, friends, and peer activities. Example items included, “I set a time when my daughter is expected home”. Response options ranged from 1 = never to 5 = always. Based on prior literature using the same measure (e.g., August et al. 2001), we averaged the scores. Higher scores indicated greater parental monitoring (Cronbach’s $\alpha = .82$).

Mother-child communication—Girls rated the communication with their mothers when faced with problems and conflicts on the adapted Family Problem Solving Communication Index (McCubbin, Thompson, and McCubbin 1996). Girls indicated their agreement with such statements as “I can discuss my beliefs with my mom without feeling restrained or embarrassed.” Responses on this 5-item scale ranged from 1 = strongly disagree to 5 = strongly agree. Ratings for each item were averaged to form an overall mother-child communication score (Schinke, Cole, and Fang 2009), with higher averaged scores indicating better mother-daughter communication (Cronbach’s $\alpha = .77$).

Maternal involvement—Mothers reported how often they checked their daughter’s homework and whether the family ate dinner and lunch together on a 3-item scale (Griffin et al. 2000). Scaled items included questions such as, “How often does your family eat dinner together?” Responses ranged from 0 = never to 4 = every day. Higher averaged scores (Griffin et al. 2000) signified greater family involvement (Cronbach’s $\alpha = .77$).

Family rules about substance use—Responding to a 3-item scale from Strengthening Families Program evaluations (Spoth, Redmond, and Shin 1998), mothers assessed the extent to which they communicated specific rules about their child’s use of alcohol and the consequences for not following those rules on items such as, “I have explained my rules about alcohol use to my child.” Possible scores ranged from 1 = strongly disagree to 5 = strongly agree. Scores were averaged (Spoth, Redmond, and Shin 1998; Schinke, Fang, and Cole 2009), with higher averaged scores reflecting more family rules about alcohol use (Cronbach’s $\alpha = .84$).

Analysis

We first used bivariate analyses to investigate if a significant relationship existed between study’s independent variables (i.e., demographic, psychological and familial variables) and girls’ substance use. Chi-square analyses tested if categorical independent variables differed between substance users and non-users, and *t*-tests examined mean differences between those two groups for continuous variables. We retained demographic variables attaining a significance value less than .05 in bivariate analyses as potential factors to be controlled in multiple logistic regression models after checking for collinearity.

Then, we employed multiple logistic regression analyses to examine relationships between each psychological and familial factor and girls’ substance use, controlling for demographic variables that showed significance at the bivariate level. In each analysis, we entered demographic variables in Block 1 of the regression equation, and a single psychological or familial factor in Block 2. For each logistic regression analysis, we examined the significance of the model and the Hosmer and Lemeshow test (Hosmer and Lemeshow 2000) results. When the model statistic was significant ($p < .05$) and the Hosmer and

Lemeshow test was nonsignificant ($p > .05$), we deemed the fit of the observed frequencies of cases in the categories, compared to those expected based on the logistic regression, appropriate (Hosmer and Lemeshow 2000). SPSS 16.0 (SPSS Inc. 2007) was used to conduct all the analyses.

Results

Sample Characteristics

Girls had an average age of 13.21 ($SD = 0.90$) years, and their mothers had an average age of 39.86 ($SD = 6.99$) years (Table 1). Over four-fifths of girls (83.0%, $n = 112$) lived in a two-parent family. Less than one-half (46.7%, $n = 63$) of the mothers had attended or had graduated from college. The majority of mothers (77.8%, $n = 105$) were in paid employment. Most of the girls (81.5%, $n = 110$) were born in the U.S., whereas slightly less than two-thirds of their mothers (63.7%, $n = 86$) were born outside the U.S.

Across the sample, 38.5% ($n = 52$) of Asian girls had ever consumed a whole alcoholic drink in the past 12 months, 17.8% ($n = 24$) of girls had ever used prescription drugs for non-medical purposes in the past 12 months, and 14.8% ($n = 20$) of girls had ever used other drugs in the past 12 months. Girls who used substances (i.e., alcohol, prescription drugs, and other drugs) did not differ significantly from those who did not use substances in family composition, mothers' education, mothers' employment status, girls' place of birth, and mothers' place of birth. However, significant differences were found in girls' and mothers' age. Compared to girls who did not use alcohol, prescription drugs and other drugs, those who used were significantly older (alcohol users: $p < .0001$; prescription drug users: $p < .01$; and other drug users, $p < .01$) and had mothers who were also older (alcohol users: $p < .05$; prescription drug users: $p < .01$; and other drug users, $p < .05$). We then included girls' and mother's age in Block 1 of the multiple logistic regression models.

Multiple Logistic Regression Analyses

Alcohol use—Psychological factors, including body satisfaction [odds ratio (OR) = 0.34, 95% confidence interval (CI) = 0.13 – 0.98; $p < .05$], problem-solving ability (OR = 0.34, 95% CI = 0.12 – 0.87; $p < .05$) and self-efficacy (OR = 0.40, 95% CI = 0.19 – 0.82; $p < .01$) were significantly negatively associated with girls' 12-month drinking, whereas depressive symptoms (OR = 2.56, 95% CI = 1.04 – 6.56; $p < .05$) and peer substance use (OR = 1.75, 95% CI = 1.13 – 2.68; $p < .05$) were significantly positively related to girls' alcohol use (Table 2). Acculturation and academic achievement did not show any direct relation to girls' drinking.

At the family level, girls were significantly less likely to have drunk in the past 12 months if their mothers exerted more monitoring (OR = 0.48, 95% CI = 0.23 – 0.96; $p < .05$), had more communication with them (OR = 0.19, 95% CI = 0.06 – 0.52; $p < .01$), and if their family had greater involvement with them (OR = 0.76, 95% CI = 0.61 – 0.93; $p < .05$). Maternal drinking was positively associated with girls' drinking (OR = 3.56, 95% CI = 1.34 – 8.80; $p < .05$). Family composition, maternal cigarette use, and family rules about substance use had no relationship with girls' alcohol use.

Non-medical use of prescription drugs—Problem-solving ability (OR = 0.25, 95% CI = 0.07 – 0.89; $p < .05$) and higher self-efficacy (OR = 0.26, 95% CI = 0.12 – 0.66; $p < .01$) significantly associated with reduced odds of non-medical use of prescription drugs, whereas depressive symptoms (OR = 3.73, 95% CI = 1.08 – 12.45; $p < .05$) and perceived peer substance use (OR = 5.43, 95% CI = 2.10 – 17.30; $p < .01$) were associated with

increased use. The relations of girls' acculturation, academic grades and body satisfaction to girls' non-medical use of prescription drugs were insignificant.

Four familial factors – maternal monitoring (OR = 0.42, 95% CI = 0.20 – 0.88, $p < .05$), mother-daughter communication (OR = 0.23, 95% CI = 0.10 – 0.80, $p < .05$), family involvement (OR = 0.73, 95% CI = 0.53 – 0.96, $p < .05$), and family rules about substance use (OR = 0.24, 95% CI = 0.08 – 0.90, $p < .05$) – were significantly associated with decreased odds of use of prescription drugs by the girls for non-medical purposes. Family composition, maternal drinking, and maternal smoking were not significantly related to girls' non-medical use of prescription drugs.

Other drug use—Body satisfaction (OR = 0.23, 95% CI = 0.06 – 0.97; $p < .05$) and self-efficacy (OR = 0.37, 95% CI = 0.05 – 0.60; $p < .01$) were significantly negatively associated with other drug use by girls, whereas peer use of substances (OR = 15.86, 95% CI = 3.05 – 52.30; $p < .001$) was significantly positively related to girls' drug use. Girls' level of acculturation, academic achievement, depressive symptoms, and problem-solving ability had no relationship with their other drug use.

At the family level, maternal monitoring (OR = 0.30; 95% CI = 0.12 – 0.71; $p < .01$), mother-daughter communication (OR = 0.05, 95% CI = 0.01 – 0.52; $p < .05$), and family rules about substance use (OR = 0.21, 95% CI = 0.05 – 0.84; $p < .05$) were significantly associated with decreased use of other drugs by the girls. Maternal smoking was significantly positively associated with girls' other drug use (OR = 12.34, 95% CI = 1.14 – 73.19; $p < .05$). Maternal drinking and family involvement were not significantly related to girls' other drug use.

Discussion

To our knowledge, this is the first published report documenting risk and protective factors associated with substance use among early-adolescent Asian American girls. Study results were consistent with family interaction theory and supported most of our hypotheses. As Jung (2001) suggested, models developed primarily to explain alcohol use were generally applicable to understanding the use of most other drugs; however, specific substances may require examination of additional or different factors from those that pertain to drinking. In our study, the etiology for each substance shared commonalities, though some variations among psychological and familial factors were observed across substances.

Psychological Factors

We examined the relations of acculturation, academic achievement, body satisfaction, depressive symptoms, problem-solving ability, self-efficacy, and peer substance use to girls' substance use. Study data indicated that low body esteem was related to alcohol and other drug use, but not to non-medical use of prescription medications. This finding was consistent with previous research (Watts and Ellis 1992; von Ranson, Iacono, and McGue 2002) that body image concerns may be a risk factor for underage drinking and smoking among Asian American girls, yet less so for other substances. Whereas depressive symptoms and problem-solving ability did not differ between girls who used drugs such as inhalants, cigarettes, and marijuana from those who did not, girls with depressed mood and low problem-solving ability were more likely to have consumed alcohol and misused licit drugs, suggesting that Asian girls may use these types of substances to manage negative mood and to cope with problems.

Self-efficacy and peer substance use were the psychological factors most consistently associated with use of all substances examined in this study. Although the role of self-

efficacy in predicting substance use among general populations has been well studied, the effect of self-efficacy on Asian American adolescents' substance use remains unknown. In an Australian sample, Oei and Jardim (2007) reported that refusal self-efficacy was negatively associated with Asian youth's alcohol consumption. In our study, Asian American girls who had higher confidence to resist drug use were less likely to drink, misuse prescription medications, and use other drugs than those with lower self-efficacy. Parallel to past research (Otsuki 2003), our findings showed that peer substance use was highly related to substance use among Asian American girls. In general, girls are more peer-oriented than boys and may be more susceptible to social influences (Flay et al. 1994). To distinguish themselves from the newly arrived Asian immigrants, Asian American girls may feel a need to follow the substance use behavior norms of their peers (Kim et al. 1995).

We explored the relation of acculturation to substance use among early-adolescent Asian American girls. Whereas several studies (Maxwell, Bernaards, and McCarthy 2005; Hofstetter et al. 2004; Nagasawa, Qian, and Wong 2001) have found a positive relationship between acculturation to the U.S. and substance use among Asian American adolescents, our findings indicated that acculturation, measured by English use at home and immigration status, was not associated with substance use among young Asian American girls. This finding may be due to our study sample consisting of acculturated, English speaking girls. Most of the study girls were born in the U.S., or emigrated as children prior to their teenage years. While the former group may be more likely to adopt the values of the dominant culture, the latter group of girls may experience a greater portion of their socialization in the U.S. and share similar life experience with their native-born peers.

Academic performance was not associated with any substance use among this group of young Asian American girls, a finding contrary to earlier studies on risk and protective factors of substance use among Asian American adolescents (Wiecha, Lee, and Hodgkins 1998; Kwon, Wang, and Valmadiano 2005; Ellickson and Morton 1999; Hahm, Lahiff, and Guterman 2004; Choi 2007; Li, Fang, and Stanton 1996). Asian American girls often outperform boys in school attainment and educational aspirations (Qin 2006). However, Asian American girls who do well in school are also at risk for substance use. Asian American youngsters are often under high parental expectations and pressure to excel. In response, they may turn to substances to cope with the stress of meeting parental expectations (Mercado 2000; Bhattacharya 1998). Although our data were skewed given that more than 90% of girls received A's or B's at school, the results suggested that academic performance may not be a relevant or valid factor for Asian American adolescent girls' substance use. Future studies should further examine Asian girls' motivations in engaging in substance use, and the interplay between gender, academic achievement, and substance use.

Familial Factors

We explored the relations of family composition, maternal drinking and smoking, maternal monitoring, mother-daughter communication, family involvement, and family rules about substance use to girls' substance use. Overall, study findings confirmed family interaction theory and underscored the importance of family process. Except for the no relation of family composition to substance use, all other familial variables were related to use of one or more substances.

Consistent with past research (Fisher et al. 2007; Cohen, Richardson, and LaBree 1994), maternal substance use (i.e., drinking and smoking) was positively associated with girls' alcohol and other drug use. Although strong cultural anti-drinking and anti-smoking norms for females may protect Asian-American adolescent girls (Mermelstein 1999; Bhattacharya 1998), the relation of cultural norms can be moderated by greater levels of acculturation

(Mercado 2000). Maternal substance use may further weaken the protective value of cultural norms and encourage girls to model maternal behaviors and use substances.

Maternal monitoring had a protective relation to all substance use examined. The Asian value of filial piety — a cultural virtue characterized by obedience to parents, provision of financial and emotional support to parents, and avoidance of behavior that would disgrace the family name (Liu et al. 2000; Ho 1994) — may buffer against substance use among Asian American girls by affecting both parents' and children's behavior. Asian American parents exert more control over their children's lives in areas such as academic, social, and extracurricular activities compared to parents of other ethnic groups (Shen, Chiu, and Lim 2006; Ishii-Kuntz 2000). Expected to obey their parents' rules and wishes (Dugsin 2001), Asian American children may interpret their parents' control more positively compared to other American children (Shen, Chiu, and Lim 2006). As receiving parental approval and avoiding the displeasure of authority figures are major concerns among Asian American children (Ishii-Kuntz 2000), they may feel pressured not to shame the family by using substances (Bhattacharya 1998).

Study results indicated that greater mother-daughter communication was associated with reduced alcohol use, prescription drug misuse, and other drug use. Although Asian American families value indirect and nonverbal communications (Dugsin 2001; Ishii-Kuntz 2000; Uba 1994), when Asian mothers openly expressed warmth and concern about their daughters, their daughters were less likely to use substances.

Family involvement is highly valued in Asian culture (Fuligni, Tseng, and Lam 1999; Uba 1994). While Asian American parents are obligated to sacrifice their time and efforts to help children to achieve (Shen, Chiu, and Lim 2006; Chao 1996), their children are expected to be present for daily meals, holidays, and special occasions (Mordkowitz and Ginsburg 1987). In our study, family involvement had a protective relation to Asian American girls' substance use. Girls whose mothers took time to examine their homework and who had shared family mealtimes were less likely to have drunk and misused licit drugs.

Past research suggested that family rules about substance use function as a protective factor for Asian American youth (Harachi et al. 2001; Catalano et al. 1992). This finding was partially confirmed by our data. Although family rules did not have any relation to girls' alcohol use, girls whose families had rules about substance use were less likely to misuse licit drugs and to use other drugs.

Counter to some findings on family structure and Asian American adolescent substance use (Catalano et al. 1992), we found that living in a single-parent household bore no relationship to girls' substance use. Relative to other American families, Asian American families have a greater sense of family cohesion, are usually larger with extended family networks, and have a deeper sense of obligation to care for one another (Mercado 2000; Dugsin 2001; Ishii-Kuntz 2000). The support from the extended family may lessen the stress of being a single parent and protect adolescent girls from using substance use.

Limitations

The present cross-sectional study had several limitations. Using non-probability, convenience and partially web-based recruitment and an ethnic-targeted recruitment strategy with data collection only in English, our study may have introduced selection bias by attracting a non-representative sample of mothers of daughters who were more acculturated, of higher educational and economic status and at higher risk for substance use. This limits the generalizability of the results. Because our study data collection was performed in English and our study sample had private access to a computer, generally did well

academically, tended to be more acculturated and from families with higher socioeconomic status, our study results may not be generalized to general Asian American populations. As well, more than 60% of participants were recruited online, and such a recruitment strategy might restrict the sample to people who accessed this particular website. Nevertheless, given that Asian Americans are highly computer literate – 77.3 % of Asian American households have broadband Internet (U.S. Department of Commerce 2010), and 90% of Asian American children use a computer at home (Day, Janus, and Davis 2005) – this approach seemed innovative and appropriate.

The small sample size reduced statistical power to detect some relations as significant particularly when adjusted for confounding variables. Also, our data treated Asians as an aggregated group, did not account for heterogeneity within the Asian population, and might have masked variations in the patterns of substance use and relations to the factors measured among subgroups.

Furthermore, our acculturation index only consisted of items on immigration generation status and language use, thus limiting the association of acculturation with the substance use examined in this study to predominately linguistic acculturation. Although acculturation measures that use language as a proxy correlate highly with multidimensional acculturation scales (Epstein et al. 1996), acculturation is nevertheless a complex construct that involves the adoptions of elements of a different culture including concepts, languages, values, norms and behaviors (Sam 2006).

Lastly, surveys were administered in English online, which may have limited the pool of potential participants as well as the generalizability of results. The cross-sectional design also restricts causal interpretations. Further, multiple statistical comparisons made between users and nonusers might also have resulted in statistically significant differences occurring by chance.

Implications for Future Research

These methodological issues notwithstanding, our study had strengths. We examined multiple potential risk and protective factors and analyzed the within-household factors in relation to the use of multiple substances based on data from early adolescent Asian American girls and their mothers. Our data begin to fill gaps in knowledge about substance use for Asian American adolescent girls. The study findings confirm the family interaction theory constructs and identify specific family factors for each substance, provide insights for prevention researchers and practitioners into how psychological processes and family practices may affect girls' substance use behavior, and serve as a basis for maximizing prevention efforts. Future research should seek to replicate our findings in other larger, more representative samples, collect ethnic-specific data, employ longitudinal designs, use multidimensional acculturation measures, and adopt a more comprehensive conceptual framework that incorporates interaction relationships and accounts for societal and cultural influences toward substance use to advance knowledge about substance use among Asian American girls. Such understanding will help scientists develop effective prevention programs for Asian American adolescent girls.

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Table 1

Summary of major study variables and group differences by substance use in the past 12 months (N = 135)

	All study participants (N = 135)	Alcohol		t or χ^2	Prescription drugs		t or χ^2	Other drugs	
		Yes (n = 52)	No (n = 83)		Yes (n = 24)	No (n = 111)		Yes (n = 20)	No (n = 115)
	Mean (SD) or n (%)	Mean (SD) or n (%)	Mean (SD) or n (%)		Mean (SD) or n (%)	Mean (SD) or n (%)		Mean (SD) or n (%)	Mean (SD) or n (%)
Demographic variables									
Daughters' age (years)	13.21 (0.90)	13.54 (0.93)	13.00 (0.81)	-3.59****	13.71 (0.91)	13.10 (0.86)	-3.12**	13.76 (1.06)	13.11 (0.83)
Mothers' age (years)	39.86 (6.99)	41.37 (7.06)	38.91 (6.74)	-2.02*	43.81 (6.83)	39.06 (6.71)	-3.08**	42.83 (6.68)	39.35 (6.89)
Family composition				0.29			0.03		
One-parent	23 (17.0%)	10 (19.2%)	13 (15.7%)		4 (16.7%)	19 (17.1%)		3 (15.0%)	20 (17.4%)
Two-parent	112 (83.0%)	42 (80.8%)	70 (84.35%)		20 (83.3%)	92 (82.9%)		17 (85.0%)	95 (82.6%)
Mothers' education				0.70			0.07		
High school degree	41 (30.4%)	17 (32.7%)	24 (28.9%)		7 (29.2%)	34 (30.6%)		7 (35.0%)	34 (29.6%)
College degree	63 (46.7%)	25 (48.1%)	38 (45.8%)		11 (45.8%)	52 (46.8%)		9 (45.0%)	54 (47.0%)
Graduate degree	31 (23.0%)	10 (19.2%)	21 (25.3%)		6 (25.0%)	25 (22.5%)		4 (20.0%)	27 (23.5%)
Mother has paid employment	105 (77.8%)	41 (78.8%)	64 (77.1%)	0.06	20 (83.3%)	85 (76.6%)	0.52	14 (70.0%)	91 (79.1%)
Girl U.S. born	110 (81.5%)	45 (86.5%)	65 (78.3%)	1.43	21 (87.5%)	89 (80.2%)	0.70	16 (80.0%)	94 (81.7%)
Mother U.S. born	49 (36.3%)	20 (38.5%)	29 (34.9%)	0.17	9 (37.5%)	40 (36.0%)	0.02	10 (50.0%)	39 (33.9%)
Girls' psychological factors									
Acculturation (Range: 1-5)	3.52 (0.92)	3.41 (0.88)	3.56 (0.95)	0.912	3.33 (0.80)	3.54 (0.94)	0.98	3.48 (0.94)	3.54 (0.92)
Academic achievement (Range: 1-4)	3.49 (0.70)	3.44 (0.66)	3.54 (0.73)	0.79	3.46 (0.83)	3.51 (0.68)	0.34	3.40 (0.68)	3.52 (0.72)
Body satisfaction (Range: 1-5)	2.68 (0.80)	2.38 (0.78)	2.87 (0.77)	3.57***	2.47 (0.78)	2.73 (0.80)	1.45	2.35 (0.84)	2.74 (0.79)
Depressive symptoms (Range: 0-2)	0.66 (0.34)	0.78 (0.29)	0.58 (0.36)	-3.43***	0.79 (0.23)	0.63 (0.36)	-2.68**	0.78 (0.26)	0.64 (0.36)
Problem-solving ability (Range: 1-5)	2.20 (0.65)	1.97 (0.59)	2.35 (0.65)	3.37***	1.96 (0.56)	2.26 (0.66)	2.08*	1.98 (0.48)	2.24 (0.67)
Self-efficacy (Range: 1-4)	2.88 (0.48)	2.66 (0.53)	3.02 (0.39)	4.42****	2.49 (0.59)	2.96 (0.41)	3.75***	2.44 (0.62)	2.96 (0.41)
Perceived peer substance use (Range: 0-4)	0.50 (0.82)	0.84 (0.92)	0.30 (0.46)	-3.94****	1.19 (1.13)	0.36 (0.49)	-3.54***	1.25 (1.12)	0.38 (0.53)
Familial factors									

	All study participants (N = 135)	Alcohol			Prescription drugs			Other drugs		
		Yes (n = 52)	No (n = 83)	t or χ^2	Yes (n = 24)	No (n = 111)	t or χ^2	Yes (n = 20)	No (n = 115)	t or χ^2
	Mean (SD) or n (%)	Mean (SD) or n (%)	Mean (SD) or n (%)		Mean (SD) or n (%)	Mean (SD) or n (%)		Mean (SD) or n (%)	Mean (SD) or n (%)	
Mothers' alcohol use (Number of drinks consumed during the past week)	2.56 (3.30)	4.63 (3.59)	1.27 (2.30)	-6.03 ****	3.88 (3.62)	2.28 (3.17)	-2.18 *	3.55 (3.44)	2.39 (3.25)	-1.48
Mothers' cigarette use (Number of cigarettes smoked during the past week)	5.12 (7.80)	6.19 (10.20)	4.44 (6.70)	-1.21	10.58 (14.20)	3.94 (5.50)	-2.26 *	10.76 (12.32)	4.14 (5.34)	-3.42 ****
Maternal monitoring (Range: 1-5)	4.48 (0.62)	4.22 (0.73)	4.65 (0.48)	3.78 ****	4.21 (0.78)	4.54 (0.57)	2.38 *	4.02 (0.77)	4.56 (0.56)	3.80 ****
Mother-daughter communication (Range: 1-5)	3.70 (0.85)	3.36 (0.94)	3.92 (0.72)	3.73 ****	3.33 (0.92)	3.78 (0.82)	2.40 *	3.15 (0.99)	3.80 (0.79)	3.27 **
Maternal involvement (Range: 0-4)	1.68 (1.38)	1.21 (1.09)	2.00 (1.45)	3.58 ****	1.26 (1.02)	1.79 (1.43)	2.15 *	1.45 (1.20)	1.74 (1.41)	0.87
Family rules (Range: 1-5)	3.70 (0.72)	3.56 (0.70)	3.78 (0.72)	1.78	3.35 (0.84)	3.77 (0.67)	2.63 **	3.27 (0.77)	3.77 (0.69)	2.95 **

* $p < .05$.** $p < .01$.*** $p < .001$.**** $p < .0001$.

Table 2

Factors related to substance use among early adolescent Asian American girls

	Alcohol		Prescription drugs		Other drugs	
	OR ^{ab}	95% CI ^a	OR ^{ab}	95% CI ^a	OR ^{ab}	95% CI ^a
Girls' psychological factors						
Acculturation (Range: 1–5)	0.98	0.55 – 1.63	0.89	0.49 – 1.76	1.02	0.46 – 2.12
Academic achievement (Range: 1–4)	0.55	0.24 – 1.22	0.76	0.31 – 1.94	0.49	0.28 – 1.12
Body satisfaction (Range: 1–5)	0.34 [*]	0.13 – 0.98	0.39	0.10 – 1.55	0.23 [*]	0.06 – 0.97
Depressive symptoms (Range: 0–2)	2.56 [*]	1.04 – 6.56	3.73 [*]	1.08 – 12.45	1.35	0.40 – 3.98
Problem-solving ability (Range 1–5)	0.34 [*]	0.12 – 0.87	0.25 [*]	0.07 – 0.89	0.50	0.16 – 1.63
Self-efficacy (Range: 1–4)	0.40 ^{**}	0.19 – 0.82	0.26 ^{**}	0.12 – 0.66	0.37 ^{**}	0.05 – 0.60
Perceived peer substance use (Range: 0–4)	1.75 [*]	1.13 – 2.68	5.43 ^{**}	2.10 – 17.30	15.86 ^{***}	3.05 – 52.30
Familial factors						
Mothers' alcohol use (Number of drinks consumed during the past week)	3.56 [*]	1.34 – 8.80	2.34	0.58 – 7.12	1.30	0.42 – 3.15
Mothers' cigarettes use (Number of cigarettes smoked during the past week)	6.23	0.62 – 58.60	5.85	0.61 – 46.82	12.34 [*]	1.14 – 73.18
Maternal monitoring (Range: 1–5)	0.48 [*]	0.23 – 0.96	0.42 [*]	0.20 – 0.88	0.30 ^{**}	0.12 – 0.71
Mother-daughter communication (Range: 1–5)	0.19 ^{**}	0.06 – 0.52	0.23 [*]	0.10 – 0.80	0.05 [*]	0.01 – 0.52
Maternal involvement (Range: 0–4)	0.76 [*]	0.61 – 0.93	0.73 [*]	0.53 – 0.96	1.02	0.84 – 1.28
Family rules against substance use (Range: 1–5)	1.38	0.48 – 2.74	0.24 [*]	0.08 – 0.90	0.21 [*]	0.05 – 0.84

Note. Each multiple logistic regression test controlled for girls' and mothers' age. Model fits of all tests were satisfactory based on the model significance ($p < .05$) and Hosmer and Lemeshow test result ($p > .05$).

^a OR denotes odds ratio and CI denotes confidence interval.

^b OR's are presented for a unit change in all independent variables.

* $p < .05$.

** $p < .01$.

*** $p < .001$.