Continuing Education

# The Association of Extracurricular Activity Participation with Substance Use Among Youth in the DARE Plus Project

*Alissa Eischens, Kelli A. Komro, Cheryl L. Perry, Linda M. Bosma, and Kian Farbakhsh*

**ABSTRACT**

*The Minnesota Drug Abuse Resistance Education (DARE) Plus project augmented the DARE curriculum with community, parent involvement, and extracurricular activity components. Of the 24 schools in the DARE Plus project, the 8 receiving the DARE Plus intervention are examined in this study. The association of participation in the extracurricular activities component of the DARE Plus project with adolescent substance use is investigated. The intervention targeted the class of 2005 from seventh to eighth grade (1999–2001). As part of the intervention, students participated in extracurricular activities planned by peer leaders, and annual surveys measured substance use and psychosocial outcomes. After 2 years students overall and boys participating in extracurricular activities had significantly less alcohol use and fewer intentions to use alcohol than did nonparticipants. Asian American participants had significantly less tobacco use and fewer intentions to use tobacco compared with nonparticipants. The results suggest an association between extracurricular activity participation in DARE Plus and lower rates of substance use, especially among boys, and suggest that such participation can be helpful for youth of varying ethnicities. Further research is needed to more rigorously evaluate this association using an experimental design.*

Adolescent substance use is a serious public health problem and is associated with school problems, risky sexual behavior, delinquent behavior, and impairments in social, psychological, and physical development; it also puts young people at risk for future substance abuse problems (Grunbaum et al., 2002; Johnston, O'Malley, & Bachman, 2001; Substance Abuse and Mental Health Services Administration, 2000). Alcohol is the most widely used substance among youth in the United States, followed by tobacco and marijuana. In 2001, 78.2% of high school students reported ever having used alcohol, 63.9% reported ever having used cigarettes, and 42.4% reported ever having used marijuana (Grunbaum et al., 2002; Johnston et al., 2001). Boys consume more alcohol, tobacco, and marijuana than do girls. American Indian, White, and Hispanic youth tend to have higher rates of substance use, whereas Asian Americans and African Americans tend to have lower rates of substance use, although smoking among Asian American youth increases rapidly during the high school years (Appleyard, Messeri, & Haviland, 2001; Grunbaum et al., 2002; Wallace et al., 2002; Welte, Barnes, Hoffman, & Dintcheff, 1999). The theory of triadic influence explains youth substance use as a result of social,

*Alissa Eischens, MPH, Kelli A. Komro, MPH, PhD, Cheryl L. Perry, PhD, Linda M. Bosma, MA, and Kian Farbakhsh, MA, are with the Division of Epidemiology, School of Public Health, University of Minnesota, 1300 S. Second Street, Suite 300, Minneapolis, MN 55454. E-mail: Komro@epi.umn.edu.*

environmental, and intrapersonal factors or causes (Flay & Petraitis, 1994). This theory recognizes that adolescents' social influences contribute to their normative beliefs about substance use (Beauvais & Oetting, 2002; Epstein, Botvin, & Diaz, 1999; Hussong, 2002), that the cultural environment shapes attitudes about substance use (Wagenaar & Perry, 1994), and that personal factors such as social skills and sense of self contribute to self-efficacy in avoiding substance use (Gaffney, Thorpe, Young, Collett, & Occhipini, 1998; Lifrak, McKay, Rostain, Alterman, & O'Brien, 1997). It also recognizes that a single factor can impact many outcomes; for example, social influences can shape normative beliefs as well as impact self-esteem or expectancies about substance use. Normative beliefs, attitudes, and self-efficacy influence the decision and intention to use substances, which in turn impacts the factors that contribute to use and may promote further substance use (Flay & Petraitis, 1994). In addition to the influences of the social environment, unsupervised and unstructured discretionary time is a risk factor for substance use among adolescents. Adolescents who are unsupervised after school are at higher risk for substance use, especially if they are unsupervised while "hanging out" compared to being unsupervised at home (Flannery, Williams, & Vazsonyi, 1999). Being unsupervised at home still brings risk, however, as youth in these circumstances have been shown to use significantly more alcohol, cigarettes, and inhalants (Mulhall, Stone, & Stone, 1996).

Peer influence has been shown to be a strong predictor of the onset of alcohol use in boys and girls (Hops, Davis, & Lewin, 1999). Some differences by gender in the etiology of substance use have been found especially among intrapersonal factors. Among boys, higher scholastic competence, athletic competence, self-worth, parental support, and teacher support are associated with less substance use. Among girls, higher scholastic competence, competence in behavioral conduct, social competence, and classmate support are associated with less substance use (Lifrak et al., 1997).

Overall, the factors that contribute to substance use (environmental, social, and intrapersonal) are common among all ethnic groups, with the most universal predictor of substance use being friends who use (Beauvais & Oetting, 2002; Epstein et al., 1999). However, the structure of these factors may vary among ethnic groups. For example, on an environmental level African American youth have been shown to spend significantly more time alone after school than youth of other ethnic groups (Mulhall et al., 1996).

## SUBSTANCE USE PREVENTION EFFORTS TARGETING YOUTH

Substance use prevention programs can be based on or in schools, extracurricular activities, families, communities, or policies (Komro & Toomey, 2002). School-based programs aim to increase knowledge about substance use, improve affect (e.g., self-esteem, feelings, values), or alter peer influence to use substances through peer programs. Family-based programs aim to improve parent–child communication as well as parenting skills such as behavior monitoring and rulemaking. Policy changes seek to intervene at the environmental level, and such changes often arise out of community-based participation and activism. Policies often aim to limit youth access to alcohol such as through raising the minimum legal drinking age or restricting commercial access (Komro & Toomey, 2002). Multilevel programs that include multiple strategies (e.g., school + community + extracurricular activities) and intervene simultaneously on environmental, social, and intrapersonal factors have been shown to be effective (Komro & Toomey, 2002).

Programs that incorporate alternative or extracurricular activities provide substance-free activities that are intended to be more appealing than substance use, and may include efforts to increase drug-free norms as well as increase personal competence through instruction in life skills to enhance youths' internal locus of control. Of the alternative activity program types, peer programs show the strongest effects in increasing knowledge, antisubstance attitudes, and life skills and in reducing substance use, especially if these programs are facilitated by peer leaders (Tobler, 1992). School-based programs based on peer interaction and leadership to deliver information and model and enhance social skills have been shown to be more effective than didactic, information-only programs in preventing substance use. Alternative activity programs are the most effective in influencing behavior and also enhancing life skills and appear to be especially effective for high-risk youth (Komro & Toomey, 2002; Tobler, 1992).

Studies have shown that extracurricular activities and peer involvement are beneficial in slowing the onset of youth substance use (Komro, Perry, Veblen-Mortenson, & Williams, 1994; Komro, et al. 1996). When examined via the theory of triadic influence (Flay & Petraitis, 1994), substance-free extracurricular activities can serve to modify the social environment to promote nonuse norms as well as social bonding among nonusing peers, and provide both positive peer and adult role models. Youth who participate in extracurricular activities can be part of a culture that values nonuse and expects that supervised, substance-free activities are preferable to activities that include substance use. Extracurricular activities can also provide a way for youths to improve their social skills and enhance their sense of self, ultimately increasing their self-efficacy in avoiding substance use.

Successful alternative/extracurricular activity programs most often serve as components of multilevel interventions and are more effective if the alternative activities are enticing, incorporate skill-building, and serve to establish community norms against substance use (Carmona & Stewart, 1996). Participants in extracurricular activity programs have been shown to have higher academic achievement, less substance use, and improved social and emotional skills as a result of their participation (Scott-Little, Hamann, & Jurs, 2002; Simantov, Schoen, & Klein, 2000). Programs that offer out-of-class experiences have been shown to be effective in enhancing

self-esteem; independence; confidence; self-efficacy; self-understanding; assertiveness; internal locus of control; and decision-making. In other words, such programs enhance students' sense of self-control, and these effects appear to be lasting (Hattie, Marsh, Neill, & Richards, 1997). School-based (e.g., sports) and non-school-based extracurricular activity participants have been shown to be significantly less likely than their nonparticipating counterparts to use marijuana, and non-school-based activity participants were also shown to be less likely to use alcohol or to have gotten drunk in the last year. However, school-based activity participation was significantly associated with increased alcohol use. School-based activities may reinforce prouse norms present in schools, but non-school-based activities may foster positive peer and adult relationships, which help to promote healthy behavior (Borden, Donnermeyer, & Scheer, 2001).

Drug Abuse Resistance Education (DARE) is currently the most widely used school drug education program in the United States; most students participate in the elementary-level DARE curriculum taught by police officers (Perry et al., 2003). DARE has not been proven effective in reducing substance use in the long term. At 10-year follow-up no program effects were found regarding drug use, resistance to peer pressure, or self-esteem, meaning that the students receiving the DARE curriculum had no more successful outcomes than did non-DARE recipients (Lynam, et al. 1999). The Minnesota DARE Plus Project included components to augment the middle/junior high school DARE curriculum and enhance DARE's effectiveness (Perry et al., 2000, 2003). It sought to intervene on environmental, social, and intrapersonal factors related to substance use with the ultimate goal of delaying substance use onset among youth. The DARE curriculum, taught by police officers, consisted of 10 classroom sessions focusing on resisting influences to use drugs, negotiating violent situations, and character-building and citizenship skills. In addition to the DARE curriculum, the DARE Plus intervention included a classroom-based, peer-led and parent-involvement program (called "On the VERGE"); neighborhood action teams to address neighborhood and school issues related to multidrug (ATOD) use and violent behavior; and youth-planned extracurricular activities for students. A community organizer was hired in each of the eight schools to organize Youth Action Teams composed of students who planned, implemented, and participated in extracurricular activities, with the goal of creating widespread normative changes promoting nonuse at the school level. Activities were held after school and on weekends, both on and off school property; were supervised by parent and adult volunteers; and included social/recreational, educational, or community service activities (Perry et al., 2000, 2003).

The DARE Plus intervention was shown to be effective for reducing substance use, especially among boys. Boys receiving the DARE Plus intervention were less likely than the controls to increase their alcohol use and intentions, past year and past month alcohol use, tobacco use and intentions, current smoking, and ATOD use and intentions. Girls receiving the DARE Plus intervention were less likely than controls to report an increase in drunkenness. The study investigators noted that at baseline, boys had significantly higher rates of alcohol and marijuana use, significantly fewer decision-making skills and parent rules concerning ATOD use, and significantly less social support and involvement in extracurricular activities compared to girls. The investigators hypothesize that the more positive program effects for boys may have been due to the program's use of predominantly male role models (e.g., male police officers, a male mascot in the "On the VERGE" program) and males' higher susceptibility and receptivity to drug use prevention (Perry et al., 2003).

The purpose of this study was to evaluate the association between involvement in the extracurricular activities component of DARE Plus and substance use and psychosocial outcomes. This study hypothesized that students participating in the extracurricular activities component of the DARE Plus intervention would have lower rates of alcohol, tobacco, and marijuana use compared to nonparticipants. In addition, this study hypothesized that extracurricular activity participants would have increased social skills, social support, and negative attitudes regarding substance use as well as decreased norms supportive of substance use compared to nonparticipants.

## METHODS

### *Study Design*

The Minnesota DARE Plus Project expanded the middle/junior high school DARE curriculum and evaluated whether this expanded program reduced tobacco, alcohol, and marijuana use and violent behavior among seventh and eighth grade students. In all, 24 schools in the Minneapolis/St. Paul metro area participated in the DARE Plus study and were randomized to condition. Of these, 8 schools received only the DARE curriculum, 8 received the DARE Plus intervention, and 8 served as controls (Perry et al., 2003).

Students in the DARE Plus schools planned, implemented, and participated in extracurricular activities of their own design. Eight community organizers assigned to the schools recruited students to form Youth Action Teams to identify, plan, and implement extracurricular activities for students. The Youth Action Teams held their first meetings in January 2000 and continued until May 2001. In addition to activities planned by the Youth Action Teams, a miniproposal funding system was developed to allow students who were not involved in the Youth Action Teams to plan and carry out activities. Adult volunteers (including parents, teachers, and police officers) were recruited to help supervise and implement the activities. Extracurricular activities included social/recreational, educational, and community service opportunities. The association between participation in extracurricular activities and substance use (and psychosocial variables) was examined among students overall, by

gender, and by ethnicity.

*Study Sample*

The sample was comprised of 2,241 students in the eight schools assigned to receive the DARE Plus intervention. The students were in seventh grade during the 1999–2000 school year and eighth grade during the 2000–2001 school year (members of the class of 2005). The sample was 52% male (*N*=1165) and 65% White (*N*=1462). Of the non-White students (*N*=779), 42% were Asian-American; 23% were African-American; 13% were Hispanic; 10% were American Indian; 8% were of mixed ethnicity; and 3% were of unknown ethnicity. At baseline no significant differences between participants and nonparticipants in DARE Plus extracurricular activities were observed for any substance use or psychosocial outcomes. Demographic and baseline information is provided in Table 1.

**Table 1. DARE Plus Extracurricular Activity Study Sample Characteristics**

| Demographic information | Extracurricular Participant *n* | Extracurricular Participant % | Extracurricular Nonparticipant *n* | Extracurricular Nonparticipant % | |
|---|---|---|---|---|---|
| Total students | 1461 | 65 | 780 | 35 | |
| Boys | 742 | 64 | 423 | 36 | |
| Girls | 719 | 67 | 357 | 33 | |
| Whites | 994 | 68 | 468 | 32 | |
| African Americans | 81 | 45 | 58 | 55 | |
| Hispanics | 59 | 58 | 43 | 42 | |
| Asian Americans | 243 | 74 | 157 | 26 | |
| American Indians | 52 | 67 | 26 | 33 | |
| Baseline Measures | Mean ± SD | | Mean ± SD | | p |
| Alcohol: behavior & intentions[a] | 10.8 ± 3.6 | | 10.6 ± 3.5 | | ns |
| Tobacco: behavior & intentions[b] | 7.5 ± 3.3 | | 7.6 ± 3.4 | | ns |
| Marijuana: behavior & intentions[c] | 6.3 ± 1.5 | | 6.4 ± 2.0 | | ns |
| Social skills[d] | 50.1 ± 6.2 | | 49.7 ± 6.3 | | ns |
| Social support[e] | 85.5 ± 15.9 | | 84.3 ± 16.0 | | ns |
| Extracurricular activity participation[f] | 26.7 ± 6.7 | | 25.5 ± 6.0 | | ns |

[a]Range 9–49, higher indicates more use and intentions; α=0.88
[b]Range 6–27, higher indicates more use and intentions; α=0.88
[c]Range 6–26, higher indicates more use and intentions; α=0.91
[d]Range 20–60, higher indicates more social skills; α=0.81
[e]Range 24–120, higher indicates more social support; α=0.90
[f]Range 13–65, higher indicates more involvement; α=0.74

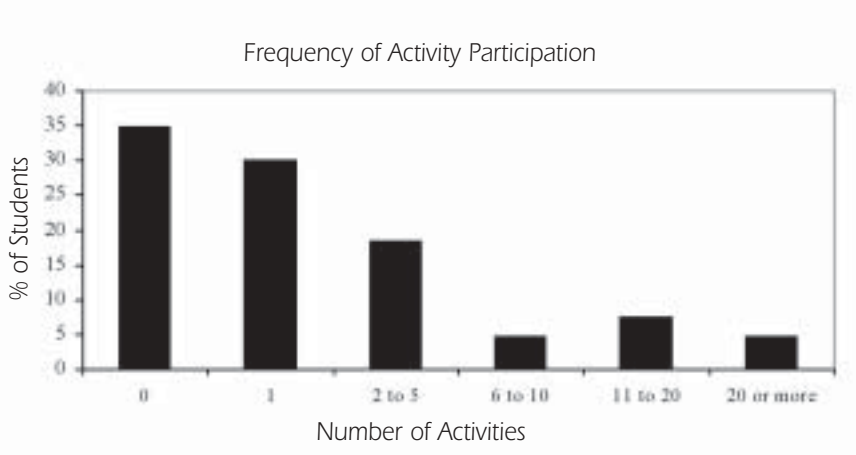
*Evaluation Methods*

Students completed DARE Plus surveys at baseline in fall 1999, in spring 2000, and again in spring 2001. The surveys measured cigarette, alcohol, and marijuana use as well as aggregate ATOD use and psychosocial factors. Alcohol use was measured according to past year use, past month use, and ever having been drunk. Marijuana use was measured according to past year and past month use, whereas cigarette use was measured by amount of current use. Students indicated their level of alcohol and marijuana use on a scale ranging from no use to 40+ occasions of use during the specified time period. Students indicated their level of current tobacco use on a scale ranging from no use to smoking a pack or more of cigarettes per day (Komro, Perry, Munson, Stigler, & Farbakhsh, in press; Perry et al., 2003).

Measures of substance use included alcohol use behavior and intentions (range 9–49, α=.88, higher score indicates more use and intentions to use), tobacco use behavior and intentions (range 6–27, α=.88, higher score indicates more use and intentions to use), and marijuana use behavior and intentions (range 6–26, α=.91, higher score indicates more use and intentions to use). Demographic characteristics such as gender and race/ethnicity were assessed. Psychosocial factors measured included social skills (resistance skills, decision making skills, communication skills; range 20–60, α =.81, higher score indicates more social skills), drug use normative estimates and expectations (range 20–100, α =.87, higher score indicates norms more supportive of use), tobacco-related outcome expectations and expectancies (range 17–51, α=.87, higher score indicates more negative outcome expectations and expectancies), and social support (range 24–120, α=.90, high score indicates more social support). More details about the psychometric properties of these scales can be found in Komro et al. (in press). Self-reported involvement in extracurricular activities was measured by a 13-item scale, measuring the level of involvement in various extracurricular activities, such as homework, music, school clubs, and so forth (range 13–65, α=.74, higher score indicates more involvement in extracurricular activities).

Extracurricular activity participation in the DARE Plus sponsored activities was documented through meeting minutes and participation records from planning meetings and event forms documenting Youth Action Team activities. Incidents of participation were used as the main independent variable. Youth Action Teams conducted 420 meetings and planned and executed 310 activities. A total of 411 miniproposal activities also were funded. Students could both plan and participate in activities; some did both of these, whereas others only planned or only participated. Activities were categorized into three types:

**Figure 1. Frequency of Student Participation in DARE Plus Extracurricular Activities**




Mean number of activities per student: 3.9
Range of activity participation: 0 to 96 activities.

social/recreational, educational, and community service. Of the 721 activities undertaken, most (71%) were social/recreational, followed by educational (23%) and community service (6%).

*Data Analysis*

Activity planning and activity participation were combined into an aggregate "Participation" variable. Students planning or participating in one or more activities were considered participants; those not planning or participating were considered nonparticipants. Data were analyzed using mixed-model linear regression (PROC MIXED). The association between extracurricular activity participation and ATOD use (and psychosocial variables) at follow-up in 2001 were adjusted for baseline measures of these outcomes to help control for self-selection. School membership was treated as a nested random effect to account for the possibility that students within a school might be more alike than students among different schools (Murray, 1998).

## RESULTS

*Participation Rates*

Participation rates are summarized in Table 1 and Figure 1. Of the 2,241 students in the overall sample, 65% participated in and/or planned at least one DARE Plus extracurricular activity. Among 1,165 boys 64% participated, and among 1,076 girls 67% participated. Participation rates for White students ($n$=1,462), African American students ($n$=179), Hispanic students ($n$=101), Asian American students ($n$=330), and American Indian students ($n$=78) were 68, 45, 58, 74, and 67%, respectively.

*Overall Associations*

The associations between participation in DARE Plus extracurricular activities and ATOD and psychosocial variables are presented in Table 2. Among all students, those planning/participating in the DARE Plus extracurricular activities (compared to nonparticipants) were significantly less likely to use or intend to use alcohol and significantly more likely to participate in extracurricular activities overall. Compared to nonparticipants, boys planning/participating in the DARE Plus extracurricular activities were significantly less likely to use or intend to use alcohol ($p$<.05). Compared to nonparticipants, girls planning/participating in the DARE Plus extracurricular activities were significantly more likely to participate in extracurricular activities overall ($p$<.05).

*Associations by Race/Ethnicity*

White students planning/participating in DARE Plus extracurricular activities were significantly more likely to report participation in extracurricular activities overall (nonparticipants $M$=26.0, participants $M$=27.6; $F$=11.78, $p$<.05), but did not show any significant reductions in substance use or gains psychosocially (results not shown in Table 2). Compared to Asian American nonparticipants, Asian American students planning/participating in DARE Plus extracurricular activities were significantly less likely to use or intend to use tobacco (nonparticipants $M$=9.6, participants $M$=9.2; $SD$=4.8; $F$=6.88, $p$<.01) (results not shown in Table 2). When analyzed by gender, participating Asian American boys were significantly less likely to use or intend to use tobacco (nonparticipants $M$=10.4, participants $M$=8.8; $SD$=4.9; $F$=6.74, $p$<.05), but significant associations were not found for girls. When comparing participants and nonparticipants within the other ethnic groups (African American, Hispanic, American Indian), no significant results were found on any of the outcomes measured.

## DISCUSSION

Participation in the DARE Plus extracurricular activities was positively associated with reduced alcohol use and intentions to use alcohol among students in general and among boys when examined by gender. No participation effects on tobacco or marijuana use were demonstrated except among Asian American boys, whose DARE Plus extracurricular activity participation was associated with significantly lower tobacco use. Participants in all groups analyzed were not shown to have significantly greater social skills or social support or decreased pro-use norms compared to nonparticipants.

Although the DARE Plus intervention overall was shown to reduce the increase of tobacco and other drug use among boys (Perry et al., 2003), DARE Plus extracurricular activity participation was not

**Table 2. Associations Between Participation in DARE Plus Extracurricular Activities and Substance Use and Psychosocial Variables Overall and by Gender**

| All Students<br>Dependent variable | Participants (n=1461)<br>Mean ± SD | Nonparticipants (n=780)<br>Mean ± SD | F | p |
|---|---|---|---|---|
| Behaviors | | | | |
| Alcohol: behavior & intentions[a] | 13.0 ± 5.7 | 13.8 ± 6.6 | 4.40 | <.05 |
| Tobacco: behavior & intentions[b] | 8.9 ± 4.7 | 9.5 ± 5.4 | 0.14 | ns |
| Marijuana: behavior & intentions[c] | 7.7 ± 3.8 | 8.1 ± 4.4 | 0.35 | ns |
| Psychosocial | | | | |
| Social skills[d] | 49.9 ± 6.2 | 49.5 ± 6.3 | 0.44 | ns |
| Drug use norms[e] | 41.6 ± 14.8 | 43.2 ± 15.6 | 0.10 | ns |
| Tobacco outcomes[f] | 41.1 ± 7.4 | 40.8 ± 7.7 | 0.12 | ns |
| Social support[g] | 79.4 ± 16.7 | 78.4 ± 16.7 | 0.40 | ns |
| Extracurricular activity participation[h] | 26.9 ± 6.4 | 25.7 ± 6.0 | 7.89 | <.01 |
| **Boys** | Participants (n=742)<br>Mean ± SD | Nonparticipants (n=423)<br>Mean ± SD | F | p |
| Behaviors | | | | |
| Alcohol: behavior & intentions[a] | 13.2 ± 6.0 | 13.7 ± 6.8 | 6.24 | <0.05 |
| Tobacco: behavior & intentions[b] | 8.9 ± 4.7 | 9.0 ± 4.9 | 0.00 | ns |
| Marijuana: behavior & intentions[c] | 8.0 ± 4.2 | 8.0 ± 4.5 | 0.25 | ns |
| Psychosocial | | | | |
| Social skills[d] | 49.4 ± 6.6 | 48.8 ± 6.6 | 0.75 | ns |
| Drug use norms[e] | 42.5 ± 15.1 | 43.2 ± 15.1 | 0.48 | ns |
| Tobacco outcomes[f] | 41.0 ± 7.8 | 41.3 ± 7.5 | 0.24 | ns |
| Social support[g] | 76.8 ± 16.6 | 77.5 ± 17.1 | 0.46 | ns |
| Extracurricular activity participation[h] | 25.6 ± 6.0 | 25.1 ± 5.9 | 0.03 | ns |
| **Girls** | Participants (n=719)<br>Mean ± SD | Nonparticipants (n=357)<br>Mean ± SD | F | p |
| Behaviors | | | | |
| Alcohol: behavior & intentions[a] | 12.8 ± 5.3 | 13.8 ± 6.4 | 0.34 | ns |
| Tobacco: behavior & intentions[b] | 8.9 ± 4.6 | 10.0 ± 5.8 | 0.10 | ns |
| Marijuana: behavior & intentions[c] | 7.4 ± 3.3 | 8.1 ± 4.3 | 1.09 | ns |
| Psychosocial | | | | |
| Social skills[d] | 50.5 ± 5.7 | 50.4 ± 5.7 | 1.82 | ns |
| Drug use norms[e] | 40.6 ± 14.5 | 43.3 ± 16.2 | 0.05 | ns |
| Tobacco outcomes[f] | 41.1 ± 7.1 | 40.2 ± 8.0 | 1.52 | ns |
| Social support[g] | 82.1 ± 16.4 | 79.5 ± 16.3 | 1.95 | ns |
| Extracurricular activity participation[h] | 28.2 ± 6.4 | 26.3 ± 6.0 | 9.94 | <0.01 |

[a]Range 9–49, higher indicates more use and intentions; α=0.88
[b]Range 6–27, higher indicates more use and intentions; α=0.88
[c]Range 6–26, higher indicates more use and intentions; α=0.91
[d]Range 20–60, higher indicates more social skills; α=0.81
[e]Range 20–100, higher indicates more norms supportive of use; α=0.87
[f]Range 17–51, higher indicates more negative outcome expectations and expectancies; α=0.87
[g]Range 24–120, higher indicates more social support; α=0.90
[h]Range 13–65, higher indicates more involvement; α=0.74

significantly associated with reduced tobacco and other drug use among boys overall, suggesting that other components of the DARE Plus program produced the effect. Furthermore, like the overall DARE Plus intervention (Perry et al., 2003), extracurricular activity participation was not associated with lower rates of substance use among girls. Although girls were significantly more likely to participate in extracurricular activities overall, this participation produced almost no detectable positive effects. This finding suggests that even with the added extracurricular activity component, DARE is not an especially effective program to reduce substance use in girls.

Analyses by ethnicity yielded no significant effects on any outcomes measured for African American, Hispanic, or American Indian students. White students who participated in the DARE Plus extracurricular activities were more likely to report participation in extracurricular activities overall, but again, this participation was not associated with positive effects regarding substance use. Encouraging results were found among Asian American boys. Among this group, participants were much less likely to use or intend to use tobacco than were nonparticipants. Significant associations with tobacco-related behavior and intentions were not found among any other group analyzed, suggesting that the extracurricular activities component of DARE Plus may have been particularly appealing to Asian American boys or created a barrier to tobacco use, and suggests that it may be an effective means of reducing use and intentions to use tobacco among the Asian American subgroup.

Previous studies have shown psychosocial benefits resulting from extracurricular activity participation (Hattie et al., 1997; Scott-Little et al., 2002). This study did not demonstrate any significant gains in social skills or social support or reductions in prosubstance use expectancies, or norms based on participation. However, although not significant, results were in the anticipated direction such that participants had more social skills and fewer pro-use norms. In light of the theory of triadic influence (Flay & Petraitis, 1994), this finding suggests that the extracurricular activities component of DARE Plus, although not significantly associated with individual intrapersonal, attitudinal, or social influences, may have had a synergistic effect. Perhaps the nonsignificant psychosocial associations, when combined, may have produced significant reductions in alcohol use.

Taken together, these results suggest that participation in the extracurricular activities component of DARE Plus was associated with a lower rate of alcohol use among participants overall and for boys. And participation was associated with lower rates of tobacco use among Asian American boys as well. These associations were significant after controlling for baseline values, a method used to try to control for selection bias. There was no indication of a significant level of selection bias, because there were no significant differences between participants and nonparticipants on substance use or the psychosocial variables at baseline. The findings of this study support the importance of conducting more rigorous evaluations of student-planned extracurricular activities as a substance use prevention effort.

Future research should seek to further examine the theoretical mechanisms by which involvement in extracurricular activities is associated with lower rates of substance use. In addition, conducting studies in which an extracurricular activity program is the only intervention component could shed light on how extracurricular activity participation impacts youth substance use. Randomly assigning students to participate in extracurricular activities is difficult, and nonrandom assignment can result in self-selection bias. However, randomly assigning schools to receive only extracurricular activity programs would help remove the effects of multiple components such as those found in the DARE Plus project and would allow further insight into the effects of extracurricular activity participation on substance use.

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