

## Development and Evaluation of School-Based Violence Prevention Programs

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*Discusses key issues in developing and evaluating school-based violence prevention interventions. Schools provide a natural setting for implementing programs directed at teaching youth attitudes, knowledge, and skills to reduce their involvement in violence. Although multitudes of these programs exist, few have been rigorously evaluated. Developers of violence prevention programs need to pay particular attention to the type of violence being addressed, the target population, relevant risk and protective factors, and the target of the intervention. Conducting sound evaluations of such programs requires careful attention to the unit of randomization, treatment conditions, outcome measures, timing of data collection, and potential moderator variables. Efforts to develop effective prevention programs can be greatly facilitated by adopting an action-research strategy in which evaluation findings provide a basis for continual program refinement.*

Increasing national attention on youth violence has led to the development of numerous prevention programs directed at teaching children various attitudes, knowledge, and skills to reduce their involvement in violence. Such programs are often implemented in school settings for practical reasons and because schools are a primary context for social development (Bronfenbrenner, 1979). The widespread implementation of such programs has become part of our national agenda, as reflected in *Healthy People 2000* (U.S. Department of Health and Human Services, 1990), which calls for the implementation of programs to teach non-violent conflict resolution skills at 50% of all elementary and secondary schools and comprehensive violence prevention programs in 80% of communities with a population over 100,000. This is also reflected in a more recent proposal by President Clinton (Safe and Drug Free Schools, 1999) that requires schools to adopt a comprehensive safety plan including effective violence prevention programs.

Although a multitude of violence prevention programs have been developed, relatively few have been

systematically evaluated (see reviews by Catalano, Berglund, Ryan, Lonczak, & Hawkins, 1998; Elliott & Tolan, 1999; Powell et al., 1996; Samples & Aber, 1998). As a result, there are limited data to inform decision makers about which specific strategies work best with which populations. No matter how well intentioned, the widespread implementation of programs of unknown effectiveness is unlikely to have a significant impact on this serious problem. On the contrary, it may lull policy makers and members of the community into falsely believing they are addressing this problem when the resources committed to such efforts could be better used to develop more effective programs. Moreover, as Elliott and Tolan noted, “doing something is not always better than doing nothing” (p. 16) because some interventions may actually have negative effects on participants.

A concerted effort is needed to provide communities with effective school-based programs to address youth violence. Recent reviews of this literature (Catalano et al., 1998; Elliott & Tolan, 1999; Samples & Aber, 1998) have summarized the current state of knowledge regarding effective programs and documented the urgent need for further study. In this article, we discuss some of the issues confronted by those seeking to advance knowledge in this area. We do not intend to provide a comprehensive review of all the relevant issues. Instead we focus on the key issues encountered in our own work in this area.

During the past 9 years we have utilized an action-research framework (Lewin, 1946) to develop, implement, and refine school-based violence prevention programs for middle school students in the public school system in Richmond, Virginia (Farrell, Meyer, &

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Dahlberg, 1996; Meyer & Farrell, 1998; Meyer, Farrell, Northup, Kung, & Plybon, 2001). This work reflects the collaborative effort of a community team that includes stakeholders from the Richmond Public Schools, the City Manager's Office, and the Richmond Behavioral Health Authority. This effort began with a process and outcome evaluation of a prevention program that had been selected and implemented by the community team (Farrell & Meyer, 1997). The results of this evaluation underscored the need for an intervention with clearly stated objectives and a firm base in relevant research and theory. This led to our development of a new curriculum—Responding in Peaceful and Positive Ways (RIPP).

RIPP is based on a conceptual framework and program objectives derived from a review of the research and feedback sessions with the evaluation and implementation teams (Meyer & Farrell, 1998; Meyer et al., 2001). It is a comprehensive, social cognitive program that includes a 25-session curriculum for sixth graders as well as 12-session seventh- and eighth-grade curricula designed to strengthen and extend the effects of the sixth-grade program. RIPP also includes a peer mediation program in which selected students help their peers solve interpersonal conflicts. A problem-solving model is the backbone of the RIPP curriculum. This model encourages students to make effective choices given the situation and their personal strengths. A valued adult role model—a prevention facilitator—teaches students knowledge, attitudes, and skills that promote nonviolence and resilience. This is accomplished using a variety of techniques including team-building activities, repetition and mental rehearsal, small group work, and role playing.

The current version of RIPP is the end product of a series of studies in which intervention components were developed, implemented, evaluated, and then revised based on process and outcome findings (Farrell, Meyer, & White, *in press*; Meyer et al., 2001). We have also tested the replicability of this program by examining its impact on students in five school districts in rural Florida (Farrell, Valois, Meyer, & Tidwell, 2001). We are currently participating in a collaborative multisite study in which RIPP will serve as the basis for the school-based component of a multicomponent intervention. Throughout this article, we draw on examples from RIPP and other school-based violence prevention programs. It is our hope that this discussion will be of value to others involved in the effort to develop effective prevention programs.

### **Schools as a Setting for Violence Prevention Efforts**

Schools are a particularly appropriate setting for violence prevention programs. To begin with, they are often the setting in which conflicts occur. Recent

shootings by students at schools in Littleton, Colorado, Jonesboro, Arkansas, and elsewhere provide particularly poignant examples of this fact. Although such extreme events are fortunately rare, incidents involving fighting and weapon carrying are all too common. A recent national survey (National Center for Injury Prevention and Control, 1999) of high school students indicated that 15% of students had been involved in a physical fight at school and 7% had been threatened or injured by someone with a weapon on school property. Prevalence rates from baseline data at schools that have been the focus of intervention efforts are often higher. For example, fighting in school was reported by 23% of kindergartners to second graders in Tucson, Arizona (Embry, Flannery, Vazsonyi, Powell, & Atha, 1996) and 37% of seventh to ninth graders in Portland, Oregon (Gabriel, Hopson, Haskins, & Powell, 1996). In Richmond, Virginia, 15% to 21% of seventh graders received at least one suspension during the school year for a violence-related offense (i.e., weapons, fighting, assault). These represent incidents in which students were caught and suspended.

The prevalence of conflict in schools may be partially explained by the nature of a school's social environment (Carlo, Fabes, Laible, & Kupanoff, 1999). Students, often from diverse backgrounds, spend considerable time at school in close proximity to their classmates. The school environment may unintentionally create informal social norms for violence in which aggression is used to gain social status and correct perceived injustices (Fagan & Wilkinson, 1998; Remboldt, 1998). This may be particularly true in economically stressed communities where prosocial means of achieving status (e.g., school success, employment) are limited because of the lack of opportunities or negative attitudes toward such goals (Fagan & Wilkinson, 1998). Schools may also provide opportunities to develop aggressive behavior through interactions with deviant peers (Dishion, Patterson, & Griesler, 1994).

Because schools are a primary context for social development, they provide a natural opportunity for strategies that focus on promoting nonviolent conflict resolution. For example, programs designed to systematically change school climate or school organization, or both, can permeate daily school routines (e.g., Embry et al., 1996) and produce shifts toward recognition and reinforcement of prosocial norms. The presence of prevention facilitators and peer mediators in programs such as RIPP provides opportunities for students to learn how to address conflicts as they occur and can reinforce the skills taught by prevention programs (e.g., Aber, Brown, Chaudry, Jones, & Samples, 1996; Meyer & Farrell, 1998).

There are also practical reasons for implementing programs in school settings. Because the vast majority of children attend school, schools provide an efficient

way to reach a large number of children (Samples & Aber, 1998) that avoids issues related to identifying a location, providing transportation, and ensuring program attendance (Guerra, Tolan, & Hammond, 1994). School settings may also provide accessibility to outcome data such as disciplinary records and teacher reports that may avoid biases associated with relying completely on parent or child report (e.g., Eddy, Dishion, & Stoolmiller, 1998). Finally, school-based programs have a greater potential for continuation because schools represent stable institutions with relatively fixed staff. For example, in Richmond, where we conducted our evaluations of RIPP, the school system secured continued funding to sustain the program.

### Considerations in Developing Prevention Programs

Developers of prevention programs should begin with a strong theoretical model and empirically tested methods and then adapt specific components to the intended population (Coatsworth, Szapocznik, Kurtines, & Santisban, 1997; McCord & Tremblay, 1992; Yung & Hammond, 1998). One means to accomplish this is to assemble experts in the field of violence prevention as well as informed stakeholders who can provide expertise regarding the local community and the particular school (Gottfredson, 1984). Such knowledge is needed to make key decisions about program development, including the type of violence to be addressed, the target population, the risk and protective factors to be addressed by the intervention, the focus of the intervention, the intervention strategy, and the most effective way to integrate the program into the school.

Because different types of violence have different risk factors and developmental pathways, program developers must have a clear understanding of the types of violence they are targeting. According to Tolan and Guerra (1994), there are four types of violence: situational, relationship, predatory, and psychopathological. Situational violence is primarily influenced by sociological factors such as poverty, alcohol and drug use, community norms, and easy accessibility of handguns. Relationship or interpersonal violence arises from disputes between individuals with an ongoing relationship and is the product of a combination of developmental, psychological, and environmental factors. Predatory violence is perpetrated for gain or as a part of an existing pattern of criminal or antisocial behavior and is determined by psychological factors that develop early in life. Psychopathological violence tends to be more extreme and repetitive than other types of violence and is attributed to biological factors such as neural system deficits or severe psychological trauma.

The primary focus of violence prevention efforts in schools has been on situational and relationship violence. These types of violence are most prevalent within school settings and have been shown to be responsive to change through prevention programs (e.g., Farrell et al., in press). In contrast, psychopathological and predatory violence have determinants that often begin before the school years, involve lower prevalence rates, and typically necessitate intensive intervention services (Tolan & Guerra, 1994).

### Identifying the Target Population

An important consideration in developing a prevention program concerns the target population. Should the program be implemented with all children within a certain population, with those at elevated risk, or on an individual level based on the presence of specific risk factors? Answering these questions will lead to prevention programs that are universal, selective, or indicated (Gordon, 1987). *Universal* prevention programs are designed to prevent a problem from occurring by addressing an entire population. These programs focus on the prevention of situational violence and relationship violence precipitated by normal developmental factors such as the development of interpersonal skills, the onset of adolescence, and school transitions and teach basic skills theorized to benefit the entire population (e.g., Meyer & Farrell, 1998). *Selective* prevention programs are designed for subgroups within a population who are at above average risk for being exposed to violence, engaging in violent behavior, or both. For example, selected programs may be developed for students who live in impoverished neighborhoods with high rates of community violence. These programs may incorporate an increased focus on developing strategies to cope with risk factors within such an ecological context. *Indicated* programs are designed for individuals within the population who have demonstrated risk factors predictive of problem behaviors in later life. These programs typically focus on improving high-risk children's social competencies and anger management skills to prevent escalation of problem behaviors in later developmental stages (e.g., Dishion, Andrews, Kavanagh, & Soberman, 1996).

Many programs include a combination of these components. For example, RIPP addresses skills theorized to benefit all children, but selective components are inherent in the program because certain components are adapted depending on the community or student population (Meyer et al., 2001). Similarly, some programs include an indicated component in combination with either universal or selected components by providing an intensive small group intervention targeted at high-risk children in addition to a classroom curriculum aimed more broadly at the en-

tire population in participating schools (e.g., Conduct Problems Prevention Research Group, 1992; Huesmann et al., 1996).

The age of the target population is also important because specific skills and issues are associated with different developmental levels. For example, early childhood (ages 5 to 8 years) is a key period for the development of emotional regulation skills (Samples & Aber, 1998). Because parent-child interactions are critical in shaping these skills, early intervention programs typically involve parents (e.g., Johnson & Walker, 1987). Middle childhood (ages 8 to 11) is an important time for developing beliefs about aggression and strategies for interpersonal mediation. This is a key time frame for the integration of emotional regulation and cognitive and behavioral components needed to develop social competence (Greenberg, Kusche, Cook, & Quamma, 1995). In early (ages 12 to 14) and middle adolescence (ages 15 to 18), peers become increasingly powerful influences and developing prosocial rather than antisocial peer groups is of particular importance. Programs aimed at this developmental level typically focus on conflict resolution, social skills, and diversity training (Meyer & Farrell, 1998; Samples & Aber, 1998). Other programs for middle adolescence include work and job skill programs designed to help students make a successful transition to work roles by providing relevant skills and hands-on experience (e.g., Dryfoos & Dryfoos, 1993).

Other characteristics of the target population to consider include the nature of the community (e.g., urban, suburban, or rural) and the ethnic makeup of the school (Ollendick, 1996). Such factors determine specific components of the program such as language, facilitator selection, and program activities designed to maximize the program's relevance to participants. For example, RIPP facilitators are encouraged to draw on examples of conflict from current local news to help make the curriculum relevant to their particular students (Meyer & Northup, 1998). Other programs that target a specific ethnic group may use ethnically congruent role models, language, and materials (e.g., Yung & Hammond, 1998).

### **Risk and Protective Factors**

A key goal of school-based violence prevention is to decrease risk factors associated with violence and enhance processes that provide either direct protective influences or that moderate the effects of risk. Because there are multiple causes of violent behavior, prevention efforts should be focused on those factors most relevant to the specific target population. This process begins by examining the research literature to identify relevant risk and protective factors, assessing the presence of these factors within the target population, de-

signing an intervention to address these factors, and assessing the extent to which the intervention impacts these factors (e.g., see McCord & Tremblay, 1992, for examples related to antisocial behavior).

Social cognitive learning theory (Bandura, 1989) provides a useful framework for organizing the risk and protective factors related to violent behavior. According to this model, both the individual and his or her environment are responsible for the occurrence of an aggressive act. Specifically, interactions between the individual and environment result in both health-compromising (i.e., risk factors) and health-promoting (i.e., protective factors) behaviors. Consequently, in order to impact the development of violent and nonviolent behavior within individuals or a group, those designing violence prevention programs must consider appropriate risk and protective factors in individual and environmental domains as well as understand the reciprocal influence of these factors on behavior.

Within the individual domain, internal processes related to violent behavior include negative attributions (Weiner, Graham, & Chandler, 1982), cognitive scripts (Huesmann & Miller, 1994), inaccurate social information processing (Crick & Dodge, 1994), current physiological and emotional state (Berkowitz, 1994), and values (Meyer & Lausell, 1996). For example, feelings of purposelessness and perceived racism, which includes both objective and subjective experiences of racism (Clark, Anderson, Clark, & Williams, 1999), may contribute to the tendency toward a hostile attributional bias (Lochman & Wayland, 1994). This bias influences social information processing and can lead to aggression (Graham, Hudley, & Williams, 1992). In contrast, when youth have a sense of personal purpose and perceive that cultural differences are respected within their environment, the protective factors of positive identity and moral competence are promoted (Catalano et al., 1998). To foster relevant protective processes within the individual, the RIPP program includes elements focused on cognitive restructuring, perspective taking, emotional competence, and mutual respect (Meyer & Farrell, 1998).

Environmental factors linked to aggression and violence include coercive parenting and association with deviant peers (Dishion et al., 1994), as well as community factors such as social norms and accessibility of handguns (Fagan & Wilkinson, 1998). Expectations for behavior and opportunities for learning that exist in the school environment are also key environmental factors (Perry & Jessor, 1985). For example, a school climate that promotes respectful attitudes and behaviors can promote positive behaviors (Remboldt, 1998). In contrast, a school climate that operates by intimidation provides few role models of prosocial behavior and little institutional support for positive conflict resolution (Meyer & Northup, 1997). Some violence prevention programs have focused on strategically improving

school climate by involving all staff and students in a school-wide effort to promote prosocial behavior (e.g., Embry et al., 1996).

Behaviors are shaped by both internal and environmental factors as well as the interaction between them (Bandura, 1989). The social information processing model of Crick and Dodge (1994) demonstrated the importance of internal processing in accurately responding to social situations. Although students may want to respond to a conflict in a prosocial way, their options are limited if they do not have the social cognitive skills to do this successfully. Moreover, if violent acts are rewarded by popularity and not discouraged by school staff, they will be more likely to continue. For such youth, an important goal of violence prevention programs might be to foster skills that enable students to respond to conflict in prosocial, nonaggressive ways, provide opportunities for students to role-play and practice these skills, and enhance the school environment to reward such behavior.

### Designing an Intervention Strategy

As the preceding sections illustrate, the focus of violence prevention efforts will be driven by the nature of the target population and identification of the specific risk and protective factors to be addressed (Gottfredson, 1984). For example, to address the individual domain, several programs focus on enlarging the skills repertoire of students by teaching social cognitive problem-solving skills, conflict resolution skills, emotional regulation, and strategies for positive achievement (e.g., Aber, Jones, Brown, Chaudry, & Samples, 1998; Dishion et al., 1996; Meyer & Farrell, 1998; Yung & Hammond, 1998). Some programs also include a focus on changing beliefs about violence and attributional biases (e.g., Aber et al., 1998; Hudley, 1994). Programs that address environmental risk factors may include a parent training component (e.g., Aber et al., 1996; Conduct Problems Prevention Research Group, 1992; Dishion et al., 1996; Embry et al., 1996; Huesmann et al., 1996) or a peer mediation component (e.g., Meyer & Farrell, 1998; VanSlyck, Stern, & Zak-Place, 1996). Other programs aim to create supportive and caring classrooms and schools that foster prosocial norms (Solomon, Watson, Battistich, Schaps, & Delucchi, 1996). To foster change on a systemic level, programs may include students, parents, teachers, administration, and support staff as partners in implementation and seek to generalize program effects across various settings (e.g., Embry et al., 1996).

The specific content of the intervention is another important consideration. Although the developmental processes for protective and risk factors have been well articulated (e.g., Catalano et al., 1998; Crick & Dodge, 1994), the types of experience that can alter these processes and subsequent developmental pathways are

much less clear. For example, drug prevention programs in the 1970s that aimed to change attitudes about drugs were primarily educational and decidedly ineffective (Tobler, 1986). More recent strategies that include skills training and a focus on building self-efficacy have been more effective (Cook, Anson, & Walchli, 1993). In the same way, although we know that negative attributions lead to violence, teaching students about negative attributions by reading specific situations and discussing them may not be an effective strategy.

Promising complementary approaches come from the field of experiential education, in which social activities that involve all five senses (e.g., noncompetitive games) designed to elicit a particular internal dynamic (e.g., negative attributions) are processed in groups through a cycle of reflection (“What just happened?” “How did you feel?”), generalization and abstraction (“How does this experience connect to other experiences in your life?”), and transfer (“Now that you have learned about negative attributions, what are you going to do about it?”; Henton, 1996). These strategies have been effective when teaching academic material because they appeal to the various learning styles of children (McCarthy, 1996). Because there are many options for transforming developmental theory and research about violence into program activities, and because these options have varying levels of effectiveness, program developers need to be methodical about the design of program material.

A final consideration when developing a violence prevention program is determining how to integrate it into the school setting (Elias et al., 1997). First, developers must consider how their program can be incorporated into a school’s vision or mission statement. Second, a core group of school staff should be established to serve as advocates for the program. This group can determine the school’s readiness for a program and support those who implement it. If a program involves a curriculum, it needs to be integrated into the academic schedule and should complement statewide standards for learning. Identification of staffing and resource needs is another crucial component. Some programs have found an outside violence prevention facilitator to be effective (Dishion et al., 1996; Grossman et al., 1997; Meyer et al., 2001; Yung & Hammond, 1998). Others have successfully utilized school teachers (e.g., Aber et al., 1998; Embry et al., 1996; Greenberg et al., 1995; Solomon et al., 1996). Finally, specification of the necessary conditions for program implementation will assist a school in developing a strategy for incorporating a program. For example, the conditions for replicating the RIPP program include (a) a school-wide commitment to promote nonviolence; (b) a core group of school staff who serve as advocates for RIPP and assist in its initiation and maintenance; (c) a qualified, full-time violence prevention

facilitator; (d) participation by the facilitator in the 8-day RIPP training; (e) a RIPP manual; and (f) willingness by the sixth grade teaching staff to schedule 25 weekly sessions of RIPP during the school year.

### Considerations in Evaluating School-Based Programs

Although considerable care may go into the development and implementation of a prevention program, this is no guarantee that the program will produce its desired effects. This statement is rather obvious, but the continued implementation of programs of unknown effectiveness (Elliott & Tolan, 1999) suggests that it bears repeating. Beyond determining if a program works, evaluation findings can also be of considerable value in improving the effectiveness of a program. This is a basic element of the action-research strategy we have employed in our development of RIPP.

Conducting rigorous evaluations of prevention programs in school settings can be a challenging undertaking. This section provides an overview of these challenges by describing five key methodological issues involved in such research. These concern selecting the unit of randomization, treatment conditions, outcome measures, collecting follow-up data, and examining moderator variables. The previous section highlighted the central role of theory in guiding decisions about program development. Theoretical considerations are no less important in evaluation design. The choice of the most appropriate design, outcome measures, and moderator variables to examine logically flow from the same theory that guided the development of the intervention. Theoretical considerations will also determine the extent to which an intervention is considered successful. In particular, if the goal of a prevention effort is to reduce the increase in violent behavior characterized by the normal developmental trajectory, then the success of a program should not be judged by the extent to which it reduces violent behavior but rather by the extent to which it reduces the rate of increase (Robins, 1992). Similarly, the durability of treatment effects must also be judged within a theoretical context (i.e., how long must an effect be maintained before an intervention is considered a success?).

Because this article provides only an introduction to this topic, readers interested in a more general discussion of relevant methodological issues should refer to the excellent sources available on evaluation research (e.g., Chen, 1990; Cook et al., 1993; Rossi & Freeman, 1993), clinical research methods (e.g., Kazdin, 1998; Kendall, Butcher, & Holmbeck, 1999), and prevention research (Bryant, Windle, & West, 1997; McCord & Tremblay, 1992). A more detailed discussion of evaluating school-based prevention programs such as RIPP may be found in Meyer et al. (2001).

### Selecting the Unit of Randomization

A critical decision in evaluating school-based programs concerns the unit of randomization. Students may be assigned to experimental conditions as individuals or in clusters (e.g., schools, homerooms). This choice has important implications for practical considerations, data analysis, and the magnitude and types of program effects to expect.

The smallest unit of randomization is an individual student. In such designs, students are randomly assigned to treatment conditions, and students therefore serve as the unit of analysis. This approach lends itself to common statistical approaches such as repeated measures analysis of variance and analysis of covariance. Such designs typically involve large numbers of students and consequently provide a fairly high level of statistical power (Cohen, 1988) and increase the likelihood that groups representing the various treatment conditions will be equivalent at baseline (Hsu, 1989). Because such designs may require pulling students out of individual classes, they may be too disruptive for many settings. These designs may also result in the diffusion of intervention effects (Kazdin, 1998). This occurs when students not assigned to the intervention are exposed to some of its elements through their interactions with peers, teachers, and others who participate in the intervention. Interventions may have other indirect effects on nonparticipating students. For example, students who participate in an intervention may be less likely to become involved in fights not only with other participants but with nonparticipants as well.

Assigning schools to treatment conditions addresses some of these problems. Such designs decrease the likelihood of diffusion and make it possible to evaluate the effects of school-wide interventions. Assignment of entire schools to treatment conditions should only be attempted when there is a sufficient number of schools to ensure adequate statistical power and equivalence of schools across conditions. A number of investigators have successfully implemented such large-scale designs (e.g., Embry et al., 1996; Grossman et al., 1997). When feasible, schools should be matched on relevant characteristics prior to randomization to increase the likelihood that schools assigned to different conditions will be as similar as possible. Robins (1992) suggested that schools be organized into groups or strata according to the degree of risk based on those factors targeted by the intervention and then within each group randomly assigned to conditions. It should be noted that assigning schools or other clusters of students to conditions require the use of special methods of multilevel data analysis (Bryk & Raudenbush, 1992; Nich & Carroll, 1997; Norton, Bieler, Ennett, & Zarkin, 1996). These methods provide sophisticated techniques for modeling change over time. Such meth-

ods may, however, be difficult to apply to some designs, such as those in which clusters do not remain intact over time.

In some instances it may be feasible to assign clusters of students within a school to treatment conditions. This avoids some of the practical issues associated with assigning individual students. It may not, however, address issues related to diffusion. For example, in our evaluation of RIPP we randomly assigned subgroups of students within schools to treatment conditions (Farrell et al., in press). Students in both the intervention and control groups had access to peer mediation. This resulted in a less powerful test of intervention effects. Nonetheless, the structure of some schools may be such that students assigned to different groups have little contact with each other and form a natural unit for assignment to conditions.

The most appropriate unit of analysis is often dictated by the theory regarding the intervention's mechanism for producing change. Interventions that focus on producing changes within the individual, such as indicated prevention programs aimed at high-risk students (e.g., Dishion et al., 1996; Hudley, 1994), may be suited to designs that assign individuals to conditions. In contrast, prevention programs such as peer mediation, teacher training, and changes in school policies that attempt to reduce violence by changing school norms or environment may necessitate designs in which the school is the unit of analysis. Implementing such interventions in a piecemeal fashion without full student participation simply may not provide the same benefits as school-wide implementation.

### Selecting Treatment Conditions

Beyond the issue of how to assign participants to conditions is the question of what conditions to include. At a minimum, it is important to include a no-treatment control group against which to judge the impact of an intervention. In our evaluations of various prevention programs, we have typically found increases in problem behaviors such as aggression and drug use from the beginning to the end of the sixth grade (Farrell et al., in press). Unlike intervention programs that may be expected to decrease problem behaviors, prevention programs may be considered successful if they reduce the rate of increase. For example, over a 2-year period of implementation, no significant changes in fight-related injuries were found among students in schools receiving the PeaceBuilders prevention program (Krug, Brener, Dahlberg, Ryan, & Powell, 1997). However, during the same period the rate of fight-related injuries increased by 56% in control schools.

The idea of assigning some students or schools to a no-treatment control group is often not greeted with

enthusiasm by school officials and other concerned parties who may be hesitant to withhold what they perceive to be an effective intervention from those they believe could benefit from it. It may also be difficult to recruit schools if there is a possibility that they will be assigned to a control condition in which none of their students are provided with services. Schools assigned to a no-treatment control condition may also be less cooperative with data collection efforts. Nonetheless, as the preceding example illustrates, the absence of a no-treatment control group may make it impossible to evaluate the impact of an intervention. A reasonable compromise may be to use a waiting list control in which all students are eventually given an opportunity to participate in the intervention. In our evaluation of an earlier intervention, we used a design in which approximately half the students participated in the intervention in the fall semester, and the others during the spring semester (see Farrell & Meyer, 1997). Within this design, data were collected at the beginning, middle, and end of the school year. The midpoint assessment thus served as a posttest for evaluating the impact of the program with those who participated in it during the fall semester. Although this design satisfied the requirement of the school system that all sixth graders participate in the program, it had several shortcomings. In particular, it did not provide a basis for assessing the longer term impact of the program.

It should be noted that the term *no-treatment control group* must often be used rather loosely. The evaluations of prevention efforts are always conducted within the context of other programs and ongoing activities within a school and the broader community. Many schools, particularly those in urban areas, are targeted for interventions that may focus on many of the same risk factors as violence prevention programs. Investigators need to be aware of such efforts and how they might influence the results of their evaluations. This underscores the importance of establishing clear communication not only with schools that participate in the intervention, but also with those that do not. If information about other ongoing programs can be obtained prior to conducting an evaluation, this information can be taken into account when schools are assigned to conditions such that schools with other ongoing interventions are balanced equally across treatment conditions.

Although the majority of evaluations of violence prevention programs have tended to include simple designs that compared an intervention to a control group, some have employed more complex designs. Huesmann et al. (1996), for example, employed a multilevel design that included three components: (a) a general enhancement curriculum, (b) a small group curriculum for high risk children, and (c) a family intervention program for high risk children. Their design provided a basis for examining the incremental effects of adding each of the components. Aber et al. (1998) used a quasiexperimental de-

sign to examine different levels of program integration and teacher participation. Other possibilities include designs that compare the relative effectiveness of two different prevention programs. As the field of violence prevention research matures and effective components are identified, it will hopefully begin to follow the lead of psychotherapy researchers by employing more sophisticated designs that attempt to identify the essential components of effective programs (cf. Kazdin, 1998) and to determine which interventions work best for specific subgroups of students (cf. Kiesler, 1966).

### Identifying Appropriate Measures

The variety of measures that have been used to evaluate violence prevention programs is reflected in a compendium published by the Centers for Disease Control and Prevention (Dahlberg, Toal, & Behrens, 1998). This document lists over 100 measures used by 15 evaluation projects funded by the Centers for Disease Control and Prevention. It includes measures of attitudes and beliefs related to aggression, psychosocial and cognitive variables (e.g., attributional bias, ethnic identity, moral reasoning), behavior (e.g., conflict resolution skills, parental control, leisure activity), and environment (e.g., family environment, quality of neighborhood). This is just a sampling of the measures that have been used in other studies. As this plethora of measures reflects, evaluating a violence prevention program requires measures not only of constructs related to its ultimate objectives (e.g., reducing physical fighting, assaults, and weapons carrying) but other domains theorized to have mediating or moderating effects. Appropriate measures to include in an evaluation depend on the nature of the intervention, the proposed mechanism by which it produces change, and characteristics of the students.

It is important for evaluations of a prevention program to include measures of the specific attitudes, knowledge, and behaviors it is believed to address (Eddy et al., 1998). Such measures provide a basis for testing theories regarding the underlying mechanisms through which the intervention is presumed to have its impact (Robins, 1992). For example, an intervention may teach conflict resolution skills because it is assumed that the acquisition of such skills will lead to a decrease in violent behaviors. If an evaluation of this program indicates that it did not result in changes in violent behavior, data on conflict resolution skills can be used to help interpret this finding. If the program did not produce changes in conflict resolution skills, this suggests that students failed to learn the necessary skills targeted by the program. Under such circumstances, process data could be reviewed to determine if the program was implemented as designed, or the developer of the program could consider alternative methods of teaching the skills. If, on the other hand, it

turns out that the program produced changes in conflict resolution skills, but not in violent behavior, this suggests that changing these skills alone is not sufficient to produce the desired changes in violent behavior or that students are unable or unwilling to transfer these skills to their natural environments. Such findings suggest the need for adding additional components to the program. Assessment of variables targeted by the intervention can also be useful in interpreting positive findings. If a program is found to produce significant changes in violent behaviors, but not in the attitudes, knowledge, and behaviors targeted by the intervention, this may suggest a flaw in the investigator's theory regarding the mechanism by which the program produces its effect (Kazdin, 1998; Robins, 1992).

The selection of measures to include in an evaluation will also depend on characteristics of the target population. Age, for example, must be considered to ensure that age-appropriate measures are included, and because programs may target different outcomes at different ages. Because a small percentage of young children may be involved in certain violent behaviors (e.g., weapons carrying), evaluators of prevention programs targeted at younger ages may need to assess risk factors related to these behaviors. Other student characteristics and setting variables may also be relevant. Cultural factors are often an important consideration in selecting appropriate measures (Okazaki & Sue, 1995). Although measures developed within one population may work well with others, this cannot be assumed. We have found that some well-established measures had acceptable psychometric properties when used with our population (e.g., Farrell, Kung, White, & Valois, 2000; Farrell & Sullivan, 2000). In other instances we have been unable to locate measures that appeared to have any relevance to our target population and have found it necessary to construct our own. For example, we (Farrell, Ampy, & Meyer, 1998) constructed a scale to assess exposure to problem situations based on situations identified by students within our urban, predominantly African American student population. The development of this measure began with focus groups to make sure the wording of items was relevant to the target population and ended with an evaluation of its psychometric properties. Contextual factors can also be very important in interpreting the meaning of items. This was evident when we expressed alarm about the high percentage of students in a rural sample that responded affirmatively to items such as "heard guns being shot" and "carried a weapon." We felt rather foolish when members within that community pointed out that their students live in areas where hunting is common. These same items carried a rather different interpretation in the urban setting where they were originally used.

Efforts should also be made to include multiple sources of data. The majority of measures used to evaluate violence prevention interventions have been based

on student report. Such measures have often been criticized for being too subjective and susceptible to various response biases (e.g., social desirability; Kazdin, 1998). This is particularly true for measures of externalizing disorders such as delinquency and aggression in which teacher or parent reports are often preferred (La Greca, 1990). Others (Johnston, 1985; Oetting & Beauvais, 1990) have argued that, under the proper circumstances, adolescents tend to be reasonably truthful in reporting rates of problem behaviors. The accuracy of self-report data can clearly vary depending on the conditions in which it is obtained. In our evaluations of RIPP, we attempt to create a testing environment in which students feel comfortable providing honest responses. We employ research staff so that school officials are not involved in handling data, staff are trained to address student concerns regarding confidentiality, and student names do not appear on any of the test materials, and we employ statistical criteria to screen out random responders (Farrell, Danish, & Howard, 1991).

Each assessment method has its own inherent problems. In various presentations of our outcome findings we have noted that audiences tend to be most impressed with program effects based on school disciplinary code violations (e.g., suspensions for fighting). Because suspensions typically involve incidents that are witnessed by school officials, such data are generally perceived as more objective than student reports. These data are not, however, without their own interpretation problems. Disciplinary code violations may underestimate rates of problem behaviors because not all fights or other incidents occur on school grounds, students do not always get caught, and disciplinary codes may not be uniformly applied. Data are sometimes obtained from collateral sources such as parents and teachers. Although such data may be a valuable supplement to student report, parents and teachers are unlikely to witness all incidents of problem behavior. Behavioral observations of children's aggressive behavior in the classroom have also been recorded using blind raters (e.g., Huesmann et al., 1996). In spite of their objectivity, such data provide only a snapshot of the child's behavioral repertoire and are not representative of all situations in which conflicts typically occur. There is clearly no incontrovertible method of assessing problem behavior that can be used in all situations. As in other research areas (e.g., Newman & Ciarlo, 1994), multiple measures can help clarify the nature of program effects and determine the extent to which they may be method specific.

Finally, measures need to have appropriate psychometric properties (see Newman & Ciarlo, 1994, for a review of psychometric considerations in selecting outcome measures). Measures should meet minimum criteria for reliability including internal consistency, stability, and interrater reliability when multiple

raters are used, and validity including content, criterion, and construct validity. It is also important that measures be sensitive to change (Lambert, 1994). This may be particularly important in evaluating prevention programs related to aggression in which many of the target behaviors have a low base rate of occurrence (i.e., floor effects). Finally, the importance of establishing the psychometric properties for the specific target population should again be noted.

### Collecting Follow-up Data

Evaluations that do not include follow-up assessments give an incomplete picture of program effects. Such data provide a basis for determining the extent to which effects observed at posttest are maintained over time. Our evaluations of the sixth grade RIPP curriculum included a posttest assessment at the end of the school year several weeks after students completed the curriculum and follow-up assessments near the end of the first and second semesters of the following school year. Although several effects observed in the posttest assessments were still evident midway through the seventh grade, none were significant by the end of that school year (Farrell et al., in press). Toward this end we developed, and are currently evaluating, seventh- and eighth-grade curricula designed to strengthen and extend the sixth-grade curriculum.

Follow-up data may also help clarify confusing posttest effects. For example, in an evaluation of the sixth grade RIPP curriculum, we were alarmed to find a trend for students who participated in the program to report greater pretest to posttest increases on a frequency measure of violent behavior than those in a no-treatment control group (Farrell et al., in press). When analyses were later conducted on 6-month follow-up data, we were relieved to see that this trend had reversed itself such that participants in RIPP reported lower frequencies of fighting. Repeated measures analyses of all three time points revealed a significant quadratic effect for the Intervention  $\times$  Time interaction. This interaction reflected a positively accelerating curve for the control group and a negatively accelerating curve for RIPP participants.

We have considered a number of possible explanations for these findings. It seems plausible that students who participated in the intervention may have initially had limited success applying the new skills they learned. Indeed, they may have been even less successful avoiding fights than before the intervention. Bodine and Crawford (1998) noted that individuals pass through the following series of stages when learning problem-solving and conflict resolution skills: (a) having no knowledge of what skills are needed (unconsciously unskilled); (b) recognizing the need for certain skills (consciously unskilled); (c) learning to perform the

skills in a rote, rehearsed manner (consciously skilled); and finally, (d) being able to generalize and perform skills automatically in a variety of settings (unconsciously skilled). These stages are circular, with continued practice and honing of skills needed in order to generalize skills learned in the classroom to real life scenarios. The positive findings revealed at follow-up suggest that students may have ultimately mastered these skills and successfully applied them. Further support for this was evident from other follow-up analyses in which significant effects emerged on several variables (e.g., threatening teachers, skipping school because of safety concerns) that were not evident at the posttest. It may be overly optimistic to assume that students can successfully apply new skills within days after completing an intervention. The acquisition of new skills may take time and students may not use these skills until they feel they have successfully mastered them or had an opportunity to apply them in new settings. In this case, the follow-up data helped clarify what appeared to be a disturbing trend at posttest.

Although follow-up assessments can provide important information about long term program effects, they must often be interpreted cautiously because of the selective effects of attrition. When follow-up assessments are conducted within a school system, data are lost for a variety of reasons. Students move, transfer to different schools, are expelled, are not promoted, have high rates of absences, or elect not to participate in the evaluation. This not only reduces the sample size but can result in a sample that does not adequately represent the school population. We have consistently found that students for whom follow-up data are not available tend to be those who reported higher rates of problem behaviors at previous assessment points (Farrell & Meyer, 1997; Farrell et al., in press), and their absence at follow-up assessments can mask effects. For example, in the evaluation of the sixth grade RIPP curriculum by Farrell et al. (in press), significant pretest to posttest program effects on disciplinary code violations for carrying weapons and for fight-related injuries were no longer significant at the 6-month follow-up. Further examination of the data suggested that the findings at this follow-up assessment were influenced by selective attrition. Although a higher percentage of students in the control group had disciplinary code violations for carrying weapons at posttest, many of these students did not return to these schools for the seventh grade. The net effect was that students in the control group who were more likely to have continued problems were also more likely to be excluded from the 6-month follow-up. Such findings underscore the importance of examining attrition effects (Flick, 1988) and employing analyses that use as much of the data as possible (Farrell, 1999).

In spite of their importance, few evaluations have conducted follow-up assessments beyond 6 months or

a year. A notable exception is the High/Scope Perry Preschool Project (Schweinhart, Barnes, & Weikart, 1993) in which annual assessments were collected on children from ages 3 to 4, when they started the program, to age 11, and additional assessments were collected at ages 14, 15, 19, and 28.

### Exploring Moderator Variables

Investigators evaluating the impact of prevention programs would do well to avoid the outcome uniformity myth (Kiesler, 1966) evident in early psychotherapy outcome research. As with psychotherapy, one cannot assume that a prevention program will be equally effective with all participants. Variables that predict an individual's response to an intervention are a special case of moderator variables (Baron & Kenny, 1986; Holmbeck, 1997). The identification of such variables can help guide efforts to determine the optimum intervention for a given individual. This is particularly important in that some programs have been found to produce iatrogenic effects or negative outcomes for some participants. A striking example of this phenomenon occurred in our (Farrell & Meyer, 1997) evaluation of a middle school violence prevention curriculum based on Prothrow-Stith's (1987) high school curriculum. Our analyses of the impact of this program across a variety of measures indicated no significant main effects. There were, however, significant Gender  $\times$  Treatment interactions. In particular, significant positive effects were found for boys who participated in the program, but for girls there were trends in the opposite direction. The potentially negative impact of this intervention on girls concerned us and led to a systematic review of this intervention to identify factors that may have been responsible for these findings (Meyer & Farrell, 1998). These factors were specifically addressed when we developed the RIPP curriculum.

Others have also reported negative effects for some program participants (e.g., level of baseline aggression; Catalano et al., 1998) and modes of implementation (e.g., aggregating high risk youth; Catterall, 1987; Dishion, McCord, & Poulin, 1999). Moreover, the characteristics of the intervention and school setting may moderate program effects. Aber et al. (1998) found the most favorable results among students who had received the most sessions, even though these students were in classrooms with the least amount of peer mediators and in which teacher-facilitators received only a moderate amount of training. In addition, program effects for aggressive cognitions were moderated by classroom differences and neighborhood context.

Further work is needed to determine the extent to which interventions that have been found to be effective in one setting will prove to be effective in new settings, and to identify the conditions necessary for pro-

ducing change. For example, the initial evaluation study of RIPP (Farrell et al., in press) was conducted in urban schools using prevention specialists who all happened to be African American men, most of whom had several previous years of experience implementing other violence prevention programs within the same schools. Whether their race, gender, previous experience, or other characteristics they may have had in common were critical to the success of the program within this setting remains unknown. We have also conducted an evaluation of RIPP at schools in five rural counties in Florida serving an ethnically diverse student body. Although preliminary findings (Farrell et al., 2001) of this replication study have been encouraging, there are many questions that remain to be answered. Would RIPP produce similar effects in suburban schools, private schools, schools located in other regions, larger schools, smaller schools, or schools that serve a different combination of grades (i.e., junior-high vs. middle-school configurations)? How important is the match between the prevention specialists and the student population? Would RIPP have produced the same effect in the urban schools if it had been implemented by Caucasian or female prevention facilitators? The answers to questions such as these can only be determined by continued replication and evaluation of the impact of the program.

### Conclusions

Schools provide a natural setting for implementing programs directed at reducing youth violence. Although efforts to identify effective programs have intensified, only a handful of programs have met even minimal criteria for effectiveness (see reviews by Catalano et al., 1998; Elliott & Tolan, 1999; Samples & Aber, 1998). Further work is urgently needed to identify relevant risk and protective factors for different types of violence, to develop appropriate strategies and components to address these factors, and to evaluate their impact across different target populations. Although the urgency and seriousness of this problem has created considerable pressure for immediate action and quick solutions, the development of effective strategies is most likely to emerge from rigorous evaluations of programs well grounded in relevant theory and research (Mercy & Potter, 1996). Shortcuts are unlikely to build the solid foundation needed to support the development of effective prevention programs. Individuals committed to developing effective violence prevention programs are encouraged to pursue an action-research paradigm (Gottfredson, 1984; Lewin, 1946) in which the results of their evaluations are shared with the community and used to continuously update and improve the intervention. As this article illustrates, we have found this approach extremely useful in our own

efforts to develop and evaluate violence prevention programs.

Finally, although the development of effective school-based violence prevention programs is a laudable goal, such programs are likely to have limited long-term effects unless they are implemented as part of a more comprehensive effort to reduce youth violence. Creating a school environment in which students feel support for engaging in prosocial behaviors may be an effective method of changing students' in-school behavior, but such effects are not likely to generalize across settings if they are not supported in the broader community (Ollendick, 1996). This underscores the need for the development of effective community-based strategies such as parent training, after school and summer programs, increased police presence in communities, and increased opportunities for meaningful youth employment. In addition, examination of the processes through which community-based programs can support and enhance school-based programs will assist communities in determining the best way to use their resources. Ultimately, coordination of efforts between various program implementers, community stakeholders, program evaluators, and program designers will provide a basis for the institutionalization of comprehensive programs that effectively reduce youth violence.

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