Original article

Reduction of Adolescent Alcohol Use Through Family–School Intervention: A Randomized Trial

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A B S T R A C T

Purpose: Two-year longitudinal follow-up data evaluated the behavioral impact of Resilient Families, a universal intervention that aimed to prevent early initiation and frequent and heavy adolescent alcohol use in secondary schools in Melbourne, Australia.
Methods: Of 24 secondary schools (62% of those approached), 12 were randomly assigned to intervention and 12 as controls. Intervention students received a social relationship curriculum; their parents received parent education handbooks and invitations to parent education events outlining strategies to encourage healthy adolescent development and reduce adolescent alcohol misuse. At Wave 1 (2004), students were in Year 7 secondary school (mean age, 12.3 years). Data were imputed for students completing at least two of three annual surveys (N = 2,354). Wave 3 (2006; mean, 14.5 years) main outcome measures for alcohol use were "any," "frequent" (at least monthly), and "heavy" (five or more drinks in a session at least once in the prior fortnight). Multivariate logistic regression assessed intervention exposure effects, adjusting for school classroom clustering and baseline measures.
Results: Relative to controls, intervention students showed significant reductions in any lifetime use (adjusted odds ratio [AOR], .78; 95% confidence interval [CI], .62–.97), and reduced progression to frequent (AOR, .69; CI, .56–.86) and heavy use (AOR, .75; CI, .60–.94).
Conclusions: Randomized assignment to Resilient Families was associated with a significant reduction in adolescent alcohol use among families volunteering for the evaluation. Family–school-based interventions appear promising as a strategy to contribute to population reductions in currently high rates of adolescent alcohol misuse.
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IMPLICATIONS AND CONTRIBUTION

Random assignment of secondary schools in Australia to the Resilient Families intervention (composed of a student social relationship curriculum and increased parent education opportunities) was associated with reductions in the development of early adolescent alcohol use within families volunteering for the evaluation. The intervention broadens the range of evidence-based adolescent alcohol prevention strategies available for implementation in secondary schools.

Alcohol misuse is a major contributor to preventable harm for young people [1]. Alcohol use before age 15 years leads to double the prospective risk of adult alcohol dependence [2,3] and increases the risk of abusive or hazardous drinking in adolescence, independent of a range of other influences [4]. Frequent and heavy adolescent drinking is predictive of alcohol dependence in young adulthood and harms [5–7] such as impaired brain development and functioning [8].

Theory suggests that reducing the cumulative number of risk factors and enhancing protective factors in the family, school, and peer environments can reduce adolescent alcohol use and a range of health and social problems [9,10]. This has led to a focus on social environment intervention strategies in adolescent health promotion [11]. Secondary schools are an important setting for adolescent health promotion interventions within the cumulative risk reduction framework, owing to the range of interaction occurring at school among parents, teachers, and peers. There have been relatively few well-designed evaluations of secondary school alcohol health promotion programs [12]. Drug education curricula focusing on social processes have shown reductions in alcohol and other drug use in students [13]. Training teachers and school staff to enhance teaching practices and school mental health promotion have also shown reduced student alcohol and drug use [11].

There are unique opportunities to further reduce student alcohol and drug use by intervening to improve parent–child relations and family management practices within the school community [14]. Studies evaluating community-based parenting interventions demonstrate their potential to reduce adolescent alcohol use by modifying family management practices [15,16]. A number of risk and protective factors for adolescent alcohol use can be influenced by intervening with families in the school context, including improved parent communication, resulting in stronger adolescent attachment to parental values [16]; clearer family rules and monitoring of adolescent behaviors [17,18]; reduced family conflict [19]; and the introduction of assertive parenting practices [18,19].

The Resilient Families program was developed for application in early secondary school (Years 7 and 8 in the state of Victoria in Australia) to encourage family support networks aimed at improving adolescent health and well-being [20]. Specifically, the program was designed to help students develop relationship skills, and to assist parents with parenting skills and support networks during the first 2 years of secondary school. A previous analysis of the Wave 2 follow-up showed the intervention had no significant direct effects on reducing depressive symptoms, the primary outcome of the trial, or on the secondary outcomes of antisocial/violent behavior or school commitment [21]. The present study examined the secondary outcome of alcohol use using the Wave 3 follow-up survey to extend a previous evaluation [22] that showed the intervention effect size did not reach significance in reducing student alcohol use in Year 8 (Wave 2).

Given that frequent and heavy patterns of adolescent alcohol use in Year 9 are common and predict increased alcohol dependence at age 21 [5], the present study examined intervention effects among Year 9 students. Three components of the Resilient Families program were specifically designed to reduce adolescent alcohol misuse. First, the intervention sought to modify social environmental risk and protective factors that influence adolescent adjustment and increase the risk of adolescent alcohol use [22]. Second, alcohol-specific messages, which were presented at parent education events and reinforced in a parent handbook, outlined the harmful effects of early adolescent alcohol use and encouraged parents to set family rules that did not permit or condone adolescent alcohol use. Third, to enhance the monitoring of adolescents, parents were encouraged to share information on adolescent behavior and manage it more consistently within the community of parents in the school. It was hypothesized that the intervention would reduce the development of adolescent alcohol use in Year 9, controlling for Year 7 use.

Methods

Study design

As an intervention supplementing standard school practices, the study aligned with definitions of a pragmatic trial [23]. A total of 39 secondary schools in Melbourne, Australia were approached to participate in a cluster-randomized prospective trial (Australian Clinical Trial Registry Number 012606000399594). The approached schools were randomly sampled using a probability proportionate to grade-level size procedure from a separate project, the International Youth Development Study (IYDS) [24]. The sampled IYDS schools were state-representative, based on comparison with available measures of school type (government, Catholic, independent), economic disadvantage, and student ethnic diversity [24]. A random subsample of Melbourne metropolitan schools participating in the IYDS was approached. A stratified-block randomization approach was used, with strata defined by school type (government or Catholic), level of entitlement to educational maintenance allowance (a surrogate measure of socioeconomic status), and single-sex schools within Catholic schools. Schools were entered into the sample within strata until 12 were recruited in each condition. A total of 20 schools were approached to participate in the regular practice comparison condition and 19 for the intervention condition, and 62% agreed, with no significant differences in refusal rates between conditions. Refusals were higher among Catholic schools in the intervention condition (six of seven) compared with the control condition (four of eight). Refusals were low among the top third disadvantaged schools in the intervention (none of seven) and control (one of eight) conditions. None of the recruited control schools was geographically proximate to the intervention schools, which reduced the prospects of cross-school transmission of intervention resources.

The University of Melbourne's Human Research Ethics Committee and relevant education authorities granted ethics approval, requiring active consent for participation from parents and students. Intervention parents and students were informed that the intervention was being conducted, because blinding was not feasible. The control schools were monitored based on usual practice, and uniform questionnaires were used in control and intervention schools, with the project being described as a family relationships study.

Participants

Power analyses based on an earlier study provided figures for school and student sample sizes [19]. Figure 1 presents the CONSORT diagram [23] showing subject recruitment and participation rates. The total eligible population (n = 4,564) within the 24 participating schools was composed of students in the first year of secondary school (Year 7) in 2004 (n = 4,404) and Year 8 students newly entering the schools in 2005 (n = 160). Parents were mailed a consent form and an information sheet. One or more valid surveys (based on signed parent consent, student consent, and survey completion) were obtained from 2,539 students (56% of the approached sample). Students completed surveys in Wave 1 (average age, 12.3 years; Year 7 in 2004), Wave 2 (average age, 13.4 years; Year 8 in 2005), and
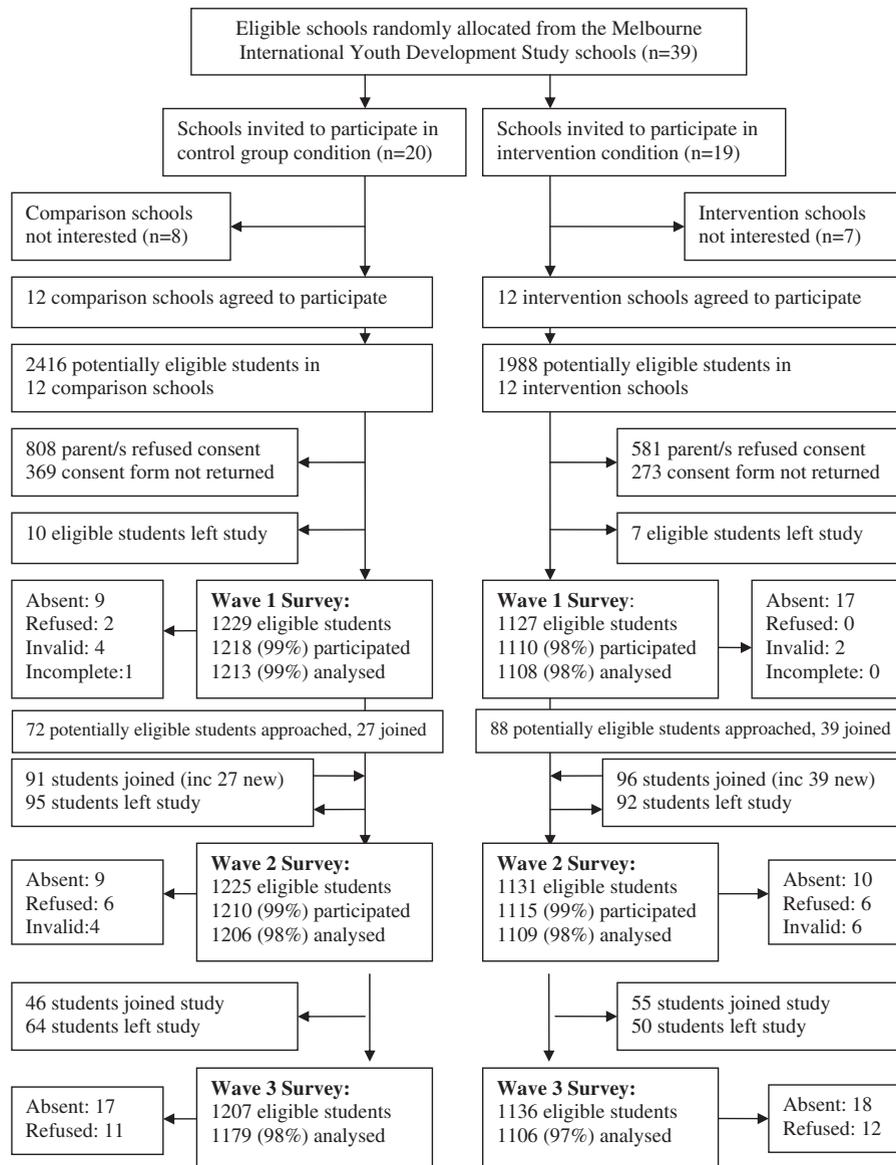
Figure 1. CONSORT diagram describing participant involvement in the study.

Wave 3 (average age, 14.5 years; Year 9 in 2006). Project staff administered questionnaires to students in regular classroom periods, and later to students who were absent. Analyses were based on N = 2,354 (93% of recruited sample participating in at least two waves). STATA proc ice [25] develops a sequence of regression equations to predict missing variables under varied starting assumptions and was used to impute a total of 20 data sets estimating missing data within this sample.

Resilient families intervention

The intervention was composed of five components: (1) a teacher-led student curriculum (described in more detail below) covering relationship problem solving, family rules and responsibilities, communication, emotional awareness, peer resistance skills, and conflict resolution; (2) a brief parent education evening

facilitated by an adolescent-health expert: a 2-hour Parenting Adolescents Quiz providing a fun social evening for parents and caregivers to work together and learn ways to promote healthy adolescent development by addressing topics such as youth culture, communication, depression, sibling rivalry, alcohol and drugs, and conflict resolution; (3) extended parent education, composed of eight 2-hour group sessions for parents and caregivers using the parenting program Parenting Adolescents: a Creative Experience, facilitated by a trained parent educator and including topics on listening, assertion, adolescent development, conflict resolution, resilience, drugs and alcohol, and family; (4) building a community of parents, which reviewed existing policies and practices for parent engagement at the school and created opportunities for parents and caregivers to build support networks in the early years of secondary school; and (5) school-wide distribution of a handbook for parents and caregivers,

combining evidence-based information and practical parenting strategies. A comprehensive description of the intervention and intervention exposure and fidelity is provided elsewhere [20,22].

Measures

A detailed description of scales and items is provided elsewhere [22]. The internal reliability of all scales was considered acceptable for an epidemiological analysis ($\alpha = .62–.84$). Unless otherwise stated, scales and items were drawn from the IYDS survey [24,26]. Outcomes in Year 9 were any use (ever using alcohol), frequent (any monthly) use, and heavy use (at least one episode in the past fortnight in which five or more alcoholic drinks were consumed [>63 mL ethanol]).

Analyses were adjusted for a range of predictors of adolescent alcohol use [22,26]. Wave 1 modifiable family predictors included family attachment, family conflict, and poor family management (i.e., lack of monitoring and clear rules). Adolescent aggression toward parents was adapted from a previous scale [27]. Two new 5-item scales were devised to measure family connection to community (e.g., "My parent[s] know other parents at the school") and family connection to school (e.g., "My parent[s] attend parent teacher evenings" or "My parent[s] think school is important"). Intervention exposure was indexed by a dichotomous variable measuring school assignment to the intervention.

For comparison of odds ratios (ORs), continuous predictor variables were dichotomized using, where possible, the top 15% of scale distributions, equating with 1 standard deviation above the mean. Where this was not possible, the extreme end of a scale distribution was used. The percentage column in Table 1 presents the prevalence of each predictor.

Demographic measures included female gender (i.e., reference category, male), age 13 years or older (reference category, younger ages), non-Australian country of birth, Indigenous descent (Aboriginal or Torres Strait islander), parental marital status (separated or divorced; reference category: other), and having no older siblings (reference category, one or more siblings).

Behavioral predictors included externalizing behavior problems, combining conduct problems items from the Strengths and Difficulties Questionnaire [28] with a series of IYDS antisocial behavior items [29].

Adjustment and competence predictors included anxious concern symptoms [30], depressive symptoms [31], negative life events, coping skills [32], negative and positive problem solving, social skills [33], and emotional control.

School and peer factors included school commitment and school rewards. Scales were devised to assess low school peer support (three items, e.g., "How many of the students in your year level at your school did something to help you?"), and significant adult attachment (three items, e.g., "There's at least one teacher or other adult in this school I can talk to if I have a problem"). Three single-item measures assessed low academic grades, experiencing bullying, and school absence (truancy). Students reported the number of school friends they had in the same year level, listing them by name. For most respondents, one or more nominated friends also completed a survey. Responses to lifetime alcohol and cigarette use questions were used to derive peer variables representing the percentage of nominated school friends using alcohol and tobacco. "Negative non-school peers" was derived from student reports of spending time with friends not enrolled at the student's school who smoked cigarettes, used marijuana, or broke the law.

Analysis

STATA software (12.0; StataCorp, College Station, TX) mi commands estimated across 20 imputed data sets for prevalence estimation and regression analyses predicting alcohol use, and frequent and heavy use at Year 9 from predictors measured at Year 7. Although averaged findings are reported, the intervention effect was significant in the fully multivariate adjusted regression analyses in all the imputed data sets. Analyses used the STATA svy command to adjust for within-school clustering of classroom responses. Logistic regression models examined predictors of the progression in alcohol use, controlling for Wave 1 alcohol use. Odds ratios and 95% confidence intervals (CIs) are reported. Multivariate gender interactions were examined across all predictors, but no significant interactions were found.

Results

Prevalence of any alcohol use in Year 7 (Wave 1) was 33% (CI, 30%–36%; control schools [C] 31% vs. intervention [I] 36%) and rose to 72% (CI, 70%–75%; C 74% vs. I 71%) in Year 9 (Wave 3). Unadjusted analyses comparing control and intervention conditions revealed that the difference in increase in alcohol use from Wave 1 to Wave 3 did not reach statistical significance (OR, .82; CI, .66–1.02) but was significant after full multivariate adjustment for Wave 1 predictors (adjusted OR [AOR], .78; CI, .62–.97) (Column Series 1 in Table 1).

The first column in Table 1 presents the fully adjusted regression model predicting self-reports of any alcohol use at Wave 3 from risk and protective factors at Wave 1. In the full multivariate analysis, none of the family predictors was significant. Significant risk factors included prior alcohol use, externalizing behavior, and peer predictors.

Rates of frequent alcohol use were 26% (CI, 24%–29%; C 25% vs. I 28%) at Wave 1 and 41% (CI, 38%–43%; C 44% vs. I 37%) at Wave 3. Progression from any to frequent alcohol use from Wave 1 to Wave 3 was significantly reduced in intervention schools relative to control schools (OR, .72; CI, .58–.88), the effect also significant in the fully adjusted model (AOR, .69; CI, .56–.86) (Column Series 2 in Table 1).

Rates of heavy alcohol use were 9% (CI, 8%–11%; C 9% vs. I 9%) at Wave 1 and 23% (CI, 21%–26%; C 25% vs. I 22%) at Wave 3. Progression to heavy alcohol use was significantly reduced for intervention students relative to control students (OR, .79; CI, .63–.99), with this effect maintained in the fully adjusted model (AOR, .75; CI, .60–.94) (Column Series 3 in Table 1).

A series of analyses examined the internal and external validity of the intervention effect estimates. Analyses first examined whether effects were robust using a different analytic strategy. The three alcohol outcome measures were combined into a single continuous measure of level of alcohol use at each wave (0 = no alcohol use; 1 = alcohol use but not recent [none in the past month]; 2 = recent alcohol use; and 3 = heavy [binge] drinking). Multilevel modeling was used across the repeated measures to predict the linear effect of level of alcohol use across the three waves. The findings showed that the intervention did

Table 1
Logistic regression predicting wave 3 alcohol use behaviors from Wave 1 variables

Wave 1 student self-report	%	Any alcohol use		Frequent use		Heavy use	
		OR	95% CI	OR	95% CI	OR	95% CI
Modifiable family predictors							
Intervention school	48	**.78**	**.62–.97**	**.69**	**.56–.86**	**.75**	**.60–.94**
High family attachment	17	.98	.73–1.31	1.16	.88–1.54	1.07	.77–1.49
Poor family management	17	1.28	.90–1.81	1.11	.83–1.47	1.26	.94–1.68
Family conflict	18	.83	.61–1.14	.91	.69–1.19	.91	.66–1.24
Adolescent aggression	17	1.25	.88–1.78	1.07	.79–1.46	1.27	.92–1.74
Family connection to community	10	1.14	.78–1.65	1.39	.97–1.99	**1.89**	**1.27–2.82**
Family connection to school	20	.81	.62–1.06	.85	.65–1.13	.96	.70–1.33
Demographics							
Female	56	1.14	.91–1.42	.99	.80–1.23	**.76**	**.58–.99**
Aged ≥ 13 years	34	**1.23**	**1.00–1.52**	1.15	.96–1.37	**1.25**	**1.02–1.53**
Non-Australian birth	10	**.64**	**.45–.90**	**.47**	**.32–.69**	.73	.48–1.11
No older siblings	38	**.68**	**.56–.83**	**.77**	**.64–.94**	**.58**	**.46–.73**
Indigenous	2	1.03	.45–2.33	1.22	.61–2.47	1.57	.81–3.05
Separated or divorced	22	1.27	.97–1.67	**1.51**	**1.20–1.90**	1.26	.98–1.62
Behavioral predictors							
Alcohol use (lifetime)	33	**3.25**	**2.39–4.43**	**2.27**	**1.78–2.88**	**1.86**	**1.43–2.43**
Cigarette smoker (lifetime)	8	1.41	.72–2.76	1.32	.85–2.04	1.50	.97–2.34
Externalizing behavior	13	**1.74**	**1.11–2.75**	1.19	.87–1.64	1.02	.71–1.45
Adjustment predictors							
Anxious concern	17	.71	.50–1.01	1.01	.75–1.36	**.65**	**.45–.93**
Depressive symptoms	16	.95	.65–1.38	1.06	.74–1.51	1.20	.83–1.75
Negative life events	15	1.23	.86–1.77	1.02	.75–1.38	1.07	.77–1.49
Competence predictors							
Coping	16	1.04	.78–1.39	1.00	.73–1.36	.74	.51–1.07
Social skills	13	.85	.62–1.17	1.15	.83–1.61	1.30	.93–1.82
Emotional control	13	.83	.60–1.15	.85	.61–1.17	.85	.59–1.22
Positive problem solving	13	.94	.69–1.28	.93	.68–1.27	.78	.49–1.24
Negative problem solving	14	.98	.71–1.36	1.10	.82–1.48	**1.63**	**1.16–2.28**
School and peer predictors							
School commitment	21	.82	.62–1.08	.88	.68–1.15	.85	.61–1.18
School rewards	15	.78	.59–1.02	**.69**	**.51–.92**	**.66**	**.45–.96**
Low academic grades	11	.94	.67–1.33	.94	.67–1.31	.95	.68–1.34
School absence	7	.91	.58–1.42	1.16	.78–1.73	1.20	.79–1.83
Low school peer support	15	.87	.64–1.19	.96	.74–1.24	.89	.67–1.20
Bullying	14	.95	.69–1.30	**.69**	**.52–.92**	**.67**	**.47–.96**
Negative non-school peers	14	1.18	.79–1.76	**1.44**	**1.05–1.97**	**1.62**	**1.15–2.28**
School friends' alcohol use	15	1.39	.97–2.00	1.33	.99–1.80	1.24	.91–1.68
School friends' tobacco use	14	**1.62**	**1.12–2.35**	1.06	.76–1.46	1.22	.88–1.70
Number of school friends	15	**1.56**	**1.11–2.18**	**1.40**	**1.06–1.85**	**1.46**	**1.10–1.94**
Significant adult attachment	20	1.21	.90–1.63	1.26	.97–1.63	1.29	.97–1.72

Bold underlined data indicate *p* < .01; bold data indicate *p* < .05. N = 2,354, average of 20 imputed models. Regression was fully adjusted for all variables in the table and for school classroom survey clustering.
CI = confidence interval; OR = odds ratio.

not affect the linear growth trend in the level of alcohol across waves, but significantly affected a nonlinear reduction in alcohol use at Wave 3 (β coefficient, −.13; CI, −.22 to −.03). This was consistent with the finding that adolescent alcohol use was not significantly reduced in the intervention at Wave 2 [22]. Further analyses examined the effect of imputing data for the sections of the sample with missing data. This revealed that findings were similar in imputed and non-imputed analyses, although imputed data provided weaker effect estimates. To perform these analyses, case-wise deletion was used to retain only those who responded to all items at each of the three survey waves. Intervention effects were slightly stronger for all outcomes within this restricted subsample (any alcohol use: OR .76, AOR .71, N = 1,693; frequent use: OR .69, AOR .67, N = 1,618; heavy use: OR .77, AOR .70, N = 1,687) and in the multilevel analysis predicting the continuous outcome (β, −.17; N = 1,736).

To examine external validity, the analytic sample (N = 2,354) was first compared with 2006 Census data for the metropolitan Melbourne population aged 14 and 15 years [34]. The retained analytic sample had lower rates of non-Australian birth (10.2% CI, 8.4%–12.0%), compared with the metropolitan Melbourne youth population (16.5%), a higher proportion female (55.9% CI, 50.6%–61.2% vs. 48.5% Melbourne), Indigenous (1.7% CI, 1.2%–2.3% vs. .7%), and from sole parent (separated or divorced) families (21.5% CI, 19.3%–23.6% vs. 19.1%). The multivariate analysis adjusted for these factors. Analyses were also repeated weighting the sample to the population rates on these four factors. Intervention effects were similar in the weighted sample, although slightly weaker compared with the unweighted analyses. Comparisons were next made with metropolitan IYDS cohorts surveyed in the same school year-levels as the Resilient Families samples. The IYDS cohorts were surveyed in Year 7 in 2002 and 2004 (74% of eligible students recruited) and followed up in Year 9 in 2004 and 2006 (n = 928; 98% retention). Comparisons showed no differences in frequent or heavy alcohol use in Years 7 and 8, which suggests that the recruited Resilient Families intervention and

control samples were similar to metropolitan Melbourne students. However, in Year 9, the IYDS cohorts had higher rates of frequent and heavy use, which suggests that effect sizes would have been larger had the IYDS cohorts been used as the control group.

Discussion

The hypothesis that exposure to the Resilient Families intervention would reduce escalation to frequent and heavy patterns of adolescent alcohol use was supported. High normative levels of alcohol use may be an important factor explaining the finding that many indicators of social relationships (e.g., older siblings, peer exclusion [bullying], a greater number of school friends) functioned as risk factors for alcohol behavior. Consistent with previous research [4], alcohol use in Year 7 was a direct risk factor for continued use into Year 9, and also frequent and heavy use.

Important strengths of the study included longitudinal follow-up of a large secondary school sample and a randomized design to complete a pragmatic trial of intervention effectiveness. An important limitation of the study was the low initial recruitment rate that may undermine the generalizability of the findings. The analytic sample had similar rates of alcohol use in Years 7 and 8 relative to the state-representative IYDS cohorts and to the Australian national school survey (41% past-month use at age 14 years) [35] and intervention effects were maintained in population weighted analyses.

Although all students within each school participated in the teacher-led curriculum, a limitation of the intervention was the low participation in the parent education components [20]. Although each school alerted parents that copies were available at the school, the handbook for parents and caregivers could be mailed only to just over half the parents who provided contact information. A minority of parents participated in the brief parent education evening (12%) or the extended parent education sessions (6%). Because of low response from parents, the program failed to implement an initiative for parents to exchange contact information [20].

The present analysis was designed to examine whether exposure to the intervention was associated with a reduced likelihood of a range of adolescent alcohol use behaviors. Because the study was not designed to randomly assign participants to the intervention components, consideration of the critical intervention components that contributed to reducing adolescent alcohol use must be guided by the intervention theory. In the following section, the three main intervention elements that were purposely designed to reduce adolescent alcohol use are discussed.

First, the teacher-led student curriculum and parent interventions were designed to increase the cumulative number of student protective factors [10]. A previous analysis of the Wave 2 data (Year 8, surveyed in 2005) reported that intervention students had improved family attachment and school rewards, and reduced school absence and a trend to lower alcohol use [22]; and prior studies suggested [10] that these improvements predict subsequent reductions in adolescent alcohol misuse.

Second, the intervention encouraged parents to set firmer rules to discourage adolescents from using alcohol. Analysis of parents providing two waves of survey data ($n = 774$) revealed that 32% of parents allowed their adolescent to use alcohol at home in Wave 1 before the intervention, with no differences in the control or intervention schools. In Wave 2 after the

intervention, this had increased to 43% of parents in control schools, with significantly lower rates ($p < .05$) in the intervention schools (35%) [36].

Finally, by running parent education as group events within the schools, the intervention sought to use informal social networks to encourage the dissemination of intervention information from attending to non-attending families [19]. Analyses in the present sample revealed that Wave 3 reductions in adolescent frequent alcohol use and changes in parent alcohol rules showed the strongest effects in families in which parents attended education events, but were also evident amongst non-attendees. Compared with parents in the control schools, the largest reductions in adolescent reports of frequent alcohol use were evident in families attending parent education events (OR, .64; CI, .44–.94), but effects were also significant for families that did not directly attend (OR, .73; CI, .59–.90). Compared with parents in the control schools, the largest reductions in Wave 2 parent reports of allowing adolescent alcohol use at home were evident for parents directly attending parent education (OR, .56; CI, .30–1.00), but were also significant for those not directly attending (OR, .63; CI, .42–.94).

Within families volunteering to participate in the evaluation, the Resilient Families intervention was associated with significant school-wide reductions across a variety of student alcohol use behavior. The findings support the potential utility of implementing and evaluating similar secondary school programs.

Acknowledgments

References

[1] Toumbourou JW, Stockwell T, Neighbors C, et al. Interventions to reduce harm associated with adolescent substance use. Lancet 2007;369: 1391–401.

[2] Brook DW, Brook JS, Zhang CS, et al. Drug use and the risk of major depressive disorder, alcohol dependence, and substance use disorders. Arch Gen Psychiatry 2002;59:1039–44.

[3] Guo J, Hawkins JD, Hill KG, et al. Childhood and adolescent predictors of alcohol abuse and dependence in young adulthood. J Stud Alcohol 2001;62: 754–62.

[4] Fergusson DM, Horwood LJ, Lynskey MT. The prevalence and risk factors associated with abusive or hazardous alcohol consumption in 16-year-olds. Addiction 1995;90:935–46.

[5] Bonomo YA, Bowes G, Coffey C, et al. Teenage drinking and the onset of alcohol dependence: A cohort study over seven years. Addiction 2004;99: 1520–8.

[6] Grant BF, Dawson DA. Age at onset of alcohol use and its association with DSM-IV alcohol abuse and dependence: Results from the National Longitudinal Alcohol Epidemiologic Survey. J Subst Abuse 1997;9:103–10.

[7] McCambridge J, McAlaney J, Rowe R. Adult consequences of late adolescent alcohol consumption: A systematic review of cohort studies. PLoS Med 2011;8:e1000413.

[8] White AM, Swartzwelder HS. Age-related effects of alcohol on memory and memory-related brain function in adolescents and adults. Recent Dev Alcohol 2005;17:161–76.

[9] Bond L, Toumbourou JW, Thomas L, et al. Individual, family, school, and community risk and protective factors for depressive symptoms in adolescents: A comparison of risk profiles for substance use and depressive symptoms. Prev Sci 2005;6:73–88.

[10] Toumbourou JW, Catalano R. Preventing harmful substance use: The evidence base for policy and practice. In: Stockwell T, Gruenewald P, Toumbourou JW, et al., eds. Predicting developmentally harmful substance use. London, UK: Wiley; 2005:53–66.

[11] Patton GC, Bond L, Carlin JB, et al. Promoting social inclusion in schools: A group-randomized trial of effects on student health risk behavior and well-being. Am J Public Health 2006;96:1582–7.

[12] Lemstra M, Bennett N, Nannapaneni U, et al. A systematic review of school-based marijuana and alcohol prevention programs targeting adolescents aged 10-15. Addict Res Theory 2010;18:84–96.

[13] Toumbourou JW, Catalano R. Preventing harmful substance use: The evidence base for policy and practice. In: Stockwell T, Gruenewald P, Toumbourou JW, et al., eds. Predicting Developmentally Harmful Substance Use. London, UK: Wiley; 2005, p. 53–66.

[14] Essau CA, Hutchinson DM. Alcohol use, abuse and dependence. In: Essau CA, ed. Adolescent addiction: Epidemiology, assessment and treatment. London, UK: Elsevier; 2008:59–115.

[15] Hayes L, Smart D, Toumbourou JW, et al. Parenting influences on adolescent alcohol use. Melbourne, Australia: Australian Institute of Family Studies; 2004.

[16] Spoth RL, Randall GK, Trudeau L, et al. Substance use outcomes 51/2 years past baseline for partnership-based, family-school preventive interventions. Drug Alcohol Depend 2008;96:57–68.

[17] Kosterman R, Hawkins JD, Spoth R, et al. Effects of a preventive parent-training intervention on observed family interactions: Proximal outcomes from preparing for the drug free years. J Commun Psychol 1997; 25:337–52.

[18] Latendresse SJ, Rose RJ, Viken RJ, et al. Parenting mechanisms in links between parents' and adolescents' alcohol use behaviors. Alcohol Clin Exp Res 2008;32:322–30.

[19] Toumbourou JW, Gregg ME. Impact of an empowerment-based parent education program on the reduction of youth suicide risk factors. J Adolesc Health 2002;31:277–85.

[20] Shortt AL, Toumbourou JW, Chapman R, et al. The Resilient Families Program: Promoting health and wellbeing in adolescents and their parents during the transition to secondary school. Youth Studies Australia 2006:33–40.

[21] Heerde JA. Temporal patterns and psychosocial consequences of adolescent help-seeking behaviour [published online ahead of print April 8, 2013]. Int J Adolesc Youth doi:10.1080/02673843.2013.767744.

[22] Shortt AL, Hutchinson DM, Chapman R, et al. Family, school, peer and individual influences on early adolescent alcohol use: First-year impact of the Resilient Families programme. Drug Alcohol Rev 2007;26:625–34.

[23] Zwarenstein M, Treweek S, Gagnier JJ, et al. Improving the reporting of pragmatic trials: An extension of the CONSORT statement. BMJ 2008;337: a2390.

[24] McMorris BJ, Hemphill SA, Toumbourou JW, et al. Prevalence of substance use and delinquent behavior in adolescents from Victoria, Australia and Washington State, United States. Health Educ Behav 2007;34:634–50.

[25] Royston P. Multiple imputation of missing values: Update. Stata J 2005;5: 188–201.

[26] Beyers JM, Toumbourou JW, Catalano RF, et al. A cross-national comparison of risk and protective factors for adolescent substance use: The United States and Australia. J Adolesc Health 2004;35:3–16.

[27] Straus MA. Measuring intra-family conflict and violence—Conflict Tactics (Ct) scales. J Marriage Fam 1979;41:75–88.

[28] Goodman R. Psychometric properties of the strengths and difficulties questionnaire. J Am Acad Child Adolesc Psychiatry 2001;40:1337–45.

[29] Arthur MW, Hawkins JD, Pollard JA, et al. Measuring risk and protective factors for substance use, delinquency, and other adolescent problem behaviors: The Communities That Care Youth Survey. Eval Rev 2002;26: 575–601.

[30] Spence SH. A measure of anxiety symptoms among children. Behav Res Ther 1998;36:545–66.

[31] Radloff LS. The use of the Center for Epidemiologic Studies Depression Scale in adolescents and young-adults. J Youth Adolescence 1991;20: 149–66.

[32] Causey DL, Dubow EF. Development of a self-report coping measure for elementary-school-children. J Clin Child Psychol 1992;21:47–59.

[33] D'Zurilla TJ, Nezu AM, Maydeu-Olivares A. Social Problem-Solving Inventory-Revised (SPS1-R). North Tonawanda (NY): Multi-Health Systems; 2002.

[34] Australian Bureau of Statistics. 2006 Census, Statistical division tables, Catalog Number 2920.0. Canberra, Australia: Australian Bureau of Statistics; 2006.

[35] White HR, Hayman J. Australian secondary school students' use of alcohol in 2005. Canberra, Australia: Australian Government Department of Health and Ageing; 2006.

[36] Cheng C. Impact on adolescent adjustment of family intervention for youth substance use problems. Melbourne, Australia: Deakin University; 2009.