Published in final edited form as:
Addict Behav. 2009 December ; 34(12): 1060–1064. doi:10.1016/j.addbeh.2009.06.007.

Preventing Substance Use among Adolescent Girls:

1-Year Outcomes of a Computerized, Mother-Daughter Program

Steven P. Schinke[a], **Lin Fang**[b], and **Kristin C. Cole**[a]

[a]School of Social Work, Columbia University, 1255 Amsterdam Avenue, New York, NY 10027, USA. Email addresses: Steven Schinke, schinke@columbia.edu; Kristin Cole, kcc3@columbia.edu

[b]Factor-Inwentash Faculty of Social Work, University of Toronto, 246 Bloor Street West, Toronto, ON, M5S 1A1, Canada. Email: lin.fang@utoronto.ca

Abstract

This study tested a computerized gender-specific, parent-involvement intervention program grounded in family interaction theory and aimed at preventing substance use among adolescent girls. Following program delivery and 1 year later, girls randomly assigned to the intervention arm improved more than girls in a control arm on variables associated with reduced risks for substance use, including communication with their mothers, knowledge of family rules about substance use, awareness of parental monitoring of their discretionary time, non-acceptance of peer substance use, problem-solving skills, and ability to refuse peer pressure to use substances. Relative to control-arm girls, those in the intervention arm also reported less 30-day use of alcohol and marijuana and lower intentions to smoke, drink, and take illicit drugs in the future. Girls' mothers in the intervention arm reported greater improvements after the program and relative to control-arm mothers in their communication with their daughters, establishment of family rules about substance use, and monitoring of their daughters' discretionary time. Study findings lend support to the potential of gender-specific, parent-involvement, and computerized approaches to preventing substance use among adolescent girls.

Keywords

adolescent girls; substance use; prevention programming; family approaches

1. Introduction

Rates of substance use for girls are approaching and, in some instances, surpassing rates for boys (National Center on Addiction and Substance Abuse, 2006). Teenaged girls use more illicit prescription drugs, inhalants, and methamphetamines than teenaged boys, and girls' alcohol consumption patterns are similarly closing the gender gap (Embry, Hankins, Biglan, & Boles, 2009; Newes-Adeyi, Chen, Williams, & Faden, 2007; Office of National Drug Control Policy, 2007). Contrary to recent trends, American girls are not reducing their cigarette

Corresponding author: Steven Schinke; Tel: 1* 860 355-8335.

use (Wallace et al., 2003). Once girls start using harmful substances, they are more likely than boys to become dependent (National Center on Addiction and Substance Abuse, 2003).

Health risks from substance use also differ by gender. Tobacco and alcohol use are associated with eating disorders among girls (Weiss, Merrill, & Gritz, 2007). Drinking and marijuana use by girls increases the likelihood of their having unprotected sex (Hoggart, 2006). Girls who use substances are not only vulnerable to unintended pregnancy, STIs, and HIV infection, but also to sexual assault and date rape (American Medical Association, 2004; Waller et al., 2006). To reverse these disquieting trends, gender-specific approaches are needed to prevent substance use among adolescent girls.

Investigators have begun to address this need, and the resulting programs show potential (Elliot et al., 2008; Schinke, Di Noia, Schwinn, & Cole, 2006; Schinke & Schwinn, 2005; Weiss & Nicholson, 1998). Still lacking, however, are gender-specific approaches grounded in theory, supported by longitudinal data, and designed to reach girls in a user-friendly, inexpensive manner (Wetherington, 2007).

Computer-based interventions offer promise for the development of such approaches (Elliott, Carey, & Bolles, 2008; Portnoy, Scott-Sheldon, Johnson, & Carey, 2008; Prokhorov et al., 2008). Holding particular attraction for technology savvy adolescents, computer interventions let users access and navigate program content at their own pace. These interventions also permit developmentally and culturally tailored audio, animation, graphics, and video. Protocol fidelity, portability, ease of use, low variable costs, and data storage are added desirable characteristics of computer-mediated programs.

Conducted in 2006 - 2008, the present study sought to exploit the advantages of computer-mediated prevention programming for reducing substance use among adolescent girls. Informed by family interaction theory, the program focused on reducing risk factors and, concurrently, on building protective factors associated with the prevention of smoking, drinking, and illicit drug taking by adolescent girls (Brook, Brook, Gordon, Whiteman, & Cohen, 1990). Family interaction theory focuses on parent-child attachment, especially that between mother and child. If mothers have warm, nurturing relationships with their daughters, according to the theory, girls may be less likely to use harmful substances. Conversely, if mothers fail to supervise and support their daughters, girls may attach to their peers, particularly to deviant ones. Theoretically, the risks of adolescent substance use can be vitiated by fostering parent-child attachment, supervision, and support. When mothers model controlled behavior, girls will feel less frustrated, aggressive, and rebellious, and will identify more with their mothers, thereby incorporating parental values and behavior.

2. Methods

2.1. Participants

Recruited through advertisements posted in local newspapers, online, in subway trains and buses, and broadcast on the radio, study participants were 591 pairs of adolescent girls and their mothers from New York, New Jersey, and Connecticut. Girls and mothers who responded to the advertisements were screened on three eligibility criteria: 1) both members of the mother-daughter dyad needed to commit to study participation, 2) girls had to be 11, 12, or 13 years of age, and 3) girls and mothers needed private access to a personal computer. For study purposes, girls' "mothers" included not only their biological mothers, but also women who assumed the mother role - e.g., aunts, grandmothers, stepmothers, and legal guardians.

Eligible girls assented to participate and obtained parental permission, and mothers consented to participate. The research protocol was approved by the Columbia University Morningside Campus Institutional Review Board

2.2. Procedure

Once enrolled, each study participant was provided a username and password and directed to the study website. There, participants completed online self-administered baseline measures. Mother-daughter dyads were then randomly divided between intervention and control arms, with more dyads assigned to the control arm owing to the disproportionate likelihood of these participants leaving the study prematurely. Intervention-arm girls and mothers received a nine-session, computer-delivered substance use prevention program. Control-arm girls and mothers received no intervention. All participants completed online post-intervention and 1-year follow-up measurements.

After control-arm participants completed outcome measures at each data collection occasion and after intervention-arm participants completed the entire intervention program and outcome measures, each girl and each mother received an incentive. Distributed online as coupons or gift certificates for merchants of participants' choosing, individual incentives at the three measurement occasions were respectively valued at $20, $25, and $30.

2.3. Measures

For girls and mothers, baseline, post-intervention, and follow-up measures were composite questionnaires comprised of scales from extant instruments. Primary outcomes for the study were assessed by scales asking girls to report their use of cigarettes, alcohol, marijuana, and prescription and over-the-counter drugs for nonmedical purposes over the past 30 days (Rocky Mountain Behavioral Institute, 2003; $\alpha = .72 - .94$). Secondary outcomes for girls were measured by scales on mother-daughter communication (Melby et al., 1998; $\alpha = .80 - .84$), family rules about children's substance use (Komro et al., 2006; $\alpha = .77 - .83$), awareness of parent monitoring of girls' discretionary time (Li, Feigelman, & Stanton, 2000; $\alpha = .77$), accuracy of knowledge about peer norms regarding substance use (Oetting, Beauvais, Edwards, & Waters, 1987; $\alpha = .82$), depression (Kovacs, 1992; $\alpha = .79 - .81$), problem-solving skills (Heppner & Peterson, 1982; $\alpha = .82$), body esteem (Harter, 1988; $\alpha = .80 - .86$), drug refusal self-efficacy (Macaulay, Griffin, & Botvin, 2002; $\alpha = .83 - .85$), and intentions to use cigarettes, alcohol, or illicit drugs in the future (Hansen, 1996; $\alpha = .84$).

Additional secondary outcomes were assessed for mothers by scales that measured their mother-daughter communication (Melby et al., 1998; $\alpha = .74 - .76$), establishment of family rules about their children's substance use (Komro et al., 2006; $\alpha = .74$), and monitoring of their daughters' discretionary time (Gorman-Smith, Tolan, Zelli, & Huesman, 1996; $\alpha = .82$).

2.4. Intervention

Guided by family interaction theory, the intervention program aimed to reduce girls' substance use through mother-daughter interactions. The program helped mothers learn to better communicate with their daughters, monitor their daughters' behavior and activities, build their daughters' self-image and self-esteem, establish rules about and consequences for substance use, create family rituals, and refrain from communicating unrealistic expectations. In the program, girls acquired skills for managing stress, conflict, and mood, for refusing peer pressure, and for enhancing body esteem and self-efficacy.

Working together in their homes and at times convenient to them, mother-daughter dyads interacted with the program's nine sessions. Though participants were advised to complete one session per week, completion time varied somewhat. On average, participants required roughly

45 minutes to complete each intervention session. Session content was delivered by voice-over narration, skills demonstrations, and interactive exercises for mothers and daughters to complete jointly.

In an illustrative session, girls and mothers learned about managing their moods and employing adaptive ways to reduce stress. Session material covered the importance of interpersonal relationships as a source of emotional support for girls and how interpersonal stress may threaten emotional well-being. Through animated vignettes and video demonstrations, girls and mothers learned how depression can result from stress, pressure to succeed, or to look a certain way. An interactive activity in this session emphasized the importance of valuing personal character and accomplishments. Thus, girls matched puzzle pieces depicting their accomplishments and talents with parts of their bodies. For example, a girl could have selected "I am good at sports" from a list of possibilities. She would have then dragged that item to the feet of her animated character representation. If she selected "I am good at drawing," she would have dragged that item to the hands of her animated character. Toward enhancing girls' emotional closeness to their mothers, session content urged mothers and daughters to plan a special day together. To help girls and mothers develop the plan, the program listed various ideas and a suggested schedule. Another activity in this session asked girls and mothers to share difficult feelings with each other. The program then illustrated healthy, supportive ways to process those difficult feelings.

The fidelity of program completion was enhanced in two ways. First, girls and their mothers could only advance to the next session if each of them separately answered correctly questions on the prior session. Second, participants could not access post-intervention and follow-up measures unless they finished all program sessions.

Of the 252 mother-daughter dyads assigned to the intervention arm, 244 (96.8%) completed all program sessions. And, of the eight dyads that failed to complete the entire prevention program, two dyads finished only one session, two completed two sessions, two completed three sessions, one finished four sessions, and one dyad completed five sessions. Demographic and available outcome data did not differ between mother-daughter dyads who completed the program and those who did not.

2.5. Statistical Analysis

Baseline measures between intervention and control arms were compared with *t* tests for continuous variables and with X^2 tests for categorical variables. Adjusted for covariates of girls' and mothers' age, ethnic-racial group membership, and household composition, generalized estimating equations (GEE) tested between-arm differences for repeated measures outcome variables (Zeger & Liang, 1986). Short-term intervention effects were tested by modeling differential change between arms from baseline to post-intervention. To examine overall intervention effects, GEE analyses were repeated across baseline, post-intervention, 1-year follow-up measurements. GEE analyses yielded the Wald X^2 test statistic. The data were analyzed with SPSS 16.0 software.

3. Results

At baseline, the intervention arm contained more White girls and the control arm had more Black girls ($X^2 = 40.27$, 4*df*, $p < .0001$). Intervention-arm girls reported better baseline patterns of communication with their mothers than control-arm girls ($t^2 = -2.25$, 583*df*, $p < .05$). Girls' mothers were older in the intervention arm than in the control arm ($t^2 = -2.1$, 590*df*, $p < .05$). More control-arm mothers were heads of single-parent households, whereas more intervention-arm mothers were in two-parent-headed households ($X^2 = 10.29$, 1*df*, $p < .001$). Rates of girls'

lifetime substance use did not differ between arms for cigarette smoking, drinking, marijuana use, and use of prescription drugs for nonmedical purposes.

At post-intervention and 1-year measurements, respectively, 9 and 50 mother-daughter pairs prematurely left the study. Girls who attrited prior to 1-year follow-up did not differ from nonattriters on measured baseline demographic and available outcome variables.

Summarized in Table 1, changes from baseline to post-intervention and 1-year follow-up measurements favored intervention-arm girls over control-arm girls on communication patterns with their mothers ($X^2 = 9.80$, 1*df*, $p < .01$), knowledge of family rules about substance use ($X^2 = .4.55$, 1*df*, $p < .05$), awareness that their parents were monitoring their discretionary time ($X^2 = 5.57$, 1*df*, $p < .05$), nonacceptance of peer substance use as normative behavior ($X^2 = 5.96$, 1*df*, $p < .05$), ability to refuse peer pressure ($X^2 = 8.14$, 1*df*, $p < .01$), reduced use of alcohol ($X^2 = 6.11$, 1*df*, $p < .05$), marijuana ($X^2 = 6.75$, 1*df*, $p < .01$), and prescriptions and over-the-counter drugs for nonmedical purposes ($X^2 = 12.45$, 1*df*, $p < .0001$), and lower intentions to use tobacco, alcohol, and other drugs in the future ($X^2 = 8.02$, 1*df*, $p < .01$).

Relative to control-arm mothers, intervention-arm mothers reported better post-intervention and 1-year outcomes on measures of communication with their daughters ($X^2 = 9.26$, 1*df*, $p < .01$), rules against their daughters' substance use ($X^2 = 5.41$, 1*df*, $p < .05$), and monitoring of their daughters' out-of-home activities ($X^2 = 21.99$, 1*df*, $p < .0001$).

4. Discussion

Study findings suggest that a computer-delivered, parent-involvement substance use prevention program can effect positive changes in adolescent girls and their mothers. Outcome results showed improvements 1 year after program delivery for intervention-arm girls relative to control-arm girls on variables associated with lower risks for substance use, variables that can protect adolescents against future substance use, current use of alcohol, marijuana, and prescription drugs, and intentions to use tobacco, alcohol, and drugs in the future. Intervention-arm mothers uniformly benefited from the program across all of their measured outcome variables.

At baseline, girls' 9.4% rate of 30-day alcohol use was slightly higher than the national average rate of 8.7% for comparably aged youths (Substance Abuse and Mental Health Services Administration, 2008). By this same comparison, 30-day rates of girls' tobacco and marijuana use (1.5% and 1.9%) were lower than the respective national rates (5.4% and 3.6%). Prescription drug use in our sample of adolescent girls, however, was reported at twice the national rate (7.1% vs. 3.4%).

Over time, girls in both arms increased their cigarette, alcohol, and marijuana use and their intentions to smoke, drink, and use illicit drugs in the future. Due to these increases, differences between arms on girls' reported 30-day substance use are notable. Baseline to 1-year follow-up increases in cigarette, alcohol, and marijuana use for intervention-arm girls were more modest than those for control-arm girls. Whereas nonmedical use of prescriptions rose for girls in the control arm, girls in the intervention arm reported less prescription drug use from baseline to 1-year follow-up. Across the sample, rising rates of substance use implicate developmental effects, given that most girls were approaching age 14 years by time of follow-up. The early teen years are a time of experimentation for adolescents.

The study's limitations include reliance on self-report data, a relatively short follow-up period, and a modestly-sized sample from the American Northeast. Potential confounds of between-arm baseline differences were mitigated by analytic adjustments using girls' and mothers' demographic characteristics. Indeed, more positive 1-year follow-up differences for

intervention-arm participants on 12 of the 16 outcome variables imply that completion of the prevention program exerted salubrious effects on girls and mothers beyond any preexisting within-arm circumstances.

The study's strengths may outweigh its weaknesses. The research adds knowledge on how prevention science can address substance use risks among adolescent girls. Engaging mothers increased the likelihood of tapping a potential source of bonding, positive social support, role modeling, and shared problem solving (Boyd, Ashcraft, & Belgrave, 2006). Delivering intervention by computer may have overcome barriers to enrolling and capturing the attention of busy families - a number of which were headed by one parent. The computer approach was designed to encourage frank discussions about substance use in the privacy and comfort of participants' homes. In these discussions, girls were encouraged to disclose problems and mothers were urged to offer constructive guidance, gained in part from the prevention program. The significance of computer-based and family-oriented intervention approaches is great as more investigators explore this line of gender-specific substance abuse prevention programming.

References

American Medical Association. Girlie drinks: Women's diseases. 2004. Retrieved February 22, 2009, from http://www.alcoholpolicymd.com/pdf/girlie_drinks_survey %20.pdf

Boyd K, Ashcraft A, Belgrave FZ. The impact of mother-daughter and father-daughter relationships on drug refusal self-efficacy among African-American adolescent girls in urban communities. Journal of Black Psychology 2006;32:29–42.

Brook JS, Brook DW, Gordon AS, Whiteman M, Cohen P. The psychological etiology of adolescent drug use: A family interactional approach. Genetic, Social, and General Monographs 1990;116Whole No. 2

Elliott JC, Carey KB, Bolles JR. Computer-based interventions for college drinking: A qualitative review. Addictive Behaviors 2008;33:994–1005. [PubMed: 18538484]

Embry D, Hankins M, Biglan A, Boles S. Behavioral and social correlates of methamphetamine use in a population-based sample of early and later adolescents. Addictive Behaviors 2009;34:343–351. [PubMed: 19138821]

Elliot DL, Goldberg L, Moe EL, DeFrancesco CA, Durham MB, McGinnis W, et al. Long-term outcomes of the ATHENA (Athletes Targeting Healthy Exercise & Nutrition Alternatives) program for female high school athletes. Journal of Alcohol and Drug Education 2008;52:73–92. [PubMed: 19081833]

Gorman-Smith D, Tolan PH, Zelli A, Huesman LR. The relation of family functioning to violence among inner-city minority youth. Journal of Family Psychology 1996;10:115–129.

Hansen WB. Pilot test results comparing the All Stars program with seventh grade D.A.R.E.: Program integrity and mediating variable analysis. Substance Use and Misuse 1996;31:1359–1377. [PubMed: 8879078]

Harter, S. Manual for the Self-Perception Profile for Adolescents. University of Denver; Denver, CO: 1988.

Heppner PP, Peterson CH. The development and implications of a personal problem-solving inventory. Journal of Counseling Psychology 1982;29:66–75.

Hoggart L. Young women and sexual decision-making. Forum: Qualitative Social Research 2006;7article 28

Keselman HJ, Algina J, Kowalchuk RK. The analysis of repeated measures designs: A review. British Journal of Mathematical and Statistical Psychology 2001;54:1–20. [PubMed: 11393894]

Kovacs, M. The Children's Depression Inventory manual. Multi Health Systems; New York: 1992.

Komro KA, Perry CL, Veblen-Mortenson S, Farbakhsh K, Kugler KC, Alfano KA, et al. Cross cultural adaptation and evaluation of a home-based program for alcohol use prevention among urban youth: The Slick Tracy Home Team Program. Journal of Primary Prevention 2006;27:135–154. [PubMed: 16502143]

Li X, Feigelman S, Stanton B. Perceived parental monitoring and health risk behaviors among urban low-income African-American children and adolescents. Journal of Adolescent Health 2000;27:43–48. [PubMed: 10867351]

Macaulay AP, Griffin KW, Botvin GJ. Initial internal reliability and descriptive statistics for a brief assessment tool for the Life Skills Training drug abuse prevention program. Psychological Reports 2002;91:459–462. [PubMed: 12416839]

Melby, JN.; Conger, RD.; Book, R.; Rueter, M.; Lucy, L.; Repinski, D., et al. The Iowa Family Interaction Rating Scales. Vol. 5th edition. Institute for Social & Behavioral Research, Iowa State University; Ames, IA: 1998. Unpublished manuscript

National Center on Addiction and Substance Abuse at Columbia University. The formative years: Pathways to substance abuse among girls and young women ages 8-22. Author; New York: 2003.

National Center on Addiction and Substance Abuse at Columbia University. Women under the influence. Johns Hopkins University Press; Baltimore: 2006.

Newes-Adeyi, GM.; Chen, CM.; Williams, GD.; Faden, VB. Surveillance report #81: Trends in underage drinking in the United States, 1991-2005. National Institute on Alcohol Abuse and Alcoholism; Rockville, MD: 2007.

Oetting, ER.; Beauvais, F.; Edwards, R.; Waters, M. The Drug and Alcohol Assessment System: Book II, instrument development, reliability and validity. Rocky Mountain Behavioral Science Institute; Fort Collins, CO: 1987.

Office of National Drug Control Policy. Women and prescription drugs. 2007. 2007 [Accessed August 31, 2008]. Available at: http://www.whitehousedrugpolicy.gov/drugfact/pdf/043007_women_presc_drgs.pdf

Portnoy DB, Scott-Sheldon LAJ, Johnson B, Carey MP. Computer-delivered interventions for health promotion and behavioral risk reduction: A meta-analysis of 75 randomized controlled trials, 1988-2007. Preventive Medicine 2008;47:3–16. [PubMed: 18403003]

Prokhorov AV, Yost T, Mullin-Jones M, de Moor C, Ford K,H, Marani S, et al. “Look at Your Health”: Outcomes associated with a computer-assisted smoking cessation counseling intervention for community college students. Addictive Behaviors 2008;33:757–771. [PubMed: 18280668]

Rocky Mountain Behavioral Institute. American Drug and Alcohol Survey; Fort Collins, CO: 2003. Retrieved May 5, 2009, from http://www.rmbsi.com/index.htm

Schinke SP, Schwinn TM. Gender-specific computer-intervention for preventing drug abuse among girls. The American Journal of Drug and Alcohol Abuse 2005;31:609–616. [PubMed: 16320437]

Substance Abuse and Mental Health Services Administration. Results from the 2007 National Survey on Drug Use and Health: National findings. Author; Rockville, MD: 2008.

Wallace JM, Bachman JG, O’Malley PM, Schulenberg JE, Cooper SM, Johnston LD. Gender and ethnic differences in smoking, drinking and illicit drug use among American 8th, 10th and 12th grade students, 1976-2000. Addiction 2003;98:225–234. [PubMed: 12534428]

Waller MW, Hallfors DD, Halpern CT, Iritani BJ, Ford CA, Guo G. Gender differences in associations between depressive symptoms and patterns of substance use and risky sexual behavior among a nationally representative sample of U.S. adolescents. Archives of Women’s Mental Health 2006;9:139–150. [PubMed: 16565790]

Weiss JW, Merrill V, Gritz ER. Ethnic variation in the association between weight concern and adolescent smoking. Addictive Behaviors 2007;32:2311–2316. [PubMed: 17307301]

Weiss F, Nicholson H. Friendly PEERsuasion against substance use: The Girls Incorporated model and evaluation. Drugs and Society 1998;12:7–22.

Wetherington CL. Sex-gender differences in drug abuse: A shift in the burden of proof? Experimental and Clinical Psychopharmacology 2007;15:411–417. [PubMed: 17924775]

Zeger SL, Liang KY. Longitudinal data analysis for discrete and continuous outcomes. Biometrics 1986;42:121–130. [PubMed: 3719049]

Table 1

Sample Characteristics and Baseline, Post-Intervention, and 1-Year Outcome Data, by Study Arm

	Baseline			Post-Intervention			1-Year Follow-Up		
Girls	**Program (n = 252) Mean (SD)**	**Control (n = 339) Mean (SD)**	***t* or X^2**	**Program (*n* = 244) Mean (SD)**	**Control (*n* = 338) Mean (SD)**	***Wald* X^{2C}**	**Program (*n* = 205) Mean (SD)**	**Control (*n* = 327) Mean (SD)**	***Wald* X^{2C}**
Age in years	12.64 (0.91)	12.75 (1.20)	1.22						
Ethnicity/Race									
Black	38.9%	56.3%							
White	38.9%	17.1%	40.27^{****}						
Latina	22.2%	26.5%							
Lifetime use									
Cigarettes	4.8%	3.9%	0.27						
Alcohol	34.3%	34.2%	0.0001						
Marijuana	1.6%	3.6%	2.17						
Prescriptions	15.5%	11.1%	2.45						
Outcomes									
Communication	3.00 (1.07)	2.79 (1.21)	-2.25^{*}	3.16 (0.99)	2.70 (1.19)	3.76^{*}	3.12 (1.06)	2.59 (1.17)	9.80^{**}
Family rules	1.52 (0.73)	1.44 (0.68)	-1.33	1.87 (0.36)	1.55 (0.65)	11.00^{***}	1.80 (0.45)	1.51 (0.68)	4.55^{*}
Monitoring	3.50 (0.79)	3.52 (0.87)	0.43	3.66 (0.70)	3.43 (0.87)	7.92^{**}	3.57 (0.76)	3.29 (0.94)	5.57^{*}
Peer drug use[a]	1.57 (1.26)	1.57 (1.26)	-0.001	1.50 (1.13)	2.00 (1.55)	11.11^{***}	1.82 (1.46)	2.57 (1.83)	5.96^{*}
Depression[a]	1.62 (0.77)	1.71 (0.79)	1.49	1.57 (0.79)	1.72 (0.84)	0.59	1.52 (0.84)	1.79 (0.80)	1.25
Problem-solving	2.28 (1.03)	2.22 (1.11)	-0.18	2.29 (1.04)	2.26 (1.11)	4.00	2.54 (1.00)	2.20 (1.06)	1.38
Body esteem	2.91 (1.06)	3.08 (1.08)	1.65	2.97 (1.00)	2.98 (1.02)	0.04	2.94 (1.10)	2.91 (1.07)	0.55
Refusal	3.50 (0.77)	3.58 (0.72)	1.24	3.60 (0.69)	3.43 (0.76)	8.49^{**}	3.52 (0.73)	3.21 (0.87)	8.14^{**}

Girls	Baseline			Post-Intervention			1-Year Follow-Up		
	Program (n = 252)	Control (n = 339)		Program (*n* = 244)	Control (*n* = 338)		Program (*n* = 205)	Control (*n* = 327)	
	Mean (SD)	Mean (SD)	*t* or X^2	Mean (SD)	Mean (SD)	*Wald* X^{2C}	Mean (SD)	Mean (SD)	*Wald* X^{2C}
30-Day Use[b]									
Cigarettes	0.03 (0.24)	0.03 (0.27)	0.1	0.03 (0.43)	0.02 (0.26)	0.55	0.05 0.50)	0.11 (1.08)	0.73
Alcohol	0.15 (0.17)	0.16 (0.31)	1.77	0.14 (0.18)	0.23 (0.50)	1.88	0.17 (0.32)	0.31 (0.61)	6.11*
Marijuana	0.08 (0.01)	0.08 (0.02)	1.37	0.09 (0.02)	0.11 (0.17)	1.04	0.10 (0.13)	0.20 (0.65)	6.75**
Prescriptions	0.21 (0.96)	0.10 (0.47)	-1.6	0.06 (0.60)	0.12 (1.02)	786.32****	0.06 (0.46)	0.17 (1.58)	12.45****
Intentions[a]	1.92 (1.85)	1.94 (2.10)	0.06	1.87 (1.91)	2.47 (2.45)	3.30	2.16 (2.27)	3.04 (2.73)	8.02**
Mothers									
Age in years	41.07 (6.55)	39.94 (6.47)	-2.1*						
Single-parent	39.7%	53.3%	10.29***						
Two-parent	60.3%	46.7%							
Outcomes									
Communication	3.59 (1.98)	3.48 (1.92)	-0.67	3.78 (1.82)	3.69 (1.89)	0.50	3.60 (1.73)	3.16 (1.82)	9.26**
Family rules	3.81 (0.58)	3.78 (0.71)	-0.07	3.93 (0.27)	3.74 (0.70)	1.56	3.85 (0.53)	3.80 (0.55)	5.41*
Monitoring	2.99 (0.91)	2.93 (1.08)	-0.52	3.09 (1.04)	2.79 (1.08)	1.02	3.06 (1.08)	2.46 (1.21)	21.99****

Note. Unless otherwise noted, scores are from 5-item scales where higher scores are better.

[a] Scores are 5 five-item scales where lower scores are better.

[b] Reported use occasions.

[c]Results of generalized estimating equations analyses of time x intervention interactions.

*$p < .05$

**$p < .01$

***$p < .001$

****$p < .0001$.