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Preventing Substance Abuse among Black and Hispanic Adolescent Girls: Results from a Computer-Delivered, Mother-Daughter Intervention Approach

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Abstract

This 2008 study involved 546 Black- and Hispanic-American adolescent girls and their mothers from New York, New Jersey, and Connecticut. Participants provided self-report data. Analysis of covariance indicated that the experimental intervention reduced risk factors, improved protective factors, and lowered girls' alcohol use and their future intentions to use substances. The study supports the value of computer-based and gender-specific interventions that involve girls and mothers. Future work needs to replicate and strengthen study results. Research support came from the National Institute on Drug Abuse within the National Institutes of Health of the United States Public Health Service.

Keywords

Drug use; adolescent girls; computer-delivered prevention programming; family intervention

American girls are smoking cigarettes, drinking alcohol, and illicitly using prescription drugs at disquietingly high rates. Reversing gender-differentiated use patterns that have long favored boys, girls are using a number of harmful substances at levels that equal and are beginning to surpass boys' rates (Neff & Waite, 2007). For the first time in memory, girls and boys report roughly comparable lifetime and 30-day prevalence of illicit drug use, other than marijuana (Wallace et al., 2003). About one in ten (9.2%) teenage girls have taken prescription drugs for non-medical purposes, compared to one in 13 (7.5%) teenage boys (Office of National Drug Control Policy, 2007). Equally alarming, girls aged 12 to 17 years demonstrate greater dependence on and abuse of prescription drugs than their male counterparts. As for alcohol, girls are drinking at younger ages than ever before; among 12-14 year-olds, alcohol use rates are higher for girls than for boys (National Center on Addiction and Substance Abuse, 2006; Pemberton, Colliver, Robbins, & Gfroerer, 2008). Binge drinking is also increasing at a faster rate among girls than among boys (Newes-Adeyi, Chen, Williams, & Faden, 2007). Notwithstanding recent trends toward low cigarette use in the U.S., American girls are showing a slight upsurge in smoking across ethnic-racial groups (Wallace et al., 2003). New approaches to prevent substance use among adolescent girls are needed. Risk and Protective Factors

The development of new prevention approaches for girls must begin with gender-specific risk and protective factors associated with adolescent substance use (Hüsler & Plancherel, 2006; Kashdan, Vetter, & Collins, 2005). Whereas males often smoke, drink, and take drugs

because of social insecurities, girls appear more influenced by stress (Simantov, Schoen, & Klein, 2000). Poor Black girls often live with stress, a condition also implicated in Latinas' substance use (Amaro, Whitaker, Coffman, & Heeren, 1990).

For Hispanic and other American immigrant groups, acculturation can disrupt families as children bridge gaps between two worlds. High acculturation is associated with substance use (Vega & Gil, 1998). Acculturation and stress may influence substance use through the deterioration of Latino family values, attitudes, and familistic behaviors (Buriel, 1993).

Girls are more likely than boys to use substances when concerned about the approval of their peers, particularly about boyfriends' approval (National Center on Addiction and Substance Use, 2003; Rohrbach & Milam, 2002). Low self-esteem and poor self-image – added risks for substance use – are more common among girls than boys (Kumpulainen & Roine, 2002). Self-esteem may be affected by girls' ethnic-racial identity. For example, as Latinas transition through school, their self-esteem appears to fall relative to White and Black girls (Striegel-Moore & Smolak, 2000). Physical appearance concerns, especially those around weight, are inordinately prevalent among girls and are linked with smoking, drinking, and drug taking (Neumark-Sztainer & Hannan, 2000). Weight is a greater preoccupation among White girls than among Black girls, albeit eating problems are on the rise among minority girls (Dounchis, Hayden, & Wilfley, 2001; Halpern, Udry, Campbell, & Suchindran, 1999). Around puberty, girls are vulnerable to depression, another risk factor for their substance use (Needham, 2007; Waller et al., 2006; Tetrault et al., 2008).

Girls' exposure to risk factors does not necessarily result in substance use. Protective factors, particularly from girls' families, can balance and buffer those risks. Authoritative parenting through support and monitoring is linked with children's reduced substance use (Shillington et al., 2005; Simons-Morton & Chen, 2005). Unsurprisingly, the gender of parent and child interact to educe different patterns of parental influence on children. Relative to fathers, mothers typically enjoy greater access to and higher levels of communication with their daughters. For their part, girls – particularly minority girls – identify their mothers as their most important source of health-related information (McKee, Karasz, & Weber, 2004). Indeed, closeness to mothers is fundamental to girls' psychological development (Luthar & Latendresse, 2005). Positive mother-daughter relationships are associated with higher substance use refusal self-efficacy (Boyd, Ashcraft, & Belgrave, 2006). Girls with mothers who practice open, honest, and direct communication are less likely to engage in high-risk behaviors (Mueller & Powers, 2004).

Participating in family activities, as well as parental praise and monitoring, can lower adolescents' substance use risks (Fiese et al., 2002). Girls who regularly eat dinner at home are less likely to use harmful substances than girls denied the consistency of this family ritual (Eisenberg, Neumark-Sztainer, Fulkerson, & Story, in press). Doubtless, girls' positive relationships with their parents can moderate negative peer influences. Clear, consistently enforced rules are protective for girls, as is parental involvement in their lives (Hill, Hawkins, Catalano, Abbott, & Guo, 2005).

Protective factors for girls are also affected by ethnic-racial variables. Whereas Black girls find protection in greater parental control, high religiosity, and greater perceived peer disapproval against substance use, by late adolescence they can experience parental derogation, less supervision, family substance abuse problems, and single-parent living situations (Vega & Gil, 1998). Among Black girls, those entering early adolescence appear to gain protection from greater trust and pride in their family members (Horton & Gil, 2008). Specific to Latinas, familism is an essential protective factor. Strong family ties can protect Latina adolescents from health risks (Brooks, Stuewig, & LeCroy, 1998).

Notwithstanding the risks associated with single-parent families, engaged mothers can compensate for absent fathers and lower their children's substance abuse risk (National Center on Addiction and Substance Abuse, 1999). Economically-stressed single Black mothers who have strong parenting efficacy can raise resilient children (Brody, Flor, & Gibson, 2003).

Family-Based Intervention

Informed by protective factors that implicate family values in reducing substance use risks, responsive prevention programs might profitably involve girls' parents, especially their mothers. Family-based prevention programs have proven efficacious in lowering substance abuse risks among minority- and majority-culture adolescents (Bry & Canby, 1986; Dishion & Kavanagh, 2003; Kumpfer, Molgaard, & Spoth, 1996; McDonald & Sayger, 1998; Spoth, Redmond, & Shin, 2001). Yet, formidable barriers remain to implementing family-centered strategies. One such barrier is cost; another is the difficulty of recruiting and retaining parents. As a result, few families receive the intervention they need to help their adolescent children avoid substance use. Ethnic-racial minority families in America are inordinately deprived of efficacious family-based approaches to substance abuse prevention.

How can family intervention become more widespread? Various solutions have been tried, including school, church, or home programs, small group sessions, and telephone counseling. Such efforts are labor-intensive, and they fail to meet the needs of most families. For family approaches to substance abuse prevention to impact large numbers of parents and adolescents, they must be engaging, affordable, and flexible, meet tight scheduling demands, and demonstrate fidelity. Intervention programs will ideally be available on demand, accessible at home, and delivered in a way that draws in and retains the attention of parents and children. Computer-mediated prevention programming fits these requirements.

Computer-Mediated Prevention Approaches

Though adolescents use computers more than any other age group, scientists have only begun to explore these vehicles as conduits for prevention programming (Rotheram-Borus, 2000; Segal, Chen, Gordon, & Gyls, 2003; Schinke, Schwinn, Di Noia, & Cole, 2004; Schinke, Schwinn, & Ozanian, 2005). Computer-delivered programs allow users to access and navigate content at their own pace. Interactive software content is stimulating and varied and permits skills demonstrations and guided rehearsals. Users can enjoy developmentally and culturally tailored audio, animation, graphics, and video. Branching technology lets users choose material according to their preferences. Participants can interact with content appropriate for their skill levels. Protocol fidelity, portability, ease of use, data storage, and low variable costs are added desirable characteristics of computer-mediated prevention programs.

Nascent data uncover the promise of computer-delivered programs aimed at health behavior among adolescents (Bellis, Grimley, & Alexander, 2002; Duncan, Duncan, Beauchamp, Wells, & Ary, 2000; Evers et al., 2003; Portnoy, Scott-Sheldon, Johnson, & Carey, 2008; Schinke, Cole, & Fang, in press; Schinke, Di Noia, Schwinn, & Cole, 2006). Illustrative are findings that in a sample of more than 4,200 adolescents, 75% of the youths preferred the computer to a live interview (Paperny, 2004). A computer program for preventing violence among youth resulted in increased knowledge and practice of prosocial behaviors (Bosworth, Espelage, Du Bay, Daytner, & Karageorge, 2000). Multimedia has also effectively taught youths complex interpersonal skills and strategies (Copeland, Humphreys, Koski-Jannes, & Cordingley, 2005; Griffiths, 2002). Employing a time-travel adventure game, an HIV prevention program produced gains in knowledge and self-efficacy among youths (Thomas, Cahill, & Santilli, 1997). Two-year follow-up data from a computer

program on AIDS, alcohol and other drug use, body management, sexuality, smoking, and stress management found program youths less likely to engage in risk-taking behaviors than control youths (Bosworth, Gustafson, & Hawkins, 1994). Results from a family-intervention study employing CD-ROM training in child-management and relationship-enhancement skills revealed behavior changes for parents and children (Gordon, 2000). Computer-delivered substance abuse prevention programs unquestionably hold considerable potential for adolescents and their families.

Offering substance abuse prevention programming via computer to ethnic-racial minority families, however, is not without controversy. Some may argue that the economic disadvantages faced by many Black and Hispanic Americans create barriers to computer access. Yet, relative to all Americans, those from poor and minority families account for greater increases in home computer use and online access. Between 2005 and 2006, broadband access rose 70% among Americans with less than a high school education (Horrigan, 2006). Black Americans' use of the Internet rose 121% during the same period. Albeit Hispanic youth lag slightly behind Black youth in their computer and Internet access at school, home computer use in Hispanic families is higher than in Black families and is approaching that of non-minority families (KewalRamani, Gilbertson, Fox, & Provasnik, 2007). As for age patterns in child and parent computer use, most teenagers (93%) and most parents of teenagers (94%) regularly access content online through a personal computer (Macgill, 2007).

The present study tested a computer-delivered family intervention approach for preventing substance use in a sample of Black- and Hispanic-American adolescent girls. Informed by family interaction theory (Brook, Brook, Gordon, Whiteman, & Cohen, 1990), the intervention approach imparted gender-specific content and skills to girls and their mothers toward helping the girls reduce salient risk factors and build protective factors associated with successful avoidance of tobacco, alcohol, and drug use during the teen years.

Method

Participants

Study participants were 546 pairs of adolescent girls and their mothers from New York, New Jersey, and Connecticut. Recruited from postings on craigslist.org and from advertisements in New York City newspapers, participant dyads were screened on three eligibility criteria. Each dyad needed to: 1) include a daughter between the ages of 10 and 13 years, 2) have private access to a personal computer, and 3) provide assurance that daughter and mother would complete measurement and intervention procedures. Columbia University's Morningside Campus Institutional Review Board approved the study protocol.

Procedure

Prior to study enrollment, girls assented and gained parental consent, and mothers consented. Randomly, mother-daughter pairs were divided between intervention and control arms. All participants completed an online pretest measurement battery; intervention-arm girls and their mothers interacted with a 10-session drug abuse prevention program; and all participants completed an online posttest measurement battery. Control-arm participants received no intervention during the study period.

Measures

Pretest and posttest scales for girls measured risk and protective factors, substance use, and intentions to use substances. Completing a communication measure, girls responded to questions on the quality of discussions with their mothers about age-relevant problems and

conflicts (McCubbin et al., 1996). On another scale, girls reported on how they perceived rules in their families regarding their use of tobacco, alcohol, and other drugs (Spoth et al., 2002). Girls also reported how closely their mothers monitored their friendships and out-of-home activities (Li et al., 2000). On a normative beliefs scale, girls reported whether and how much their peers smoked, drank, and used other substances (Rocky Mountain Behavioral Institute, 2004). Depression, as a risk factor for substance use, was measured as girls completed a scale asking about their feelings over the past fortnight (Kovacs, 1992).

Girls' body esteem was assessed with questions about the degree to which they were happy with the way they look (Harter, 1988; Thomson & Zand, 2002). Girls' self-efficacy was assessed by questions asking them about their confidence in abstaining from substance use in various situations (DiClemente et al., 1994). The substance use measure asked girls about their past month's consumption of cigarettes, beer, wine, spirits, marijuana, and recreational use of prescription drugs (Rocky Mountain Behavioral Institute, 2004). Finally, girls reported their intentions to smoke, drink, and use drugs when adults (Rocky Mountain Behavioral Institute, 2004).

At pretest and posttest measurement occasions, mothers completed three scales that paralleled measures completed by girls. Describing communication patterns with their daughters, mothers gave the frequency and quality of their relevant interactions (McCubbin et al., 1996). Mothers also reported on the extent of family rules applicable to their adolescent daughters (Spoth et al., 2002). Last, mothers responded to questions about the extent to which they monitored their children's whereabouts, activities, and friends (Gorman-Smith et al., 1996).

Intervention

Drawing upon family interaction theory, the intervention approach incorporated elements of social learning, attachment, and deviant behavior proneness theories (Brook et al., 1990). The premise of the integrated theoretical model is that girls' emotional attachment to their parents, principles of social learning, and intrapersonal characteristics jointly influence substance use. 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. Thus, 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.

Guided by this theory, our gender-specific intervention program sought 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, mood, and anxiety; for refusing peer pressure; and for enhancing body esteem and self-efficacy. Girls also learned accurate information about the prevalence of smoking, drinking, and drug use among their peers.

Mother-daughter dyads in the intervention arm gained access to the program via CD-ROM or through the Internet, with the bulk of participants accessing the program online. Working together in their homes and at times convenient to them, participant dyads interacted with

the program's 10 sessions. Though participants were advised to complete one session per week, completion time varied across the intervention arm. Studies of computer-delivered intervention programs for mothers and daughters indicate that program completion time is unrelated to outcomes ().

Each program session included voice-over narration, skills demonstrations by animated characters, and interactive exercises for mothers and daughters to complete jointly. For example, a session devoted to problem solving was introduced by an animation sequence of five problem-solving steps: Stop, Options, Decide, Act, and Self-praise. Girls and their mothers then viewed a vignette of a character faced with a risky situation. For the Stop step, girls learned to pause so they can better define problems and their role in solving them. Applying the second step, Options, girls considered alternative solutions. To learn the Decide step, girls enlisted their mothers in helping them systematically rank the options according to the expected benefits and feasibility of each option. Based on the rankings, girls chose the best solution for their problem situations. Act, the fourth step, engaged girls in planning how to implement the chosen solution. For the Self-praise step, girls learned how to reward themselves for using the problem solving steps and for implementing their chosen solutions. Material in this session led girls and mothers through exercises of increasing complexity to master each problem-solving step.

Besides the session on problem solving, the intervention program encompassed sessions on conflict management, substance use education, body image, mood management, stress reduction and relaxation skills, norms and social influences, self-efficacy, and social supports for maintaining personal change. An introductory session helped girls and their mothers learn active listening skills. In that session, participants also viewed examples of the manner through which their behavior may trigger corresponding behaviors from others. Further, girls and mothers took part in exercises to increase the value of time together and to increase family rituals and routines. And mother-daughter dyads engaged in a gift-giving exercise to underscore the importance of showing their caring for each other.

To ensure the fidelity of intervention delivery, the program allowed girls and their mothers to advance from one session to the next only when each of them successfully completed the prior session. Girls and mothers had separate and unique log-in names and passwords, and they completed separate schedules of questions about program content. When they completed pretest measures, intervention-arm participants were routed to the intervention program. Upon finishing the program, the participants were directed to the posttest measurement battery.

Results

Across the sample, girls had an average age of 12.75 years, with a standard deviation of about 1-year (Table 1). The sample was roughly two-thirds Black and one-third Latina. Girls' ethnic-racial distribution varied according to study arm. Whereas the intervention arm contained more Latinas than the control arm, the control arm contained more Black girls than the intervention arm. Overall, girls reported their school grades as roughly average. Mothers' average age was approximately 40 years. More than one-half of the mothers (52.9%) had graduated from college. Slightly more than one-half of all mothers were heads of single-parent households.

Comparisons of pretest scores between arms for girls and for mothers failed to disclose differences on any outcome variable. Post-intervention differences between intervention- and control-arm participants were tested with analysis of covariance, in which posttest scores served as dependent variables and the pretest scores were covariates.

Girls' Outcomes

Between-arm differences were seen in favor of girls who received intervention on the quality of their communications with their mothers, $F(1,541), p < .05$, perceptions of family rules against their substance use, $F(1,540), p < .0001$, perceptions of their parents' monitoring of their extracurricular activities, whereabouts, and friends, $F(1,541), p < .01$, and normative beliefs about peer substance use, $F(1,540), p < .001$ (Table 2). Following their completion of the intervention program and relative to control-arm girls, intervention-arm girls reported lower levels of depression, $F(1,541), p < .05$, and higher levels of self-efficacy about their ability to avoid cigarette smoking, alcohol consumption, and drug use, $F(1,540), p < .001$.

Rates of 30-day substance use for girls were low overall, except for alcohol consumption. On the alcohol use variable, intervention-arm girls reported having drunk less in the past 30 days than control-arm girls, $F(1,541), p < .01$. Relative to control-arm girls, intervention-arm girls reported lower intentions to smoke, drink, and use drugs when they were adults, $F(1,539), p < .05$.

Mothers' Outcomes

Mothers who received intervention reported better levels of communication with their daughters than control-arm mothers, $F(1,541), p < .01$ (Table 3). Relative to control-arm mothers and following their receipt of the intervention program, intervention-arm mothers said that their families had more rules against their children's use of tobacco, alcohol, and drugs, $F(1,542), p < .001$. Also more than control-arm mothers, intervention-arm mothers reported greater posttest levels of monitoring of their daughters' extracurricular activities, including locations and friendships, $F(1,542), p < .05$.

Discussion

Study results lend support to the promise of a gender-specific, computer-delivered intervention program to help mothers and daughters reduce girls' risks for substance abuse. Following program delivery, girls showed improvements in their communication with their mothers, in their understanding of family rules regarding substance use, and in their awareness of parental monitoring of their social activities and friendships. Further, girls improved their normative beliefs about the extent of substance use among their peers, were less depressed, and expressed higher levels of self-efficacy regarding their ability to not smoke, drink, and use drugs. The program also resulted in lower reports of girls' alcohol use and in their lower expectations of future tobacco, alcohol, and prescription drug use. Mothers who took part in the program improved their communication with their daughters, reported more family rules against substance use, and said that they were monitoring their daughters' activities and friends more closely.

The concinnity of post-intervention changes for girls and for mothers indicates that the computer-delivered program exerted a salubrious effect not only across risk and protective factors that have particular salience for adolescent girls, but also on girls' alcohol use and on their substance use intentions. Because mothers completed measurement scales that closely mirrored those completed by girls, program effects appear to have been experienced by both members of the mother-daughter dyad. That the program failed to impact girls' cigarette, marijuana, and prescription drug use may be explained by low use rates of these substances in both arms of the trial and at both measurement occasions.

The tested program was gender-specific, interactively involved mothers and daughters, and delivered solely by computer. Gender specificity in prevention programming is timely given girls' increased use of tobacco, alcohol, and drugs. Indeed, absent expressed attention to

gender-specific factors, substance abuse prevention programs are unlikely to address factors most pertinent to girls and, concomitantly, to not exert a differential impact on girls (cf. Greenfield et al., 2007; Kulis, Yabiku, Marsiglia, Nieri, & Crossman, 2007).

Efforts to involve parents in prevention programming are not new. But programs that engage mothers in interventions aimed at their daughters are somewhat novel. Most mothers enjoy powerful, dynamic bonds with their daughters, especially during adolescence (Snyderman & Streep, 2002). And, mothers' influence on their children, particularly concerning personal matters, decisions, and behaviors, is well-documented (Boyd-Franklin, 2001; Drotar, 2005). Prevention programs for adolescent girls, moreover, are certain to touch upon such sensitive issues as puberty, topics more suited to discussions with same-gender parents. Our study did not vary the gender of the parent involved in the intervention dyad and, hence, cannot address questions about the relative merits of mothers' involvement in contrast to fathers' involvement. Yet, the ubiquitous presence of mothers in most American families, together with the too-frequent absence of fathers, points toward the clinical wisdom of mother-daughter approaches.

Computer delivery offers distinct advantages for prevention programs. Arguably, the convenience of completing prevention programs online will enhance the engagement and retention of program participants. Contrariwise, requiring participants to attend regular clinic sessions would seem a recipe for failure, particularly among working parents and youths enrolled in school and active in numerous after-school venues. Computer delivery enhances the achievement of high fidelity, exact replication of the intervention protocol with each participant, and cost savings. In our program, we additionally ensured protocol compliance by not allowing mothers and daughters to advance to a new session until they had demonstrated mastery over the preceding session. Computer modes of intervention will surely grow in popularity and may someday eclipse live delivery of substance abuse prevention and treatment programs (cf. Bewick et al., 2008; Portnoy et al., 2008).

Our study is not without limitations. The sample was entirely Black and Hispanic, thereby limiting generalizability. The design compared intervention with no intervention, an admittedly prosaic way to test the nuances of a prevention approach. All data were self-reported. The lack of follow-up measurement precludes conclusions about longitudinal outcomes. Not only were girls' fathers excluded from the study, but also the need for private computer access eliminated from the sample a potentially large demographic group who, owing to economic and other circumstances, neither possessed computers nor Internet connectivity. The demand that study participants interact in mother-daughter dyads may have further affected the nature of the sample. Mothers' relatively high educational attainment suggests a somewhat rarified participant sample.

These and other limitations notwithstanding, the study helped to further realize the promise of gender-specific and computer-delivered approaches to substance abuse prevention with adolescent girls and their mothers. Girls who took part in the intervention showed decreases in risk factors, increases in protective factors, and lower rates of alcohol and future intentions to smoke, drink, and illicitly use prescription drugs. Girls' mothers also profited from the intervention program in their abilities to help their daughters avoid problems with substance abuse.

Positive, yet modest findings from this study should stimulate further exploration of gender-specific, computer-delivered approaches to prevention programming with adolescent girls and their mothers. Future studies might isolate the relative contributions of gender specificity and parent involvement. Many more investigations are needed to find optimal means for delivering computer approaches and for employing the latest interactive

technology, new media, and interactivity options. Any computer program warrants replication and must be subjected to long-term evaluation. By scientifically testing, refining, and disseminating innovative approaches, investigators will advance the field and incrementally develop effective new ways to prevent substance abuse among all American youth, across genders and ethnic-racial groups.

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Table 1

Demographic characteristics of girls and mothers by study arm.

	All (<i>N</i> = 546) <i>M</i> (<i>SD</i>) or %	Intervention (<i>n</i> = 212) <i>M</i> (<i>SD</i>) or %	Control (<i>n</i> = 334) <i>M</i> (<i>SD</i>) or %	<i>t</i> or χ^2
Girl Variables				
Age	12.75 (1.02)	12.64 (1.02)	12.81 (1.01)	-1.91
Race/Ethnicity				12.74*
Black	65.2	58.0	69.8	
Latina	34.1	42.0	30.2	
School grades				4.18
A's	32.9	35.9	30.9	
B's	50.1	50.2	50.0	
C's and lower	17.1	13.9	18.7	
Mother Variables				
Age	39.61 (6.43)	40.44 (6.45)	39.08 (6.38)	
Education				3.29
< High school	6.2	7.5	5.4	
High school	8.6	8.5	8.7	
Some college	32.2	29.7	33.8	
College degree	35.9	34.9	36.6	
Post-graduate	17.0	17.0	14.1	
Family Composition				1.22
Single parent	55.3	52.4	57.2	
Two parent	44.7	47.6	42.8	

* $p < .01$.

Table 2

Pretest and Posttest Scores for Girls

Outcome Variable	Pretest		Posttest		F (1, 541)
	M (SD)	M (SD)	M (SD)	M (SD)	
Mother communication ^a	2.82 (1.13)	2.81 (1.23)	3.00 (1.06)	2.72 (1.20)	5.95*
Family rules ^a	2.17 (1.39)	2.09 (1.37)	2.70 (1.20)	2.02 (1.30)	39.00****
Parental monitoring ^a	2.27 (2.04)	2.52 (2.00)	2.67 (2.93)	1.98 (2.09)	6.81**
Normative beliefs ^b	1.77 (1.52)	1.66 (1.32)	1.58 (1.28)	2.05 (1.60)	13.50****
Depression ^b	1.34 (1.08)	1.33 (1.05)	1.15 (1.04)	1.39 (1.05)	5.80*
Body esteem ^a	3.57 (1.49)	3.64 (1.47)	3.58 (1.42)	3.47 (1.52)	2.08
Self-efficacy ^a	3.64 (0.62)	3.63 (0.67)	3.71 (0.61)	3.50 (0.72)	11.87****
30-Day Use Rates					
Cigarettes ^c	0.01 (0.09)	0.01 (0.11)	0.01 (0.10)	0.02 (0.12)	0.21
Alcohol ^d	0.10 (0.30)	0.09 (0.29)	0.09 (0.28)	0.17 (0.38)	7.77**
Marijuana ^e	0.06 (0.45)	0.05 (0.35)	0.01 (0.01)	0.05 (0.22)	2.11
Prescription drugs ^f	0.01 (0.11)	0.03 (0.35)	0.00 (0.00)	0.01 (0.22)	0.06
Intentions to use ^b	1.73 (1.01)	1.76 (1.01)	1.25 (0.88)	1.44 (0.85)	4.99*

^aResponses to 5-item scales; higher scores are better.

^bResponses to 5-item scales; lower scores are better.

^cNumber of cigarettes smoked.

^dNumber of alcohol drinks consumed (e.g., glasses of wine; cans or bottles of beer; shots of spirits; mixed drinks).

^eNumber of times marijuana used.

^fPrescription drugs used recreationally or for off-label purposes or taken by other than the intended recipient.

* $p < .05$,

** $p < .01$,

 $p < .001$

 $p < .0001$

Table 3

Pretest and Posttest Scores for Mothers

Outcome Variable	Pretest		Posttest		F
	Intervention M (SD)	Control M (SD)	Intervention M (SD)	Control M (SD)	
Daughter Communication	2.40 (2.56)	2.44 (2.77)	3.07 (2.00)	2.46 (2.65)	7.42**
Family Rules	2.20 (1.53)	2.05 (1.58)	2.75 (1.25)	2.33 (1.48)	10.84***
Parental Monitoring	2.05 (2.30)	2.01 (2.30)	2.90(1.95)	2.52 (2.00)	5.09*

Note. Scores are responses to 5-item scales where higher scores are better.

* $p < .05$,

** $p < .01$,

*** $p < .001$.