

Preventing Alcohol Use Among Late Adolescent Urban Youth: 6-Year Results From a Computer-Based Intervention*

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ABSTRACT. Objective: This study was undertaken to evaluate the efficacy of a skills-based CD-ROM intervention, with and without a parent component, to reduce alcohol use among urban youth at 6-year follow-up. **Method:** At recruitment, 513 youths with a mean age of 10.8 years were randomly assigned to one of three study arms: youth CD-ROM intervention plus parent component, youth CD-ROM intervention only, or control. All youths completed pretest, posttest, and annual follow-up measures. Youths and parents in their respective arms received the initial intervention program between pretest and posttest measures and received booster interventions between each follow-up measure. **Results:** With 80% sample retention at 6-year follow-up, youths in both intervention

arms reported less past-month alcohol and cigarette use and fewer instances of heavy drinking and negative alcohol-related consequences. Despite having similar numbers of drinking peers as youths in the control arm, youths in both intervention arms reported greater alcohol-refusal skills. Only past-month cigarette use differed between the two intervention arms, with youths in the intervention-plus-parent-component arm smoking less than youths in the CD-ROM intervention-only arm. **Conclusions:** Six years after initial intervention, youths who received a culturally tailored, skills-based prevention program had reduced alcohol use and lower rates of related risky behaviors than youths in the control arm. (*J. Stud. Alcohol Drugs*, 71, 535-538, 2010)

ALCOHOL IS THE SUBSTANCE OF CHOICE among adolescents in this country and is associated with social, health, and economic problems (Office of the Surgeon General, 2006). Prevention science has responded to the pervasiveness and sequelae of underage drinking with effective, theory-based programs that delay the onset of alcohol use and reduce alcohol misuse (Komro and Toomey, 2002; Nation et al., 2003; Saltz et al., 2009; Stewart et al., 2005; Wood et al., 2009). Few data exist on the long-term effectiveness of these programs as youths enter the high-risk drinking years of late adolescence (Spath et al., 2008). There are even fewer studies that provide longitudinal data on programs tailored for minority adolescents (Sussman, 2006).

Computers hold promise for being used to remove barriers to prevention program implementation, to engage youths, to improve fidelity, and to reduce costs. Computer interventions have addressed such adolescent health risks as drug use (Schinke et al., 2004a), HIV infection (Di Noia et al., 2004), heavy drinking (Neighbors et al., 2004), and smoking (Pallonen et al., 1998). These promising studies provide short-term data ranging from posttest (Di Noia et al., 2004; Schinke et al., 2004a) to 6-month follow-up (Neighbors et al., 2004; Pallonen et al., 1998). This article reports 6-year study outcomes from a computerized alcohol prevention program aimed at urban youth.

Method

Participants

Youths ($N = 513$) were recruited from community agencies serving impoverished neighborhoods in the New York City area (for recruitment details, see Schinke et al., 2004b). All procedures were approved by Columbia University's Morningside Campus Institutional Review Board. Data from 6-year follow-up include 413 youths (80%) from the initial sample, with a mean age of 17.3 ($SD = 1.11$) years; 53% were Black (53%), 28% were Hispanic, 9% were White, and 10% were of other ethnic-racial groups.

Procedures

Before pretest, youths were randomly assigned by their community-based agency to one of three arms (see Schinke et al., 2004b): CD-ROM plus parent intervention (CDP); CD-ROM only (CD), and control. After pretest, youths in the CDP and CD arms interacted with a 10-session skills-based prevention program guided by social cognitive theory (Bandura, 1986) and problem behavior theory (Jessor, 1987). Following completion of intervention, youths in all three arms were tested again. Parents of youths in the CDP arm received materials at the same time as the youth intervention delivery.

Annual data were collected from all youths at their post-test anniversary. Youths in the CDP and CD arms and parents in the CDP arm received booster material subsequent to annual follow-up measures. More than 90% of youths com-

Received: July 20, 2009. Revision: January 1, 2010.

*This research was supported by National Institute on Alcohol Abuse and Alcoholism grant AA11924.

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pleted the initial 10-session program, and more than 90% of youths completed at least one of the three boosters (62% completed two or more boosters). Adherence rates for initial parent and booster content ranged from 50% (workshop) to 64% (podcast recording).

Six-year follow-up data were available for 413 (80%) of the original 513 youths involved in the clinical trial. Of the 100 youths not included in the analyses, 35 failed to complete the sixth-annual measure during the data collection window, 33 were unavailable because of nonworking contact information (e.g., telephone, email, mailing address), 19 requested to discontinue study participation, and 3 died. Ten youths were removed from analyses because of inconsistent response patterns on the outcome measures.

Measures

Pretest measures were completed at youth's recruitment site. Six-year follow-up data were completed primarily online (55%). Youths without Internet access completed the measures by telephone (35%) or at our research facility (10%). With the exception of alcohol and drug use items below, alpha scores reflect our study data.

Demographic information included youths' age, gender, ethnic-racial group, status of school enrollment, most recent average school grade, and living arrangement. Youth's refusal skills were assessed with items measuring the ease with which youths thought they could refuse offers from a close friend to drink alcohol and use drugs ($\alpha = .84$; Fearnow-Kenney et al., 2002). Another scale (Farrell and White, 1998) assessed peer use by asking youths to report how many of their closest friends consumed alcohol and how many had been drunk in the past month ($\alpha = .91$). For alcohol-related consequences, youths specified how many times in the past month their drinking caused them to get arrested; fight with peers, parents, or others; pass out; destroy property; and harm themselves or others ($\alpha = .71$; Beauvais et al., 2003). Alcohol and drug use items asked youths about past-month substance use (National Center for Chronic Disease Pre-

vention and Health Promotion, Division of Adolescent and School Health, 2006; Monitoring the Future Remote Access Service, 2007).

Data analysis

Program effects were estimated for the CDP and CD versus the control groups and for CDP versus CD groups. Covariates included age, gender, and pretest scores on the outcome variables. Individuals were the units of analysis because analyses controlling for recruitment were identical to those ignoring recruitment site.

Results

Sample

Nonsignificant chi-square values were obtained for analyses of differential attrition by study arm and youth demographic variables (age, gender, race, average school grade). One-way analysis of variance (ANOVA) indicated no difference in outcome measures among attriters and nonattriters at 6-year follow-up. Pretest comparability on demographic and outcome variables was assessed for the 413 youths included in 6-year follow-up (Table 1). One-way ANOVA and chi-square tests revealed no differences across the three study arms on any pretest variable, with the exception of refusal skills ($p < .05$).

Substance use and related outcomes

Table 2 presents results from regression models comparing CDP and CD versus control and CDP versus CD. Compared with youths in the control arm, youths who received intervention (CDP and CD) reported less past-month alcohol use ($B = -1.31, p < .01$), less heavy drinking ($B = -0.57, p < .01$), and less cigarette use ($B = -1.68, p < .05$). Youths in the CDP and CD arms also reported greater alcohol-refusal skills ($B = -0.38, p < .05$) and fewer negative consequences

TABLE 1. Descriptives by arm on the 413 youths available at pretest and 6-year follow-up

Variable	Pretest			6-year follow-up		
	CDP <i>M (SD)</i>	CD <i>M (SD)</i>	Control <i>M (SD)</i>	CDP <i>M (SD)</i>	CD <i>M (SD)</i>	Control <i>M (SD)</i>
Gender, female	0.56 (0.50)	0.50 (0.50)	0.57 (0.50)	0.56 (0.50)	0.50 (0.50)	0.56 (0.50)
Age, years	10.80 (0.99)	10.80 (1.00)	10.90 (1.00)	17.40 (1.09)	17.30 (1.17)	17.40 (1.10)
Alcohol use	0.07 (0.51)	0.01 (0.16)	0.06 (0.35)	1.50 _a (2.65)	1.94 _{a,b} (3.75)	3.02 _b (6.36)
Heavy drinking	0.00 (0.00)	0.01 (0.10)	0.03 (0.20)	0.43 (1.03)	0.73 (2.58)	1.05 (3.12)
Cigarette use	0.14 (1.64)	0.08 (1.11)	0.04 (0.42)	0.60 _a (3.06)	2.72 _b (7.79)	3.20 _b (8.53)
Marijuana use	0.03 (0.41)	0.00 (0.00)	0.03 (0.40)	2.33 (7.23)	2.41 (7.15)	2.50 (7.27)
Refusal skills [§]	1.62 _{a,b} (0.90)	1.51 _a (0.79)	1.80 _b (0.94)	2.64 _{a,b} (1.51)	2.41 _a (1.64)	2.94 _b (1.70)
Peer alcohol use [†]	1.11 (0.38)	1.10 (0.57)	1.21 (0.57)	2.22 (0.80)	2.23 (0.86)	2.35 (0.96)

Notes: CDP = CD-ROM and parent component arm; CD = CD-ROM only arm. Sample sizes are 130, 152, and 131, for CDP, CD, and control arm, respectively. Mean substance-use scores represent number of occasions of past-month use. Means with different subscripts differ at $p < .05$ across arms and within measurement occasions. [§]Six-point scale, lower scores are better; [†]four-point scale, lower scores are better.

TABLE 2. Unstandardized regression estimates of program effects at 6-year follow-up ($n = 413$)

Variable	30-day substance use						
	Alcohol <i>B</i> (<i>SE</i>)	Heavy drinking <i>B</i> (<i>SE</i>)	Cigarettes <i>B</i> (<i>SE</i>)	Marijuana <i>B</i> (<i>SE</i>)	Refusal skills <i>B</i> (<i>SE</i>)	Peer use <i>B</i> (<i>SE</i>)	Alcohol consequences <i>B</i> (<i>SE</i>)
CDP vs. CD [§]	-0.53 (0.54)	-0.18 (0.24)	-2.50** (0.82)	-0.27 (0.86)	0.21 (0.20)	-0.01 (0.11)	-0.16 (0.13)
CDP and CD vs. control [†]	-1.31** (0.48)	-0.57** (0.21)	-1.68* (0.72)	-0.30 (0.76)	-0.38* (0.17)	-0.13 (0.09)	-0.26* (0.11)
Age	0.65** (0.33)	0.20* (0.09)	0.91** (0.30)	0.20 (0.31)	0.93 (0.07)	0.09 (0.04)	-0.01 (0.11)
Female	0.38 (0.66)	-0.29 (0.20)	0.61 (0.67)	-0.76 (0.70)	0.11 (0.16)	0.19 (0.09)	-0.05 (0.05)
Pretest scores	0.25 (0.63)	0.74** (0.28)	-0.48 (1.27)	-0.54 (1.43)	0.10 (0.09)	-0.10 (0.10)	—

Notes: CDP = CD-ROM and parent component arm; CD = CD-ROM only arm. [§]Contrast code = 0.5, -0.5, 0.0 for conditions CDP, CD, control, respectively;

[†]contrast code = 1.0, 1.0, 0.0 for conditions CDP, CD, control, respectively.

* $p < .05$; ** $p < .01$.

related to alcohol ($B = -0.26$, $p < .05$) compared with youths in the control arm. Effect size estimates (Cohen, 1988) for significant outcomes are as follows: past-month alcohol use ($d = 0.29$), heavy drinking ($d = 0.19$), cigarette use ($d = 0.23$), refusal skills ($d = 0.26$), and negative consequences related to alcohol ($d = 0.25$). Only past-month cigarette use differed for youths in the CDP arm versus the CD arm, with youths in the CDP arm reporting fewer cigarettes smoked than youths in the CD arm ($B = -2.50$, $p < .01$); the estimated effect size was $d = 0.40$.

Discussion

This study provides long-term follow-up data on a technology-based prevention program tailored for minority urban youth who have entered the high-risk years for alcohol and substance use. Findings suggest that 6 years following receipt of a computer-based prevention program, youths had lower rates of past-month drinking, heavy drinking, and cigarette use relative to their peers in the control arm. Youths in the intervention arms also reported greater alcohol-refusal skills despite having similar numbers of friends who drink alcohol, and they reported fewer incidences of negative alcohol-related consequences. These data mirror other studies to underscore the promise of computer-based approaches to alcohol prevention (Bersamin et al., 2007; Neighbors et al., 2004).

Despite barriers to retention that attend longitudinal studies, 6-year follow-up data were collected from more than 80% of the original sample. Rates of attrition among arms were comparable in demographic and pretest outcome variables among attriters and nonattriters.

In light of research indicating modest but continued effects of positive parental influences on older adolescents' reduced alcohol use (Ichiyama et al., 2009; Turrisi et al., 2001), the absence of differences in outcomes between intervention-arm youths whose parents received materials and those whose parents did not deserves scrutiny. We hypothesize three explanations, likely working in tandem: (a)

the annual parent boosters provided insufficient dosage to increase parent-child relations, (b) our efforts to minimize barriers to participation ultimately yielded didactic and knowledge-based only materials (videos, podcasts), and (c) the initially modest parent-arm effects (Schinke et al. 2004b) have waned over the years.

Study limitations warrant attention. Self-report data are drawn from urban youth residing predominantly in the Northeast. Intervention materials were commensurately tailored for such an audience and may not appeal to or resonate with youths who differ with respect to geographic region, socioeconomic status, or other demographics. Pretest scores on alcohol and substance use were low, owing to youths' young recruitment age. Youths who discontinued participation, who were lost at follow-up, or who refused to complete follow-up may differ from youths who maintained study participation in ways undetectable from available pretest data. Albeit significant and comparable to results from rigorously tested interactive prevention programs (Tobler et al., 2000), the magnitude of the program effects for past-month substance use and related risk factors (ranging from .19 to .29) were small (Cohen, 1988).

Despite these limitations, 6-year follow-up data provide support for the sustained effects of a skills-based, CD-ROM prevention program to reduce alcohol use and related risky behaviors among urban youth. The persistence of program effects during late adolescence when youths are at increased risk for alcohol use augurs well for the computer intervention. That the majority of the original sample was included in the analyses nearly 7 years after pretest also lends credence to the viability of intervention procedures and the credibility of the findings.

It may prove advantageous for future research to continue to explore testing of computer-based approaches with more sophisticated study designs, including, for example, comparison with standard prevention curricula. Isolation of booster session effects also warrants additional study. Questions about the wide-scale applicability of computer approaches also beg for original research.

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