

Influence of Family Factors and Supervised Alcohol Use on Adolescent Alcohol Use and Harms: Similarities Between Youth in Different Alcohol Policy Contexts*

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ABSTRACT. Objective: Harm-minimization policies suggest that alcohol use is a part of normal adolescent development and that parents should supervise their children's use to encourage responsible drinking. Zero-tolerance policies suggest that all underage alcohol use should be discouraged. This article compared hypotheses derived from harm-minimization and zero-tolerance policies regarding the influence of family context and supervised drinking on adolescent alcohol use and related harms among adolescents in Washington State, USA, and Victoria, Australia, two states that have respectively adopted zero-tolerance and harm-minimization policies. **Method:** Representative samples of seventh-grade students ($N = 1,945$; 989 females) were recruited from schools in each state. Students completed comprehensive questionnaires on alcohol use, related problem behaviors, and risk and protective factors annually from 2002 to 2004 when they were in ninth grade. **Results:**

Relationships between family context and alcohol use and harmful use were very similar in both states. Adult-supervised settings for alcohol use were associated with higher levels of harmful alcohol consequences. Adult-supervised alcohol use mediated the links between favorable parental attitudes to alcohol use and ninth-grade alcohol use for students in both states. **Conclusions:** Despite policy differences in the two states, relationships between family context variables and alcohol use and harmful use are remarkably similar. Adult-supervised settings for alcohol use resulted in higher levels of harmful alcohol consequences, contrary to predictions derived from harm-minimization policy. Findings challenge the harm-minimization position that supervised alcohol use or early-age alcohol use will reduce the development of adolescent alcohol problems. (*J. Stud. Alcohol Drugs*, 72, 418–428, 2011)

ADOLESCENT ALCOHOL USE IS RELATED to a variety of problem behaviors, including harmful alcohol use, drinking and driving, risky sex, and violence (Sise et al., 2009; World Health Organization, 2008). Despite the increasing influence of peers from late childhood through adolescence (Kandel, 1985; Li et al., 2002b), one of the most important social contexts impacting adolescent decisions to use alcohol is the family (Bahr et al., 1995; Guo et al., 2001; Hawkins et al., 1992; Latendresse et al., 2008; Peterson et al., 1994; Reifman et al., 1998). A variety of modifiable family factors are related to later alcohol and substance use. Longitudinal studies demonstrate that good family

management practices, including clear rules prohibiting alcohol use, monitoring of children's behavior, and consistent consequences for violating rules, are related to decreases in teen alcohol use (Barnes et al., 2000; Brook et al., 1986; Chilcoat and Anthony, 1996; Kosterman et al., 2000; Nash et al., 2005; Sargent and Dalton, 2001).

In contrast, parental attitudes favoring alcohol and other drug use tend to be linked with a greater likelihood of substance use by adolescents (Foley et al., 2004; Hawkins et al., 1992). Positive norms (e.g., approval of underage drinking) are communicated by parents to children, who, in turn, develop favorable attitudes around drinking (Ary et al., 1993; Brody et al., 1998; Foley et al., 2004; Hawkins et al., 1992). Likewise, parental patterns of alcohol use and involvement of their children in their use have been shown to be risk factors for adolescent alcohol and other drug use (Chassin et al., 2003; Hawkins et al., 1992; Johnson and Leff, 1999; Li et al., 2002a).

Many of the studies examining the contribution of family factors to adolescent alcohol use come from the United States, where national and state policies support family norms against alcohol. Such policies include setting the minimum legal age for possession and purchase of alcohol at 21 years and laws targeting retail and social access to alcohol by youth (Fell et al., 2008; Wagenaar et al., 2006), in addition to school district policies that promote abstinence and zero tolerance for underage drinking (Beyers et

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al., 2005). Recently, the U.S. surgeon general issued a call to action promoting a zero-tolerance position toward youth alcohol use that was characterized by abstinence messages, severe consequences for use, and the illegality of underage drinking (U.S. Department of Health and Human Services, 2007). Despite this orientation, some parents still provide alcohol to their children, as illustrated by a 2005 American Medical Association study in which 25% of teens reported being at a party at which underage drinking was occurring in the presence of parents (American Medical Association, 2006). Parental approval of underage drinking and provision of opportunities to use alcohol in supervised settings has been countered, however, by local U.S. law enforcement efforts to charge parents for provision of alcohol to minors at home under social-host-liability laws (Bernat, 2006), which have recently been linked to significant reductions in drunk-driving fatalities among minors (Dills, 2010).

In Australia, surveys indicate that 30%–50% of adolescent drinkers obtain alcohol from their parents (Hayes et al., 2004), suggesting that it is more normative for parents to be involved in their children's alcohol use. Australian parents are supported by a national harm-minimization policy orientation regarding youth initiation and escalation of use. Specifically, Australian harm-minimization policy suggests that alcohol use is a normal part of adolescent development (Beyers et al., 2005). In 2001, the Australian Government promoted "Alcohol Guidelines" for youth younger than the legal age for alcohol purchase (age 18) that offered suggestions for being a responsible drinker in settings where alcohol is available (e.g., being under adult supervision at all times) and for becoming a responsible adult drinker through a gradual, supervised introduction to alcohol (Ministerial Council on Drug Strategy, 2001; please note that guidelines were revoked in 2009). Harm-minimization advocates contend that exposure to supervised drinking contexts (i.e., drinking with parents or other adults present) may help youth learn responsible drinking (McBride et al., 2000, 2003) and, therefore, encourage responsible drinking in contexts where alcohol is available but adults are not present.

However, U.S. data often show that parental norms that are more tolerant toward alcohol use have the unintended effect of increasing teens' alcohol use in unsupervised settings (Foley et al., 2004; Yu, 2003). Harm-minimization advocates concede that parental rules and attitudes favoring "responsible" drinking may be associated with a greater likelihood of underage alcohol use but also argue that parental supervised alcohol use may reduce the likelihood of adolescent drinkers progressing to problematic alcohol use during adolescence and early adulthood. A recent longitudinal study conducted by van der Vorst and colleagues (2010) in the Netherlands examined the impact of parental supervision of alcohol use on adolescent drinking both in and outside the home. Although their sample of families with two biological parents and siblings of different educational levels limits generaliz-

ability, no differences in progression to problem drinking were noted between youth whose parents provided high and low levels of supervision of alcohol use. These findings were contrary to the expectations of Dutch alcohol policy, which recommends high levels of supervision to dampen the progression to problem use. Mixed findings regarding the impact of supervised alcohol use have characterized the literature, and these conflicting findings may be a result of the variety of cultural contexts examined and the quality of measures used in each study.

Perhaps, in part, as a result of opposing policy orientations toward youth drinking, significant differences in rates of youth alcohol use in Australia and the United States may be expected. Indeed, Australian students are much more likely to be alcohol users at younger ages (yet no more likely to report antisocial behavior), compared with their American counterparts (McMorris et al., 2007). However, contrary to harm-minimization ideals, Toumbourou et al. (2009) found that heavy episodic drinking and harmful consequences resulting from alcohol use (e.g., blackouts, accidents, or injuries) tended to be more prevalent among Australian youth. For example, just under one quarter (24%) of 15-year-old girls in Victoria, Australia, reported they had been unable to stop drinking once they started in the past year, and 9% reported an alcohol-related accident or injury in the past year. In contrast, lower rates were reported on these same questions by girls in Washington State (9% and 3%, respectively). The purpose of the current article is to examine and test hypotheses derived from zero-tolerance and harm-minimization policies regarding how family factors influence use in different policy contexts.

Hypotheses derived from harm-minimization and zero-tolerance policies

Despite consistent findings in the United States, few international studies compare the impact of parental use, favorable parental attitudes toward use, family management practices, and parental supervision of alcohol use on the development of adolescent alcohol use. Because of different policy approaches and cultural differences in underage drinking, these family factors may operate differently in Australia and the United States. If the relationship between family factors and adolescent alcohol use is context dependent, then it may be possible to detect a country interaction, or a moderating effect of country, whereby cross-national differences may be identifiable in the relationship between family factors and drinking. Alternatively, these family factors may operate in a universal fashion in different country contexts, resulting in potential international consensus as to whether specific policies may be protective or risk influences.

Parental supervision is an example of a specific factor that has been anticipated to operate differently across countries with abstinence versus harm-minimization policy

orientations, reflecting a direct moderation effect of policy. In countries with policy orientations that support abstinence, parental supervision of alcohol use is expected to result in increased use. Because this parenting practice is at odds with abstinence policy and is viewed as deviant in these contexts, it is not surprising that some studies have found that supervised use (e.g., parental provision of alcohol at parties or at home) is associated with risky alcohol use (Dielman et al., 1989; Foley et al., 2004) and subsequent drinking over time (Jackson et al., 1999; Komro et al., 2007). In contrast, parental supervision is hypothesized to be related to more moderate drinking among adolescent alcohol users in countries with harm-minimization policies that support learning responsible drinking patterns in supervised settings, as found in previous cross-sectional studies (Bellis et al., 2007; Pavis et al., 1997; but see Lundborg, 2007, for an exception).

In addition to the potential for country policy differences to moderate the relationship between parental supervision and alcohol use, it may be that the mediating impact of parental supervision on other family risks differs by policy context. This is an example of a moderated mediation process, defined as a process that varies as a function of context (Muller et al., 2005). Thus, in countries such as Australia that adopt a harm-minimization approach, adult supervision of youth alcohol use may work as a protective mediator of other family factors to dampen related family risks, including favorable attitudes toward use, family management problems, and parental drinking. In contrast, in a country such as the United States, where adult supervision of adolescent drinking deviates from abstinence policy, it is hypothesized to act as a risk mediator to enhance the impact of other family risk factors on harmful alcohol consequences.

From these different perspectives, competing hypotheses arise. Despite U.S. evidence suggesting that parental use, favorable attitudes toward alcohol use, and parental supervision of use will lead to increased alcohol use and harmful use, harm-minimization advocates suggest that these family factors will lead to increased use but less harmful drinking as a result of parental supervision of use. The current cross-national study allows for exploration of these competing hypotheses.

Research objectives

This study investigates the impact of family factors on early adolescent use and harmful use among youth from Victoria, Australia, and Washington State, United States. Specifically, we explore whether adult-supervised alcohol use is a risk factor, as predicted by zero-tolerance policy, or a protective factor for harmful alcohol use, as predicted by harm-minimization policy, and whether the influence of other family risk factors on adolescent alcohol use and harmful use is mediated by adult-supervised alcohol use in different ways, cross-nationally. The bi-national data set provides

a unique opportunity to establish the extent to which the associations between these family factors and youth alcohol use vary for different policy orientations.

The current study has the following research objectives: (a) to examine cross-state variation in levels of seventh-grade family factors, opportunities to use alcohol in supervised settings in eighth grade, and alcohol use and harmful use in ninth grade; (b) to investigate the contribution of family factors to ninth-grade alcohol use and harmful use and whether these relationships are differentiated or moderated by states adopting zero-tolerance or harm minimization policies; and (c) to investigate whether adult supervision of alcohol use in eighth grade mediates the impact of seventh-grade family variables and whether these relationships are the same or different across states adopting different policy orientations (i.e., moderated mediation).

Method

Study procedures and sample

International comparisons are often difficult because data are not collected using matched procedures. Without matching sampling strategies, data collection protocols, and instruments, international comparisons may confound method differences as country differences (Pirkis et al., 2003). The current study overcomes these difficulties by using longitudinal self-report data from a survey instrument that underwent several tests to ensure that items were being perceived in the same manner by U.S. and Australian teens (McMorris et al., 2007). This instrument was administered through matched sampling, recruitment, administration, and follow-up procedures to produce a panel of Australian and American youth participating in the International Youth Development Study (IYDS).

In 2002, a two-stage cluster sampling approach was used for school recruitment to obtain state-representative samples (see McMorris et al., 2007, for additional details on the IYDS design). Data for the current analyses were based on a cohort of Grade 7 students who participated in three annual survey administrations from 2002 to 2004. In the first year of the project, 1,945 students and their parents (961 in Washington, 984 in Victoria; 78.4% in Washington and 75.6% in Victoria of those eligible) consented to participate. Student surveys were developed from the Communities That Care survey (Arthur et al., 2002) and were augmented, cognitively pretested, and piloted in each country before being used in both states (McMorris et al., 2007). Surveys were group administered in classrooms from February to June in Washington and from May to October in Victoria to maintain seasonal equivalence. Demographic data (e.g., socioeconomic status and birthplace of the student) were collected via a short telephone interview of a parent in the first year. Annual survey completion rates during 3 years of the project (Grades

7–9) were consistently high for both states, with more than 97% completing surveys at 12-month follow-up in 2003 and 24-month follow-up in 2004. Research protocols were approved by the institutional review board at the University of Washington and the Ethics in Human Research Office at the Royal Children's Hospital in Victoria.

To be included in the analysis sample, a student had to meet "honesty" criteria (defined by three items asking [a] how honest the student was when filling out the survey, [b] whether the student reported use of a fictional drug, and [c] whether the student reported improbably high frequencies of illicit drug use) across all three data collection periods. We excluded 57 students (16 in Washington and 41 in Victoria) classified as dishonest. The analysis sample ($n = 1,888$) comprised primarily 13-year-olds in the first year of the study (Victoria: $M = 13.0$, $SD = 0.4$; Washington: $M = 13.1$, $SD = 0.4$). Males and females were equally represented in both states. In terms of racial/ethnic characteristics, 65% of students in Washington described themselves as White, 16% as Hispanic, 6% as Asian/Pacific Islander, 6% as Native American, and 4% as African American; 3% reported belonging to other ethnic groups. In Victoria, the majority of students described themselves as Australian (91%), 6% as Asian/Pacific Islander, 1% as Aboriginal or Torres Strait Islander, and less than 1% each as African or Spanish; 1% reported belonging to other ethnic groups. Because these racial/ethnic categories are not directly comparable across the two states (i.e., Australians have a tendency to identify as Australians if they were not foreign born, regardless of race), analyses for the present article do not control for race or ethnicity. Retention rates across the three IYDS waves of data collection were very high. An attrition analysis showed that the few students who did not participate in the third wave of data collection were more likely to be from Victoria ($p < .01$), slightly older ($p < .02$), and from slightly lower income levels ($p < .04$) than students who completed the third survey.

Measures

Most survey measures originated from the Communities That Care self-report survey, unless otherwise indicated (Arthur et al., 2002). Previous studies have demonstrated good psychometric properties for Communities That Care measures among different gender and ethnic groups (Glaser et al., 2005; Pollard et al., 1999).

Frequency of alcohol use and number of harmful consequences as a result of alcohol use in the past year in Grade 9 were used as the two dependent variables in these analyses. Frequency of alcohol use was determined by asking students "in the *past year* (12 months), on how many occasions (if any) have you had more than just a few sips of an alcoholic beverage (like beer, wine, or liquor)?" The original response options ranged, on an 8-point scale, from 0 (*never*) to 7 (*40*

or more times). Because of a skewed distribution, responses were recoded to produce an ordinal measure ranging from 0 (*never*) to 6 (*30 or more times*). Eight harmful consequences resulting from alcohol use were examined with response options also ranging from 0 (*never*) to 7 (*40 or more times*) over the past year (Hibbert et al., 1996). Consequences included loss of control ("not able to stop drinking once you had started") and social conflict ("trouble at school the next day," "arguments with your family," and "become violent and get into a fight"). Other alcohol-related consequences were "got injured or had an accident," "had sex with someone, which you later regretted," "got so drunk you were sick or passed out," and "were unable to remember the night before because you had been drinking (blackouts)." Because of skewed distributions, responses were dichotomized to indicate 1 ("ever experienced a particular alcohol-related harm in the past year") versus 0 ("never") and summed to produce an ordinal count of the number of harmful alcohol consequences experienced in the past year, ranging from 0 to 6 or more consequences.

The potential mediating mechanism, opportunities to use alcohol under adult supervision, was measured on the Grade 8 survey by asking how many times in the past year the student had consumed alcohol: "at dinner, or on a special occasion or holiday, *with* adult supervision?" or "at parties *with* adult supervision?" Response options ranged on an 8-point scale from 0 (*never*) to 7 (*40 or more times*). Students' answers to the two questions were averaged to compute a composite score; Pearson's correlation between the two variables was .66.

To measure family factors, three measures from the Grade 7 survey were used. First, positive family management was a 4-point average scale score computed from nine items measuring the extent to which students perceive that their parents monitor their activities, that their families establish clear rules, and their likelihood of being caught by parents for drinking, carrying a weapon, or skipping school. Likert response options ranged from 1 (*definitely NO*) to 4 (*definitely YES*). Cronbach's α was .82 for this scale in both states. Second, parental attitudes favorable toward alcohol use was a composite measure of two items asking how wrong would parents feel it would be for their child to drink beer or wine regularly and to drink distilled spirits regularly (at least once or twice a month). Response options ranged from 1 (*very wrong*) to 4 (*not wrong at all*); Pearson's correlation between the two variables was .73. Third, substance use problems in the family was measured by a dichotomous question asking "Has anyone in your family ever had a severe alcohol or drug problem?"

To control for prior alcohol use, the analysis included the frequency of lifetime drinking assessed in seventh grade. This item offered an 8-point response set ranging from 0 (*never*) to 7 (*40 or more times*). Owing to sparse frequencies for some response categories, responses were collapsed

into six categories ranging from 0 (*never*) to 5 (*20 or more times*). Sociodemographic variables were also measured in seventh grade and included as control variables. Specifically, these included students' gender (male = 1, female = 0) and age in years (measured as seventh-grade survey date minus date of birth). Socioeconomic status was a standardized composite measure made up of parent-reported income and highest parent-reported education level. Pearson's correlation between these two standardized variables was .43.

Analysis strategy

The first step was to examine differences between students in Washington and Victoria with respect to rates of alcohol use and mean levels of family influences and alcohol use. Mean differences between Washington and Victoria students were compared using *t* tests, and effect sizes were calculated with pooled standard deviations (Cohen, 1988) to demonstrate the magnitude of mean differences in these measures between states.

For tests of hypothesized relationships among family factors and alcohol use variables, and equivalence of relationships between the two states, two-group multiple-group path models were estimated using Mplus Version 5.21 (Muthén and Muthén, 1998–2007). To adjust for clustering within schools (interdependence among observations), we used the Mplus CLUSTER with the COMPLEX method. This procedure provides adjusted standard errors and overall chi-square tests of model fit. The weighted least squares mean and variance adjusted estimator was used to model a binary variable (family substance use problems at Grade 7) and ordered categorical variables (lifetime alcohol use at Grade 7 and alcohol use and harms at Grade 9).

Path models incorporated maximum likelihood missing data estimation, which yields less biased parameter estimates than traditional missing data methods (e.g., listwise case deletion) and makes full use of all available data (Little and Rubin, 2002; Schafer and Graham, 2002), with the exception of measures treated as exogenous. Using this missing data estimation technique, path models were based on an analysis sample of 1,826 (918 in Washington and 908 in Victoria), which excluded 62 participants who had missing data on the exogenous socioeconomic status measure.

Path analyses followed a two-step process. First, a measurement model examined the overall associations among variables in the path model. Second, we tested structural models to examine equivalence of hypothesized relationships across students in the two states. To test structural invariance, we first estimated an unconstrained model, in which specified paths were allowed to vary across the two states, to test the significance of hypothesized relationships for each state. A test of overall invariance of the path model was based on comparison of the fit of a constrained model in which cross-group equality constraints were placed on all specified

paths with the fit of an unconstrained model. Model fit was assessed using the mean- and variance-adjusted chi-square statistic (Muthén et al., 1997); root mean square error of approximation index (RMSEA; Browne and Cudeck, 1993); Tucker–Lewis index (TLI; Tucker and Lewis, 1973); and the comparative fit index (CFI; Bentler, 1990).

To identify individual paths contributing to the overall group difference, we added one unconstrained path to the fully constrained model based on estimates of Lagrange multiplier tests, until the chi-square statistic of a partially constrained model was not significantly worse than the fully unconstrained model. To test the degree to which adult-supervised alcohol use acted as a mediator of Grade 7 family influences on later alcohol use and harm at Grade 9, we used estimates of indirect effects generated with the Mplus Model Indirect command, which computes the product of component paths and Delta method standard errors (Muthén and Muthén, 1998–2007; Sobel, 1982).

To address possible gender differences in the association among variables in the analysis, we conducted preliminary tests to examine invariance of the structural path model. Results of these model tests indicated evidence of invariance in relationships among variables, $\Delta\chi^2(\Delta df) = 11.26 (7), p > .05$, despite slight mean differences in family factors (e.g., girls reported slightly higher positive family management scores, and slightly more boys reported family alcohol/drug problems) and alcohol harms (higher rates for boys). Thus, gender was treated as a control variable with specified paths to each variable. Age and socioeconomic status were also included to control for their potential impact on other variables in the model. Results for these control variables are not shown but are available on request.

Results

Differences in prevalence of alcohol use and levels of family factors

Predictably, the prevalence of alcohol use behavior in both states increased over time between seventh and ninth grades. Lifetime alcohol use by seventh grade among Victoria students was significantly higher than among Washington students (59% vs. 39%). By eighth grade, drinking in adult-supervised settings was reported by two thirds of students in Victoria and 35% of Washington youth. By ninth grade, rates of alcohol use had increased to 71% in Victoria and 45% in Washington. More than a third of Victoria students (36%) also reported having experienced any harmful consequences resulting from their alcohol use, compared with about a fifth of Washington students (21%).

There were also significant differences in mean levels of all family variables based on *t* tests ($p < .05$). For descriptive purposes, Figure 1 shows estimates of effect sizes corresponding to cross-state differences in levels of family influences and

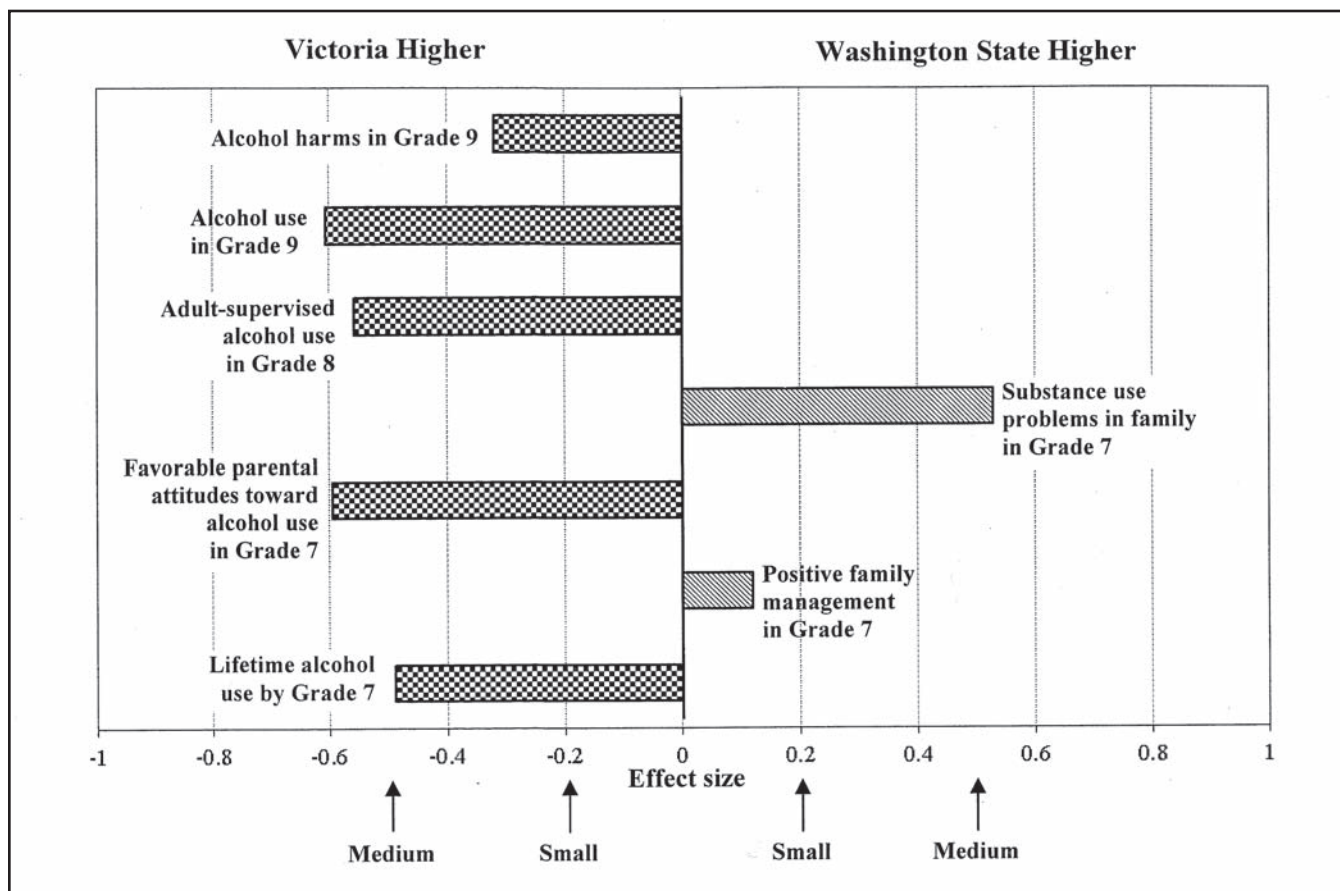


FIGURE 1. Effect size of mean differences in family influences and alcohol use between students in Victoria, Australia, and Washington State, USA. All mean differences are significant based on *t*-test values ($p < .05$). Small and medium effect sizes specified by Cohen (1988).

alcohol use variables, using Cohen’s (1988) specification of small (.20), medium (.50), and large (.80) effect sizes. Negative estimates correspond to comparisons in which variables were higher in Victoria (vs. Washington), and positive estimates indicate higher levels of factors in Washington (vs. Victoria). Higher levels of lifetime alcohol use and favorable parental attitudes toward alcohol use in seventh grade, adult-supervised alcohol use in eighth grade, and both of the ninth-grade alcohol outcomes were notable among students in Victoria. Adolescents in Washington reported higher levels of positive family management and substance use problems among family members. Cross-state differences in alcohol use in ninth grade and favorable parental norms toward alcohol use in seventh grade were of the largest magnitude, with effect sizes *d* of .60 and .59, respectively. Positive family management was the most similar family factor between countries, with a small effect size of .11.

Path models

Table 1 shows the standardized correlation coefficients for Washington and Victoria, yielded by a measurement model

in which all variables were freely correlated across both states. For both states, correlations among all variables were significant and in the hypothesized direction, except for two relationships in the Victoria sample. Family substance use problems were not significantly correlated with either favorable parental attitudes toward alcohol use or adult-supervised alcohol use in Victoria. Despite between-state differences in means of the family and alcohol use variables, correlations among variables demonstrated similar magnitudes for both Washington and Victoria youth. The biggest difference in magnitude was found for the correlation between lifetime alcohol use in seventh grade and family substance use problems, with a stronger association for Washington (.37) than for Victoria students (.20). Hypothesized relationships between family risk and protective factors generally look similar across the two states, despite policy and cultural differences.

Figure 2 shows the standardized path coefficients for each of the structural paths from the unconstrained model in which the structural paths were freely estimated (unstandardized coefficients, including correlations between exogenous variables, are available on request). For youth in both states,

TABLE 1. Correlations between all variables for IYDS students in Victoria (above the diagonal) and Washington State (below the diagonal)

Measure	Alcohol use in Grade 9	Alcohol harms in Grade 9	Adult-supervised alcohol use in Grade 8	Positive family management in Grade 7	Favorable parental attitudes toward alcohol in Grade 7	Substance use problems in family in Grade 7	Lifetime alcohol use by Grade 7
Alcohol use in Grade 9	1.00	.68	.36	-.27	.26	.24	.51
Alcohol harms in Grade 9	.79	1.00	.29	-.30	.28	.30	.43
Adult-supervised alcohol use in Grade 8	.29	.22	1.00	-.14	.23	.08 ^{N.S.}	.34
Positive family management in Grade 7	-.32	-.34	-.09	1.00	-.39	-.15	-.36
Favorable parental attitudes toward alcohol in Grade 7	.25	.18	.13	-.28	1.00	.09 ^{N.S.}	.38
Substance use problems in family in Grade 7	.32	.38	.10	-.21	.19	1.00	.20
Lifetime alcohol use by Grade 7	.53	.53	.23	-.35	.31	.37	1.00

Notes: All coefficients are standardized. All correlations are significant unless otherwise noted. IYDS = International Youth Development Study.
N.S. = nonsignificant ($p \geq .05$)

lifetime alcohol use (Grade 7), family alcohol/drug problems (Grade 7), and adult-supervised alcohol use (Grade 8) were positively related and positive family management practices (Grade 7) were negatively related to later alcohol use and alcohol harms in Grade 9.

Favorable parental attitudes to alcohol use in seventh grade did not have a unique effect on either later alcohol use or alcohol harm for students in Washington and Victoria after accounting for other variables in the model. Although significant bivariate associations exist between favorable parental attitudes toward alcohol use and ninth-grade alcohol outcomes for youth in both states (Table 1), these direct effects were not significant in the multivariate model. Favorable parental attitudes indirectly influenced alcohol use and alcohol harm through the impact of adult-supervised alcohol use at eighth grade for youth in both Washington State and Victoria. Tests of this indirect effect were statistically significant ($p < .05$), providing statistical evidence that adult-supervised alcohol use served as a mediator of the association between parental attitudes and alcohol use and harm for youth in both states.

Lifetime alcohol use in seventh grade was significantly and uniquely associated with later alcohol use and alcohol harms in ninth grade. However, compared with the bivariate associations in Table 1, the magnitude of the direct effects of seventh-grade alcohol use decreased, indicating relationships were partially mediated by adult-supervised alcohol use at eighth grade. Tests of indirect effects of early seventh-grade alcohol use through supervised alcohol use at eighth grade on ninth-grade alcohol use and harms were all statistically significant ($p < .05$), providing evidence of partial mediation in both states. Overall, this path model explained 34% of variance in alcohol use for Washington and Victoria, and

36% and 30% of variance in alcohol harm for Washington and Victoria, respectively.

To test the overall invariance of hypothesized relationships across states, we imposed equality constraints to all paths and assessed the fit of the constrained model. This fully constrained model fit the data well, $\chi^2(10) = 52.26$ (CFI = .98, TLI = .94, RMSEA = .07). However, this chi-square test was statistically significant, indicating that the constrained model was significantly worse than the unconstrained model, which was a just-identified model with perfect fit. Based on a Lagrange multiplier test that indicated that releasing the path from early alcohol use to supervised alcohol use in eighth grade contributed to the largest decrease in the chi-square statistic (a decrease of 70.95), we compared the unconstrained model with a partially constrained model in which the association was allowed to vary across states and all other paths were constrained to equality. This comparison yielded a nonsignificant chi-square difference between the partially constrained model and unconstrained model, suggesting that differences in magnitude of associations between lifetime use in seventh grade and supervised alcohol use in eighth grade accounted for the between-state difference (.20 in Washington vs. .30 in Victoria). Thus, findings indicated that the overall configuration of the structural relationships specified in Figure 2 is similar for students in Washington and Victoria, with all significant paths demonstrating relationships in the same direction and of similar magnitudes. The one exception is the magnitude of the difference in path coefficients between lifetime alcohol use by Grade 7 and supervised alcohol use, with the coefficient of lifetime drinking in seventh grade on supervised alcohol use in eighth grade being 1.5 times greater for students in Victoria compared with their Washington counterparts.

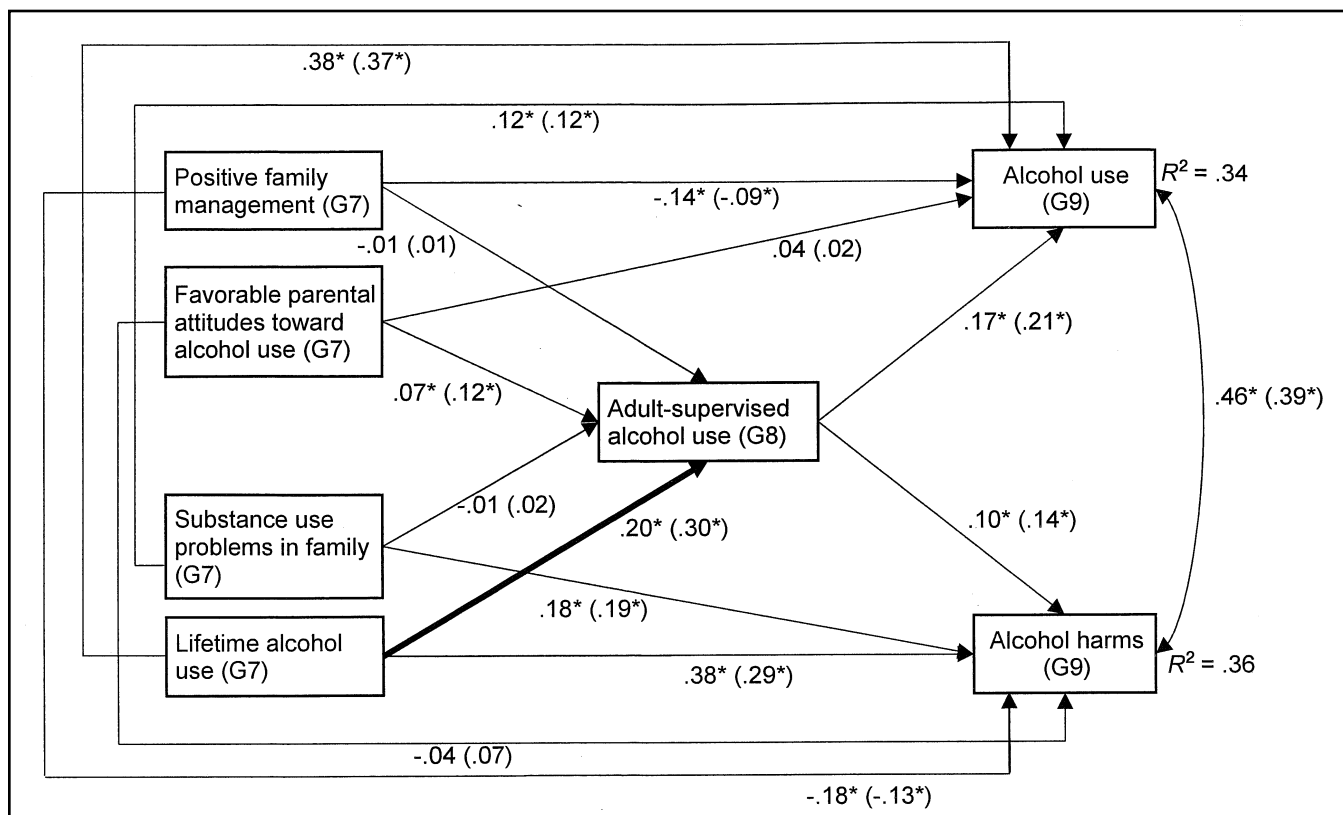


FIGURE 2. Standardized coefficients from the unconstrained path models for Washington State and Victoria students. Analysis sample sizes: Washington State: $n = 918$; Victoria: $n = 908$. All estimates are standardized. Coefficients for Victoria are in parentheses. The significant between-state difference is indicated by the bold line. G7 = Grade 7; G8 = Grade 8; G9 = Grade 9. * $p < .05$ or better.

This finding of invariant relationships across the two states using a composite measure of adult-supervised alcohol use was confirmed in a sensitivity analysis. When models were re-estimated using single measures of supervised alcohol use, one at a time, results indicated that supervised alcohol use in either context—“at parties” or “at dinner or a special occasion”—increased the risk of alcohol use and harms for students in both states. We also determined that effects of family factors on each supervised use measure were substantively similar to those found with the composite measure (results available on request).

Discussion

The national policy contexts concerning adolescent drinking were strikingly different in Washington and Victoria at the time of this study, reflecting different perspectives on underage drinking. Despite policy differences, results from the multiple-group path analysis demonstrate that relationships between family context variables and alcohol use and harms are remarkably similar between youth in both states; thus, there was no evidence for a moderating effect of state context on these relationships. This finding is consistent with a

previous study of adolescent use in Australia and the United States that noted similarities in risk and protective factors for adolescent substance use between the two countries (Beyers et al., 2004).

Analyses yielded little evidence of moderated mediation processes in this bi-national data set (Muller et al., 2005). Specifically, we hypothesized mediation of family factors through the mechanism of adult-supervised alcohol use and that these mediation processes would differ by state. In Washington, the relationship between favorable parental attitudes toward alcohol use and ninth-grade alcohol use and alcohol-related harms was mediated by opportunities to drink in an adult-supervised setting in a way that increased risk. For Victoria youth, there was no protective mediating effect of supervised use. Instead, similar to Washington students, we found a significant mediating process that increased the risk for subsequent alcohol use and harms among students in Victoria.

Higher levels of early alcohol use seem to set the stage for increased use during middle adolescence regardless of country; however, the impact of frequency of ever using alcohol by seventh grade on adult supervision of alcohol use in eighth grade is 1.5 times larger in Victoria, contributing

to increases in alcohol use and harms in ninth grade. Supervised drinking is a response that parents make to adolescent alcohol use in both states but more strongly in Victoria. It appears likely that, in the Australia harm-minimization context, a greater number of parents find themselves in the position of having to manage adolescent drinking. Our findings suggest that higher rates of early-age alcohol use and higher levels of adult-supervised use contribute to higher rates of alcohol-related problems in Australia. This clearly contradicts the position that supervised alcohol use or early experience with alcohol will have a reduced impact on the development of adolescent alcohol problems in the harm-minimization setting. Thus, our results run counter to harm-minimization hypotheses, which contend that youth will learn how to use alcohol safely in controlled, supervised settings and apply that knowledge to future opportunities to drink.

This study has a number of limitations. First, some measures lack specificity. For example, the measure of supervised alcohol use in eighth grade was not specific about which adults were supervising the use. A more concrete measure asking about parents or guardians overseeing youth alcohol use may have yielded different results. Similarly, the measure of family history of substance use could be more specific about exactly which family members had an alcohol or drug problem (e.g., parents, siblings, or extended family members). Second, this study relies on self-reported behavior and parenting practices by youth participants. However, Brener and colleagues (2003) contend that the use of self-report measures is essential to research on adolescent health risk behaviors, and most have found self-reports from adolescents to be valid (Hindelang et al., 1981; Johnston et al., 2007). Third, generalizability of study results is limited to the states and grade levels examined here.

Despite these limitations, results are compelling because data were collected from a large-scale, well-matched, representative sample of adolescents from Washington State and Victoria. Other study strengths include the use of longitudinal data and multiple-group path modeling techniques to demonstrate similar structural models of relationships between family influences and youth alcohol use and harms in mid-adolescence.

In summary, although harm-minimization perspectives contend that youth drinking in adult-supervised settings is protective against future harmful use, we found that adult-supervised drinking in both states resulted in higher levels of harmful alcohol use. This finding has implications for many national contexts that encourage parents to supervise their children's drinking. In addition to Australia, many European countries favor this approach to prevention of alcohol-related harm (Bellis et al., 2007; Pavis et al., 1997; van der Vorst et al., 2010). However, evidence from the current study and previous studies (Komro et al., 2007; Lundborg, 2007; van der Vorst et al., 2010) provides little support for parental su-

pervision of alcohol use as a protective factor for adolescent drinking.

Providing opportunities for drinking in supervised contexts did not inhibit alcohol use or harmful use in either state. These results, coupled with recent evidence from van der Vorst and colleagues (2010), lead us to suggest that policies should not encourage parents to drink with their children nor provide opportunities to supervise their use. Even after adolescents begin to drink, adult supervision of alcohol use appears to exacerbate continued drinking and harms associated with drinking. Kypri and colleagues (2007) suggest parental supervision of children's drinking at a young age might set in motion a developmental process by which progression to unsupervised drinking is made more rapidly than it otherwise would be. Similar findings were noted in differing policy contexts by van der Vorst and colleagues (2010) and Warner and White (2003), who found that alcohol use in a supervised setting and subsequent alcohol use outside a supervised setting both influenced the likelihood of progression to misuse in adulthood. Results from the current study provide consistent support for parents adopting a "no-use" standard if they want to reduce harmful alcohol use among their adolescents.

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