

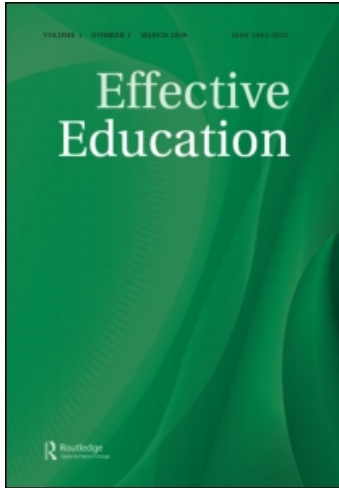
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School-based prevention: current status and future challenges

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The field of school-based prevention of behavioral problems and promotion of caring and competence has grown dramatically in the past decade. This article provides a brief summary of current progress in the field and a discussion of future challenges and directions in research and practice. The article presents four future directions for research in the field of school-based prevention and health promotion: building the science of implementation and sustainability, building greater integration between educational policy and prevention, understanding factors influencing program integration with ongoing programming in schools, and the continued development and refinement of new programs and models. These future directions are driven by two significant research-to-service challenges faced both by practitioners and researchers that involve systems integration across developmental stages and levels of care. There is little question that further advances in the development and application of effective prevention practices and policies with schools and communities will require a much greater degree of collaboration in which researchers learn from educators and vice versa. A central part of this collaboration includes greater attention to the important role that prevention programs and policies can play in both increasing academic performance and resilience, and improving the quality of life of communities.

Keywords: prevention; social-emotional learning; social development; curricula; social competence

Introduction

The field of school-based prevention has grown dramatically since the first Institute of Medicine report (Mrazek & Haggerty, 1994), as reflected in the most recent report (O'Connell, Boat, & Warner, 2009). Here I provide a brief summary of current progress in the field and a discussion of future challenges and directions in research and practice. I do not provide a comprehensive review of effective programs and policies, both of which are beyond the scope of this article (see section on Current Evidence for citations to numerous reviews).

Why is school-based prevention critical to community well-being?

Citizens in many countries are concerned about the extent to which today's children and youth experience poor academic achievement, high rates of early substance use, violence, and school dropout. Because of the universal nature of schooling, schools

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provide a critical opportunity for changing societal behavior as almost all children are engaged in this institution for many years, starting at an early and formative period. As a result, schools have come to play a more central role in the prevention of mental disorders and the promotion of well-being.

By virtue of their central role in lives of children and families and their broad reach, schools are the primary setting in which many initial concerns arise and can be effectively remediated. Schools are the primary environment in which all children must learn to negotiate and function and their relations with both adults and peers have long-term impacts on their development.

Because of their central role in a secular society, public schools not only focus on traditional core subjects, but also assist children to function effectively as constructive citizens and productive workers. In our global, competitive society, schools play an important role in attempting to ensure that all students learn how to interact with others from diverse backgrounds in socially and emotionally skilled ways, practice healthy behaviors, and behave responsibly and respectfully (Greenberg et al., 2003). Although somewhat at odds with some current national policies, such as those in the USA created by No Child Left Behind, which appear to almost solely focus on test score results, this broader perspective on educational goals has been strongly endorsed by national associations of educators (Association for Supervision and Curriculum Development, 2005; Bear & Minke, 2006; Tognoni & Anderson, 2003).

The potential benefits of improved behavior and well-being of school children are both direct and long-term. More directly, improved behavior both during instruction and with peers leads to a better classroom atmosphere, reduced interruptions, and supports teacher's effective instruction, which influences academic achievement and school success. Broader and longer term benefits may accrue from improvements in social relations with others as well as reductions in delinquency and antisocial behavior, school dropout and academic failure, and improved mental health. Building protective factors to promote good mental health has the potential to reduce the burden on multiple forms of later disease/poor outcomes. Finally, even if treatment is effective for those with identified disorders, only prevention can reduce the number of new cases.

Types of school-based interventions

There are a variety of types of school-based interventions. First, interventions can be categorized in terms of their reach and focus. Universal interventions are those that are used with all children, are relatively low in cost, attempt to reduce a variety of risk factors and promote a broad range of protective factors that will both increase competence and reduce disorder across the entire population. Universal interventions can have a variety of foci. For example, some interventions are primarily focused on the school and its structure (organizational features, school rules), as in models such as Positive Behavioral Intervention Support (Horner, Sugai, Todd, & Lewis-Palmer, 2005). As of yet, there is little research with strong experimental designs to show the efficacy of these approaches alone, in spite of their growing popularity (Bradshaw et al., 2008). Second, other interventions have primarily focused on improvement in the teacher's classroom management. These interventions support more proactive classroom management by teachers and may have a variety of skills that are taught to teachers to improve attention, behavior, the management of transition times, etc. A well-researched example of a teacher-management intervention is the Good Behavior

Game which has been shown to reduce disruptive behavior (Kellam, Ling, Mersica, Brown, & Jalongo, 1998; Kellam et al., 2008).

The third and most researched types of universal intervention are curricula that teach students new skills which build their competence to engage in positive peer and adult relations, and to develop self-control and healthy values and norms to resist engagement in deviant or dangerous behavior. Although a relatively new term, most of these skills-based programs can be characterized as 'social and emotional learning' (SEL; Elias, 1997). SEL programs are characterized by improvements in competence in the following five domains: self-awareness, social awareness, responsible decision making, self-management, and relationship management. Although some universal skills-focused intervention models focus on only one or more of these competencies, there are numerous others that focus on most or all of these competencies in programs that are taught by teachers over multiple school years (Collaborative for Academic, Social, and Emotional Learning [CASEL], 2003). In addition, there are numerous intervention models that combine skills-based interventions at the classroom level with ecological interventions that focus on behavior or policies in other areas or domains of the school.

In addition to universal intervention, schools have also become a venue for both targeted and indicated interventions. Selective interventions are those that are delivered to a class of children either because their characteristics place them at risk for later problems (e.g., poverty, the children of parents who are depressed or have serious substance abuse problems, children with peer relations and/or social skills difficulties) or because students have experienced a stress-triggered event that increases their risk for maladjustment (e.g., divorce, loss of a parent through death, other traumas, moving to a new school). In these cases, no student may yet have difficulties, but the circumstances in which students find themselves create additional risk. Selective interventions usually involve specialized services such as group interventions, and once again many of these interventions can be characterized as teaching aspects of social and emotional learning including social skills, social information processing and decision-making. Examples of school-based selective interventions shown to reduce later maladjustment include the School Transitional Environment Project (STEP) (Ferner et al., 1993) to ease the transition for children who have moved to a new school and the Children of Divorce Parenting Program (Wolchik et al., 2002).

Finally, some school-based interventions focus on children who are already showing early prodromal signs or serious disorders, and are designated as indicated preventions. These children include those who are showing high rates of aggressive behavior, anxiety, depression or other forms of maladjustment. Although this group usually excludes those that have diagnostic disorders such as conduct disorder or major depression, this group of children are chosen for intervention because of the symptoms that they are manifesting. Once again, these interventions are usually provided in special groups and most support the development of SEL skills. An example of a school-based indicated program that reduces behavior problems and delinquency is the Anger Coping Program (Lochman & Wells, 1996).

Universal, selective and indicated interventions may all employ multi-component interventions in which the school is only one element, and others may include family or community-based interventions. However, given the extra costs associated with multi-component interventions, they are more often utilized with either selective or indicated models, or with universal models that occur in high-risk neighborhood schools. An example of an exemplary universal focused, multi-component program is

the Seattle Social Development Project (Hawkins, Kosterman, Catalano, Hill, & Abbott, 2005). An example of a selective multi-component program in the early elementary year is *The Incredible Years* (Webster-Stratton, 1998), and an example at the middle school transition is the *Coping Power Program* (Lochman & Wells, 2004). Finally, an example of a multi-component indicated program is *Fast Track* (Conduct Problems Prevention Research Group, 2007) which focuses on children with high levels of aggression at the entrance to school.

Universal programs are desirable because they can contribute to adaptive coping/resilience across an array of experiences and settings. Because these programs are positive, proactive, and provided independent of risk status, their potential for stigmatizing participants is minimized and they may be more readily accepted and adopted. Further, when conducted in schools, students are 'captive populations,' and this obviates the need for recruitment and dramatically reduces attrition. Universal programs may operate not only through ecological change and skill development, but also through building peer support for positive choices.

Another advantage of universal models is the potential for a single preventive intervention to reduce or prevent multiple problems. A growing body of research shows that many poor outcomes such as psychopathology, substance abuse, delinquency, and school failure have overlapping associated risk factors and a significant degree of comorbidity (Greenberg, Domitrovich, & Bumbarger, 2001). Because of their focus on risk reduction and health promotion, universal preventive interventions often produce reductions in multiple problem areas. In addition, universal programs may also promote well-being and enhance resilience.

A final advantage of universal school models is that targeted (selective and indicated) approaches are likely to miss a large percentage of later cases. Durlak (1995) points out that if only 8% of well-adjusted children go on to have serious adjustment problems as adults (as opposed to 30% of clinically dysfunctional children), the well-adjusted children will represent 50% more of the population of maladjusted adults, based on real numbers. This follows Rose's maxim that 'a large number of people exposed to a small risk may generate many more cases than a small number exposed to a high risk.' It may then be beneficial to provide universal preventive interventions regardless of the low prevalence rate of childhood psychopathology. Thus, when dealing with a common and costly disorder such as depression or conduct disorder, there may be more justification for preventive efforts that are universal (Merry & Spence, 2007; Shamblen & Derzon, 2009).

However, there are also 'trade-offs' between universal and targeted (indicated or selective) approaches (Offord, 1996). A potential disadvantage of universal programs is that, based on the relatively low prevalence of psychopathology, much of the effort will be spent on children who may not develop mental health problems. Further, because of the relatively low dosage provided by most universal interventions, they might not provide sufficient duration or intensity to alter the developmental pathways of children already at significant risk for psychopathology. Thus, for children at relatively high risk or who are already showing early signs of disorder, the greater conceptual precision, intensity, and focus of targeted models may produce greater benefit. Offord (1996) also raises the question of whether universal programs will have the greatest impact on those at lowest risk, though the findings of some programs contradict this theory by demonstrating stronger effects for more at-risk subgroups (Kellam et al., 2008).

The implementation of universal school-based interventions also poses considerable challenges. First, they require access to and the approval of schools that often

appear overburdened with other academic and policy-related priorities. They also require multiple levels of approval, often from superintendents, principals and teachers, as well as school boards and community partners. Second, the relatively low dosage that is common to most universal strategies may not offer sufficient exposure to impact children already at very high risk for a specific disorder (e.g., depression or anxiety). Thus, universal interventions are likely to be most effective when they are of sufficient duration and intensity, target the development of protective factors and resilience that are likely to impact risk for multiple disorders, or target problems that are common to a large segment of the population (e.g., bullying, early alcohol use). Finally, there are considerable challenges in obtaining both high-quality implementation and sustainability (see below).

What is the current evidence for the effectiveness of school-based prevention?

The past two decades have brought clear progress and a stronger empirical base to the field of school-based prevention and the broader field of social and emotional learning (Greenberg et al., 2003). There are now a considerable number of evidence-based interventions (EBI), classroom- and family-based curricula that have been shown to reduce mental health symptoms, substance use, and their associated risk factors. Reviews and meta-analyses of the prevention of substance abuse (Blitz, Arthur, & Hawkins, 2002; D.C. Gottfredson & Wilson, 2003; Lochman & van den Steenhoven, 2002; Tobler et al., 2000), violence and antisocial behavior (Elliott & Mihlaic, 2004; US Department of Health and Human Services, 2001; Wilson, Gottfredson, & Najaka, 2001; Wilson, Lipsey, & Derzon, 2003), mental health (Adi, Killoran, Janmohamend, & Stewart-Brown, 2007; Durlak & Wells, 1997; Greenberg et al., 2001; Hoagwood et al., 2007; Tenant, Goens, Barlow, Day, & Stewart-Smith, 2007), and positive youth development (Catalano, Berglund, Ryan, Lonczak, & Hawkins, 2002) have shown that both universal and targeted prevention programs can substantially reduce the rate of problem behaviors and symptoms, and build protective factors that reduce further risk in child and adolescent populations.

Violence and aggression

Recent Campbell Collaboration reviews (meta-analyses) have noted the effectiveness of social information-processing approaches for the prevention of aggression and violence in both universal (Wilson & Lipsey, 2006a) and selective models (Wilson & Lipsey, 2006b). A recent update of these meta-analyses examined 249 studies using experimental designs that assessed aggressive and disruptive behavior. The mean effect size of these interventions on aggression was 0.21 ($p < .05$) (Wilson & Lipsey, 2007). When divided by type of intervention, universal model effect size was 0.21 – within these studies there were somewhat larger effects for younger children and those of lower socio-economic status (SES). The effect size for selected and indicated interventions was 0.29; among the targeted students, those who showed greater problems showed greater improvements. In addition, behavioral strategies were more effective than cognitively oriented models. The quality of implementation has a significant impact on outcome, with higher quality implementation related to a greater effect size. The authors conclude that these effects are both statistically significant and of practical significance, and they forecast that such programs would lead to a 25–33% reduction in the base rate of aggressive problems in an average school.

A recent report from a Center for Disease Control taskforce also indicates the efficacy of universal school-based models for the prevention of violence (Center for Disease Control and Prevention, 2007; Hahn et al., 2007). Fifty-three universal prevention studies were utilized in the meta-analysis and the median effect size was .15, with generally greater effect sizes seen in preschool and elementary school-aged children. Thus, there was substantial agreement between these two comprehensive studies that universal school-based violence-prevention programs represent an important means of reducing violent and aggressive behavior in the USA as well as other countries (Adi, Killoran, Schrader Macmillan, & Stewart-Brown, 2007).

Depression

Although before the 1980s there was little focus on the prevention of depression, there has been a dramatic increase in the development and evaluation of both universal and targeted prevention models during the past decade (Beardslee & Gladstone, 2001). Two recent meta-analyses have reviewed this rapidly growing literature (Horowitz & Garber, 2006; Merry & Spence, 2007). In general, the results show substantial effects of selective and indicated programs; however, effects vary by population and there is a need for further replication in school settings. Although the meta-analyses show inconsistency in findings from universal analyses and few follow-ups, both reviews indicate the substantial promise of universal interventions due to the absence of the need for screening, the non-stigmatizing nature of universal interventions, and the potential benefits of non-depressed peers as models. A recent universal prevention study with high school students illustrates these benefits, showing that both cognitive and interpersonal models demonstrate overall effectiveness compared with a control sample and that students with higher pre-test scores on depressive symptoms show the greatest reduction following the intervention (Horowitz, Garber, Ciesla, Young, & Mufson, 2007).

Anxiety

Although relatively few studies have examined preventive interventions for anxiety disorders, these programs appear quite promising (Barrett & Farrell, 2007). Both universal and indicated interventions have been conducted with children as young as preschool and through middle school (early teen years). Effects have shown significant reductions in most cases at post test (both universal and indicated) with some effects maintained as long as two to three years after intervention. Initial studies have, in some cases, shown the largest impact on girls (although impact on boys is also reported) and on children around ages 11 and 12. Most of these studies have been conducted in Australia and require replication in other countries (Neil & Christensen, 2007). At present, there has been no meta-analysis of interventions for anxiety.

Early alcohol use

Spoth, Greenberg, and Turrissi (2008) reviewed 127 reports of preventive intervention studies with alcohol-specific outcome measures falling into three developmental periods (under 10 years, 10–15 years, 16–20+ years). They classified interventions into one of three categories; ‘most promising evidence,’ ‘mixed or emerging evidence,’ and ‘insufficient or no evidence of impact.’ For interventions to be considered mixed

or promising required significant effects at least six months post intervention. Most interventions occurred in school settings. Twelve interventions met criteria for 'most promising' evidence and 28 met criteria for 'mixed or emerging' evidence. The review indicated the need for greater emphasis on particular populations (e.g., early tweens, late teens and young adults not attending college, non-majority populations), the need for longer longitudinal follow-up, replication studies, and dissemination research. As with the meta-analyses on depression and aggression, there is a need for improved consistency in reporting standards of evidence.

A recent meta-analysis has examined the effectiveness of universal school-based interventions on a variety of outcomes (Durlak, Weissberg, Taylor, & Dymnicki, in press). This analysis shows that SEL interventions have a substantial impact (effects sizes from 0.15 to 0.35) on a variety of outcomes including aggression and disruption, social and emotional competence, school bonding, prosocial norms, disciplinary referrals, emotional distress, and academic achievement. It should be noted that few interventions that focus on promoting positive development or citizenship have been evaluated.

Improving outcome research

The number of EBI preventive interventions has grown substantially and randomized clinical trials have been crucial in legitimizing these prevention efforts by demonstrating clear outcomes. Although great progress has been made in school-based prevention with a variety of demonstrated outcomes, effect sizes are often small to moderate, and there is need for more effective and refined programs. A number of improvements in the research on program outcomes are needed in the next generation of school-based research. First, there is a need for longer longitudinal follow-up, because most programs have demonstrated their outcomes only for a relatively short period. Second, few prevention models have been independently replicated. The literature specifies different types of replications (e.g., exact, scientific, conceptual, and systematic) and discusses their applicability across different phases of prevention research (Flay et al., 2005). Systematic replications, ones that entail studying the effects of systematic variations in programs are especially important to consider and without further replication few would meet the criteria set forth by the Society for Prevention Research (Flay et al., 2005). Third, there is a need for studies to have sufficient power, when feasible, to analyze their findings at the level of randomization or implementation.

Fourth, there is a need to examine how generalizable the findings of already 'proven' evidence-based models may be across cultural groups, understudied groups (e.g., rural or immigrant populations), and contexts. This may include replication with new populations, as well as examining versions that strengthen the cultural competency of interventions. As part of this process, it will be important to differentiate surface structure changes (changes in wording, pictures, and stories to represent culturally relevant models) compared with deep structure changes (actual changes in the skills, attitudes, cognitions, or policies that may be necessary with different cultural groups).

Fifth, there has been limited study of the active ingredients or core components of most programs. Given the resource demands of programming, especially in middle and high schools, it will be important to assess which intervention components are producing the observed effects. This might include dismantling designs and factorial designs (Collins, Murphy, Nair, & Strecher, 2005). By testing improved logic models

with broader and more valid assessments, future research should test multiple models of the mediational processes. For example, when a selective prevention program produces changes in depressive symptoms are these mediated by changes in attitudes or cognition that are related to the theory of action on which the intervention is based? Are these changes evident in social–emotional behavior as evidenced by the observations or reports of others (teachers, peers)? Are changes at the behavioral or cognitive level also found at the neurophysiological level? When a universal intervention leads to reductions in aggression, one might address the same mediators as above, but in addition consider larger ecological levels. For example, did the intervention reduce aggression in students *vis-à-vis* changes in teacher behavior or through changes in the perceived safety of the classroom context? Similarly, when classroom-wide interventions positively alter teacher behavior, are these effects mediated through the quality of technical assistance that is received or by the degree of instructional leadership and support provided by principals or other administrators?

Sixth, there has been limited study of the moderators of program effects. That is, there is a need to assess for whom and under what conditions program effects are obtained. For example, universal programs are very unlikely to have uniform effects across a population. By having more accurate knowledge of who is least likely to be impacted, it will be possible to either alter the program to increase its impact on this population, or to create selected or indicated programs that integrate with the universal program to impact those who require additional services (Conduct Problems Prevention Research Group, in press). In this regard, the integration of molecular genetics with prevention trials, when done with care, may provide new insights into program improvement.

Seventh, research on selected and indicated models would be strengthened by the use of active control groups that receive an alternative intervention to counter potential placebo effects. This is not a significant problem in universal interventions that are delivered by normal teachers as part of the regular curriculum because students are not selected by any criteria, and they are not ‘pulled-out’ for a special program. However, for universal interventions, it will be instructive to randomize students to different efficacious interventions to compare the relative benefit of the interventions.

Eighth, as recommended in past reviews, greater attention to benefit–cost analysis is required. Few school-based interventions have had careful benefit–cost analyses conducted (Aos, Mayfield, Miller, & Yen, 2006) and such findings can have a considerable impact on public policy (Duncan & Magnusson, 2007). The careful analysis of costs is an essential component as schools and communities need advance knowledge of the true costs of programs in planning for both implementation and sustainability.

Finally, there is a need for greater consideration of the most effective metrics by which to report the outcomes to the public. Although effect size may be the most appropriate metric for studies of treatment or indicated interventions in which all participants begin with a substantial rate of symptoms, it may be a poor metric for universal interventions. In universal interventions, it is usually the case that a large percentage of the population begins without symptoms and thus it is unlikely (at least in the short term) that much of this population will change. In most cases, it is only in the higher symptom group of the population that larger effect sizes will be obtained (Wilson & Lipsey, 2007). Thus, for universal interventions, effect size may not be effective for indicating the practical and social policy significance of effects where impact is a product of both population reach and effect size (Davis, MacKinnon, Schultz, & Sandler, 2003; Hemenway, 2009).

Evidence, policy, and community dissemination of information

Much of the progress in school-based prevention and promotion has been due to the adoption of the public health model and the advent of prevention science as applied to curricular interventions (Coie et al., 1993; Mrazek & Haggerty, 1994). This has included the analysis of longitudinal data to understand both the risk and protective factors related to later maladaptive outcomes, as well as the multiple pathways and stages of development of these adolescent problem behaviors. Further, there has been substantial attention to methodology with attendant improvements in study design and analysis (hierarchical linear models, etc.). In addition, numerous program developers have created carefully manualized, replicable models of intervention. The use of randomized clinical trials has been crucial to legitimizing prevention efforts.

The growth of evidence in the field has been paralleled by a substantial change in policy legislation at both the federal and state levels. Two dramatic examples are the Safe and Drug-Free Schools Act of 1999, which stated ‘principles of effectiveness,’ and the No Child Left Behind Act of 2001, which calls for school districts to implement evidence-based programming (Hallfors & Godette, 2002). Further, numerous state and federal agencies have created grant programs for communities that restrict funds to the use of evidence-based interventions programs (e.g., Substance Abuse and Mental Health Administration, Center for Disease Control). Numerous best-practice guidelines have been published at the federal and state level (Maryland Governor’s Office on Crime Control and Prevention, 2003), and in Europe (Fundacion Marcelino Botin, 2008), although somewhat different and sometimes confusing, criteria have been used for the selection of ‘model’ or ‘effective’ programs across reviews and federal agencies (CASEL, 2003; US Department of Education, 2001; Substance Abuse and Mental Health Administration, 2003; US Department of Health and Human Services, 1999).

Although some websites have chosen to only list programs that have demonstrated significant outcomes (Blueprints for Violence Prevention: www.colorado.edu/cspv/index.html), a substantial policy change has recently been made by the Substance Abuse and Mental Health Services Administration on the National Registry of Evidence-based Programs and Practices site (<http://www.nrepp.samhsa.gov/>). Instead of deciding that certain programs met the criteria for efficacy or effectiveness, this highly accessed federal website now lists many programs, some of very dubious quality, and leaves it to the uninformed consumer to evaluate which are satisfactory. Because few educators are well-trained in prevention science or outcomes research, this strategy may lead to substantial confusion and the implementation of programs of low quality. A new development in education is the What Work’s Clearinghouse; unfortunately, they have chosen not to evaluate school-based programs for the prevention of problems of mental health or substance use, character education, or the promotion of positive youth development.

This article presents four future directions for research in the field of school-based prevention and health promotion. These directions are: building the science of implementation and sustainability, building greater integration between educational policy and prevention, understanding factors influencing program integration with ongoing programming in schools, and the continued development and refinement of new programs and models. These future directions are driven by two significant research-to-service challenges faced both by practitioners and researchers that involve systems integration across developmental stages and levels of care.

The prevention challenge: systems integration

During the next decade, prevention initiatives face a number of significant challenges that signal the next stage of the linkage between prevention science, policy, and practice in the educational system. These challenges focus on the need to better integrate prevention programming along the dimensions: stages/grades, levels of care, and community institutions.

Systems integration across developmental stages

As a result of federal and state legislation, US schools are rapidly altering their organization and are striving to develop broader and more comprehensive models of reform that utilize clear goals, standards, and benchmarks for outcomes (Education Commission of the States, 2001; Togerni & Anderson, 2003). As EBIs have accumulated and schools have begun adopting these programs at increasing rates (Ringwalt et al., 2002), schools are now searching for integrated models with a clear scope and sequence from pre-kindergarten through Grade 12 (pre-K-12) (CASEL, 2003; Elias, 1997; Weare, 2004). At present, the field of prevention science has primarily assessed isolated programs that span relatively small parts of this entire age span.

As this process of school reform grows, researchers and practitioners will need to work together to develop pre-K-12 guidelines and to consider how all the elements of evidence-based programs and policies fit together in the context of an overall school-wide or school-district effort, how they increase student school success, and how to ensure that coordinated, multi-year programs will be implemented effectively (Adelman & Taylor, 2000; Osher, Dwyer, & Jackson, 2002). This will require not only integrating program models across developmental periods, but also that researchers and practitioners engage together in developing long-term curricular planning, ensuring adequate local infrastructure to support prevention activities, teacher training and technical assistance, and appropriate evaluation of process and outcome (Greenberg et al., 2003). As a result of legislation in both Illinois and New York requiring schools to develop plans for social and emotional learning, models for learning standards and benchmarks now exist across all grade levels (www.casel.org/standards/learning.php#IL).

Systems integration across levels of care

It is a rare school–community system that has developed integrated programming between universal, classroom programs and either selective prevention (e.g., counselor-led programs with students who are experiencing divorce, bereavement, or other trauma), indicated services (for children identified as having aggression, peer problems, prodromal signs of depression, etc.), or treatment. This is in part due to the fragmented nature of the models created by curriculum developers and researchers, as well as the often fragmented planning between schools, government agencies, and the private sector of human services. One exception is the Fast Track program, which intentionally and systematically attempts to integrate levels of prevention (Conduct Problems Prevention Research Group, 1992, 2000). Thus, a second challenge is to create models that integrate curriculum training and technical assistance across levels of prevention and treatment services (Adelman & Taylor, 2000).

Integrating prevention programming across developmental levels and levels of care provides major services research challenges that will dramatically alter the nature

of the research–practitioner agenda and require new models of communication and collaboration across these disciplines. To create coordinated planning and action across institutional structures and levels of care will require greater integration between community agencies and schools. To encourage these actions will require substantial policy changes at the local, state and federal levels (New Freedom Commission Report on Mental Health, 2003).

Although there have been substantial accomplishments in both prevention research and its impact on federal and state policy, the two science-to-practice challenges discussed above lead to four future directions for school-based prevention research.

Building the science of implementation and sustainability

As more programs have shown efficacy in controlled trials, a next stage in prevention programming is to move to studies of effectiveness under real-world conditions (Mrazek & Haggerty, 1994). This research focus, deemed ‘Type Two translational’ research, focuses on factors associated with the adoption and utilization of scientifically validated interventions by service systems (Green, 2007). ‘Type Two’ research proceeds after efficacy has been established and examines factors associated with the adoption, maintenance, and sustainability of science-based interventions at the practice level. Such research is necessary because EBIs often are poorly implemented in real-world settings. When this occurs, they are very unlikely to yield the expected benefits (Domitrovich et al., 2008; Durlak & Dupre, 2008).

Within translational research, a central question to address is what factors influence the quality of implementation? In such studies, implementation quality itself may be the outcome. Although reviews of the implementation literature (Dane & Schneider, 1998; Domitrovich & Greenberg, 2000; Durlak, 1998) indicate the absence of significant attention to this issue, the study of implementation has recently become a greater focus and there is a now a developing ‘science of implementation’ (Dane & Schneider, 1998; Domitrovich & Greenberg, 2000; Durlak, 1998). There is increasing knowledge regarding a variety of factors that influence implementation quality and it is clear that better quality implementation leads to improved outcomes for children (Durlak & Dupre, 2008).

Research should focus on a variety of factors including the decision-making process regarding the adoption of an EBI, the curriculum model or policy and the implementation support system, as well as non-program factors involving the characteristics of teachers, students, and policies, and the regulations of school and governmental bodies. For example, a recent community-based study highlighted the interactive influences of both high-quality implementation by teachers and the level of principal leadership in influencing aggressive behavior in elementary aged children (Kam, Greenberg, & Walls, 2003). Three conceptual models that may assist in guiding research questions include those of the National Implementation Research Network (Fixsen, Naoom, Blase, Friedman, & Wallace, 2005), the school ecological model (Greenberg, Domitrovich, Graczyk, & Zins, 2006), and the REACH model (Glasgow, Klesges, Dzwealtowski, Bull, & Estabrooks, 2004).

Although some aspects of implementation research can be conducted by studying natural variation in the dissemination of EBI programs, it will also be necessary to conduct experimental trials in which aspects of implementation are varied, such as training characteristics or level of technical assistance. An important variable that has been neglected is the background, training, attitudes, classroom-management

skills, and coping styles of teachers (Han & Weiss, 2005). The characteristics of teachers have been neglected as factors that may either influence implementation quality or be impacted by various types of training and ongoing technical assistance and coaching (Jennings & Greenberg, 2009). Finally, it will be important to understand how prevention programs articulate over multiple years and across developmental and school-triggered transitions and how schools alter programs to meet these local needs.

Understanding broad dissemination – ‘going to scale’

A related challenge is conducting research on the process of ‘going to scale.’ The broad dissemination of EBIs is just beginning and there is little experimental or naturalistic/case-study research to guide such efforts. However, a number of recent reports indicate that with appropriate training and monitoring EBIs can be disseminated with fidelity (Fagan & Mihalic, 2003; Spoth, Guyll, Lillehoj, Redmond, & Greenberg, 2007).

There are clear challenges in the process of going to scale that relate to the nature of the programs, their models of marketing and dissemination (Pentz, 2004; Rotheram-Borus, & Duan, 2003), as well as the readiness, knowledge, and planned effort of local schools and teachers. However, without clear implementation guidelines and support, regulation may be ineffective. A series of national studies indicates the substantial obstacles that local schools face in implementing such programs and there is a need for a research agenda on improving implementation quality in the process of broad dissemination (D.C. Gottfredson & Gottfredson, 2002; Hallfors & Godette, 2002; Ringwalt et al., 2002, 2003). At present, many schools are either not using EBI programs or are using them with low levels of fidelity.

Many of the same ‘services research’ questions described above regarding effectiveness also apply to studies of broad dissemination:

- how does variation in implementation affect student outcomes?
- what factors influence the quality of implementation?
- how do varying models of training and TA affect implementation? and
- what kinds of information systems help to effectively inform practitioners and guide implementation?

Sustainability

A significant challenge to effective prevention programming is to sustain this programming over time. Only by providing effective services to multiple cohorts of children and youth will communities begin to see change in the rates of problem behaviors and in the public health impact. The challenge of sustainability truly requires a change in approach and philosophy from previous research paradigms. Instead of researchers approaching schools and communities in order to get their permission to test the effectiveness of new programs, they will be required to collaborate with schools to understand what supports and structures are necessary to create sustainable change in school prevention programming. Such a change will be dramatic for many researchers and truly lead to a more mature integration of the prevention science and community collaborative perspectives (Weissberg & Greenberg, 1998). In a series of insightful critiques, Elias and colleagues (Elias, 1994; Elias, Zins, Graczyk,



Figure 1. Social and emotional learning (SEL) implementation and sustainability process. © 2005, Collaborative for Academic Social and Emotional Learning (CASEL).

& Weissberg, 2003) have elaborated the need for a new model of action researcher that is both a ‘participant conceptualizer and praxis explicator.’

If EBI programs and policies are to be broadly disseminated, it is likely that schools will need considerable assistance to effectively navigate the multiple steps of the diffusion process. Figure 1 illustrates a model of the developmental phases and sub-phases that characterize the entire process including the stages of decision-making/adoption, implementation, and sustained use (Devaney, O’Brien, Resnik, Keister, & Weissberg, 2006). Central to this type of broader conceptual model is the recognition that implementation occurs not only at the level of the classroom, but also at the organizational level of the school, and requires leadership from principals, superintendents, and other educational leaders. While there is a growing research base on the implementation of specific programs, there have been no experimental studies that have examined a model such as that in Figure 1, which is independent of any program. This broader organization model focuses on the school as a community and builds readiness, capacity, knowledge, and leadership in order to create the culture necessary for high-quality implementation, the utilization of effective assessment to monitor programs, plans for continuous quality assurance, and sustainability.

The study of implementation and sustainability will bring new research and policy challenges and opportunities, as well as a need for well-validated practical tools to assist schools and communities in moving programs to a sustainable basis (Johnson, Hays, Center, & Daley, 2004). Research questions will include:

- what factors influence the sustainability of EBI programming in schools and communities?
- do effective outcomes for youth or families influence sustainability?
- how can local groups use data effectively to influence sustainability?
- is there a relation between quality of program implementation and sustainability?
- what factors in management, motivation, organization, financing, training, and technical assistance in schools lead to sustainability for programs and policies?
- what types of regional, state or national diffusion networks and TA most effectively support sustainability? and
- how do changes in policy lead to alterations in management, coordination and financing for sustainability?

In order to conduct such research multiple methodologies will be required. This will include naturalistic/descriptive studies of the longer term outcome of evidence-based programs and partnerships in communities, as well as experimental trials that vary important features of systems development, policy, management, training, financing, etc.

Building congruence between educational policy and prevention: integration of goals and assessment

Centrality versus marginalization of prevention in educational policy

Schools are now faced with many competing demands and educational leaders are faced with difficult choices about priorities (Adelman & Taylor, 2000; Berends, Bodilly, & Kirby, 2002; Weare, 2004). Educational leaders often are singularly focused on student academic performance. The USA may provide the most extreme example in the current No Child Left Behind (NCLB) legislation. While a potential benefit of NCLB is the promotion of academic excellence and equity, it has also led to high-stakes testing, a narrowing of the curriculum, and a loss of the 'whole child' in education. A consequence of NCLB has been a marginalization of most prevention efforts as they have not been well-linked to educational outcomes, especially to achievement test scores (McMurrer, 2007; Ravitch & Cortese, 2009). Critics caution that without attending to students' social and emotional needs, many of these actions may be ineffective at best and harmful at worst, especially for economically disadvantaged groups (Meier & Woods, 2004).

The relation between effective prevention and academic success

A central question that has been initially addressed in the last decade is whether prevention programs that promote SEL skills also affect academic performance (Zins, Weissberg, Wang, & Walberg, 2004). A recent meta-analysis (Durlak et al., in press) examined the outcomes of over 250 experimental studies of universal SEL programs. As noted by others, only a small percentage of these programs assessed academic performance as an outcome (Hoagwood et al., 2007). However, 35 programs assessed academic achievement at post test and 10 at a follow-up assessment. Compared with controls, student receiving SEL programs showed significant and meaningful improvements on achievement test performance; the effect was equivalent to an approximately 10% point gain on achievement testing. Further, program students were

significantly more likely to attend school, less likely to be disciplined for misbehavior, and received better grades. These findings are quite important and their broad dissemination to educators and policy-makers may strongly influence prevention funding and implementation.

This meta-analysis also supports correlational and longitudinal studies that have documented connections between social-emotional variables and academic performance (Zins et al., 2004). These findings fit with conceptual models that self-awareness and self-control can improve attention, acquisition of skills, and persistence in the face of challenges. Also, students who use problem-solving skills to overcome obstacles and make responsible decisions about studying and completing homework do better academically. Further, new research has shown that SEL programs may affect central executive cognitive functions, such as inhibitory control, planning, and set-shifting which are the result of building greater cognitive-affect regulation in prefrontal areas of the cortex (Riggs, Greenberg, Kusche, & Pentz, 2006). Thus, although there is now strong evidence that prevention programs based on an SEL model can influence academic achievement and wider indices of school success, there is a need for future prevention research to both carefully assess aspects of academic success (a small percentage of programs in the above meta-analysis reported achievement data) and to more clearly specify logic models that indicate potential mechanisms through which such changes are achieved.

Although it is of great value that some prevention programs not only impact social outcomes, but also influence school success, there is a danger that programs that prevent maladjustment and promote competence will only be seen as valuable to schools if they also affect school success. It is important to value prevention programs for their primary focus; that is, reductions in the rate of mental disorders or early substance use, effects that are of significant short-term as well as long-term value.

Development of standards and accountability systems related to school success

Following the maxim that ‘what gets assessed gets attention’, many schools have increased instructional time in reading and math while reducing time for ‘non-assessed programming.’ A central tenant of today’s educational system is that assessment should be integrated with and impact curricular efforts. Consequently, it is important to establish assessment and accountability systems for prevention programs in relation to student outcomes (Greenberg et al., 2003; Kratochwill & Shernoff, 2003, Marzano, 2006).

In order for school-based prevention to ‘go to scale’ there is an urgent need for the development of valid and reliable assessments of social, emotional, ethical, and health outcomes that can easily be utilized by schools as part of their accountability process (Greenberg et al., 2003). Such measures could be used as a visible ‘report card’ on a particular school that could be used both for planning and to educate the public on aspects of a school’s success or needs, in addition to its academic test scores. For example, assessment of children’s bonding to school is an important predictor of adolescent substance abuse and delinquency, as well as school success (Hawkins, Guo, Hill, Battin-Pearson, & Abbott, 2001). Such a ‘report card’ should focus on problem behaviors (aggression/bullying, substance use), protective factors (e.g., children’s bonding to school), and school climate from the view of students and staff.

Program integration with ongoing school and community programs and activities

Although there is now sufficient data to warrant the use of numerous prevention programs in schools and communities, a challenge is to develop models that integrate prevention programming across the institutional structures of schools, community agencies (e.g., mental health, substance abuse, family services), hospitals, and youth development organizations (e.g., cooperative extension, afterschool programming, youth service agencies). Most communities have a tangle of fragmented and often duplicative services with little coordination. Children and families are often served by multiple sources, yet there is little dialogue between these entities and no process to assist providers and participants in developing a common language of prevention services and activities. Thus, treatment providers from community agencies providing individual counseling to children are commonly unaware of the prevention-focused goals in the classroom and do not 'recruit' or generalize the skills learned by the child to the treatment context.

A central research question that crosses both effectiveness and broad dissemination studies is what factors influence the success with which specific EBI prevention programs and policies are integrated with the ongoing activities and program delivery systems in schools and communities (Kratochwill & Shernoff, 2003). It is unlikely that most attempts at implementing programs will survive unless there is long-term planning and adjustment of the program model to become integrated with other programming already ongoing in schools (Adelman & Taylor, 2000). This is unlikely to occur in the first implementation in a system unless there is sufficient planning, which includes consideration of how the program will affect other aspects of curriculum and programming. For this reason alone, it is rare that an off-the-shelf program is implemented without adjustments to local conditions (e.g., local adaptations that are intended to meet local needs and also preserve fidelity).

There are numerous examples of local state and national coordination between schools and communities in the implementation of prevention models. In the USA, the Safe Schools/Healthy Students (SSHS) grant program is an example of this trend. Funded jointly by three federal agencies (Center for Mental Health Services, Department of Education, Office of Juvenile Justice and Delinquency Prevention), the goal of this long-term grant program is for local communities to develop integrated programming that involves prevention, treatment, and school reform efforts from K-12. Unfortunately, although over 150 communities have been funded through this program, as yet there is little research on this model. Another large-scale model for prevention programming is the Strategic Prevention Framework-State Incentive Grants (SPF-SIG) funded by Substance Abuse and Mental Health Administration in the USA. Operating in many states, this program also has the potential to inform the science of prevention. However, as neither the SSHS nor the SPF-SIG program has successfully blended funding or priorities with either the National Institutes of Health or the Institute for Educational Sciences, these large-scale implementations have not taken advantage of opportunities for prevention scientists to study these processes. Such large federal programs if planned carefully could provide an important platform for examining Type Two translational issues such as effectiveness, diffusion, and program integration.

A second level of program integration is also possible through the use of community collaborations that provide both a community planning function and organizational

structure for the coordination of prevention programs between schools, community agencies, youth-serving community groups, and governmental bodies. A leading example of this type of organizational model is Communities That Care (CTC) (Hawkins & Catalano, 1992; Hawkins, Catalano, & Arthur, 2002). In this model, community leaders are taken through a series of phases starting at developing readiness and proceeding to board formation. Communities are educated in the public health model of risk and protective factors, how to interpret the assessment of these factors, and how to link the choice of EBI prevention models to those risk assessments. After these phases are completed communities then begin to implement prevention programs and use ongoing assessment and CTC board planning to create program integration and make further prevention program decisions. Although the CTC model is now being tested in a randomized trial design (Hawkins et al., 2007), recent findings examining 146 school districts in Pennsylvania using a quasi-experimental design indicated significant impacts on both risk and protective factors as well as outcomes in academic success, substance abuse, and delinquency (Feinberg, Greenberg, Osgood, Sartorius, & Bontempo, 2007; Feinberg, Jones, Greenberg, Osgood, & Bontempo, in press).

A more delimited model of community organization and planning for coordinated prevention programming is the Promoting School–Community–University Partnerships to Promote Resilience (PROSPER) model. The goal of PROSPER is to link the Cooperative Extension system (administered through land-grant universities) and local school districts through the creation of local partnership teams that provide planning and structure for the quality implementation of evidence-based programs. Technical assistance to these teams on prevention research and programming is provided by both prevention researchers and university-based Cooperative Extension faculty. A goal of PROSPER is to utilize sustainable systems (Cooperative Extension and public schools) to create sustainable prevention programming in communities. Findings from a randomized trial involving 28 communities in Iowa and Pennsylvania indicate that EBI programs can be implemented with fidelity (Spoth, Gyll, et al., 2007) and that seventh-grade students in the PROSPER communities showed significantly lower rates of early drug and alcohol use (Spoth, Redmond, Shin, Clair, Greenberg, & Feinberg, 2007).

The study of community–school–government partnerships presents exciting opportunities and there is an extensive, primarily anecdotal ‘wisdom literature’ on the operation of such collaboratives. However, substantial research questions remain regarding ways to develop effective community–school partnership systems for coordination of EBI programming. First, what factors in management, organization, financing, training, and technical assistance lead to effective partnership functioning? Second, does effective internal partnership functioning predict the quality of implementation of EBI programs? Third, what are the optimal ways to build a larger infrastructure – a diffusion network focused on creating systems change for evidence-based prevention? Finally, what factors influence sustainability of such state and local systems?

Current and future research issues

Development of new programs and models

In the past decade there has been relatively little innovation in the field of school-based prevention and there is a need to test new programs, models, and policies. A few suggested avenues for development are considered here – and some follow directly from

this article. This article has pointed out the lack of integration of EBI programs. It may be that by combining different types of programs into more integrated packages greater effects may be obtained. For example, it may be of benefit to combine programs focused on classroom management (e.g., behavioral ecological models) with those that promote SEL, as it is unlikely that children will show substantial gains in social development in classrooms that are poorly managed (Domitrovich et al., in press).

In a similar manner, there is a need for innovations that integrate SEL prevention programs with other curricular models. For example, by carefully selecting both the literature and writing assignments, it is feasible to embed SEL prevention programs within the reading and writing curriculum. For example, the Research-based, Developmentally Informed (REDI) intervention integrated SEL with pre-reading skills in the Head Start context and demonstrated effects on both academic and social and emotional outcomes (Bierman et al., 2008). Similarly, social studies modules that use the study of history and culture to help students more deeply understand their identity, address issues regarding discrimination and stereotyping, and focus on effective conflict resolution have substantial promise, especially for middle and high school students to promote positive identity and reduce conflict.

A third potential area for innovation is to focus on the knowledge, attitudes, and coping abilities of teachers. Because teachers receive little training in either prevention or children's social and emotional development as part of their pre-service training, many arrive at the classroom with few skills to handle disruptive and inattentive learners, and the rates of burnout and teacher attrition are quite high (Jennings & Greenberg, 2009). Surprisingly, to date, there has been little focus on how improving the broad skills of teachers regarding classroom management, developing relations with 'difficult students', understanding dynamics of peer relations, etc. may influence children's outcomes. Further, integrated models that combine interventions for teachers along with SEL curricula for students may have synergistic effects.

A fourth potential area of development focuses on the development and testing of interventions that derive from basic and applied findings in developmental neuroscience (Fishbein, 2001; Greenberg, 2006; Greenberg, Riggs, & Blair, 2007; Posner & Rothbart, 2007; Riggs & Greenberg, 2004). Recent research in developmental neuroscience has demonstrated the importance of the development of the executive attention systems and executive functions (EF) (Blair, 2002). EF is comprised of a number of related, but distinguishable components, including working memory, inhibitory control, attention flexibility, and planning (Pennington & Ozonoff, 1996). Taken together, EF skills enable flexible, coordinated, cognitive, and affective decision-making that is critical in most ongoing behavior. During the past decade, there has been an enormous expansion of knowledge regarding both the development of EF skills and the growth and differentiation of the prefrontal area of the brain. During the past decade, there has been progress on the development of curricula and training programs to promote self-regulation and a few programs have focused on developing EF skills. One SEL program, PATHS, has been shown to increase inhibitory control and working memory, and these changes in EF skills mediated changes one year later in reduced aggression, as rated by teachers. A second study of a preschool intervention model based on Vygotskyian ideas about the importance of play called Tools of the Mind (Diamond, Barnett, Thomas, & Munro, 2007) has also shown changes in both working memory and inhibitory control using computer-based measures of EF.

In addition to these broader classroom curriculum models that integrate SEL and EF, there have been a number of more limited, clinic- or laboratory-based interventions

that explicitly focus on improving EF skills using computer-based training, with some success (Dowsett & Livesey, 2000; Klingberg, Fernell, & Olesen, 2005; Rueda, Rothbart, Saccamanno, & Posner, 2005). New insights into regulatory processes also have implications for adolescents. Recently, there has been considerable interest in the concept of mindfulness, which can be defined as paying attention moment to moment, without judgment to whatever is going on in the mind and in the body – including thoughts, physical sensations, and emotions. In other words, mindfulness means being aware without judgment (Segal, Williams, & Teasdale, 2001). With the considerable and growing interest in mindfulness research and intervention with adults (Davidson et al., 2003), we believe that careful clinical trials of interventions focused on mindfulness training or the ‘potentiation of cognitive control’ (Keating, 2004) are warranted. It is surprising that there has been little controlled research on mindfulness, martial arts traditions, or yoga (Birdee et al., 2009). To the extent that such preventive interventions can help young people reduce their stress exposure and develop greater awareness of their level of stress and provide skills (mindfulness, relaxation, or emotion-regulation techniques) that reduce such stress, impacts may be shown on both brain and behavior.

These projects will require rigorous randomized clinical trial designs with appropriate comparison groups. However, in some cases it is not appropriate to label these as ‘control’ groups, as most children in the USA receive some kind of curricular or school-wide interventions to improve behavior and reduce problems (Ennett et al., 2003; Hallfors & Godette, 2002; Gottfredson & Gottfredson, 2001; Pentz, 2004). Given that there are few ‘true control’ groups, it is critical for trials to carefully study the experiences and interventions received by the comparison group. Further, it will be important to compare the efficacy of new models to existing EBI programs, not just to ‘current practices,’ in order to assess their value-added.

In addition to using randomized clinical trial designs, greater work is needed on improved statistical methodology for quasi-experimental designs. For example, given that schools are becoming more reluctant to have children placed in ‘no treatment’ comparison groups and that schools often want to initiate programs grade- or district-wide, analyses that utilize the most recent cohort of students from the same building or that phase in the program over time may lead to more viable design models for collaboration and evaluation, but may require new models of statistical control and estimation. A variety of designs may be appropriate depending on the question, context, sample size, and stage of testing of the intervention (Mercer, DeVinney, Fine, Green, & Dougherty, 2007; Sanson-Fisher, Bonevski, Green, & D’Este, 2007; Shadish, Cook, & Campbell, 2002). Finally, although the most methodologically strong designs of universal programs include hierarchical analyses in which the classroom or school is considered the unit of analysis (group randomized trials), such designs require many classrooms and schools to participate, which makes them very expensive and often practically infeasible (Mercer et al., 2007). The often-noted peer review requirement of nested designs has slowed innovation sponsored by federal funding and has especially affected young prevention scientists for whom such funding for such studies is unattainable and has stifled innovation.

Conclusion

In the past decade, there has been substantial development of an inventory of school-based EBIs that can both reduce mental disorders and build resilience in children and

youth. Although there is a need for improved research on program outcomes, as well as a need to develop and test innovations, Type Two translational research is a critical step if these programs are to be widely and effectively used to improve the public health

As effective programs and policies undergo the challenge of translation from science to widespread practice, there is a need for greater integration with schools and communities in order to build processes and structures that will insure high-quality implementation and promote sustainability. There is little question that further advances in the development and application of effective prevention practices and policies with schools and communities will require a much greater degree of collaboration in which researchers learn from educators and vice versa. A central part of this collaboration includes greater attention to the important role that prevention programs and policies can play in increasing academic performance, resilience, and improving the quality of life of communities.

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