

A Comparison of Family Interventions to Address Adolescent Risky Behaviors: A Literature Review

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Abstract

The purpose of this integrative review is to describe, compare, and synthesize traditional and computer-based family interventions that aim to change adolescents' risky sexual behaviors and substance abuse. Family interventions have been shown to generate protective effects for preventing adolescents from risky behaviors. It is not clear, however, whether there are significant differences or similarities in the designs and effects of traditional and computer-based family interventions. An integrative literature review was conducted to describe and compare the designs and effects of traditional and computer-based family interventions. Both interventions have generated significant effects on reducing risky behavior among adolescents. Interventions guided by theory, tailored to participants' culture/gender, and which included sufficient boosting dosages in their designs demonstrated significant short- or long-term effects in terms of reducing adolescents' risky behaviors. Regardless of delivery method, well-designed family interventions are noted to maximize familial protective effects and reduce risky behaviors.

Keywords

parenting/families, population focus, sexuality, health behavior/symptom focus, adolescence

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Although many social and environmental factors play an important role in adolescents' development in health behaviors, the basic socialization unit for adolescents is the family unit. In fact, parental influence has been shown to have beneficial, protective effects on adolescents' engagement in risky behaviors (Wang, Hsu, Lin, Cheng, & Lee, 2009). In particular, parental involvement plays a critical role in the promotion of healthy behaviors among adolescents (Resnick et al., 1997; Riesch, Anderson, & Krueger, 2006; Schor, 1996). Evidence suggests that increased parental involvement is associated with a decrease in the incidence and prevalence of unhealthy behaviors such as unprotected sexual intercourse (Resnick et al., 1997), alcohol use (Kumpfer & Alvarado, 2003), and marijuana and tobacco use (Kumpfer & Alvarado, 2003). Traditional and computer-based family interventions have been documented to reduce and prevent adolescents' risky behaviors. The differences and similarities between these two types of interventions, however, are not clearly understood.

Traditional family interventions are delivered by either direct contact (face to face) or indirect contact (providing printed information). Computer-based interventions are relayed by indirect contact via media such as the Internet, World Wide Web, and/or CD-ROM. The purpose of this review is to describe, compare, and synthesize the significant findings for sustainable change in risky behaviors among adolescents participating in traditional or computer-based family interventions.

Risky adolescent behaviors such as substance abuse (e.g., tobacco, alcohol, and illicit drugs) and risky sexual behaviors are among the primary contributors to mortality and morbidity during adolescence in the United States (Mulye et al., 2009; Riesch et al., 2006). Adolescence is a period marked by initiation and experimentation of a variety of activities, and it is no wonder that the incidence of risky behaviors peaks during this time. Johnson, O'Malley, Bachman, and Schulenberg (2011) reported that at least 1 out of every 16 high school seniors uses marijuana on a daily or near daily basis. According to the 2009 Youth Risk Behavior Surveillance System (Centers for Disease Control and Prevention, 2009), more than 24% of students surveyed had five or more alcoholic drinks in a row on at least 1 day in the month prior to the survey. Early initiation of alcohol use has been shown to lead to lifetime dependence rates as much as four times higher than those who initiate use later in life (Spath, Redmond, & Shin, 2001). Notably, the consequences of substance abuse are more significant for boys than girls and are sometimes linked to increased risks for unintended pregnancy, HIV infection, STIs, as well as sexual assault and date rape (Schinke, Fang, & Cole, 2009).

In 2007, the prevalence of gonorrhea and chlamydia were shown to have steadily increased among adolescents for several consecutive years—In fact, nearly half of all new STIs diagnoses occur among adolescents (Mulye et al., 2009). In 2006, more than 14% of all new HIV/AIDS diagnoses occurred among those aged 15 to 24 years (Mulye et al., 2009). In addition, an HIV/AIDS diagnosis in young adulthood could be the result of HIV exposure during adolescence. Teenage pregnancy, a consequence of unprotected sexual intercourse, is often used as an indicator of adolescent health. Compared with other developed countries, the teenage birthrate in the United States remains as much as nine times higher than in the Netherlands, Sweden, and Switzerland; three times higher than in Canada; and one and a half times higher than in the United Kingdom (Pazol et al., 2011).

These adverse health effects can be avoided, particularly through the prevention of risky behaviors via efficacious family interventions. A literature review by Kumpfer and Alvarado (2003), for example, demonstrated the effects of family-focused interventions to be nine times greater than interventions that focused solely on the child.

Family interventions can be defined as programs that are developed with the family as the stated treatment group. The specific definition of the term *family* varies among researchers and in general. One commonly used—and assumed—definition of *family* is one that includes two (biological) parents: one primarily in the workforce and one who works in the home (Weissberg, Kumpfer, & Seligman, 2003). Surprisingly, studies reporting on the implementation of family interventions to reduce adolescent risky behaviors rarely defined the term as used in their interventions. Although generally unspecified, the definition of the term as used by the studies in this review could be inferred by their targeted sample populations, specifically one caregiver and one child.

According to Jessor (1991), adolescents who have a moderate or high probability for problem behaviors can be positively influenced by certain protective familial factors that insulate against participation in risky behaviors. Multiple studies have recognized the protective effects of families. Resnick et al. (1997); Kung and Farrell (2000); Li, Feigelman, and Stanton (2000); and Li et al. (2002) determined that parental monitoring of adolescent activities makes a significant difference in adolescents' participation, magnitude, and extent of participation in risky behaviors. Kung and Farrell noted that poor parental monitoring and unpredictable parenting practices lead to a higher risk of peer influence and participation in risky behavior. The amount of time that families spend together and parents' availability for their children are significant protectors against risky behaviors (Li et al., 2000; Resnick et al., 1997). Positive parent-child relationships, positive discipline techniques, and substantial

parent–child communication also have protective effects (Kumpfer & Alvarado, 2003). Schor (1996) found that protective factors allow children to develop their own values and behavior rules—an important component when learning the ability to cope with complex issues and problems of normal adolescence, such as peer and environmental pressures. These skills are particularly important when adolescents are forced to make decisions at times when a parent is not available to assist in the decision-making process.

Understanding the differences, implementation, and effects of family intervention programs can play a key role in the prevention of risky behaviors during adolescence. This literature review explores traditional and computer-based family interventions that target certain adolescent risky behaviors. Examination and comparison of recruitment strategies, design, delivery methods, and effectiveness of traditional and computer-based interventions are included. The strengths and limitations of the review are discussed.

Method

An extensive Internet search of peer-reviewed studies published between 1998 and 2011 was conducted using the following databases: PubMed, Medline, OCLC, ProQuest, Ebscohost, and Ovid. Given that Internet use was not widespread until the 1990s, we limited our review to studies published in 1998 or later. We determined that this starting date would enable our search to encompass all available web-based family interventions. Keywords utilized for this search were: *family, intervention, family intervention, parenting, teen, youth, adolescent, adolescence, risky, sexual behavior, alcohol, marijuana, web, and computer*. The search was restricted to articles published in English. Selection criteria included studies that aimed to decrease adolescents' risky behaviors, such as unprotected sexual intercourse, tobacco, and alcohol or drug (or substance) use. Criteria also included studies that targeted adolescents between the ages of 10 and 19 years and were defined by researchers as a "family intervention." Meta-analyses and descriptive studies were excluded from the analysis.

Our integrative review used the constant comparison method described by Whittemore and Knafl (2005). Our data analysis utilized data reduction, data display, data comparison, conclusion drawing, and verification.

Results

The literature search yielded a total of 35 articles. Of these studies, 20 fit the selection criteria and were retained for further analysis. In all, 14 used

traditionally styled interventions, whereas 7 reported on the implementation of computer-based interventions.

Target Populations and Behaviors

Table 1 lists target populations and behavior by intervention type. Interventions targeting at-risk adolescents sought to reduce risks by decreasing emotional and relationship problems and/or by reducing substance abuse. In three studies (Anderson, Vostanis, & O'Reilly, 2005; Grimes & Mullin, 2006; Marvel, Rowe, Colon-Perez, DiClemente, & Liddle, 2009), parent/guardian-child pairs were referred to researchers specifically due to their history of behavior problems. These interventions offered individualized family therapy or family support services to the adolescents and their families. Interventions for at-risk adolescents and their families can be limited by difficulties in reaching and promoting health behaviors among at-risk populations.

Community-based interventions, meanwhile, provide an opportunity to reach more potential participants and promote healthy attitudes and behaviors on a broader level. The community-based interventions examined in this review targeted populations in public schools or low-income communities and utilized strengths-focused approaches to enhance a family's protective effects. Three such interventions (Spoth et al., 2001; Spoth, Redmond, & Shin, 2000; Stanton et al., 2004) were designed with the intent to build and strengthen family function and parenting skills. These programs significantly reduced adolescents' aggressive and substance-abuse behaviors over time. Other studies (Connell, Dishon, & Deater-Deckard, 2006; Forehand et al., 2007; Li et al., 2002; Litrownik et al., 2000; Pantin et al., 2003; Schinke, Schwinn, Di Noia, & Cole, 2004) focused on providing support services, improving family interaction and general parent-child communication, and/or reducing risk-taking behaviors by increasing protective factors. Among community-based interventions, it can be difficult to estimate the benefits (e.g., savings in health care costs) generated from health-promotion interventions. This limitation may further impede funding opportunities and slow generalizability.

Notably, the traditional and computer-based approaches targeted similar participant groupings of adolescents and/or parents. Parent/guardian-adolescent pairs were more likely targeted as compared with parent- or adolescent-only interventions. Among traditional interventions involving parents, parents were often targeted for parenting skill training to enhance adolescent health outcomes. Forehand et al. (2007) promoted parents' responsiveness while communicating with their adolescents and significantly decreased

Table 1. Selected Target Population and Corresponding Intervention.

Targeted population \ outcome variables	Traditional interventions				Computer-based interventions			
	Alcohol	Drugs	Sex	General behavior	Alcohol	Drugs	Sex	General behavior
Parent and child	Connell Dishon, and Deater-Deckard (2006) ³ ; Grimes and Mullin (2006) ³ ; Li et al. (2002) ³ ; Litrownik et al. (2000) ³ ; Loveland-Cherry, Ross, and Kaufman (1999); Spoth, Redmond, and Shin (2001) ³ ;	Connell et al. (2006) ³ ; Grimes and Mullin (2006) ³ ; Li et al. (2002) ³ ; Litrownik et al. (2000) ³ ; Spoth et al. (2001) ³ ;	Forehand et al. (2007); Li et al. (2002) ³ ; Marvel, Rowe, Colon-Perez, DiClemente, and Liddle (2009); Spoth et al. (2001) ³ ;	Anderson, Vostanis, and O'Reilly (2005); Harrison, Boyle, and Farley (1999); Pantin et al. (2003); Spoth, Redmond, and Shin (2000)	Schinke, Schwinn, Di Noia, and Cole (2004) ³ ; Schinke, Di Noia, Schwinn, and Cole (2006) ³	Schinke et al. (2004) ³ ; Schinke et al. (2006) ³ ; Schinke, Fang, and Cole (2009)		
Parent only	Ichiyama et al. (2009)							Taylor et al. (2008)
Child/individual only							Buell (2009); Lightfoot, Comulada, and Stover (2007)	
Mother–daughter pairs						Schinke et al. (2006); Schinke et al. (2009)		
African American	Li et al. (2002) ^a	Li et al. (2002) ^a	Forehand et al. (2007); Li et al. (2002) ^a		Schinke et al. (2006)	Schinke et al. (2006) ^a		
Hispanic American	Litrownik et al. (2000)	Litrownik et al. (2000)		Pantin et al. (2003)	Schinke et al. (2006) ^a	Schinke et al. (2006) ^a		

Note: Articles are identified by the first author and published year in parentheses.
^aIndicates multiple behaviors targeted by single intervention.

adolescents' relative risk for risky sexual behaviors (relative risk [RR] = 0.65). Ichiyama et al. (2009) provided parents with printed information about drinking and reported significant effects of decreasing the likelihood of college freshman transitioning into drinking status ($p < .05$). Spoth et al. (2001) taught parents about how to consider children's developmental needs and to realistically express their expectations for their children while concurrently teaching their children substance refusal skills. At the 24-month follow-up, they found a significant decrease in adolescents' illicit drug use ($p < .015$), cigarette use ($p < .003$), and an increased ability of adolescents to ask their sexual partners to always use a condom ($p < .037$).

Similarly, computer-based family interventions were often used to enhance parenting practices and minimize adolescents' use of tobacco, alcohol, marijuana, illicit prescription drugs, and inhalants. Schinke, Di Noia, Schwinn, and Cole (2006) and Schinke et al. (2009) selected mother-daughter pairs to enhance communication, parental monitoring, and adolescent self-image, self-esteem, mood management, and peer selection. Two years post-intervention, Schinke et al. (2004) noted a reduced prior-30-day use of alcohol ($p < .001$). Five years later (Schinke et al., 2009), adolescents in the intervention group had a significantly higher drug refusal self-efficacy ($p < .0001$) compared with those in the control group.

Setting and Recruitment

Traditional family interventions were most frequently used in urban areas, where population density allows for greater participant potential (Connell et al., 2006; Forehand et al., 2007; Grimes & Mullin, 2006; Harrison, Boyle, & Farley, 1999; Ichiyama et al., 2009; Li et al., 2002; Litrownik et al., 2000; Marvel et al., 2009; Pantin et al., 2003; Stanton et al., 2004). Likewise, computer-based interventions were most frequently used in urban areas (Schinke et al., 2004; Schinke et al., 2006; Schinke et al., 2009), although the nature of the interventions allowed for greater diversity and creativity in recruitment methods. Researchers used referrals from juvenile justice system personnel (Lightfoot, Comulada, & Stover, 2007), contacts via social service community agencies (Schinke et al., 2004), youth service agencies (Schinke et al., 2006), a local Head Start program (Taylor et al., 2008), as well as postings online and in local media and transportation hubs (Schinke et al., 2009). Urban settings also increased ease of delivery for intervention designs that used computers in community center settings (Schinke et al., 2006). Interestingly, only one intervention specifically and exclusively utilized a rural setting for its target population (Spoth et al., 2001).

Content and Delivery Methods

The most frequent mode of delivery among traditional interventions was in-person parent/child- or parent-only sessions in a familiar setting. Grimes and Mullin (2006) and Marvel et al. (2009) used a one-on-one format with either a case manager or family therapist to deliver interventions to the family unit. In Anderson et al. (2005), a family support worker delivered one-on-one interventions to the parent, and the child/children if needed. Connell et al. (2006), Harrison et al. (1999), Spoth et al. (2000, 2001), and Stanton et al. (2004) delivered interventions to parents and adolescents in separate sessions. Each of these studies provided parents with specific training in areas such as child development and behavior, developing family goals, and listening and communication. Adolescents were taught refusal skills, stress management, and problems-solving techniques.

Computer-based interventions were delivered to participants either through a website or by CD-ROM. These interventions required a computer terminal and sometimes Internet access. Schinke et al. (2004), Schinke et al. (2006), and Schinke et al. (2009) used CD-ROMs to present materials that taught parents and children higher level communication and listening skills. These interventions allowed participants time to practice learned skills and promote the building of self-image and self-esteem. Taylor et al. (2008) delivered their intervention via a website and included additional parental coaching in separate at-home encounters to enhance intervention effects. As technology continues to develop, new options such as webinars, videos, and real-time presentations provide even more avenues for nontraditional delivery.

Theoretical Frameworks

Well-designed, effective family interventions are guided by theory and informed by empirical evidence. Theory-driven family interventions that are based on learning and developmental principles appropriate to the target population are essential in the promotion of positive behavior change. Nation et al. (2003) and Weissberg et al. (2003) have suggested that theory is essential among interventions that aim to prevent and reduce adolescent risky behaviors through the strengthening of protective factors and to address common influences and risk factors, such as family, peer pressure, school, and community. Loveland-Cherry, Ross, and Kaufman (1999), for example, utilized social learning theory in their intervention, and enhanced positive parenting practices and decreased adolescents' risk behaviors.

The most common behavioral theories utilized by traditional interventions in this review were social cognitive theory (Bandura, 1969), cognitive behavior theory, and problem behavior theory (see Table 2, for list of interventions and their corresponding theories). Stanton et al. (2004), for example, used the construct of *self-efficacy*, derived from social learning theory, to mediate risky behaviors through the significant promotion of parental influences and found significant effects in terms of lowering adolescents' illicit drug and cigarette use ($p < .015$ and $p < .003$, respectively), and an increased likelihood of asking sex partners to use condoms ($p < .037$). Of the 20 interventions examined in this review, 2 (Grimes & Mullin, 2006 and Marvel et al., 2009) did not specifically state the use of a theory in the development or implementation of the intervention.

Similarly, computer-based interventions utilized a range of theories to improve the function of parent-child interactions, including family symbolic interaction theory, life skills training theory, social learning theory, and theory of planned behavior. An intervention targeting mother-daughter pairs (Schinke et al., 2009) utilized life skills training and family interaction theories and noted improved refusal skills associated with parental monitoring, adolescents' self-image, self-esteem, mood management, peer assessment, and relationship building, including communication and perceived closeness with parents. At the 2-year follow-up, participating daughters were more likely to recognize substance abuse as a nonnormative behavior ($p < .0001$) and had greater drug refusal self-efficacy ($p < .0001$) as compared with the baseline or control groups.

Dosage and Effects

Table 3 presents an overview of each intervention's specific dosing, sample, outcome variable, and effect. Dosage, or the number of sessions in which an intervention is presented to a target population, varied widely, as did the results among traditional and computer-based interventions examined in this review. Booster or follow-up sessions are sometimes a component of an intervention and work to increase doses of an intervention to the target population (Nation et al., 2003). In their meta-analysis, Portnoy, Scott-Sheldon, Johnson, and Carey (2008) noted that a common positive outcome of computer-based interventions was based on the number of times an intervention was delivered, with more doses resulting in a more positive outcome. In their traditional parent training intervention, meanwhile, Kumpfer and Alvarado (2003) asserted that the ideal number of contact hours for skill building of parenting practices and educational interventions is 45 contact

Table 2. Theory and Corresponding Intervention.

Theoretical framework\ outcome variables	Traditional interventions			Computer-based interventions				
	Alcohol	Drugs	Sex	General behavior	Alcohol	Drugs	Sex	General behavior
Social learning/ cognitive theory	Li et al. (2002) ^a ; Litrownik et al. (2000); Loveland-Cherry et al. (1999) ^b	Li et al. (2002) ^a ; Litrownik et al. (2000) ^a	Forehand et al. (2007); Li et al. (2002) ^a ; Stanton et al. (2004) ^b	Anderson et al. (2005); Harrison et al. (1999) ^b	Schinke et al. (2004) ^{a,b}	Schinke et al. (2004) ^{a,b}	Buell (2009)	Taylor et al. (2008) ^b
Behavioral theory	Connell et al. (2006) ^a ; Loveland-Cherry et al. (1999) ^b	Connell et al. (2006) ^a	Stanton et al. (2004) ^b	Harrison et al. (1999) ^b	Schinke et al. (2004) ^{a,b}	Schinke et al. (2004) ^{a,b}	Lightfoot et al. (2007)	Taylor et al. (2008) ^b
Theory of emerging adulthood	Ichiyama et al. (2009)							
Eco-developmental theory	Spoth et al. (2001) ^a	Spoth et al. (2001) ^a		Pantin et al. (2003)	Schinke et al. (2006) ^a	Schinke et al. (2006) ^a		
Family interaction theory			Stanton et al. (2004) ^b ; Spoth et al. (2000)		Schinke et al. (2004) ^{a,b}	Schinke et al. (2004) ^{a,b}	Schinke et al. (2009) ^{a,b}	Taylor et al. (2008) ^b

Note: Articles are identified by the first author and published year in parentheses.

^aIndicates intervention addressed multiple behaviors.

^bIndicates multiple theories utilized.

Table 3. Dose, Sample, Outcome Variable, and Effect among Corresponding Articles.

	Approach/dosage/sample	Outcome variables	Results/effects
^a Anderson et al. (2005)	<i>Family Support</i> : Service to parents of youth (ages 7-15) with behavioral problems. Total of 5 to 7 visits; 93 parent-child pairs.	Measurements of Strengths and Difficulties Questionnaire Health of the Nations Outcome Scale for Children and Adolescents	Significantly improved parent-child relationship between pre- and posttest total difficulties ($-4.62, p < .001$), conduct problems ($-4.07, p < .001$), emotional problems ($-2.69, p = .007$), hyperactive problems ($-3.14, p = .001$), and peer relationship problems ($-2.46, p = .014$). No difference between pretest and 3-year posttest ($p > .05$)
^b Buell (2009) RCT	"Keep It Real!" Website: Three 20-min Internet sessions; booster at 1 and 2 months. $n = 574$, ages 18 to 24. Structure equation model.	Condom norms and change in proportion of protected sex acts with condom/total sex acts between baseline and follow-up	Very small effect ($\beta = .06$) noted for Internet group ($n = 99$) in terms of condom norms. No intervention effects noted in the clinic sample ($n = 574$). Significant relationship between condom norms and differences in proportion of protected sex acts ($\beta = .42$). $R^2 = .42$. Parental monitoring was protective. Peer deviance in Grade 6 a risk factor.
^c Connell et al. (2006) RCT	<i>Family Check-Up</i> : Three parent consultation sessions with periodic meetings over 2 years. Parent-child pairs ($n = 698$). Youth in Grades 6 to 9.	Frequency of cigarette or alcohol use in month prior: Latent growth mixture model.	
^d Forehand et al. (2007) RCT ITT	Arm 1. \uparrow communication: five 2.5-hr sessions; Arm 2. Single session: one 2.5-hr session; Arm 3. Control: one 2.5-hr session about general communication. African American parent-child pairs ($n = 1,115$), ages 9 to 12.	Parent-preadolescent sexual communication and parent responsiveness to sex related questions at pre-, post-, 6-month, and 12-month follow-up	At 12-month follow-up, preadolescents whose parents attended all five sessions of the enhanced intervention had a likelihood of sexual risk of less than 1.00 relative to those whose parents attended the control (relative risk = 0.65) or single sessions (relative risk = 0.62)
^e Grimes and Mullin (2006)	<i>Home-Based Clinical Int.</i> : 12-month program with unspecified sessions. Parent-child pairs ($n = 83$), ages 3 to 18.	Integrated primary care, mental health, substance abuse, and social services. Functional status at baseline, 6 months, and at discharge.	Self-reported scale showed significant improvement in reducing substance abuse (unspecified substances). 40% improvement seen in baseline score of 4.1- to 12-month follow-up score of 2.4.
^f Harrison et al. (1999)	<i>A Family-Based Int. for Troubled Children</i> : Skills and relationship training. Weekly 120-min sessions over 12 weeks. Parent-child pairs ($n = 115$), mean age = 10.75 years.	Family cohesion, family conflict, parent-child agreement, family time spent together, time spent in community, parenting styles and discipline styles	Significant difference in conflict mean training between pretest and posttest (5.6 and 4.8, respectively; $t = 1.99, p < .048$). Positive changes following treatment: family cohesion ($t = -3.05, p < .003$), family conflict ($t = 7.74, p < .000$), and family time together ($t = -2.13, p < .035$), time spent in the community ($t = -4.63, p < .000$), parent mental health ($t = -5.57, p < .000$), and parenting styles ($t = -6.05, p < .000$).

(continued)

Table 3. (continued)

	Approach/dosage/sample	Outcome variables	Results/effects
^a Ichiyama et al. (2009) RCT	<i>Experimental Group:</i> Parents read, discuss, and implement contents of handbook. College freshman ($n = 542$).	Number of alcoholic drinks in week, incidence of heavy episodic drinking, and alcohol-related problems	Students in experimental group significantly less likely to start drinking ($b = -2.67$ [1.53], $p < .05$), and increase drinking amount ($b = -0.62$ [0.23], $p < .01$; $\beta = -.37$) than those in comparison group.
^b Lightfoot et al. (2007)	<i>Project LIGHT:</i> Group 1: Computer based ($n = 38$); Group 2: Small face-to-face ($n = 31$); Group 3: Control ($n = 38$); Children only ($n = 133$), ages 14 to 18.	Frequency of sexual intercourse in past 3 months and type of sexual activity. One 90-min assessment and 3-month follow-up	Participants in computer group less likely to participate in sexual activity than those in small group ($t = 104$, $p < .02$). Participants in Groups 1 and 2 had fewer sex partners than those in control group ($t = 2.67$, $p < .01$; $t = 2.15$, $p = .03$, respectively).
^a Li et al. (2002) RCT	<i>ImPACT Home-Based Int:</i> 60- to 90-min culturally tailored video. African American parent-child pairs ($n = 179$), ages 12 to 16.	Adolescents' self-reported and parental perceptions of youth risk. At baseline and 12 months	Parents in control dyads significantly underestimated youth protective and risk activities. No evidence of a direct intervention effect on self-reported risk behaviors.
^a Litrownik et al. (2000) RCT	Eight 120-min information, social and communication skill training sessions over 7 to 10 weeks. Hispanic parent-child pairs ($n = 660$). Grades 7 to 8.	Parent and adolescent perceptions of parent-child communication	Intervention group reported significantly higher parent-child communication. Intervention effect size = .10.
^a Loveland-Cherry et al. (1999) RCT	<i>Home-Based Family Intervention:</i> Three 60-min sessions w/family meetings in between. Parent-child pairs ($n = 428$). Grades 4 to 8 (booster Grade 7).	Quantity and frequency of alcohol consumption in the past year for eighth-grade students	Compared with control group, significant findings for reduced alcohol use over time in Grade 8, $F(4, 421) = 21.72$, $p < .001$, and for reduced alcohol misuse, $F(4, 421) = 3.08$, $p < .05$.
^a Marvel et al. (2009)	<i>Multidimensional Family Therapy:</i> Three sessions weekly for 4 to 6 months; integrating cultural sensitivity in family therapy for juvenile offenders. Parent-child pairs ($n = 154$), ages 11 to 18.	Improving individual and family function. Proportion of times using a condom to times having sex; STI incidence and HIV-related skills	6-month follow-up: reported moderate effect ($d = .40$) on conversations between sex partners about HIV/AIDS and safe sex practices, moderate-to-large effect ($d = .65$) in protected sex acts, and large effect ($d = .80$) in participants risk of STD exposure. Moderate effect ($d = .53$) for decrease in STD incidence.
^a Pantin et al. (2003)	<i>Familias Unidas:</i> Parent groups; parent-adolescent discussion circles, and periodic home visits. Weekly sessions over 9-month school year. Hispanic parent-child pairs ($n = 167$), Grades 6 to 7.	Parental investment behaviors, adolescent behavior problems, and school bonding/academic achievement	Significant Time \times Condition on parental investment, $F(4, 577) = 2.68$, $p < .04$; significant Time \times Condition on adolescent behavior problems, $F(3, 424) = 4.25$, $p < .006$, as compared with control group.

(continued)

Table 3. (continued)

	Approach/dosage/sample	Outcome variables	Results/effects
^a Schinke et al. (2004) RCT	Group A: CD-ROM; Group B: CD-ROM + parent; Group C: no intervention. Ten 45-min sessions; parent-child pairs (<i>n</i> = 514), ages 10 to 12.	Family involvement, peer influence, and adolescents' substance use. Pre-, post-, years 1, 2, and 3	At 3-year follow-up, alcohol use was lower for CD-ROM + parent intervention youth than for CD-ROM-only youth, who, in turn, reported less use than control. Group B youth were less likely to be influenced by their peers as compared with those in Groups A or C. 3-week posttest: improved communication from pretest, girls: $F(1, 84) = 4.05, p < .04$; mothers: $F(1, 81) = 9.93, p < .002$; closer to their mothers, $F(1, 82) = 9.51, p < .003$; closer to their daughters, $F(1, 83) = 10.03, p < .002$. 3-month posttest: Failed to reach significance.
^b Schinke et al. (2006) RCT	<i>Mother-Daughter Intervention</i> : ↑ rapport; five computer modules over 3 weeks. African American mother-daughter pairs (<i>n</i> = 86), ages 9 to 12.	Mother-daughter communication and closeness, family rules, parental monitoring, body esteem, depression, coping ability, normative beliefs, substance use intentions. Pretest, 3-week posttest, and 3-month posttests	2-year posttest, girls: ↓ alcohol use ($F = 5.20, p < .006$) and ↓ marijuana use ($F = 4.12, p < .016$), ↑ communication ($F = 5.44, p < .004$), ↑ closeness ($F = 6.86, p < .002$), and ↑ drug refusal self-efficacy ($F = 7.72, p < .0001$). Mothers: ↑ family rituals ($p < .0001$), ↑ communication ($p < .0001$), ↑ closeness ($p < .0001$), upholding family rules against substance use ($p < .0001$), ↑ maternal monitoring ($p < .0001$), and ↓ own alcohol consumption ($p < .0001$). In Grade 10, significant adolescent self-report of aggressive and destructive conduct ($p = .01$), with relative reduced rates ranging from 31.7% to 77% Intervention effect between Grades 6 and 10: observer-rated aggression and hostility (effect size 0.33), reported aggression and hostility (effect size 0.08), and self-reported aggression and destructive conduct (effect size 0.35).
^b Schinke et al. (2009) RCT	Intervention: Nine 60-min sessions per week, two 45-min annual booster sessions (<i>n</i> = 916), mean age = 12.76 years.	Mother-daughter communication and closeness. Exercises to improve the mother-daughter relationship, build girls' substance use prevention skills, and reduce associated risk factors	
^a Spoth et al. (2000) RCT 22 public schools	<i>Iowa Strengthening Families Program (ISFP)</i> : Seven sessions for parents and children in Grade 6 (<i>n</i> = 846). Longitudinal, Grades 6, 7, 8, and 10.	Independent observer ratings of adolescent, family member reports of aggressive/hostile behaviors, and self-reported aggression and destructive conduct across settings	

(continued)

Table 3. (continued)

	Approach/dosage/sample	Outcome variables	Results/effects
^a Spoth et al. (2001) RCT 33 public schools	Group A: Preparing for the Drug Free Years (PDFY); 5 sessions; Group B: ISFP; seven sessions; Group C: Control; minimal contact. Parent-child pairs ($n = 667$), Grade 6.	Substance use (i.e., alcohol, tobacco, and marijuana) measured in lifetime use behaviors, current use, and frequency at the Grade 10 follow-up, 4 years after baseline, and 3.5 years after interventions	Significant relative reduction rates for drunkenness and marijuana use at Grade 10. ISFP: Prior 30-day frequency of drinking compared with control ($t = 2.25, p < .05$, effect size 0.26). Prior 30-day cigarette use intervention compared with control ($t = 2.70, p < .05$, effect size 0.31). PDFY: Prior 30-day frequency of drinking compared with control ($t = 2.39, p < .05$, effect size 0.28). Not significant for prior 30-day use of cigarettes. Significantly greater rate of new users noted in control group as compared with those in ISFP. No significant ISFP-PDFY differences.
^a Stanton et al. (2004) RCT 35 low-income communities	1. Focus on Kids (FOK) 2. FOK + ImPACT without boosters 3. FOK + ImPACT with boosters Portable video; eight 90-min sessions; African American parent-child pairs ($n = 817$), ages 13 to 16.	Can ImPACT further reduce adolescent truancy, substance abuse, and sexual risk behaviors?	Significantly reduced 6 of 16 risk behaviors ($p < .05$) among youth receiving FOK + ImPACT as compared with FOK-only (respectively, mean number of days suspended: 0.65% vs. 1.17%, carry a bat as a weapon: 4.1% vs. 9.6%, smoked cigarettes: 12.5% vs. 22.7%, used marijuana: 18.3% vs. 26.8%, used other illicit drugs: 1.4% vs. 5.6%, and asked sexual partner to always use a condom: 77.9% vs. 64.9%). Risky behaviors lower among Group 3.
^b Taylor et al. (2008) RCT	Web-Based Version of <i>Incredible Years</i> Parenting: Combined computer- and web-based delivery; ten weekly 60- to 90-min sessions. Head Start parent-child pairs ($n = 178$), Parent age = 23 to 54 years ($M = 34$).	Promote behavioral change in parents and children. Assess risk and protective behaviors and perceptions. Self-reported goal completion and overall satisfaction, as well as attendance rates of intervention.	↑ Parents' self-reported goal attainment (66%) and satisfaction (89%). Feasibility testing only; did not report the effectiveness of intervention.

Note: RCT = randomized control trial; ITT = intended to treat; Int. = intervention; ↑ increase; ↓ decrease. Articles are identified by the first author and published year in parentheses.

^aIndicates traditional delivery method.

^bIndicates computer-delivered method.

hours over a period of 6 to 15 sessions. This amount of dosing allowed for adequate learning and reinforcement of intervention behavior change.

Forehand et al. (2007) found that parents who attended all five sessions of their intervention reported more sexual communication and responsiveness to sexual communication with their adolescent 1 year post-intervention, as compared with the control group (mean change = 1.21). Two years post-intervention, Stanton et al. (2004) noted significant positive findings in regard to adolescents' cigarette use ($p < .003$), other illicit drug use ($p < .015$), and ability to ask their sexual partners to use a condom ($p < .035$). The ability of adolescents to broach the subject of condom use with a potential partner is significant, and further demonstrates the importance of dosing when attempting to influence the ability of adolescents to increase self-efficacy of protective behaviors and to advance risk reduction and health promotion.

Outcome Variables

Table 4 presents a breakdown by gender and ethnicity of the outcome variables among the interventions analyzed in this review. Of the 20 interventions, 15 addressed either risky sexual behaviors or substance abuse, defined specifically as alcohol, tobacco, or drug use. In particular, these 15 studies assessed measurable adolescent behavior change, such as frequency of condom use (Buell, 2009; Lightfoot et al., 2007; Marvel et al., 2009; Stanton et al., 2004), alcohol or drug use (Connell et al., 2006; Harrison, et al. 1999; Litrownik et al., 2000; Schinke et al., 2006; Schinke et al., 2009), or perceptions and attitudes that might be related to adolescents' risky behaviors (Forehand et al., 2007; Harrison et al., 1999; Li et al., 2002; Litrownik et al., 2000).

Loveland-Cherry et al. (1999) reported significant intervention results only for adolescents who did not have prior history of alcohol use ($p = .01$) and misuse ($p = .04$); adolescents with a prior history with alcohol use and misuse did not demonstrate significant results ($p = .021$ and $p = .16$, respectively). Harrison et al. (1999) looked specifically at outcomes related to family cohesion and time spent together as a family. Other interventions were designed to improve parents' communication skills with their adolescent children (Forehand et al., 2007; Litrownik et al., 2000; Schinke et al., 2006; Schinke et al., 2009), improve parental monitoring of adolescents activities (Connell et al., 2006; Schinke et al., 2006; Schinke et al., 2009), and improve parental discipline skills (Harrison et al., 1999).

The effects of family interventions were often measured by behavioral changes (Anderson et al., 2005; Buell, 2009; Forehand et al., 2007; Grimes &

Table 4. Outcome Variable(s) and Sample Population.

Outcome variables	Traditional delivery				Computer-based delivery			
	Alcohol	Drugs	Sex	General behavior	Alcohol	Drugs	Sex	General behavior
Change in proportion of risky behaviors								
Frequency of risky behavior(s)	Connell et al. (2006); Ichiyama et al. (2009); Loveland-Cherry et al. (1999)	Connell et al. (2006); Spoth et al. (2001)	Marvel et al. (2009)		Schinke et al. (2004)	Schinke et al. (2004)	Buell (2009)	
Self-reporting scale used to measure functional status	Grimes and Mullin (2006); Stanton et al. (2004) ^a	Grimes and Mullin (2006); Stanton et al. (2004) ^a	Stanton et al. (2004) ^a	Anderson et al. (2005); Spoth et al. (2000)				Taylor et al. (2008)
Parent-child perceptions of closeness, communication, parental investment	Li et al. (2002) ^a ; Litrownik et al. (2000) ^a	Li et al. (2002) ^a ; Litrownik et al. (2000) ^a	Forehand et al. (2007) ^a ; Li et al. (2002) ^a	Harrison et al. (1999); Pantin et al. (2003) ^a	Schinke et al. (2006) ^{a,b}	Schinke et al. (2006) ^{a,b} ; Schinke et al. (2009) ^b		

Note: Articles are identified by the first author and published year in parentheses.
^aIndicates ethnicity-based intervention.
^bIndicates gender-based intervention.

Mullin, 2006; Ichiyama et al., 2009; Li et al., 2002; Lightfoot et al., 2007; Loveland-Cherry et al., 1999; Marvel et al., 2009; Pantin et al., 2003; Schinke et al., 2004; Spoth et al., 2000; Stanton et al., 2004; Taylor et al., 2008) or self-reported beliefs, attitudes, or abilities about making better choices when encountering risky behavior situations (Connell et al., 2006; Harrison et al., 1999; Litrownik et al., 2000; Schinke et al., 2006; Schinke et al., 2009). Only one of the interventions was designed to address substance abuse and sexual behaviors concurrently (Stanton et al., 2004). General problem behaviors, such as aggressive and hostile behaviors, self-harm, poor school achievement, poor family management, and other delinquent and oppositional behaviors were addressed in 5 of the 20 interventions (Anderson et al., 2005; Harrison et al., 1999; Pantin et al., 2003; Spoth et al., 2000; Taylor et al., 2008). The computer-based interventions, meanwhile, addressed mother-daughter communication and closeness (Schinke et al., 2006; Schinke et al., 2009), risky sexual behaviors (Buell, 2009; Lightfoot et al., 2007), behavior problems (Taylor et al., 2008), and peer influence and substance use (Schinke et al., 2004).

Retention and Intervention Effects on Outcome Behavior

Regardless of delivery method, retaining the target population is essential for assuring adequate data for intervention evaluation. The traditional interventions tended to have a somewhat higher retention rates than did comparable computer-based interventions. A traditional intervention that focused on parental monitoring (Stanton et al., 2004) reported high attrition rates at the 24-month follow-up. Further analysis revealed that risk characteristics were relatively consistent, however, allowing the results to remain reliable despite attrition. In another traditional intervention, Loveland-Cherry et al. (1999) also reported that “significant” numbers of parents dropped out of the study before all data could be collected at the 4-year postintervention date. Attrition can be problematic for brief- and long-term studies and can reduce the strength of results.

Among computer-based interventions, Buell (2009) reported an online sample retention rate of 53%, with a desired retention rate of 70% to 80%. Schinke et al. (2004) reported a parent participation rate of 79% for their joint CD-ROM and parent intervention activities. This was lower than the youth participation rate of 91% for the same computer-based intervention. Natural attrition can be attributed to normal family activities such as relocation or divorce, which can apply to any intervention delivery method. Higher attrition or dropout rates in the computer-based interventions could be attributed

to a lack of face-to-face encounters with intervention staff. Computer-based interventions may need to provide other types of incentives, such as monetary reimbursements or gifts to encourage retention.

High attrition rates may influence the effectiveness of behavioral outcomes of participants and may make it difficult to achieve an idea of accurate intervention effects or intervention data (Buell, 2009). Half of the 20 studies in this review provided participants with some form of incentive to participate in, continue with, or complete a follow-up assessment. Incentives included travel reimbursements (Schinke et al., 2004), gift certificates (Schinke et al., 2009; Taylor et al., 2008), and monetary amounts ranging from US\$10 per hour for completion of assessments to cash payments of up to US\$25 per hour of assessment (Buell, 2009; Connell et al., 2006; Lightfoot et al., 2007; Litrownik et al., 2000; Loveland-Cherry et al., 1999; Spoth et al., 2000, 2001).

Constraints and Adaptations

Implementing either type of intervention involved multiple adaptations. Traditional family interventions are limited by the size of their potential audience. Constraints such location and transportation as well as time and scheduling conflicts can be barriers for a traditional family intervention (Schinke et al., 2009). Loveland-Cherry et al. (1999) noted that even when conducting an in-home face-to-face intervention in an urban area, lasting attendance can be difficult due to participants' withdrawal from socialization within, or reluctance to participate in their environment. One of the benefits of traditional intervention methods is that they often include face-to-face interaction with facilitators, and sometimes other participants. Pantin et al. (2003) found that group-style interventions provide support to individuals within the group and are beneficial for subsequent behavior change. Forehand et al. (2007) identified advantages of group interventions for parents, including observing positive modeling behavior, practicing hands-on skills, and receiving feedback. These are important factors for providing lasting behavior change and greater skill building.

Challenges associated with computer-based interventions include the availability of required technology, such as computer accessibility and literacy. However, as technology plays a greater role in society, computer-based family interventions for behavior change are a natural development (Norman et al., 2007; Orlandi, Dozier, & Marta, 1990). Computer-based family interventions have often been adapted from traditional family interventions. Lightfoot et al. (2007) implemented a traditional intervention design that

utilized computers to provide adolescents knowledge about HIV/AIDS. They reported significance in reducing adolescents' number of sex partners ($p < .01$). Taylor et al. (2008) formulated a computer-based intervention that also included a face-to-face component with a parent coach to provide support and education through telephone and home visits. This allowed for social interaction with other parents enrolled in the intervention, which extended support beyond the intervention period.

Discussion

Regardless of delivery method, several common characteristics were observed within effective interventions. Incorporating parents in the intervention appeared to significantly strengthen intervention effects and minimize adolescents' risky behaviors. Second, interventions that incorporated strategies to enhance family efficacy and dynamics were more likely to generate adolescents' behavioral change over time than interventions that did not. In particular, building skills for parenting efficacy was consistently associated with decreased risky behaviors among adolescents. Interventions often targeted parent-child communication, but the effects of promoting parent-child communication about risks were not always significantly related to behavioral changes over time. As such, the contents and/or outcome expectancies of parent-child communication are equally critical. Third, resources for parents such as parental support, parent consultation, and parenting training were essential for generating significant long-term effects (Anderson et al., 2005; Connell et al., 2006; Harrison et al., 1999; Pantin et al., 2003; Spoth et al., 2000, 2001).

Although increasing attention is paid to the use of deficit-based approaches as well as tailoring family interventions to fit the needs of a specific culture (Erwin et al., 2007), our review did not note any specific effects generated from interventions customized to one specific culture. For example, culturally tailored interventions (Li et al., 2002; Pantin et al., 2003) were not particularly effective in terms of against adolescents' risk behaviors over time as compared with other family interventions (Schinke et al., 2006; Schinke et al., 2009; Spoth et al., 2001). This finding is congruent with a literature review by Kumpfer, Alvarado, Smith, and Bellamy (2002), which noted that culturally tailored interventions could increase retention by up to 40%, but risked reducing positive outcomes because core content is potentially eliminated in the process. Instead, strengths-based approaches that focused on enhancing parent-child interactions and family efficacy while remaining sensitive to diverse families' culture and gender seemed to be well received by

participants and generated significant long-term effects. Schinke et al. (2006) and Schinke et al. (2009), for example, focused on incorporating daughters' needs while improving relationships with their mothers and found positive behavior change in daughters at the 3-month follow-up and at the 2-year follow-up.

Because of the specific populations targeted in the interventions (i.e., high-risk adolescents), generalizability to other adolescents and their families is limited. Interventions that target one racial/ethnic group may not produce the same significant results within another group. This review reflects significant, sustainable results found in studies specifically designed for a certain gender or racial/ethnic background. Careful consideration of adolescents' gender and cultural backgrounds may be necessary when developing an intervention. This should not be the only consideration, however, as it can delay the ability to implement an intervention with other or larger populations. If the objective is to shorten the time needed to translate research results into practice, it is important to study commonalities among effective interventions. For example, enhancing family function (e.g., improving parent-child communication and relationships) and cohesiveness seems to be effective across many different cultural groups from this review, but this concept is stressed far less in intervention design than is tailoring interventions to specific cultures and/or genders. Additional assessment and description of commonalities among intervention designs may be necessary to apply them to other populations.

In short, although interventions tailored specifically to a particular culture have their merit for addressing unique aspects of different cultures and groups, overemphasis on tailoring interventions to fit the special needs of many different cultural groups may delay their generalization to the general population. Integrating a strengths-based approach that implements an intervention's core values while remaining sensitive toward participants' cultural and/or gender needs may be important for reducing the time needed to translate research knowledge into implementation.

Not all studies demonstrated significant long-term behavioral change. At the 3-year follow-up of their family support service intervention, Anderson et al. (2005) found no significant changes in the scores for family life and relationships ($p = .61$). Similarly, at the 24-month follow-up, Stanton et al. (2004) could not find significant changes in adolescents' marijuana use ($p = .056$). Spoth et al. (2001) found significant short-term effects (30 days prior) on adolescents' alcohol and cigarette use, but no significant long-term effects (3.5 years post-intervention). It is important to note that these interventions did not include booster sessions to reinforce behavior change.

Regardless of delivery method, increasing the number of intervention sessions, including boosters, was identified as a significant factor for maintaining behavior change over time. Schinke et al. (2006) used five sessions, whereas Schinke et al. (2009) used nine sessions and one booster. Compared with the 3-month posttest effects seen in the 2006 study, the 2009 study generated and maintained significant effects at its 2-year follow-up (i.e., for drug refusal self-efficacy, maternal communication, and normative behavior recognition). Conversely, results of some studies (Forehand et al., 2007; Ichiyama et al., 2009; Li et al., 2002) were not directly associated with the number of doses received. An intervention addressing parent-adolescent communication and responsiveness to questions related to sex (Forehand et al., 2007) reported a relative risk of 0.65 at the 12-month follow-up with adolescents whose parents attended all five sessions, compared with a relative risk of 0.62 for adolescents whose parents attended just one intervention session. This indicates that though dosing is an important factor for result significance, study effectiveness may vary according to intervention design. There may be a limit to the maximum effectiveness any intervention can have, regardless of dosage. Other factors such as intervention content and theoretical grounding may need to be considered when analyzing significance and dose effect. More knowledge about how to sustain adolescents' behavioral change over time is critical to the prevention of risky behavior.

The studies provided limited information for assessing how and whether their interventions were guided by sound theory. Limited discussion about the role theory played in the design and implementation of an intervention limits the ability of other researchers to replicate effective programs. Most of interventions in this review focused on improving interpersonal behaviors by utilizing several theories, including social learning, cognitive theory, behavioral theory, family interactional theory, and/or facilitating adolescent healthy development within family structure by using developmental theory and eco-developmental theory (see Table 2).

Only 2 of the 20 studies in this review provided a specific definition of the term *family* (Grimes & Mullin, 2006; Li et al., 2002). Providing a clear definition assures readers that the researchers gave significant consideration to the concept when formulating their intervention. Ultimately, how researchers understand and view the impact of families can enhance (or hinder) an intervention's ability to draw on familial strengths. Assuming that a "family-based" intervention will always include a parent and child may be misleading. In many cases, studies did not assess how family members functioned within the family system.

Furthermore, although intervention timing can affect the initiation of risky behaviors, studies in this review did not examine or compare timing. Taylor et al. (2008) and Loveland-Cherry et al. (1999) discussed the importance of timing interventions to prevent the early establishment of high-risk behaviors. Other discussion of the timing of interventions to reduce future risky behavior is limited. Further consideration of intervention timing specific to the target population is needed to effectively minimize adolescent engagement in risky behaviors.

In summary, it is clear that traditional and computer-based family interventions can be effective in preventing and reducing risky behaviors among adolescents. It is also clear that there are circumstances in which an intervention could have been much more effective had it been delivered with design adaptations such as increased dosage or booster sessions. Logistical considerations for administering interventions that are guided by familial and behavior theory could also be a major area of future study. Although the reviewed literature often mentioned theoretical frameworks, there was limited discussion about how theory was used to guide intervention design and implementation. Researchers often failed to provide a clear definition of the term *family* as utilized in their interventions. It is imperative that family interventions are delivered appropriately according to their design, guiding theory, and purpose, as well as target population, dosing, setting, and the ability to recruit and retain participants. To have the greatest impact on the target population, sample selection must assure inclusion of those persons at highest risk of risky behaviors (Buell, 2009). Finally, whether implementing computer-based or traditional interventions, it is important to reach adolescent populations at an early age, either before there is any participation in risky behaviors or before such behaviors are well established (Loveland-Cherry et al., 1999; Nation et al., 2003; Spoth et al., 2001).

Given the specific advantages of each delivery methods, a combination of both delivery formats may be most effective for to delivering interventions to parents and adolescents (Nation et al., 2003). It may be advantageous to provide written or learned knowledge via computer and to offer communication and refusal skills training in face-to-face settings. Doing so can harness multiple learning avenues, thereby reinforcing skills and increasing the impact of the program (Kumpfer & Alvarado, 2003). A combination of delivery methods may also increase the cost-effectiveness of such evidence-based programs and provide a way to reach a wider audience (Kumpfer & Alvarado, 2003). Computer-based interventions that target rural or isolated populations via unique learning methods such as webinars or electronic learning communities warrant further consideration and description. Creative solutions to

enhance family protective factors offer promising opportunities for influencing behavior change.

In conclusion, family interventions that are guided by behavior and learning theories are essential in the effort to reduce adolescents' risky behaviors by increasing parental protective effects within the context of the family. The importance of family and the establishment of family-imparted protective effects can affect adolescent behavior and influence health and welfare during and beyond adolescence. Findings do show that methods and interventions may not be equally effective in all situations. Differences in target populations affect the significance of interventions, as can intervention dosing, design, and content. In addition, inconsistencies exist in the available literature, indicating a need for further research and to assure that effective, sustainable family interventions are widely available to alleviate adolescents' risky behaviors.

A very important consideration in promoting behavior change through family interventions, whether via traditional or computer-based methods, is to understand general behavior change in adolescent populations. It would be nearly impossible to eliminate all adolescent risk behaviors with a single family-based intervention. Many factors affect behavior. Congruent with Jessor's (1991) recommendation that socioeconomic and individual factors should be considered when developing interventions and assessing outcomes, increasing protective factors within the family can affect the objective to reduce adolescents' risky behaviors. Both behavioral and economic factors are significant and influence adolescents' decision making. The results of this review highlight the importance of continuing to develop sustainable, evidence-based family interventions, regardless of delivery method, to decrease risky behaviors and enhance the well-being of adolescents.

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