

# Alcohol Prevention and School Students: Findings From an Australian 2-Year Trial of Integrated Harm Minimization School Drug Education

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## Abstract

The Drug Education in Victorian Schools program provided integrated education about licit and illicit drugs, employed a harm minimization approach that incorporated participatory, critical thinking and skill-based teaching methods, and engaged parental influence through home activities. A cluster-randomized, controlled trial of the program was conducted with a student cohort during Year 8 (13 years) and Year 9 (14 years). Twenty-one secondary schools in Victoria, Australia, were randomly allocated to the Drug Education in Victorian Schools program (14 schools,  $n = 1,163$ ) or their usual drug education program (7 schools,  $n = 589$ ). This study reports program effects for alcohol. There was a greater increase in the intervention students' knowledge

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about drugs, including alcohol; there was a greater increase in communication with parents about alcohol; they recalled receiving more alcohol education; their alcohol consumption increased less; and they experienced a lesser increase in alcohol-related harms. Among intervention group risky drinkers, consumption and harm increased less. There were no differences between study groups in attitudes toward alcohol or in the proportion of drinkers or risky drinkers. While the program did not stop students taking up drinking, it did reduce their consumption and harm.

### **Keywords**

harm minimization, alcohol, school drug education, cluster-randomized controlled trial, Australia, high school students

## **Introduction**

Alcohol is widely consumed in Australia, with much consumption occurring at levels considered to risk lifetime or single occasion harm (Australian Bureau of Statistics, 2014; Australian Institute of Health and Welfare, 2010). In 2003, problematic alcohol consumption was responsible for 3.3% of the total burden of disease and injury in Australia, and this burden falls disproportionately on young Australians (Begg et al., 2007). Alcohol accounts for 13% of deaths among 14 to 17 year olds (Chikritzhs, Pascal, & Jones, 2004). A high percentage of road accidents and alcohol-related hospitalizations involve young people aged 15 to 29 (Chikritzhs et al., 2003; National Health and Medical Research Council [NHMRC], 2009). In addition, young drinkers are particularly vulnerable to memory loss, sexual predation, and violence, as a consequence of consuming alcohol (Bonomo et al., 2001). This vulnerability is a result of youthful risk-taking behaviors as well as a lack of experience in recognizing and managing the effects of alcohol.

Comparing data from 2005 and 2011 school surveys, fewer Australian secondary students have tried alcohol or are current drinkers, but levels of frequent risky drinking (five or more standard drinks in the past week) have remained much the same (White & Bariola, 2012). Focusing attention on the threshold of risky drinking may, however, mask an increase in high-level risky consumption by young drinkers. The Victorian Youth Alcohol and Drug Survey found a steady increase from 2002 to 2009 in the proportion of young people (16–24 year olds) moving from consuming 7 to 19 standard drinks in a day to 20 or more. In 2002, 26% drank at this higher level at least once in the past 12 months, and 2% did so weekly. This increased to 42% and 5%, respectively, in 2009. The proportion of young people drinking at the less risky level of 7 to 19 standard drinks at least once a year decreased in this same period from 40% to 27% (Social Research Centre, 2010). This pattern of increased consumption by risky

drinkers highlights the need for prevention programs to focus on strategies to reduce high-level consumption, when acute harmful consequences are most likely (Midford et al., 2014).

Australian drug strategy supports drug education as a prevention measure and explicitly endorses a harm minimization framework based on the three pillars of demand reduction, supply reduction, and harm reduction (Ministerial Council on Drug Strategy, 2011). The government school sector in Australia has generally embraced harm minimization as an underpinning concept for school drug education but operationalization at the program level varies. School drug education programs based on harm minimization principles should provide practical knowledge and skills to enable young people to make safer decisions in regard to drug use and should be evaluated in terms of demonstrably reducing risk and harm. Abstinence remains a prevention strategy within a harm minimization approach, but it should not be the measure of program effectiveness (Lenton & Midford, 1996). A harm minimization approach is arguably more relevant to students, as it permits an overt focus on the types of drug use decisions young people make (Marlatt & Witkiewitz, 2010). At the same time, research indicates that use of harm minimization strategies within well-designed programs does not increase uptake or level of use (Hamilton, Cross, Resnicow, & Shaw, 2007; McBride, Farringdon, Midford, Meuleners, & Phillips, 2004).

The Drug Education in Victorian Schools (DEVS) program draws on three theoretical models of behavior: social learning theory, which posits that behavior is socially learned through modeling, imitation, and reinforcement; post-structuralist subjectivity theory, which emphasizes the way the social world shapes an individual's values and sense of identity; and cognitive dissonance theory, which provides a way of understanding how an individual resolves conflicting ideas and behaviors, including those relating to drug use (Midford, Cahill, Foxcroft, et al., 2012). At an operational level, the program was designed to provide young people with the critical disposition, practical knowledge, and communication skills needed to enable them to minimize the harms most likely to be encountered because of drug use, whether their own or that of others. As alcohol is the drug that causes the most harm to young people, it was given greatest emphasis. The program comprised 18 lessons, provided successively over 2 years, to a cohort of secondary school students with an average age of 13 at the start of the program. Lessons on alcohol were integrated with lessons on other drugs, and the program as a whole explored the connection of drug use to issues such as mental health, violence, antisocial behavior, and sexual vulnerability. Stead and Stradling (2010) suggest that comprehensive drug programs are more efficient in tackling the common risk factors in drug use because messages are mutually reinforcing, and skills are transferable. The literature also indicates that comprehensive programs are at least as effective as those with an alcohol-specific focus, and in some cases more so (Foxcroft & Tsertsvadze, 2011; Tobler et al., 2000).

This research study builds on the previous DEVS pilot study and the first year of the main DEVS study, when intervention students had only received the first half of the education program. The central finding in relation to alcohol prevention from both the studies was that while intervention students were no less likely to have tried alcohol, their alcohol consumption and related harm increased over time to a lesser extent than that of control students (Midford, Cahill, Ramsden, et al., 2012; Midford et al., 2014). This article reports findings in relation to alcohol from the second year of the main study, when the intervention students had received the full 18-lesson program.

## **Purpose**

The purpose of this research is to evaluate the effectiveness, in terms of alcohol prevention, of a comprehensive, 2-year harm minimization focused drug education program for junior secondary school students. Students in the control group received the drug education normally provided by their school. The study measured the difference between these two groups in terms of alcohol and other drug knowledge, communication with parents about alcohol, lessons remembered about alcohol, and attitudes toward alcohol, as these can be important influences on drinking behavior. However, the primary outcome sought by the program was a reduction in risk and harm associated with alcohol use. Accordingly, consumption and harm were measured, with specific hypotheses that intervention students would:

1. consume less alcohol;
2. consume alcohol in a less risky manner;
3. experience less harm associated with the use of alcohol.

## **Methods**

The research methodology for this study has been previously described in the study protocol and the paper reporting findings from the first year (Midford, Cahill, Foxcroft, et al., 2012; Midford et al., 2014) The study was approved by Edith Cowan University's and the University of Melbourne's Human Research Ethics Committees. It was also approved by the Research Branch, Education Policy and Research Division of the Victorian Department of Education and Early Childhood Development.

## **Design**

This research is part of a 3-year, cluster-randomized, controlled study that followed a cohort of students from the start of Year 8 in 2010 (average age 13) to

the end of Year 10 in 2012 (average age 16). The intervention students received 10 lessons of the 18 lesson research-derived education program during 2010, followed by eight lessons in 2011. No lessons from the DEVS program were provided in 2012. The control students received drug education lessons usually provided by their school. These varied considerably from school to school, as no standard curriculum was specified. This article focuses on changes between the Baseline testing in March/April 2010 and Post2 testing in November/December 2011, although descriptive graphs, incorporating Post1 data collected in November/December 2010 have been included in the results to illustrate trends.

The 2-year drug education intervention was developed from material trialed in the pilot program. This in turn drew on a range of earlier Australian research projects in the areas of drug and resilience education (Cahill, Stafford, & Shaw, 2000; McBride et al., 2004; McLeod, 1997). The 18 lessons provided in the program are described in Table 1, and the curriculum support resources, comprising student workbooks, trigger videos, and teacher manuals can be accessed online at <http://www.education.vic.gov.au/school/teachers/health/Pages/drugedulearn.aspx>

An evidence-based, harm minimization approach was used to orient program development, giving consideration to the fact that teachers indicated it was important to understand the rationale for the approach as well as the pedagogy used to deliver the program (Cahill et al., 2014). In the first year, the lessons emphasized alcohol, but also addressed tobacco and cannabis use. In the second year, there was a focus on other illicit drugs, including ecstasy, amphetamines, and heroin, although important alcohol issues were revisited. In both years, lessons included a combination of knowledge about drug effects; development of strategies to prevent accidents; violence, sexual vulnerability, and peer and familial conflict associated with drug use; use of critical thinking strategies to deconstruct normative influences; and implementation skills. In addition, students were given home tasks to be undertaken with their parents to create a conversation on drug issues, as parents have consistently been identified by young people as having the greatest influence on their decisions about drinking (Bremmer, Burnett, Nunney, Ravat, & Mistral, 2011; Miller-Day, 2008).

The teachers delivering the classroom program each year participated in intensive 2-day professional training. This incorporated a summary of the evidence base informing the program and active sampling of each lesson activity. Emphasis was given to modeling and coaching in use of the participatory, skills-based, and critical thinking pedagogy. The emphasis on pedagogical method during training was important, as data collected on entry to the program indicated that most of the teachers in the trial favored teacher-centric strategies over participatory strategies in their teaching practice (Cahill et al., 2013). Participatory methods such as role-play and small group work, which were central to the program design, were used infrequently, with over half of the teachers using role-play only a few times a year.

**Table 1.** Year 8 and Year 9 Lesson Plans.

Lesson	Year 8	Year 9
1	What is a drug?—Introduction, agreements, definitions, and drug categories	Priorities and concerns—Identifying what young people value and worry about generally and what particular concerns they have around drugs
2	Alcohol and effects and standard drinks—How alcohol effects the body, assessing harms associated with use, pouring standard drinks, understanding blood alcohol content and safer levels of use?	Facing facts and finding solutions—Alcohol and cannabis guidelines on use and the research that informs them
3	Party behaviors and alcohol—The relationship between levels of alcohol use and the risk of harm to self and others	Using your resources—Pouring standard drinks, matching harms to levels of alcohol use, identifying strategies to reduce harm
4	Prevalence and norms—Dispelling myths about levels of drug use amongst young people, identifying reasons for use/nonuse	Winding up, winding down—Learning about the effects/risks of amphetamine-type stimulants, identifying drug-free ways of achieving “high” and “serene” states of mind
5	Tobacco—Considering gender differences in relation to smoking, the impact of media messages	Drugs, disinhibition, sexual vulnerability, and violence—Discussing sexual vulnerability and violence in relation to drug use, identifying strategies for avoiding or reducing harm
6	Cannabis—Information about cannabis and its effects, identifying risks associated with cannabis use	Invisible risks—Information about injecting drug use, blood-borne viruses and methods of protection
7	Risk reduction—Assessing risk and developing strategies to avoid or minimize harm	Personal confidence and drug use—Developing and rehearsing positive self-talk, refusal skills, and tactics for peer negotiation
8	Influences—Identifying social and media influences to use alcohol	Getting help and talking with adults—Information about heroin, rehearsing steps for practical first aid in situations involving overdose, rehearsing help seeking with adults

(continued)

**Table 1.** Continued.

Lesson	Year 8	Year 9
9	Options and decisions—Generating and rehearsing strategies to reduce harms associated with drug use	
10	Standing up for yourself—Providing peer support using assertion skills in situations involving alcohol	

The self-report survey instrument used to measure change was trialed in the pilot research that preceded this study. It gathers information on knowledge, communication with parents, exposure to drug education, patterns and context of use, attitudes and risks, or harms experienced. Self-report is well-accepted practice in studies of this type, and research indicates little inconsistency between self-report and other measures of drug use (Lintonen, Ahlstrom, & Metso, 2004; Morgan, 1997).

Validity is high if the anonymity of participants and the confidentiality of data are clearly demonstrated (United Nations Office on Drugs and Crime, 2003). In this study, a student-generated code, based on easily remembered fragments of personal information, was used to maintain anonymity, while allowing matching of individuals over the course of the study. Confidentiality was demonstrated by having the participating students seal their completed survey forms in envelopes, which were then collected by researchers and immediately taken out of the school.

### *Sample Size Calculation*

Sample size estimations were based on detecting a small effect size of 0.15 in relation to alcohol consumption and associated harm. This effect size was chosen on the basis of previous school drug education studies (McBride et al., 2004; Malmberg et al., 2010). The target sample size has been estimated using G\*Power v.3.1.3 software where  $\alpha = .05$  and  $1 - \beta$  error probability = .95 (Faul, Erdfelder, Buchner, & Lang, 2009). On the basis of random sampling and a design effect of 1.48, calculated to account for school clustering and student attrition, at least 539 students were needed at the end of the study (McBride et al., 2004; Midford Cahill, Foxcroft, et al., 2012).

### *Sampling and Data Collection*

At the commencement of the 2010 school year, 21 Victorian government secondary schools were recruited to the study on a voluntary basis and allocated to metro/regional location and high/low socioeconomic strata (SES) to approximate the proportion of Victorian secondary schools in each category. SES allocation was made using the Department of Education and Early Childhood Development's Student Family Occupation index for 2010. Schools within each strata were then randomly allocated to either the intervention or control condition on a two to one proportion to allow more precise statements about the effects of the intervention (Hendricks, 2006). Subsequently, schools were further partitioned into high, medium, and low SES so as to better align with DEECD's school SES categories. One intervention school, with 44 participating students at Post1, withdrew from the second year of the study in 2011 because they did not have the resources to implement the program.

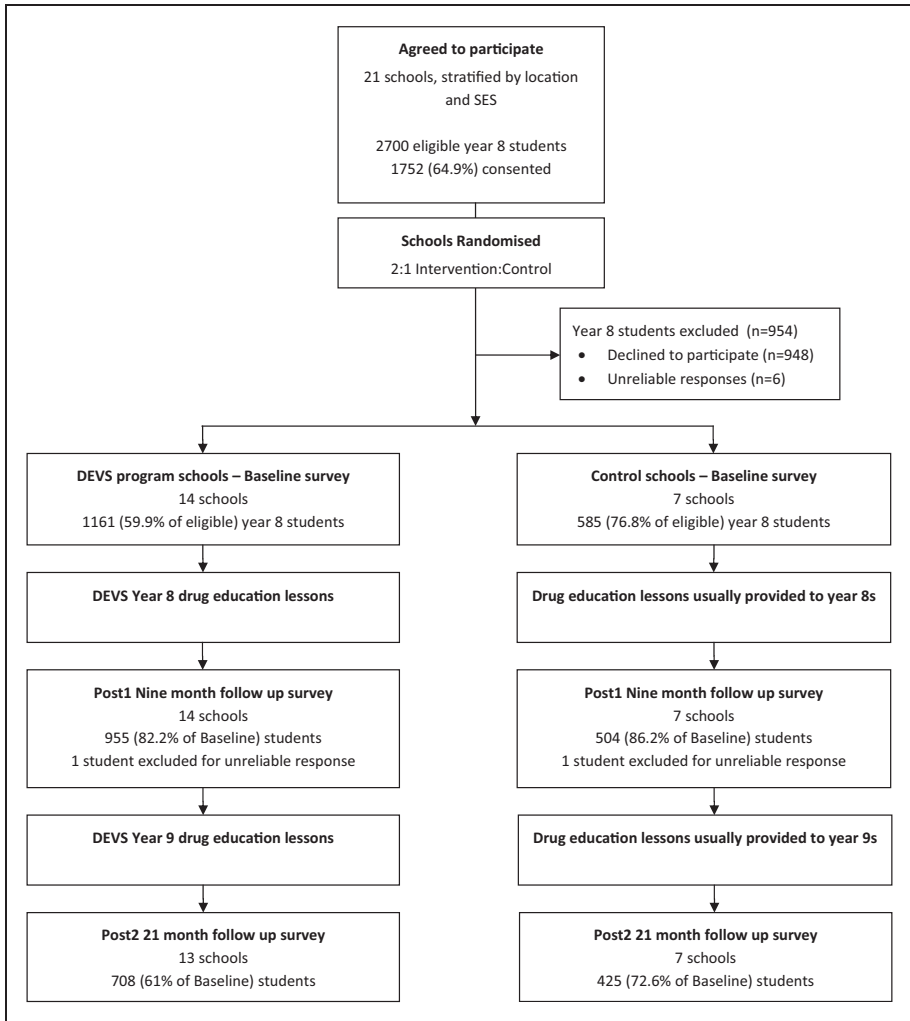
Written active consent was sought from the 2,700 Year 8 students in the 21 original participating schools and their parents. Of this total population, 1,752 or 64.9% agreed to participate in the research. At Baseline, 1,161 usable surveys were returned by intervention students and 585 by control students. Six Baseline surveys were excluded as unreliable because all responses to the questions on alcohol, smoking, cannabis, or other drug use and harm were uniformly in the highest category. This was considered a strong indication that these students had simply reported maximum possible values rather than their true behavior. At Post2, smaller proportions of usable surveys were returned by intervention ( $n = 708$ , 60.9% of Baseline returns) than control students ( $n = 425$ , 72.6% of Baseline returns). This was partly an artifact of one intervention school, withdrawing from the study. A flow diagram illustrating the number of schools and students in each study group over time is presented in Figure 1.

### *Measures*

**Knowledge.** The knowledge index represented the number of correct answers to 38 knowledge questions on alcohol, smoking, and other drugs. The internal consistency of the index was measured during the pilot phase, using the Cronbach's alpha test ( $\alpha = .859$ ,  $p < .001$ ).

**Attitudes.** The alcohol attitude scale was a sum of the five attitude variables, with higher scores representing safer alcohol-related attitudes. Individual attitude items were based on a 5-point Likert scale and measured attitudes to alcohol harm, alcohol education, safe use of alcohol, getting drunk on purpose, and talking with parents about alcohol. The internal consistency of the scale was measured during pilot phase, using the Cronbach's alpha test ( $\alpha = .387$ ,  $p < .001$ ). Two components, knowledge/communication and harm accounted for most of the variance.





**Figure 1.** Flow chart illustrating the recruitment and participation of schools and students in the full Year 8 and Year 9 drug education program.

*Talking to parents.* Students indicated how often they talked to their parents about alcohol in the past 12 months. Response choices were *never, once or twice, 3 to 4 times, 5 to 11 times, and 12 times or more.*

*Lessons.* Students indicated the number of lessons concerning alcohol they remembered receiving at school over the past year. The question was phrased in the same manner as that asked in national surveys of secondary school

students' use of alcohol (White & Bariola, 2012) to enable comparison. Response choices were *not even part of a lesson*, *part of a lesson*, *one lesson*, and *more than one lesson*.

**Consumption.** Students indicated whether they had drunk a full standard drink in the past 12 months, and if so, their level of alcohol consumption. This was calculated by combining the responses to two variables: one on quantity (how many standard drinks were usually consumed per occasion) and one on frequency (how often alcohol was usually consumed). This provided total alcohol consumption over a 12-month period.

**Risky consumption.** Drinking in a manner that risks acute harm was measured by the proportion of student drinkers who usually consumed five or more standard drinks (10 g of alcohol) on the occasions when they drank. This quantity derives from the current Australian drinking guidelines for both men and women (NHMRC, 2009). The level of consumption by risky drinkers was also measured separately.

**Harms.** The alcohol harm index was the sum of harms from the 10 items that measured different alcohol harms experienced over a 12-month period. Harms were feeling sick/hung over after drinking, memory lapses, verbal, physical and property abuse, regretted sex, and getting into trouble with police, parents, friends, and school. The internal consistency of the scale was measured during the pilot phase using the Cronbach's alpha test ( $\alpha = .949$ ,  $p < .001$ ). The level of harm experienced by risky drinkers was also measured separately.

### **Statistical Analysis**

Analyses were conducted using STATA v12 and SPSS v19. Data were analyzed on an intent-to-treat basis, with complete-case analysis, complemented with multiple imputation to account for missing data. The variables, school, intervention condition, region, SES, and gender were used as predictors. Separate multilevel regression models were fitted with Post2 independent variables modeled as a function of intervention condition, region, gender, SES, and Baseline variables to adjust for any Baseline differences between the intervention and control groups. A random intercept was included in each model to account for the clustering of students within schools. Linear regression models were used to determine differences between intervention and control groups for alcohol and other drug knowledge, alcohol attitudes, talking to parents about alcohol, drinking habits, alcohol consumption, and alcohol harms. An ordinal logistic regression model was used to determine differences between groups in the number of alcohol lessons recalled. Logistic regression models were used to determine differences between groups as to whether the students had consumed a

**Table 2.** Demographics of the Student Sample.

	Intervention <i>n</i> = 1,161 (% = 66.5)	Control <i>n</i> = 585 (% = 33.5)	Total <i>n</i> = 1,746
Gender**			
Male	587 (50.6)	211 (36.0)	798 (45.7)
Female	574 (49.4)	374 (64.0)	948 (54.3)
Location**			
Metropolitan	930 (80.1)	434 (74.2)	1,364 (78.1)
Regional	231 (19.9)	151 (26.8)	382 (22.9)
SES category**			
Low	257 (22.1)	81 (13.8)	338 (19.4)
Medium	682 (58.7)	262 (44.8)	944 (54.1)
High	222 (19.1)	242 (41.4)	464 (26.6)

Note. SES = socioeconomic strata.

\*\**p* < .01.

full alcoholic drink and whether they usually engaged in risky drinking. For those who engaged in risky drinking at Baseline, a linear regression model was used to determine differences between intervention and control groups in alcohol consumption and the level of harm experienced at Post2.

## Results

A total of 1,746 students, from 21 schools, provided valid responses at Baseline (Table 2). Overall, 54% of students were female, with control schools having a significantly higher proportion of females than males ( $\chi^2 = 32.919, p < .001$ ). The significantly higher proportion of females in the control group is in the main accounted for by one control school being exclusively female. The majority of students were from schools within the metropolitan area, with control schools having a significantly higher proportion of students from regional areas than intervention schools ( $\chi^2 = 7.964, p = .005$ ). The majority of schools were classified as medium SES, with intervention schools having a higher proportion of low SES and medium SES and a lower proportion of high SES students than control schools ( $\chi^2 = 100.263, p < .001$ ). The significant geographic and SES differences between intervention and control schools occurred despite stratification because of different student participation rates in different schools.

Comparisons between Baseline and Post2 are reported for the 20 schools that remained in the study, and whose students received the full year 18-lesson program. Student numbers for each data collection point are presented in the Figure 1 flow chart. Similar proportions of male and female students remained in the study at Post2.

## Knowledge

The knowledge index score increased from Baseline to Post2 for both the intervention and control students, with an average increase of 27.4% (just under six correct answers) for intervention students and 19.5% (just over four correct answers) for control students (Table 3, Figure 2). After taking into account Baseline knowledge index score, gender, SES category, and region, students within the intervention group significantly increased their knowledge index scores at Post2, compared with students in the control group ( $p < .001$ , Table 4).

## Attitudes

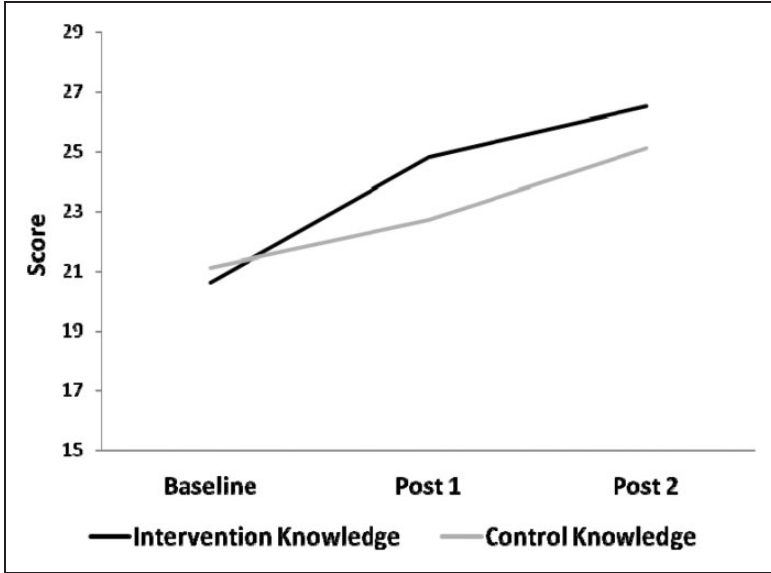
The attitudes of students toward alcohol issues in both the intervention and control groups were highly responsible at Baseline, with both intervention and control students scoring 18.6 out of a possible 25 (Table 3). At Post2, attitude scores increased by 8.1% for intervention students and by 8.6% for control

**Table 3.** Descriptive Statistics by Time and Group.

	Baseline		Post2	
	Intervention ( <i>n</i> = 1,161) % [95% CI]	Control ( <i>n</i> = 585) % [95% CI]	Intervention ( <i>n</i> = 709) % [95% CI]	Control ( <i>n</i> = 425) % [95% CI]
Lessons at school				
None	20.9 [18.7, 23.3]	30.5 [26.9, 34.4]	2.7 [1.7, 4.2]	13.9 [10.9, 17.5]
Part of a lesson	28.5 [26.0, 31.2]	31.7 [28.1, 35.6]	5.4 [3.9, 7.3]	13.9 [10.9, 17.5]
One lesson	22.5 [20.2, 25.0]	13.7 [11.2, 16.8]	9.1 [7.2, 11.4]	12.9 [10.1, 16.5]
More than one lesson	28.1 [25.6, 30.7]	24.0 [20.7, 27.6]	82.9 [79.9, 85.5]	59.3 [54.6, 63.9]
Drank a full standard drink	23.4 [21.4, 25.4]	22.7 [20.7, 24.7]	37.6 [34.1, 41.3]	42.6 [38.0, 47.3]
Drank in a risky manner	18.8 [17.0, 20.6]	18.8 [17.0, 20.6]	26.3 [21.4, 34.9]	38.1 [31.4, 45.4]
	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )
Knowledge index	20.8 (5.4)	21.0 (5.3)	26.5 (5.4)	25.1 (5.7)
Attitude scale	18.6 (3.7)	18.6 (3.7)	20.1 (2.9)	20.2 (3.1)
Talked to parents	2.1 (3.1)	2.1 (2.9)	2.8 (3.2)	2.3 (2.6)
Consumption by all drinkers	30.5 (98.4)	21.1 (55.0)	63.2 (193.4)	103.4 (260.6)
Consumption by risky drinkers	131.0 (196.5)	78.7 (103.2)	205.6 (332.1)	256.3 (375.5)
Alcohol harms all drinkers	4.0 (7.6)	3.9 (7.2)	3.8 (6.3)	5.7 (8.9)
Alcohol harms risky drinkers	8.6 (9.8)	10.3 (9.9)	7.6 (8.4)	12.4 (11.0)

Note. CI = confidence interval.

students, with both intervention and control students scoring 20. After taking into account Baseline attitude score, gender, SES category, and region, there was no significant difference between groups in the change of attitudes from Baseline to Post2 ( $p = .950$ ) (Table 4).



**Figure 2.** Mean knowledge index score for intervention and control groups at Baseline, Post1, and Post2.

**Table 4.** Multi-Level Linear Regression Models.

Post2	$\beta$	SE	95% CI	$p$
Knowledge index ( $n = 1,693$ )	2.40	0.64	[1.15, 3.65]	<.001**
Alcohol attitude scale ( $n = 1,684$ )	0.01	0.01	[-0.03, 0.03]	.950
Talk to parents ( $n = 1,684$ )	0.82	0.25	[0.32, 1.31]	.002**
Consumption by all drinkers ( $n = 444$ ) <sup>a</sup>	-49.80	25.04	[-98.86, -0.72]	.047*
Alcohol harms all drinkers ( $n = 436$ ) <sup>a</sup>	-2.16	0.83	[-3.78, -0.53]	.009**
Consumption by risky drinkers ( $n = 40$ ) <sup>b</sup>	-1.69	0.49	[-2.64, -0.74]	<.001**
Alcohol harms risky drinkers ( $n = 40$ ) <sup>b</sup>	-8.71	2.93	[-14.46, -2.96]	.003**

Note. CI = confidence interval.

Models have taken into account Baseline variable, gender, SES, and region.

<sup>a</sup>Drinkers at Baseline or Post2.

<sup>b</sup>Risky drinkers at Baseline or Post2.

\* $p < .05$ . \*\* $p < .01$ .

### *Communication With Parents*

The average number of times intervention students talked to their parents about alcohol increased from Baseline to Post2 by 33.3%, from 2.1 to 2.8 occasions, compared with an increase of 9.5% for control students, from 2.1 to 2.3 occasions (Table 3). After taking into account the number of times each group talked to their parents at Baseline, gender, SES category, and region, the increase by intervention students in talking with their parents was significantly greater at Post2 than the increase by control students ( $p = .002$ ) (Table 4).

### *Alcohol Lessons Remembered*

The proportion of intervention students who recalled receiving more than one lesson on alcohol increased from 28.1% at Baseline to 82.9% at Post2, compared with an increase from 24% to 53.9% of control students (Table 3). By way of comparison, the 2011 Australian student survey found that 56.5% of 14 year olds remembered receiving more than one lesson about alcohol in the previous year (White & Bariola, 2012). After taking into account recall of alcohol lessons at Baseline, gender, SES category, and region, intervention students recalled receiving significantly more alcohol education than control students ( $p < .001$ ) (Table 5).

### *The Proportion of Students Who Drank At Least One Full Drink (Student Drinkers)*

The proportion of intervention students who consumed a full standard drink increased from 23.4% at Baseline to 37.6% at Post2, compared with an increase from 22.7% to 42.6% for control students (Table 3). After taking into account

**Table 5.** Multi-Level Ordinal and Logistic Regression Models.

Post2	OR	SE	95% CI	<i>p</i>
Ordinal regression				
School lessons ( $n = 1,129$ )	5.0	0.79	[3.70, 6.84]	<.001**
Logistic regression				
Drank full standard drink ( $n = 1,693$ )	0.93	0.24	[0.56, 1.56]	.782
Drank in a risky manner ( $n = 444$ ) <sup>a</sup>	0.58	0.18	[0.31, 1.08]	.084

Note. OR = odds ratio; CI = confidence interval.

Models have taken into account Baseline variable, gender, SES, and region.

<sup>a</sup>Drinkers at Baseline or Post2.

\*\* $p < .01$ .

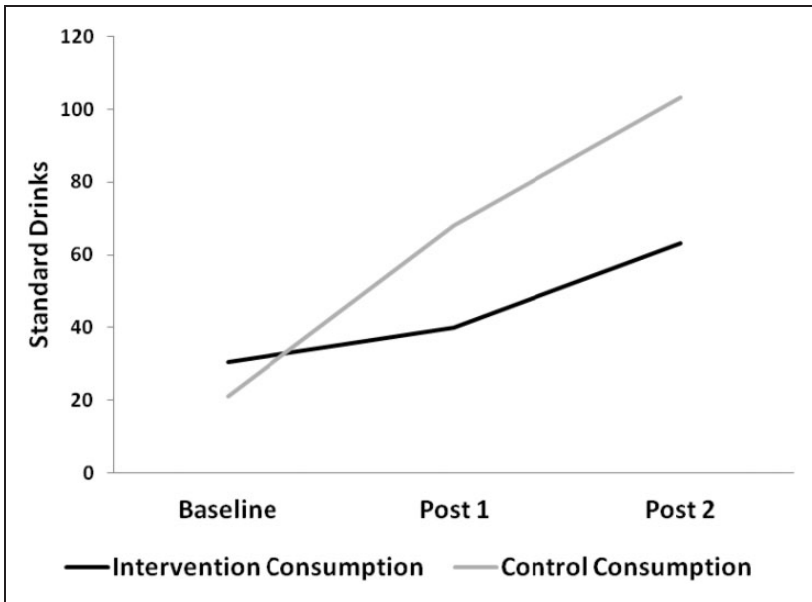
the proportion of student drinkers at Baseline, gender, SES category, and region, there was no significant difference between groups in the increase of drinkers ( $p = .782$ ) (Table 5).

### Alcohol Consumption by All Drinkers

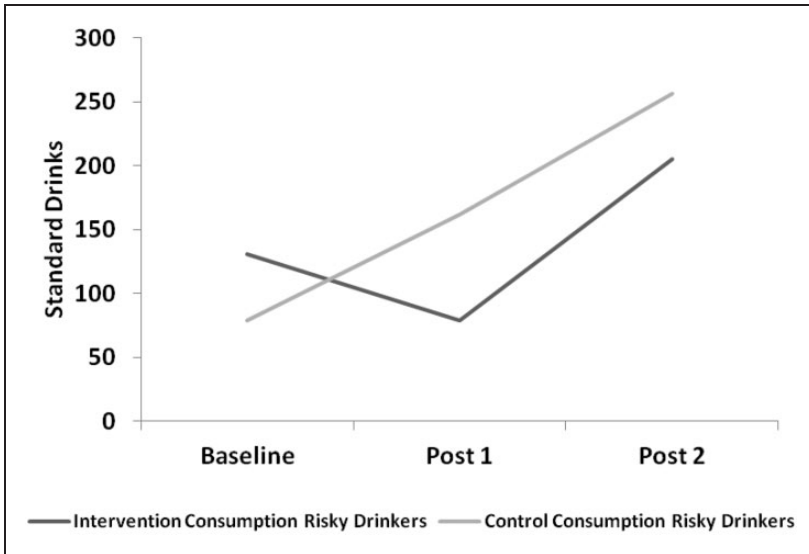
Alcohol consumption increased for both intervention and control student drinkers, with a 110% increase from Baseline to Post2 for intervention students (mean Baseline = 30.5, mean Post2 = 64.2) and a 390% increase for control students (mean Baseline = 21.1, mean Post2 = 103.4) (Table 3, Figure 3). After taking into account Baseline consumption, gender, SES category, and region, control students had a significantly greater increase in consumption than intervention students ( $p = .047$ ) (Table 4).

### Proportion of Risky Drinkers

The proportion of intervention student drinkers who usually drank in a manner that risks acute harm increased from 18.8% at Baseline to 26.3% at Post2, compared with an increase from 18.8% to 38.1% of control students



**Figure 3.** Mean number of standard drinks consumed by intervention and control group drinkers over a 12-month period at Baseline, Post1, and Post2.



**Figure 4.** Mean number of standard drinks consumed by intervention and control group risky drinkers over a 12-month period at Baseline, Post1, and Post2.

(Table 3). After taking into account the proportion of student risky drinkers at Baseline, gender, SES category, and region, there was no significant change between groups in the proportion of risky drinkers from Baseline to Post2 ( $p = .084$ ) (Table 5).

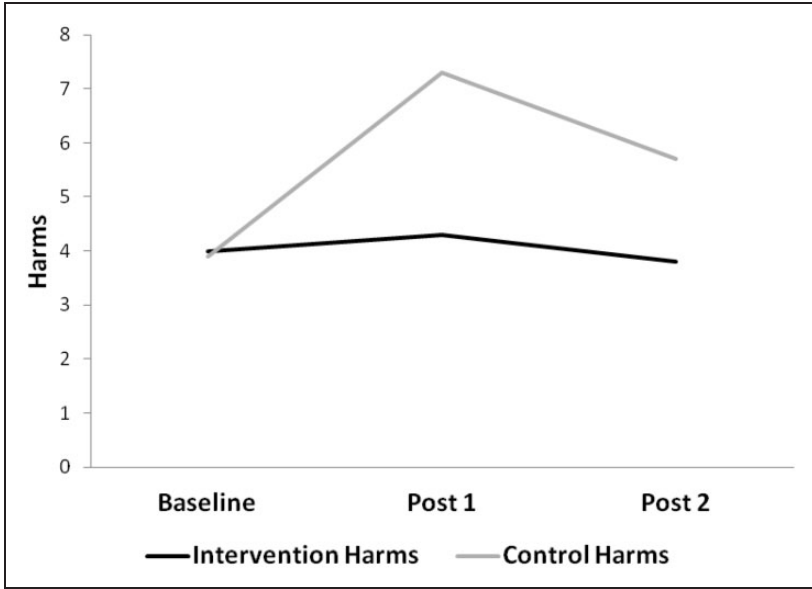
### *Consumption by Risky Drinkers*

At Post2, intervention students who usually drank in a manner that risks acute harm increased their consumption by 56.9% (mean Baseline = 131, mean Post2 = 205.6), compared with control students who increased their consumption by 225.7% (mean Baseline = 78.7, mean Post2 = 256.3) (Table 3, Figure 4). After taking into account gender, SES category, region, and risky drinking, control students had a significantly greater increase in consumption than risky drinking, intervention students ( $p < .001$ , Table 4).

### *Alcohol Harms for All Drinkers*

Alcohol harms experienced by student drinkers during the previous 12 months decreased by 5% from Baseline to Post2 (mean Baseline = 4.0, mean Post2 = 3.8) for intervention students and increased by 46.2% (mean Baseline = 3.9, mean Post2 = 5.7) for control students (Table 3, Figure 5). After taking into account





**Figure 5.** Mean number of alcohol harms experienced by intervention and control group drinkers over a 12-month period at Baseline, Post1, and Post2.

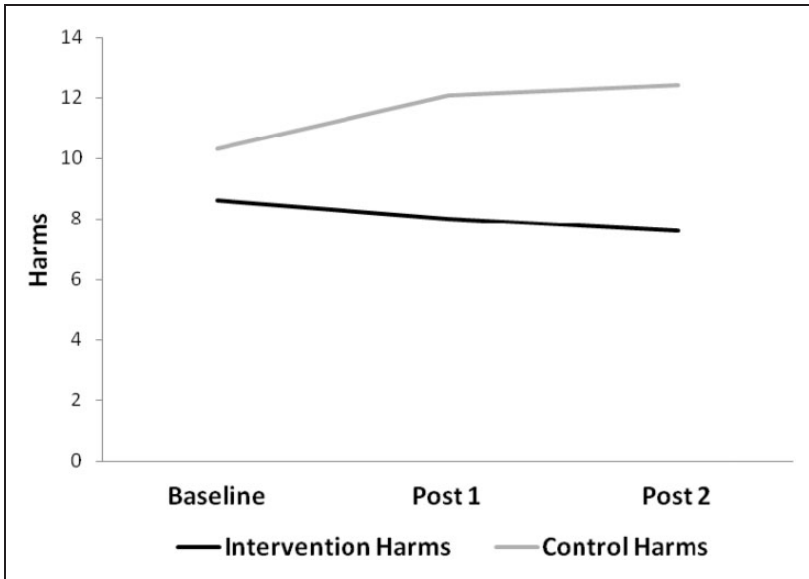
the number of alcohol harms experienced at Baseline, gender, SES category, and region, the increase in harms experienced by control students was significant at Post2, compared with intervention students, whose harms decreased ( $p = .009$ ) (Table 4).

### *Alcohol Harms for Risky Drinkers*

Alcohol harms experienced by student risky drinkers during the previous 12 months decreased by 13% from Baseline to Post2 (mean Baseline = 8.6, mean Post2 = 7.6) for intervention students and increased by 20% (mean Baseline = 10.3, mean Post2 = 12.4) for control students (Table 3, Figure 6). After taking into account the number of alcohol harms experienced at Baseline, gender, SES category, and region, the increase in harms experienced by control students, who were risky drinkers, was significant at Post2, compared with intervention student risky drinkers, whose harms decreased ( $p = .009$ ) (Table 4).

## **Discussion**

In general, the alcohol trends from the second year of the study, when the full program had been implemented, were similar to those from the first year, when



**Figure 6.** Mean number of alcohol harms experienced by intervention and control group risky drinkers over a 12-month period at Baseline, Post1, and Post2.

only 10 of the full 18-lesson curriculum had been implemented. However, the magnitude of change tended to be less. This is not surprising, as the key knowledge and skills around appraising and preventing risks associated with alcohol use were introduced in the first year of the program, with alcohol lessons in Year 9 lessons predominantly reinforcing and elaborating previous material.

As in the first year, intervention students were more knowledgeable about alcohol and other drug use issues after receiving the education program. This has been noted in a previous paper as an important intermediate step in changing behavior (Midford et al., 2014). The trend in attitudes toward alcohol over the full 2-year study was also very similar to that evidenced in the first year and was likely for the same reason, namely, that both intervention and control students already held very responsible attitudes at Pre, allowing little room for improvement. As has been previously stated, this has implications for the design of future drug education programs, in that putting effort into engendering responsible attitudes is an exercise in preaching to the cognitively converted. Moreover, responsible attitudes toward alcohol do not predict lower levels of consumption and harm (Midford et al., 2014).

The 2-year program maintained the success achieved in the first year in bringing about change in three factors likely to influence student drinking decisions. First, intervention students were more knowledgeable about drug issues, including alcohol. This provides the basis for more informed decision making.

Second, they talked more to their parents about alcohol. This is likely to influence their drinking behavior because of the notice taken of parental values and opinions (Bremmer et al., 2011; Miller-Day, 2008). Third, intervention students remembered receiving more alcohol education than the controls. They also remembered receiving more than similarly aged students in the 2011 Australian survey of secondary school students (White & Bariola, 2012). The favorable comparison with the control group is reassuring, made more compelling by the national comparison, which suggests that this program provided better coverage of alcohol issues than the average program in Australian schools. A further predisposing consideration is that young people's alcohol use is also influenced by peer behavior, and given that many young people socialize with school peers, having peers who received the same harm minimization education program may have reduced social pressure to drink in a risky manner (Bremmer et al., 2011).

As was the case after the first year of the program, intervention students were no less likely to drink than controls, and those who drank were no less likely to usually drink in a risky manner (five or more drinks on a single occasion) (Midford et al., 2014). However, the full 2-year program repeated the success achieved in the first year, in terms of influencing intervention students who drank to moderate their consumption, although the relative gains in the second year did not match those in the first (Figure 3). In addition, the full 2-year program influenced intervention group risky drinkers to drink less than controls when they did drink: Their increase in annual consumption from Pre to Post2 was less than half that of controls (Table 3).

The influence of the program on consumption carried through to alcohol-related harms. Harms experienced by intervention student drinkers decreased slightly over the 2-year program, whereas harms experienced by the control group drinkers increased by a half, albeit mostly in the first year (Table 3, Figure 5). There was a similar trend in harms experienced by risky drinkers: Harms went down for intervention students and went up for controls (Table 3, Figure 6).

The DEVS program was effective in terms of its stated aims: intervention students consumed less alcohol; consumed less alcohol at risky levels; and experienced less alcohol-related harm, both in aggregate and in association with consumption at risky levels. This indicates that an integrated, harm minimization focused school drug education program delivered by specifically trained teachers, employing participatory, student-centered pedagogy is capable of influencing students, who choose to consume alcohol, to consume in a more responsible manner. However, a number of limitations need to be noted. The requirement to obtain active consent from both student and parent meant that 35.3% of eligible students were not included in the study. This was not a consequence of particular students or their parents being actively opposed to participation but rather a function of school follow-up on the return of consent

forms. In a similar vein, the study suffered from 35% attrition from Pre to Post2. Although high, this level of attrition over 2 years is similar to a previous comparable study and can be largely explained in terms of family mobility (McBride et al., 2004). Such loss of participants at different points in the study should be expected in this type of research, but it still has implications for the generalizability of findings. A further potential criticism of the program is that it was no more effective than the usual school drug education programs in stopping underage students from taking up drinking, but this has to be balanced against the reduction in consumption and harm achieved with both low risk and risky drinkers. This should be seen as a worthwhile benefit in the context of Australian society, and by implication western society in general, where most young people have consumed alcohol well before they reach the legal age of purchase (Australian Institute of Health and Welfare, 2010; White & Bariola, 2012).

The findings from this program, with its focus on harm minimization and an integrated approach to licit and illicit drug use, have a twofold implication for school drug education programs and prevention strategy. Young people are particularly vulnerable to acute harm from alcohol and other drug use, and effective school drug education offers immediate and mass benefit. As all Australian jurisdictions provide some form of school drug education, there is likely to be incremental prevention benefit if harm minimization programs, with demonstrated effect, are preferentially selected over existing programs with no demonstrated effect. Further, an approach that covers all drugs in the one integrated program can be more readily accommodated within an already-crowded school curriculum and would act to reinforce harm minimization skills relevant across a range of drug scenarios. The Australian policy environment endorses an evidence-based, harm minimization approach to drug use, and these research findings provide a strong argument for translating this into standard drug education practice within schools.

### **Clinical Trial Registration Details**

Australia and New Zealand Clinical Trials Register (ANZCTR)  
ACTRN12612000079842.

### **Declarations of Conflicting Interests**

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