APPROACHES TO SUBSTANCE USE PREVENTION UTILIZING SCHOOL CURRICULUM PLUS SOCIAL ENVIRONMENT CHANGE

BRIAN R. FLAY
Health Research and Policy Centers, University of Illinois at Chicago

Abstract — Hundreds of studies have tested the efficacy or effectiveness of school curriculum-based (CB) substance use prevention programs. Over the years, various researchers have also tested programs that included school curricula, but with the addition of school environment, family, mass media, or community components. The purpose of this review is to determine the extent to which adding any of these components to CB programs improves overall program effectiveness in the prevention of substance use (SU).

Key Words. Substance use, Prevention, School-based, Social environment.

THE IMPORTANCE OF SOCIAL ENVIRONMENTS

The case for including program components that address the broader social environment is multifaceted and theoretically very clear. Most succinctly, how can we expect youth to continue to hold new attitudes or persist with new behaviors if the social environment does not provide positive role models and reinforcement for such changes?

Social environments provide the major influences on youth behavior. First, people in different social environments provide models of desired or undesired behaviors, and/or approval of desired behavior or disapproval of undesired behaviors. Second, parent, peer, or community substance use (SU) increases youth access to substances. Third, most adolescents have overinflated perceptions of the prevalence of SU, especially by their peers (Sussman et al., 1988), and underestimates of levels of disapproval of SU (Nezami & Johnson, 1997). Fourth, parents, teachers, and community leaders can provide opportunities for adolescents to bond with people with conventional values (and non-SU expectations). As each one of these factors predicts adolescent SU, changes in these factors should alter the risk of adolescent SU.

Though normative beliefs are proximal predictors of behavior, the predictors of normative beliefs, such as parent behavior, school policies, and community norms, are more distal. Prevention programs cannot hope to have lasting effects unless the broader social environment that includes the more distal influences is also changed to be more supportive and reinforcing of newly changed attitudes, normative beliefs, and social skills (c.f., Flay & Petraitis, 1994). These social influences on adolescent behavior are far too strong for school curricula alone to countermand.

The primary social environments of concern in SU prevention are the school, the home, the mass media, and the community. The purpose of this paper is to review the effectiveness of programs that include a classroom-based curriculum plus intervention components involving any one or more of school-wide climate change, parent involve-
ment or training, mass media, and/or community. Many classroom-based (CB) programs have been evaluated during the last 30+ years. The effectiveness of CB programs has been reviewed multiple times by Gil Botvin (1995, this conference; Botvin & Dusenbury, 1989) and others (e.g., Best, Thomson, Santi, Smith, & Brown, 1988; Flay, 1985; Goodstadt, 1978; Hansen, 1992; Lantz et al., 2000; Moskowitz, 1989; Paglia & Room, 1999; Schaps, DiBartolo, Moskowitz, Palley, & Churgin, 1981; Stead, Hastings, & Tudor-Smith, 1996; Thompson, 1978; Tobler & Stratton, 1997). Historically, the focus of prevention programs has moved from (1) information to (2) affective approaches to (3) social skills and correction of normative beliefs. They have also changed in terms of the domains of influence, from being largely classroom-based to including parents, using the mass media, and involving community. Each of these changes has, on the whole, been accompanied by improved prevention effectiveness. The following two paragraphs provide a very brief synopsis of the effects of the change in content focus (see also Perry & Staufacker, 1996). The remainder of the paper will review the changes in domains of influence.

In the first generation of preventive approaches, information about the properties and consequences of drugs was shown to change knowledge, but little else. Indeed, some informational programs led to increased drug use because the information led to increased curiosity and, in some cases, increased knowledge about how to identify, where to get, and how to use substances (Goodstadt, 1978). In the second generation, affective approaches (values clarification and intrapersonal decision-making) were used. They were not very effective largely because, like the informational approaches, they focused on only one small part of the complex set of influences on SU. In the third generation of preventive approaches, social influences education and skills training approaches reported more consistent, though still relatively small effects on cigarette smoking (Flay, 1985) and SU (Tobler & Stratton, 1997). Most early social influences and skills training programs included little, if any, information on consequences of SU; it was assumed that adolescents did not want to use substances, but they did not have the skills to resist social pressures. One major exception was Gil Botvin’s Life Skills Training, which included a wider array of both personal and social skills than most other programs, and did include some content designed to motivate students to want to avoid SU (see Botvin, this issue). In recent years, secondary analyses of the mediator variables affected by prevention programs has suggested that, for some programs at least, the correction of normative beliefs may be more important than skills development (Dielman, Kloska, Leech, Schulenberg, & Shope, 1992; Hansen & Graham, 1991; MacKinnon et al., 1991).

The most recent meta-analysis of SU prevention program results (Tobler & Stratton, 1997) supports the conclusions reached above in more traditional reviews. They divided programs into noninteractive and interactive. Noninteractive programs tend to be didactic, with little or no student interaction, and emphasize informational and affective approaches. Interactive programs, on the other hand, tend to be dialectic or Socratic, with a high degree of student activity and interaction, and also included more skills training. High quality studies of noninteractive programs (informational and affective) had a mean effect size of zero. High quality studies of interactive programs had a mean effect size of .19 for social influences/skills programs and .24 for comprehensive life skills programs.

SCHOOL-WIDE CHANGE

At the school level, the behaviors of teachers and other staff influence students’ perceptions of SU, the expectations of adults, and the social approval or disapproval of
SU. School policies, and how well they are enforced, also influence all of these outcomes. Student bonding to school increases school performance and reduces problem behaviors (Resnick et al., 1997). All of these, in turn, influence students’ attitudes, normative beliefs, intentions, and beliefs (Conrad, Flay, & Hill, 1992; Hawkins et al., 1992). The existence of all these risk factors at the school level, and theory that incorporates them (e.g., Flay & Petrakis, 1994; Hawkins & Weis, 1985), suggests that unless these aspects of the school environment are changed, any change in student attitudes, normative beliefs, social skills, or SU behavior will decay over time. Many long-term followup studies have found such decay (Flay et al., 1989; Murray, Pirie, Luepker, & Pallonen, 1989).

Some of the observed decay may be due to lack of follow-up education, since programs that provide multiple years of education or booster sessions have found improved long-term effects (Botvin & Botvin, 1992; Botvin, Renick, & Baker, 1983). However, some of the decay may also be due to an unchanged school-wide environment. Offering SU prevention curricula at every grade (a school-wide approach) could go a long way toward altering school norms. However, other school-wide changes might be expected to increase the program effects still more and for a longer time.

School policies

School policies regarding SU can reflect community norms and expectations, specify punishment for violations, or reinforce compliance with norms (Goodstadt, 1989). Some studies have found school policies to be important predictors of the prevalence of SU. For example, in Southern California schools, we found the lowest rates of smoking in schools with clearly articulated policies regarding smoking restrictions and requirements for smoking prevention education. More comprehensive policies were related to lower amounts of smoking, but not to prevalence rates. An emphasis on prevention and cessation was also related to amount smoked and prevalence, whereas a focus on punishment had no effect on smoking behavior (Pentz, Brannon, et al., 1989). In Ontario schools, Gliksman, Adlaf, and Newton-Taylor (1992) found that type of policy (a preventive curriculum, early intervention, or disciplinary actions) was not related to alcohol use or problems. They did find a relationship between comprehensiveness of school policies (regardless of type) regarding SU and alcohol use. In an Australian study, researchers found no relationship between smoking policies or types of policy and student smoking prevalence (Clarke, White, Hill, & Borland, 1994). In a recent econometric analysis using Monitoring the Future data, Chaloupka and Grossman (1996) found that more restrictive policies regarding smoking in schools are asso-

1Some of these programs (e.g., DARE) included some social influences awareness, normative education and skills training, but the overall emphasis was much more on information and affective issues.

2Tobler and Stratton (1997) defined high quality programs (56 out of a total of 120) as having: (a) used random assignment, (b) at least 4 hours of programming, (c) posttest at least 3 months, (d) was not a placebo program, (e) was not compared to another program (i.e., control was no treatment), (f) was longitudinal, and (g) had a measure of control for preexisting differences.

3Effect sizes were not different for different substances (tobacco, alcohol, marijuana, illicit substances), outcomes (behavior and attitudes) or different providers (teachers, peer leaders and others). A valuable result is that programs delivered in high-minority schools were equally or slightly more effective that programs delivered in mostly white schools. Surprisingly, levels of attrition did not significantly impact effect size estimates. However, results from large-scale implementations were significantly weaker than results from small-scale implementations (.16 and .5, respectively). This suggests a need for much more research on how to bring effective programs to scale.
associated with a reduced number of cigarettes smoked. Thus, the evidence for the effectiveness of school policies regarding SU on student SU is suggestive, but still equivocal.

Evaluations of interventions to change school policies (in the absence of other programs) have been few, if any. Some studies have incorporated school policy changes in more comprehensive interventions involving family and/or community components (see below, e.g., Battistich, Schaps, Watson, & Solomon, 1996; Gottfredson, 1986; Gottfredson, Gottfredson, & Skroban, 1996a, 1996b; Hawkins et al., 1992, 1999).

Changing teaching practices and school environments

Changing how teachers interact with students can also improve student engagement with school and teachers (bonding). Improved school bonding should lead to improved behavior and school performance. Several researchers have developed interventions of this nature.

Kellam and colleagues evaluated whether two interventions designed to diminish aggressive and disruptive behavior and poor academic achievement among students in the first and second grades would reduce the incidence of smoking initiation through age 14 (Kellam & Anthony, 1998; Kellam, Rebok, Ialongo, & Mayer, 1994). The Good Behavior Game was a behavior management strategy designed to help teachers reduce aggressive and disruptive classroom behavior. Mastery Learning was an enriched curriculum that was designed to raise reading achievement stores. This experimental study involved random assignment of matched schools to one of two intervention conditions or a control condition, with a baseline and several follow-up evaluations. At intervention schools, one first-grade classroom and teacher were randomly assigned to the intervention, and at least one classroom served as a within-school control. Two consecutive cohorts of first-grade students were studied. Seven years after the interventions, boys in both cohorts of the Good Behavior Game condition were less likely than their control counterparts to have initiated smoking. Boys in one cohort of the Mastery Learning condition were significantly less likely than their control counterparts to initiate tobacco smoking (and this effect also approached significance in the other cohort).

Gottfredson and her colleagues have developed and evaluated three programs designed to improve teaching methods and to change the whole school experience for students. Gottfredson (1986) evaluated the effectiveness of a multicomponent school environment change and direct intervention for high risk students in middle and high school. Project Positive Action Through Holistic Education (PATHE) consisted of several components: (1) staff, student, and community participation in revising school policies and designing and managing school change; (2) school-wide organizational changes aimed at increasing academic performance; (3) school-wide organizational changes aimed at enhancing school climate; (4) programs to prepare students for careers; and (5) academic and affective services for high-risk students. A quasiexperimental design included five middle schools (four program and one comparison) and four high schools (three program and one comparison). Most of the students were African American. Intervention high school students in the program schools experienced significant baseline to post-test improvements on all delinquency and school conduct outcome measures (i.e., serious delinquency, drug involvement, suspensions, and school punishments.) The only parallel significant improvement for intervention middle school students related to school punishments. Student grades declined in all study schools, a negative outcome.
Gottfredson (1990) evaluated the effectiveness of innovative teaching methods and an “alternative” English and social studies class with a coordinated law-related education curriculum to reduce delinquent behavior among high risk students in the seventh grade (Project STATUS—Student Training Through Urban Strategies). Innovative teaching methods encouraged active student participation, and included field experiences, guest speakers, role play exercises and simulations, and independent and small group research projects. Teachers were trained to use heterogeneous student teams for tutoring and support, rewards for individual and group progress, and individualized learning plans. In a quasiexperimental design (123 junior high and 124 senior high school students were nonrandomly assigned to intervention or comparison conditions), intervention students scored better than their comparison counterparts in relation to self-reports of drug involvement, negative peer influence, self-reports of grades, grade point average, school punishments, and attachment to school. In addition, senior high school intervention students scored significantly better in relation to self-reports of serious delinquency, school rewards, positive self concept, and months on honor roll.

Gottfredson et al. (1996a, 1996b) and Skroban, Gottfredson, and Gottfredson (1999) evaluated the effectiveness of a 5-year school policies and practices and student social competency intervention to reduce problem behaviors among general and high-risk students in the sixth through eighth grades. The Multimodal School-Based Prevention Demonstration was designed to change the learning environment of the school by initiating school-wide changes. Instructional improvement components included school-wide changes in instruction and individually targeted tutoring for high-risk students. A social support component was a mentoring program for high-risk students who met with their mentor once weekly. A cognitive-behavioral skills component included (1) a 16-session life skills training course for sixth grade students and 8 booster sessions for students in the seventh and eighth grades, (2) a 29-session cognitive self-management course for all students, and (3) a 21-lesson violence prevention curriculum for all eighth-grade students. Also, approximately 10% of the highest-risk students at the intervention school received additional components. The evaluation consisted of comparing students in one intervention school with one nonintervention school. The main finding was that the program was not implemented as well as anticipated (Gottfredson, Gottfredson, & Skroban, 1998) and therefore did not work.

It is difficult to draw any conclusions about the effects of school-wide environmental change from the studies reviewed. The positive results mixed in with negative or no results, together with theoretical expectations, suggests that more work is needed in this area. Findings from more comprehensive interventions that include school-wide environmental change (see below) are also suggestive, though the effects of the different components cannot be separated.

The Seattle Social Development Program combined a curriculum, teaching, and classroom management skills of teachers and parent training. It is reviewed in the next section because it included parent training.

PARENTS

Parents/families provide strong messages about normative (expected) behaviors. Their own behaviors, expressed attitudes, and communicated expectations of their children are major influences on adolescent behavior. Contrary to many people’s beliefs, the influence of parents may not decrease, though the influence of peers cer
tainly does increase as children enter and go through adolescence (Flay et al., 1994; Hansen et al., 1987; Hu, Flay, Hedeker, Siddiqui, & Day, 1995). However, parents can have an influence on how important peer influence becomes for their children. Parents who are more engaged with their children as they enter adolescence, and who have appropriate parenting styles can maintain positive relationships with their adolescents. Parents who have clear expectations about behaviors can influence their child’s friend selection and behavior. Parents can also be a major source of social support/reinforcement for desired behaviors. However, unless parents know what behaviors to model and reinforce, and how to model and reinforce well, we cannot expect them to support school-based programs as well as they could or should.

Several behavioral family programs that train parents in positive parenting strategies and effective discipline have proven effective at improving child-rearing skills in distressed families (Taylor & Biglan, 1998), and some have been shown to produce improved child behavior in school (McNeil, Eyberg, Eisenstadt, Newcomb, & Funderburk, 1991; Webster-Stratton, Kolpacoff, & Hollinsworth, 1988), including reduced SU (Biglan & Metzler, 1998; Tremblay et al., 1991, 1996). School curriculum plus family programs share a focus on altering the family environment to be less supportive of youth SU or more actively supportive of non-SU.

Small scale studies

Project Kick was designed to provide parenting skills training to parents, improve the perception of family coping and adaptability, and improve children’s self-concept, decision-making and drug refusal skills, and knowledge about drugs through a positive peer buddy system. Trained seventh-grade peer counselors provided the third-grade intervention for two 20-minute periods weekly for 10 weeks. Parent sessions were conducted once monthly during the academic year. Rollin et al. (1994; Rollin, Rubin, Marcil, Ferullo, & Buncher, 1995) evaluated its effectiveness in a quasiexperimental design within one school. Intervention students displayed baseline to post-test improvements on life management and decision making, and displayed baseline to follow-up improvements regarding knowledge and awareness, decision making and drug refusal skills, and scores on the self-concept scale.

In a complex experimental study, LoSciuto and Ausetts (1988) evaluated the effectiveness of a social skills and resistance program, teacher training, student counseling, and parent training to improve self-concept and decision-making skills, develop anti-drug attitudes, and prevent substance use among students in the sixth and seventh grades. The project was designed to help teachers become familiar with prevention theory, change attitudes toward substance abuse, acquire classroom strategies to promote a positive atmosphere for student’s growth, acquire effective classroom communication skills, and explore alternative teaching styles. The parent component provided parenting skills training, such as limit-setting, communication, and conflict resolution.

Schools from three SES strata were randomly assigned to teacher training or control. Six home room sections were randomly selected from each school and assigned to conditions in which students: received student counseling only, received student counseling plus their parents were offered parent training, or were controls. This resulted in five conditions: (1) nonintervention control, (2) youth counseling only, (3) youth counseling plus parents were offered training, (4) youth counseling plus teachers were offered training, and (5) youth counseling plus both parents and teachers were offered training.
Significant differences between intervention conditions, or outcomes for teachers and parents, were few and ambiguous. Overall, intervention students were more likely than control students to have positive scores in relation to attitudes and knowledge, motivations for using substances, acceptability of drug refusal, and willingness (intentions) to use substances. The mixed findings are difficult to interpret given the complex design with few subjects per condition.

**Large-scale studies**

Two major studies combined a classroom social skills curriculum with modifying teaching practices and parent training. The *Child Development Project* was designed to change the learning environment of the school by modifying teacher/classroom practices, changing classroom and whole-school policies, and fostering connections between the school and home. The program was designed to help schools become environments characterized by: (1) caring and supportive relationships among and between students, staff, and parents; (2) a sense of common purpose and commitment to the values of caring, justice, responsibility, and learning; (3) responsiveness to student’s developmental and sociocultural needs and provide an accessible and meaningful curriculum; and (4) provision of opportunities for students to participate meaningfully in decision making and be actively involved in the intellectual and social life of the school. The intervention took the form of a 4-year “training of trainers” with small groups of site administrators, teachers, and staff developers in each of the school districts. These implementation teams in turn worked with intervention school staff and teachers.

Battistich et al. (1996) used a quasiexperimental design (12 schools on both treatment and control conditions) to evaluate the effectiveness of the program in preventing substance use and delinquent behaviors among elementary school children. Alcohol and marijuana use was less among intervention than comparison students at a 2-year follow-up. Intervention students in the half of the program schools where the program implementation was high were less likely than comparison students to use marijuana, carry a weapon, steal a car, skip school, or threaten another with harm. It is not possible to estimate the contribution of the school versus parent intervention to the observed effects, though the description of the intervention may suggest that most, if not all, of the effect was due to changing the school-wide environment. Poor implementation in half of the schools also raises questions about levels of adoption of the program and, therefore, its long-term viability. This is of major concern given the reliance on the training-the-trainer model.

The *Seattle Social Development Project* (Hawkins et al., 1992; O’Donnell, Hawkins, Catalano, Abbott, & Day, 1995; Hawkins, Catalano, Kosterman, Abbott, & Hill, 1999) was a 6-year intervention that also combined a classroom social skills training with a classroom management intervention and a parent training program. The stu-

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4See also Abbott et al. (1998), who studied the effects of an intervention to modify teaching practices (to use more proactive classroom management, be more interactive, and use cooperative learning methods) in grades 5 and 6 on grade 6 student classroom involvement, reinforcement from peers, bonding to school and prosocial peers, and achievement. The study was in the context of the larger Seattle Social Development Project. Schools that had received prior teaching practices, parent training and the social development curriculum, together with schools that received only the grade 5–6 teaching practices intervention were combined and compared with control schools. When comparing intervention and control conditions, significant effects were found only for academic achievement, but not for any of the hypothesized mediating variables (classroom involvement, reinforcement for classroom involvement, or bonding to school or prosocial peers). An analysis of the correlations between degree of implementation and outcomes showed
dent skills training component (grades 1–6) was intended to develop skills so that students could accomplish goals without resorting to problem behavior. It consisted of the Interpersonal Cognitive Problem Solving curriculum (Shure & Spivak, 1980, 1988) during the first grade and 4 hours of refusal skills training during the sixth grade. The teacher/classroom components (proactive classroom management, interactive teaching, and cooperative learning) were intended to enhance attachment and commitment to school. They were embedded within normal classroom activities throughout each school year, grades 1–6. The parent component (child behavior management, academic support, and antisocial prevention) was intended to increase the level of bonding to the family and thus enhance protective mechanisms. It consisted of voluntary parent training classes offered during grades 1–6 (except 4th). These involved a seven-session child behavior management curriculum for parents of first and second grade students, a four-session academic support curriculum provided to parents of second and third grade students, and a five-session risk-focused skills training curriculum for parents of children in the fifth and sixth grades. Parents of 43% of students attended some classes (Hawkins et al., 1999).

The evaluation employed a quasiexperimental research design with partial randomization to intervention or comparison conditions based on both the school and the student. Initially, the study involved eight public schools, two of which were assigned to either a full intervention or a comparison condition (randomization was not specified), while in the remaining six schools, students entering first grade were randomly assigned to intervention or comparison condition classrooms. When the initial cohorts entered the fifth grade, the panel was expanded to include all fifth grade students in 18 elementary schools, leading to the recapture of some intervention students and the addition of more comparison students. There were 608 students in the general population sample at the end of the sixth grade. For the O’Donnell et al. (1995) paper, a subsample of low-income high-risk students was drawn (N = 106 at the end of the sixth grade).

High-risk intervention boys reported higher grades and scored significantly higher on the combined math, reading, and language arts scores than their comparison counterparts, and were more attached and committed to school. High-risk intervention girls reported greater classroom use of cooperative team learning methods and opportunities for classroom involvement than their comparison counterparts. High-risk comparison girls were significantly more likely to have smoked cigarettes and somewhat more likely to have tried alcohol and marijuana than were their intervention counterparts.

For the complete sample, Hawkins et al. (1992) found program effects on behavior, school bonding, and achievement. When the student cohort was in grade 5, another condition was formed, where students received all components of the intervention, but only in grades 5 and 6. Six years after the end of the intervention, when the students were nearing the end of high school, Hawkins et al. (1999) found strong positive effects on SU and other behaviors, including academic achievement, for the full intervention, but few effects of the grades 5–6 intervention. For example, students in the

- correlations with some of the mediating variables (degree of reinforcement and bonding to prosocial peers) but not with achievement! The results reported here are ambiguous. It is confusing and difficult to interpret the finding that the intervention influenced achievement but not the mediating variables, while degree of implementation influenced mediating variables but not achievement. In addition, despite the attempt to use statistical methods to adjust for the fact that some students in the intervention condition had received the larger intervention (starting in grade 1), the reality is that the separate effects of the teaching practices intervention cannot be estimated from the analyses and results presented.
full intervention schools scored higher on school bonding (both commitment and attachment), school performance (GPA marginally significant, lifetime prevalence of repeating a grade 14 vs. 23%—but standardized tests and school drop-out were not significant), school misbehavior (cheating on tests, official disciplinary action, suspensions), violence (lifetime, 48 vs. 60%), and sexual behavior (lifetime, 72 vs. 83%; multiple partners, 50 vs. 62%; and pregnancy, 17 vs. 26%). There were also effects on heavy drinking (percentage of students reporting drinking 10 or more times during the past year, 15 vs. 25%), but no significant effects on lifetime use of tobacco, alcohol, marijuana, or other SU. The effects on school attachment and percentage of students repeating a grade were mostly with students living in poverty (for example, bringing the rate of repeating a grade down from a high rate to middle/working class rates), whereas the effects on being/gotten a woman pregnant and fathered/had baby were mostly with students from middle class and working backgrounds (bringing already lower rates down still further).

The reported results are impressive, and suggest the importance of starting early, involving the whole school and parents, and maintaining the intervention through elementary school. The results suggest that a program with the same content delivered only in grades 5 and 6 is not as effective—at least any effects it may have produced had decayed by the end of high school, whereas the full-length interventions effects were sustained through high school. It is unclear why there were so few effects on SU prevention given the breadth of the significant effects reported. Unfortunately (for the purposes of this paper), the research design does not allow us to separately estimate the effects of the various components of this intervention; indeed, published reports do not allow readers to determine who received which portions of the intervention. In addition, the nonrandomized design leaves open the possibility of alternative interpretations of the reported results. Even though the groups were not different on key predictors at pretest, the self-selection of initial schools into the intervention might have played a role in the size of the effects obtained.

**MASS MEDIA**

Mass media are the main purveyor of youth culture. Children spend more time watching television than attending school. Youth at increased risk for becoming substance users are often the heaviest viewers. Behaviors modeled in the mass media influence all of our behaviors. Youth take media depictions of attitudes and behaviors as indicators of societal norms. Mass media are used to “sell” lifestyles, not just products. Depictions of behavior in entertainment media are particularly influential. For example, exposure to television violence encourages aggressive behavior (Reiss & Roth, 1993). Even over- or under-reporting of community events influence our perceptions of the prevalence of certain behaviors.

One hypothesized way to counteract the influence of media is to provide students with media literacy skills (Alverman & Hagwood, 2000; Brecklin & Hoffman, 1998). These involve training students to analyze media content, it's origins, and the different levels of meaning, and to be aware of subliminal advertising in entertainment media, and to be critical and skeptical of advertising messages. Several studies have shown that media literacy can be taught effectively (Irving, DuPen, & Berel, 1998) and that improved media literacy can exert a protective effect against unhealthy attitudes learned from media (Austin & Johnson, 1997; Huston et al., 1992). To our knowledge, no study has compared SU prevention curricula with and without media literacy. That
is, we do not know whether adding a media literacy program, or a component to a program, can improve the effectiveness of classroom-base SU prevention programs.

Mass media can be used to counteract other messages (counter-advertising), to support/reinforce other programming, alter perceptions of community norms, or to demonstrate new behavioral skills. Several studies demonstrate that large-scale mass media campaigns can influence adolescent tobacco use. Recent state-level campaigns have produced large effects (Pierce et al., 1998; Popham et al., 1994), though it is difficult to separate out the effects of the media component from the myriad of other activities occurring at the same time (e.g., Hu, Sung, & Keeler, 1995). From these theoretical statements and reviews of media effectiveness, we identified key mediating variables that could be targeted for change supportive of behavior change—awareness, beliefs, attitudes, social influences, and skills development (Flay, 1981, 1987; Flay & Burton, 1990; Flay, DiTecco, & Schlegel, 1980; see also DeJong & Winston, 1990). We suggested that for belief and attitude changes, media campaigns should: (1) increase involvement in an issue and arouse motivation to change, (2) have message repetition by multiple sources, via multimedia, over long periods (years, not months or weeks), (3) have multiple, novel presentations of the same message, (4) target very specific issues and provide attitudinal alternatives, and (5) use high-quality production materials and strategies to ensure audience attention. For behavior change, we recommended: (1) information about behavioral alternatives, (2) skills modeling and development, (3) promoting interaction with the audience (e.g., via telephone or written material), (4) supplementing with face-to-face interaction (e.g., in classrooms), and (5) mobilizing community resources.

Failed studies

During the 1980s, several studies were conducted that implemented most of the above recommendations. Flay et al. (1987, 1995) and Kaufman, Jason, Sawlski, and Halpert (1994) each evaluated the effectiveness of social resistance skills development curriculum and media interventions to decrease the incidence of cigarette use. These three studies produced mixed effects on mediator variables, but no significant results on behavior.

Murray et al. (1988, 1992; Murray, Prokhorov, & Harty, 1994) evaluated the effectiveness of a statewide multicomponent tobacco use prevention program to prevent tobacco use among ninth grade students over a 5-year period. Students exposed to a state-wide mass media campaign plus school-based curricula in Minnesota were compared to students in Wisconsin (treatment as usual). Students in Minnesota reported exposure to many more messages in the mass media, however, they did not experience significant improvements related to smoking behaviors or smoking-related beliefs.

The Vermont study

Vermont researchers provided the strongest test of the effectiveness of mass media as a supplement to a school-based prevention program (Flynn et al., 1992, 1994, 1997; Secker-Walker, Worden, Flynn, & Detsky, 1997; Worden et al., 1988; Worden, 1999). These researchers provide the best example to date of proper development of media messages for adolescents. Worden (1999; Worden et al., 1988) describes their process in detail, key features of which include the following. The target audience was carefully identified and delineated so that program components could be developed for each gender at each of three different levels of maturation. Educational objectives were developed to structure the program to show advantages of not smoking, disad-
vantages of smoking, that most young people do not smoke, how to refuse a cigarette, how the tobacco industry wants kids to start smoking (for older kids), and how to quit (for kids who smoke). While both the school and media programs shared educational objectives there were no other programmatic links between them—to give the sense of multiple independent message sources. Surveys and focus groups were used to determine target group interests. Formats that appealed to the target groups were used, e.g., situation comedy, cartoons, rock video, and straight forward testimonials. Six different production companies were used to ensure variety/novelty with multiple messages coming from different sources. Principles of social learning were followed, including showing successful models saying things like, “I don’t smoke and I’m doing fine!” Spots were created in preliminary form and pilot tested, and new spots were created for each year of the 4-year campaign. At least 10 different spots were aired on weekly rotation during the campaign period each year, with no logos, slogans, music, or sponsoring messages that would tie them together, thus supporting the multiple sources and variety objectives. Survey data were used to identify the most effective media channels and programs, then time on them was purchased (an average of 190 broadcast TV, 350 cable TV, and 350 radio exposures each year). Of Flay’s recommendations, this study applied the concepts of message variety and repetition using different sources, via multiple media, over long periods of time; of targeting very specific issues and providing attitudinal and behavioral alternatives; of producing high quality materials to ensure audience attention; and of offering skills development, and supplementation with face-to-face interaction in the school program. It did not promote interaction with the audience, and it did not mobilize community resources.

In a large-scale quasiexperimental study of two media markets (cities) per condition (school-alone and school+media), these researchers found strong effects of the media campaign on smoking behavior and mediating variables. For example, after 4 years of intervention, students receiving both the school and media programs reported 35% less smoking than those receiving only the school program (Flynn et al., 1992). These effects persisted through 2-year follow-up, when the study cohort was in grades 8–10 (Flynn et al., 1994). The program was highly effective for youth at increased risk (Flynn et al., 1997). Secker-Walker et al. (1997) provided analyses to demonstrate that such a program would be affordable on a nation-wide scale, and if instituted on a nationwide scale would be cost-effective. Clearly, this particular media campaign produced larger effects than their particular school program alone. Unfortunately, we do not know how effective (or ineffective) the school-based program was (there was no no-treatment control condition), so we do not know how effective the media campaign alone would be (if the school program was ineffective) or the combination of the school and media campaign (compared to controls).

**COMMUNITY**

Community- or neighborhood-level norms are also important risk or protective factors for adolescent SU. The best curriculum in the world cannot be counted on to counter the norms of a broader community or the pressures faced by many disadvantaged or inner-city youth as they get to and from school or play in their neighborhood. In addition to general community measures to making substances harder or more costlier to get, interventions that specifically decrease youth access to substances (Forster & Wolfson, 1998) or increase their price (Chaloupka & Warner, 2000; Chaloupka & Wechsler, 1997), can also influence adolescents’ normative beliefs about the desirability of use and/or reinforce school or family messages about nonuse.
School curriculum plus community-wide programs share a focus on altering the community environment to be more supportive of nonsmoking efforts and norms. This could increase the effects or persistence of the effects of school-based programs.

**Small scale studies**

Stevens et al. (Stevens, Freeman, Mott, Youells, & Linsey, 1993, 1996; Stevens, Freeman, Mott, & Youells, 1996) conducted a three-group quasiexperimental evaluation of the effectiveness of a social and refusal skills development program combined with a parent communication course and a community task force to prevent smokeless tobacco, alcohol, and marijuana use among students in the fourth, fifth, and sixth grades. The classroom curriculum was “Here’s Looking At You, 2000,” designed for students to learn drug education information, adopt a “no drug use” philosophy, develop general social coping skills, and increase bonding with families and other professional institutions, consisted of 30 instruction hours per year. The parenting course (“Parent Communication Course”) was designed to help parents develop the personal and social skills needed to communicate with their children, especially about risky or unacceptable behavior, and consisted of 10 sessions. The community task force component was designed to recruit community members, increase their prevention knowledge and communication skills, and as an active volunteer task force, to work with community groups and institutions to promote community awareness and changes in attitudes, expectations, and behavior on issues related to children’s drug use. Schools in three districts were (nonrandomly) assigned to one of the two intervention conditions, while schools in the fourth district were the controls. Students were surveyed at immediate post-test, and at 1-, 2-, and 3-year follow-ups. Neither the curriculum alone nor the curriculum with the parent course and task force had any effect on preventing tobacco or alcohol use among the students. Students exposed to the curriculum plus parent and community components experienced 50% lower regular marijuana use, but there were no effects on the initiation of marijuana use.

**Prevention in the context of large-scale community prevention studies**

Community interventions have been tried for heart disease and cancer prevention—for example Minnesota (Blackburn et al., 1984; Luepker et al., 1994), Stanford 3-community (Farquhar et al., 1977) and 5-community studies (Farquhar et al., 1985), North Karelia (Puska, Tuomilehto, Nissinen, & Vartiainen, 1995), the Community Intervention Trial (COMMIT) for Smoking Cessation (Lewit, Hyland, Kerrebrook, & Cummings, 1997; Lichtenstein, Wallack, & Pechacek, 1990–91; U.S. Department of Health and Human Services, 1995), and the American Stop Smoking Intervention Study (ASSIST; Manley, Lynn, et al., 1997; Manley, Pierce, et al., 1997). See Schooler and Flora (1997) and Schooler, Farquhar, Fortmann, and Flora (1997) for reviews. Most outcomes of these have concerned adult behavior and health outcomes. Some of these programs have reported no effects of the community-based programs on youth smoking (e.g., Winkleby, Fortmann, & Rockhill, 1993).

As a component of the North Karelia project, Vartiainen et al. (Vartiainen, Pallonen, McAlister, Koskela, & Puska, 1983, 1986; Vartiainen, Pallonen, McAlister, & Puska, 1990; Vartiainen, Paavola, McAlister, & Puska, 1998) evaluated a school-based smoking prevention curriculum in a quasi-experimental design with two schools that received a curriculum (10 sessions over 2 years) in schools in intervention communities delivered by project staff, compared with (a) two schools that received a 5-session curriculum in schools in the rest of the intervention county (the county-wide condi-
tion), and (b) controls (schools in another county) that did not receive any component of the intervention. Both interventions produced significant and similar effects on smoking (ever, past month, past week, and daily) at immediate, 6-month and 1-year post-tests (Vartiainen et al., 1983). Effects on all levels of smoking were still significant at 2-year post-test (Vartiainen et al., 1986)—32% ever smoked in intervention groups compared to 44% in controls; 26 vs. 38% smoked in past month; 23 vs. 32% smoked in past week; 19 vs. 28% smoking daily). By 6-year follow-up (8 years after pretest; Vartiainen et al., 1990), the effects in the intensive intervention group were maintained (42% ever), but the effects in the county-wide group (that received the shorter curriculum within the community intervention context) had decayed somewhat (35%, controls 50%). By 13 years after the interventions (15 years after pretest; Vartiainen et al., 1998), effects on prevalence were still significant if smokers at baseline were excluded from the analysis (30% for both intervention groups versus 41% for the control group). Furthermore, lifetime exposure to tobacco was significantly lower (22–27% depending on the sample analyzed) for subjects in either intervention condition 13–15 years earlier than for controls. All effects were greater for males than females.

All results from this study must be interpreted with caution because of design limitations—only two schools per condition, nonrandom selection and assignment, statistically significant differences at pretest, and no school-only condition. Without a school-only control, one can never be sure exactly how much of the effects reported here were due to the large county-wide changes brought about by the North Karelia project versus the school-based interventions. The researchers (Vartiainen, Tossavainen, Viri, Niskanen, & Puska, 1991) do suggest that, just as with the Stanford 5-community study (Winkleby et al., 1993), the North Karelia community intervention alone had no significant effects on adolescent behavior or health. However, despite their assurances, we can never be sure that the county-wide intervention did not eventually alter the smoking behavior of the study cohort. The long-term effects are more easily attributed to the community intervention—that is, even if the school-based program did produce the immediate effects, they were no doubt maintained by the community intervention.

As a component of the Minnesota Heart Health Project (MHHP), a 13-year, population-wide, community-based, cardiovascular disease prevention program, Perry, Kelder, Murray, and Klepp (1992; Klepp, Kelder, & Perry, 1995) conducted a study of a school-based smoking curriculum (The Minnesota Smoking Prevention Program (MSPP) and SU prevention curriculum (Shifting Gears). The prevention programs were peer- and teacher-led and focused on influencing the social and psychological factors that encourage the onset of cigarette and alcohol use. The study compared student outcomes from a MHHP intervention community with its matched pair. Following the “Shifting Gears” component, 9th-grade students in the intervention community reported significantly fewer drinking occasions during the last month and fewer occasions of problem drinking than did their reference community counterparts. From the 10th through the 12th grades, intervention students continued to report lower rates than their counterparts, but the differences were no longer significant. Before the smoking prevention program there were no significant differences between the intervention and reference community students. In contrast, at all followup years (7th through 12th grades), the intervention students reported significantly lower smoking prevalence and intensity rates than their

Though these differences favored the control condition—13–15% ever smoked in the treatment conditions versus 8% in the controls.
reference community counterparts. At the end of the 12th grade, 15% of the intervention students and 24% of the reference students were smoking.

Strictly speaking, the effects of the school-based curriculum cannot be separated from the effects of the broader community intervention, though the lack of pretest differences suggest that the community intervention had little effect on youth smoking up to that point (after several years of community intervention). This suggests that the curriculum was necessary to produce the effects, which the community intervention may then have helped maintain. Tobler and Stratton (1997) reported that the effect size for this study was almost double that of school-based curricula alone.

Conclusions from school-based curricula used in combination with adult-focused community-wide interventions. The conclusions from these two studies appear to be similar. Although it is not entirely clear, the school-based curricula appear to have brought about changes in youth behavior that might otherwise not have occurred with the community interventions alone. From these studies one cannot be sure that the community interventions had a role in maintaining effects, but other evidence suggests that this is the case. Theoretically, this also makes sense—changed community norms should support the improved behavior of youth.

Independent school plus community studies

Project Northland (Perry et al., 1993, 1996, 1998) was designed to improve parent-child communication about alcohol use, enhance student’s reasons for not using alcohol, strengthen students self-efficacy to resist alcohol, reduce peer influences to drinking, improve alcohol use norms, and reduce student’s ease of access to alcohol. The strategies used to accomplish these objectives were parental involvement and education, social-behavioral curricula, peer leadership opportunities, and community-wide task force activities. The intervention was delivered to students in grades 6–8. The study design was experimental with random assignment of 20 school districts to intervention or control conditions after blocking on district size. A cohort of 6th-grade students were followed for 3 years. In the 6th grade, the intervention included (1) four weekly sessions of activity-story books completed with their parents, (2) small group discussion about the books at school, (3) an evening fair with topic-related posters and projects, and (4) a parent newsletter about adolescent alcohol use. In the 7th grade, the intervention included (1) a kickoff evening party with parents, (2) an 8-week peer-led classroom curriculum, (3) a peer participation program to create alternative alcohol-free activities, (4) four parent/student activities booklets mailed to parents, (5) and three parent newsletters. In the 8th grade, the intervention included (1) an eight-session classroom curriculum; (2) a student theater production performed for peers, parents, and community members; (3) three parent newsletters; (4) a continuation of the peer participation program to create alternative activities; and (5) a teen-written newsletter sent to peers and parents. During all 3 years, community-wide task forces engaged in several community-based activities and received training sessions. The control conditions received no intervention.

By the end of the 8th grade, compared with control students, intervention students reported significantly lower scores on intentions (Tendency to Use Alcohol Scale), and significantly less past-month alcohol use, past-week alcohol use, and peer influ-

\textsuperscript{6}Actually 24, but several small districts were combined into one unit for purposes of this study.
ence on behavior (Perry et al. 1996). The effects were stronger with students who had not yet tried alcohol before the start of the study. In addition to all of the above, intervention students who were nonusers at baseline also reported significantly less cigarette and marijuana use, and significantly greater self-efficacy. The intervention group were also significantly more likely to: (1) report that they could resist alcohol at a party or when offered by a boyfriend or girlfriend, (2) perceive that peer drinking was not normative, (3) to report that people their age do not drink alcohol when they go out on dates, (4) report that their parents had told them what would happen if they were caught drinking, (5) view nine of a list of ten reasons for not using alcohol as important, and (6) to report that driving while drinking would result in being disciplined by the school. Unfortunately, like with many other programs, by the 10th grade, the effects on alcohol use had decayed (Perry et al., 1998). Results from Phase II of the intervention (high school) are not yet available. Like many other studies, the results reported for this intervention can only be attributed to the complete intervention. That is, there is no way of separating out the effects of the school, parent, or community components.

The Midwestern Prevention Project ([MPP]; also known as Project STAR; Dwyer et al., 1989; Johnson et al., 1990; MacKinnon et al., 1991; Pentz, Dwyer, et al., 1989; Pentz, MacKinnon, Dwyer, et al., 1989; Pentz, MacKinnon, Flay, et al., 1989; Pentz et al., 1990) was a comprehensive, multicomponent, community-based program to reduce the prevalence of substance use among middle and junior high-school students designed to reduce the prevalence of tobacco, alcohol, and marijuana use among students in early adolescence, and to reduce the prevalence of other illicit substance use among students during later years. The intervention included school, media, parent, community organizing, and health policy components that focus on resisting peer pressure to smoke and use drugs; preparing for the pressures involved in the transition to high school; counteracting prosmoking modeling influences by adults, media, and the environment; and promoting positive parent–child communication about substance prevention. The intervention was initiated in the 1984–85 school year in the first grade of middle school 6th or 7th). The school-based component included a 10-session curriculum for resistance skills training and homework sessions with parents, and a five-session booster school program and homework. Parent training and community organizing involved several planning meetings, annual educational seminars, and organizing efforts regarding drug prevention curricula and school policies. Mass media efforts included 1- to 2-minute news spots of training and program implementation aired on the evening news by three major network stations, television, and radio talk shows with project staff, press conferences, and articles describing baseline substance use and program goals. A total of 14 television, 15 radio, and 41 print media promotions for the project were broadcast or distributed over the entire Kansas City metropolitan area, including the control group areas, from 1984–1986. Compared to mass media interventions, this represents a very low level of intervention.

In Kansas City, the MPP is a mixed experimental and quasiexperimental longitudinal study. For the experimental study, eight schools were matched on school characteristics and randomly assigned to condition, and all students in the intervention cohort were followed longitudinally. For the quasiexperimental study, 42 schools self-selected themselves to either the school program or a delayed school program (health education as usual) comparison group, and a random 25% of classrooms were surveyed annually.

Pentz, Dwyer, et al. (1989) and MacKinnon et al. (1991) report results from the quasiexperimental study on cigarette, alcohol, and marijuana use, the mediating vari-
ables it was designed to change, and on the extent to which changes in those variables may have mediated program effects on drug use at 1-year followup of the quasiexperimental study. Pentz, MacKinnon, Dwyer, et al. (1989) reported the effects of the intervention on smoking 2 years after the intervention was initiated using data from the two samples merged. Pentz, MacKinnon, Flay, et al. (1989) reported the effects of intervention on smoking 6 months, 1 year, and 2 years after initiation of the intervention using the longitudinal panel from the eight experimental schools. Pentz et al. (1990) examined data from all schools in the Kansas City area over the first year, but focused on effects of the level of program implementation on subsequent change in adolescent drug use behavior. For this component of the research, additional evaluations included a teacher implementation questionnaire and a research staff member program implementation observation measure. Johnson et al. (1990) focused on the panel of students from the eight experimental schools. This report analyzes the effects of the intervention on cigarette, alcohol, and marijuana use 3 years after the intervention was initiated.

At the 1-year evaluation, students in intervention schools had significantly lower prevalence rates for all three drugs (cigarettes, alcohol, and marijuana) than their counterparts in the comparison schools. Also, the net increase in substance use prevalence among students in intervention schools was half that of comparison school students (Pentz, Dwyer, et al., 1989). Students in intervention schools also had significantly decreased rates of intention to use substances, were significantly less likely to believe in the positive consequences of substance use, were significantly more likely to find it easy to talk to their friends about a school or substance problem, and were significantly more likely to report that their best friends would be intolerant of substance use (MacKinnon et al., 1991). Effects on actual behavior were found to be mediated by changes in normative beliefs rather than changes in skills.

At the year 1 and 2 evaluations, students in the intervention schools had significantly lower past-week and past-month rates of smoking that comparison school students. Intervention students demonstrated a low rate of increase in smoking onset, while comparison students had a sharp increase in smoking onset (Pentz, MacKinnon, Dwyer, et al., 1989; Pentz, MacKinnon, Flay, et al., 1989).

At the year 3 evaluation, students in intervention schools had significantly lower prevalence rates for tobacco and marijuana use, but not alcohol use, than comparison school students (Johnson et al., 1990). The quality of CB prevention program implementation, as measured by the amount of implementation or program exposure, had a significant effect on changing adolescent drug use behavior. A high level of implementation produced declines in substance use prevalence rates and prevented increases (Pentz et al., 1990).

Given the research design, we cannot separately estimate the effects of school-curricula, family, mass media, and community components of the intervention. It is quite possible that only one of the components of the multicomponent model had any measurable effect. Students in the comparison schools were exposed to the mass media and community-level interventions, but not to the school curriculum or the family intervention. The results clearly demonstrate that the school and family components added significantly to the effects of the media and community components alone. The large effects of the total intervention also suggest that the media and community components had little effect on students not exposed to the school curriculum (the comparison group). We cannot be sure whether the observed effects are due only to some part of the parent, media and/or community interventions, or if they added to effects
of the school curriculum. It is possible that the school curriculum alone was totally ineffective. Alternatively, it could have had a significant effect or be the only component that produced the observed effects (we shall never know because a pure control group was not available). The bottom line is that we shall never know how much effect the media and community intervention added to the school curriculum—was it responsible for all of the effects, or did they add to significant effects of the school curriculum. However, Tobler and Stratton (1997) in their meta-analyses of effect sizes, reported that effect sizes for the MPP (school + parent + media + community compared with school-alone) were nearly double those found in studies of the effects of school-based curricula alone (usually compared to treatment as usual).

As with any study, replication would strengthen our confidence in the reported results. From this perspective, the lack of reported results from the Indianapolis replication, where the research design was stronger, leaves many questions unanswered and reflects negatively on the MPP study.

**Project Six Teen**

Biglan (1995) has provided the best full-length treatment of the importance of social contextual influences on behavior, and ways to intervene at different contextual levels. Biglan and colleagues (Biglan, 1995; Biglan, Ary, Koehn, et al., 1996; Biglan, Ary, Yudelson, et al., 1996; Biglan, Ary, Smolkowski, & Black, 2000) attempted to put this theory to work in a 16-community study in Oregon. The study compared a multicomponent community-based intervention with a school-based curriculum only. The school-based curriculum consisted of the grades 6–12 Programs to Advance Teen Health (PATH) curriculum, shown in an earlier randomized trial to reduce the rate of smoking among adolescents who reported cigarette use before the intervention (Ary et al., 1990). The community-based intervention consisted of five components: (a) media advocacy, (b) youth antitobacco activities, (c) family communications about tobacco, (d) reducing illegal sales of tobacco to young people, and (e) policy on minors in possession of tobacco.

Schools/communities were randomly assigned to the two conditions from matched pairs, and successive cross-sectional samples of grades 7 and 9 students were surveyed at five times (pretest, two times during the intervention, immediate post-test, and 1-year after the formal intervention ended). During the course of developing the full 3-year intervention, component modules were tested using time-series experiments. For example, Biglan, Ary, Koehn, et al. (1996) tested the effectiveness of the youth anti-tobacco and family communications components. Youth anti-tobacco activities led to increases in parent and youth knowledge about tobacco use and more negative attitudes toward tobacco. Family communications activities led to significantly lower intentions to smoke. Biglan et al. (Biglan, 1995; Biglan, Ary, Yudelson, et al., 1996) found that the Youth Access module was effective at reducing sales of cigarettes to minors.

Biglan et al. (2000) reported the effects of the full intervention. They reported positive results for tobacco, alcohol (grade 9 only) and marijuana use. For example, at 1-year post-test, the effect size for smoking was 1.03. Significant effects were also reported for awareness of efforts to prevent illegal sales, attitudes toward tobacco, intentions to chew smokeless tobacco (males only), estimates of friend’s smoking, and estimates of general peer deviance.

These results suggest that a community intervention that targets multiple influences of tobacco use can improve on the effects of a school-based program alone. However,
we cannot tell how effective the school-based program was. The earlier study of the PATH program found that it reduced smoking amounts at 1-year post-test only among those students who were already smoking at pretest. The program had no effects on the likelihood of pretest nonsmokers taking it up. It is difficult to compare the results of the current study with these because the earlier study reported results on amount of smoking among pretest smokers, and this study reports prevalence of ever smoking. However, the lack of prevalence results in the earlier study suggests the possibility that the results observed in the current study are mostly, maybe all, due to the community activities. A fairer test of the value of community interventions in addition to school-based curriculum would require a three-group design—control, school-only, school plus community—where the school-only condition is shown to produce effects at least as good as one of the better school-based programs (i.e., effect size in the realm of .5).

SUMMARY

My objective was to review research results that compared school-based curricula with programs that combined school curricula with other ways of altering the social environments in which adolescents live their lives—school-wide environmental change, parent training programs, mass media campaigns, and community-wide interventions. I reviewed all known studies that combined a school curriculum with either school-wide environmental change, parent training, mass media, or community-wide programs. While there is evidence that parent training, mass media, and community-wide programs can be effective, there is little evidence of the added effects of any of these approaches over and above the effects of the school curricula with which they are often combined.7 This disappointing result is mostly because most study designs did not allow for separate estimates of school curricula and any added components. The few studies that would have allowed for such estimates were either too small, or found no differential effects.

It is somewhat surprising that so few studies have been designed to separate out the effects of curricula, school-wide environmental change, parent training, mass media, or community interventions. In other respects it may be less surprising because such studies can be very large and expensive. Given the theoretical and practical (feasibility and cost-effectiveness) importance of the question, I recommend that such studies be supported in the near future.

It is also becoming more and more difficult to include pure control groups in prevention studies. However, this limitation makes it very important to compare multicomponent programs with the very best school-based programs—of known effectiveness. This was not done in most studies. Comparing a multicomponent program with a school program of unknown effectiveness does not allow one to estimate the contribution of the other components over and above the effects of the school program.

There is little evidence to date that school-wide climate change programs are effective, either alone or when combined with a curriculum. Three of the reviewed studies suggest that changing the way that teachers manage classrooms and student behaviors and/or their teaching methods and/or altering the school environment in other ways may have positive effects on student behavior and performance. The strongest effects come from the strongest design (Kellam & Anthony, 1998). This study found that

7There is also little evidence of the effectiveness of school-wide environment change strategies alone.
changing teaching and classroom management practices effectively improved school performance at short-term follow-ups, and smoking over the long term (Kellam & Anthony, 1998). However, this study did not compare this intervention with a prevention curriculum. It is difficult to know what to make of the contradictory findings from the Gottfredson et al. studies, but they could be due to methodological issues in that all three studies were relatively small quasiexperimental studies.

Parent training has been found to be effective at changing parenting practices in multiple studies. Indeed, three approaches have been found effective in replications by independent investigators. However, all of these studies are of indicated or selective interventions, that is, those targeted to families of youth who already engage in substance use (or other problem behaviors) or high risk youth/families. The studies reviewed were of universal interventions, and do not provide strong evidence that parent training programs can add to the effects of an effective universal school-based curriculum.

While there have been many attempts to use mass media for prevention, success has been difficult to obtain. Though it needs replication, the Vermont study provides a very strong example of how to obtain success. It requires ensuring that lots of careful steps are taken in the development and design of the media program and its airing. The study does not, however, allow us to estimate how much of the total effect can be attributed to the school program versus the media program. The minimal nature of the school curriculum suggests that most of the observed effects are due to the media component, but without a no-treatment control group one can never be sure. The studies that did include control groups failed in that no behavioral effects were found in any condition (Flay et al., 1987, 1995). Studies are needed that contrast a curriculum of known effectiveness with a mass media program of known effectiveness and a no-treatment (or treatment as usual) control group.

Of the community intervention studies reviewed, only one included the three conditions necessary to separate out the added effects of a community intervention. Unfortunately, it was a small-scale quasiexperiment that reported some effects of the intensive program (school plus parent plus community) on marijuana use, but no effects of the school-only program (Here’s Looking at You 2000, a curriculum of unproven effectiveness). There were no effects of either program on tobacco or alcohol use. None of the larger studies included the three conditions necessary to estimate the effects of the community interventions separately from the effects of the school-based curricula. The North Karelia project compared two different combined programs with a treatment as usual controls, but did not include a school-only condition. The Minnesota Heart Health Class of ‘89 Project and Project SixTeen both compared a combined program with a school-only condition, but had no control group. Project Northland and the Midwest Prevention Project both compared a combined program with a control, but did not include a school-only condition. Each of the combined programs produced significant effects. However, neither study has yet been replicated. Furthermore, in no case are we able to estimate the proportion of that effect that is due to the community component over and above the school component. However, overall, it does appear that the effects of community programs may tend to be larger, occur in more domains, and are more likely to be maintained than the results of school-only programs.

**Conclusion:** Existing studies do not inform us of the differential effectiveness of school curricula-based, school-wide environmental change, parent training, mass media or community-wide interventions. We require such knowledge before we will be
able to recommend any of programs that combine two or more of these approaches to schools or communities for substance use prevention. Without such knowledge, we cannot assess the cost-effectiveness of adding components. Until we do so, schools and communities will not be able to make informed decisions.

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