ARTICLE

HOW DO IMPLEMENTATION EFFORTS RELATE TO PROGRAM ADHERENCE? EXAMINING THE ROLE OF ORGANIZATIONAL, IMPLEMENTER, AND PROGRAM FACTORS

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Widespread replications of evidence-based prevention programs (EBPPs) prompt prevention scientists to examine program implementation adherence in real world settings. Based on Chen's model (1990), we identified five key factors of the implementation system and assessed which characteristics related to program adherence. The sample included 32 EBPPs and results indicate that target recipient responsivity, program material quality, implementer prioritization, community collaborative system support, and parental support significantly relate to program adherence. Several differences reached statistical significance, thereby highlighting the importance of these variables and the need for future studies with larger sample sizes to identify factors related to program adherence adequately. © *2008 Wiley Periodicals, Inc.*

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INTRODUCTION

Prevention science innovations over the past decade yielded numerous prevention programs that have shown *efficacy* in altering youth developmental trajectories and preventing problem behaviors. Rigorous, carefully controlled efficacy trials have demonstrated positive program effects in areas such as substance use, mental health, violence, and general positive youth development (Catalano, Berglund, Ryan, Lonczak, & Hawkins, 1998; Drug Strategies, 1998; Elliot, 1998; Greenberg, Domitrovich, & Bumbarger, 2001; Tobler Research Associates, 1988). Subsequently, federal and state funding has been increasingly targeted for the adoption of these evidence-based prevention programs (EBPPs; Gottfredson & Gottfredson, 2002; Pentz, 2003).

In conjunction with this shift in public funding, program developers are promoting the diffusion of efficacious prevention programs and encouraging program replication. Thus, published "best-practice" program lists are now available in the public domain (e.g., *Blueprints for Violence Prevention*; Elliot, 1998). These dissemination efforts have increased awareness of evidence-based programs among community change agents leading, in turn, to more widespread adoption of EBP programs. Although there is increasing research on the "scaling up" of effective programs, such as the National Institutes of Health initiative to support "Type II Translational Research"—which is aimed at increasing the adoption of effective interventions in the community (Rohrbach, Grana, Sussman, & Valente, 2006), little is known about the quality of implementation when a wide variety of programs are broadly disseminated outside the research context (Gottfredson & Gottfredson, 2002; Harachi, Abbott, Catalano, Haggerty, & Fleming, 1999). An example of such a widespread diffusion of EBPPs can be found in the Pennsylvania Commission on Crime and Delinquency's (PCCD) Research-based Programs Initiative, which began funding the replication of efficacious prevention programs throughout Pennsylvania in 1998. This current study examines implementation factors related to program adherence using data collected from 32 community-based implementations of EBPPs under this PCCD initiative.

An important stage of program evaluation involves the analysis of program *effectiveness* in school- and community-based settings once programs have left the developers' control. It is recognized that adaptation is common and that program delivery may vary greatly under naturalistic conditions (Elias, 1997; Greenberg, Domitrovich, Graczyk, & Zins, 2005), although there is ongoing debate about whether, and to what extent, such program modification is acceptable or encouraged (Backer, 2000; Castro, Barrera, & Martinez, 2004; Elliot & Mihalic, 2004; U.S. Department of Health and Human Services, 2002). This debate notwithstanding, implementation quality has been linked to program outcomes whereby greater fidelity is associated with better youth outcomes (Battistich, Schaps, Watson, & Solomon, 1996; Botvin, 2001; Rohrbach, Graham, & Hansen, 1993). In addition, recent studies suggest that the quality of implementation may vary based on the type of program being implemented (e.g., school-based, community, family treatment; Mihalic, Irwin, Fagan, Ballard & Elliott, 2004).

Given the likelihood of variability in program delivery, it is important to understand the conditions or degree of implementation adherence that are necessary for successful outcomes. Some researchers suggest that variation in implementation is acceptable as long as local adaptations and changes preserve "enough" implementation quality and fidelity (Backer, 2000; Domitrovich & Greenberg, 2000). Scheirer

(1994) states that the "gaps" between an implementation plan and the actual delivery might be either positive or negative, recognizing that some adaptations may be proactive attempts to improve program effectiveness based on local context. Others suggest further that the quality of implementation may suffer if providers are unable to adapt programs to meet their unique needs (Meyer, Miller, & Herman, 1993; U.S. Department of Health and Human Services, 2002). Hence, there is a need for studies that describe whether programs are implemented with adherence (i.e., fidelity) to the original plan; and, if not, what factors, whether proactive or reactive, lead to adaptations in implementation (Greenberg et al., 2005; Mihalic, 2001).

FACTORS RELATED TO PROGRAM ADHERENCE

Chen (1998) suggests that programs operate within an *implementation system* that can either provide support or present barriers to the delivery of a program. As a result, there is often a discrepancy between the implementation plan as intended and actual implementation, potentially depreciating program efficacy. A conceptual or heuristic model of the implementation system developed by Chen (1998) and expanded by Greenberg and colleagues (Greenberg et al., 2005) highlights characteristics related to the *implementer, implementing organization, program,* and *school/community context* that may affect the quality of program implementation and specifically program adherence.

Implementer Characteristics

With the exception of media campaigns, most preventive interventions are implemented by person(s) (e.g., teacher, guidance counselor, nurse, community worker, peer leader) who are responsible for carrying out the key elements of the program to the target group. Therefore, the knowledge, skills, and motivation of the program implementer are likely to play a significant role in program implementation success. In addition to having the appropriate skills necessary to perform this role, implementers need to understand the theoretical basis of the intervention and why it is likely to be effective. This understanding of the program's "logic model" makes implementers better qualified to make decisions about adaptation without impacting efficacy. Feeling confident in their ability to deliver the program and believing that the approach will be effective may also increase a provider's motivation to implement an intervention as designed (Domitrovich & Greenberg, 2000; Elias, Breune-Butler, Blum, & Schuyler, 2000). Not having adequate time to conduct the activities required and not "buying-in" to the program's model may negatively affect the provider's enthusiasm toward the program and how well they implement it (Mihalic, 2002; Rohrbach, Graham, & Hansen, 1993).

Implementing Organization Characteristics

Another important component of the implementation system is the implementing organization, which is responsible for hiring, training, coordinating, and supporting program implementers (Chen, 1990). Characteristics of the implementing organization may include the strength of connection to a collaborative system, a specific program "champion," authority structure, operating standards, and sufficient resources for carrying out the program. In order for the implementing organization to prioritize a program in terms of resource allocation, program goals ought to

coincide with the implementing organization's goals (Greenberg et al., 2005). According to Chen (1990), characteristics of the implementing organization contribute to the "amount and specific form of treatment delivered" (123). In their evaluation of the Safe and Drug Free Schools Program, for example, Hallfors, Sporer, Pankratz, and Godette (2000) found that many providers reported limited financial resources within their organization as a common barrier to program adherence and sustainability.

Program Characteristics

Programs differ in the quality and availability of the materials and training, and the complexity of recommended teaching strategies required for faithful implementation. It is possible that variation in these program characteristics may also affect program adherence. Programs that include an easy-to-use, clear instructional manual with specific delivery strategies, for example, provide implementers with greater support and guidance for implementation (Gottfredson & Gottfredson, 2002). The quality and availability of initial and ongoing training may influence providers' comfort with program materials and teaching strategies, which may, in turn, affect program delivery (Dusenbury & Falco, 1995; Ennett et al., 2003). For instance, in one study the need for retraining staff and additional training of new staff (due to staff turnover) emerged as common problems affecting implementation (Mihalic, 2002). In their study of the Safe and Drug Free Schools program, Silvia and Thorne (1997) found that some teachers reported feeling uncomfortable with program materials and the teaching strategies due to insufficient training. As a result, these teachers were less motivated to completely teach all program components. High-quality training and ongoing technical assistance increases providers' knowledge of how the program works and what is necessary to implement the program effectively, contributing to a better understanding and acceptance of given programs (Collaborative for Academic, Social, and Emotional Learning, 2003; Meyer, Miller, & Herman, 1993).

Recipient Characteristics

Programs vary with respect to their target population. Universal programs serve a wide range of people whereas targeted programs serve a select group of people. Hence, the degree of difficulty in recruiting and retaining program participants varies greatly across program types. School-based programs are unique in that youth under a certain age (it varies by state) are required to attend school. Given the structure of schools, policies about attendance, and the organizational infrastructure of schools, the pool of potential program recipients is much larger and more consistent over time in schools relative to community-based programs. Programs drawing from a pool of potential recipients not organized in the same way as schools have a more difficult time not only locating potential recipients, but retaining participants over the program duration may be more problematic due to a lack of structure. Furthermore, programs targeting harder-to-reach individuals and people with multiple constraints may experience many obstacles to retention including contextual constraints (e.g., transportation) as well as participant willingness to attend, and positive response to the program (e.g., if participants are mandated to attend the program they may view the program less favorably). As our investigation includes community-based and family-focused programs that may have a more difficult time finding and retaining participants, we have included characteristics related to identifying, recruiting, and retaining a target population as part of our assessment.

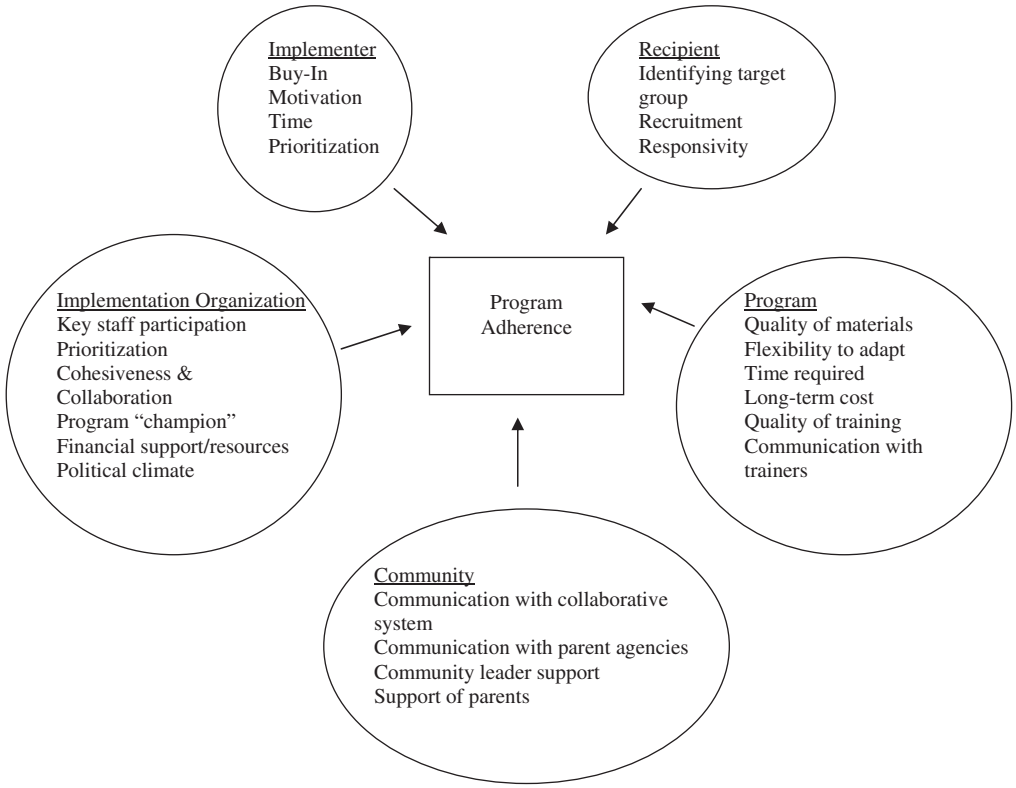

Figure 1. Implementation system model.

School/Community Context

The external environment (e.g., school, community, home) in which programs are implemented consists of numerous individuals (e.g., principal, client, parent, community leader) and agencies (e.g., public, private, and not-for-profit). These components of the school/ community context may directly or indirectly influence program implementation. Greater principal support, for example, has been associated with both implementation quality and maintenance of school-based programs (Gottfredson & Gottfredson, 2002; Kam, Greenberg, & Walls, 2003). In comparison, community-based program implementation success relies largely on support from community members, especially community leaders and volunteers.

Thus, we propose the following five broad conceptual factors play an integral role in influencing program adherence: (a) implementer, (b) implementing organization, (c) program, (d) intervention recipient, and (e) school/community context. Figure 1 presents a conceptual model of the five factors and their characteristics in relation to program adherence. We hypothesize that higher values on indices of each of these characteristics will result in a greater degree of program adherence. We predict that most programs will make some adaptations to their original implementation plan and that these changes will be related to implementer, implementing organization, program, intervention recipient, and community context factors. Furthermore, we expect that different types of programs will differ with regard to factors they perceive as assets or limitations to implementation.

The current study has two goals. The first is to describe the assets and barriers faced by communities in implementing EBPPs. The second goal is to assess the degree to which measures assessing aspects of these five key factors are related to program adherence and to further examine how these relationships differ as a function of program type (i.e. school, community, family).

METHOD

Participants

The programs used to test our hypotheses included replications of EBPPs funded through the Pennsylvania Commission on Crime and Delinquency's (PCCD) Research-based Programs Initiative between 1998 and 2002. Following from the U.S. Department of Justice's "Blueprints" Initiative (Mihalic, 2002) PCCD's Research-based Programs Initiative began in 1998 to provide grants to Pennsylvania communities to replicate any of nearly 120 empirically validated prevention programs. The PCCD provided 4 years of grant funding to each grantee, up to $300,000 per year (with a 25% local match in Year 3 and 50% match in Year 4). To make a successful application to PCCD, it was required that each grantee demonstrate an ongoing relationship with a collaborative community prevention coalition actively working in the region (e.g., Communities That Care or other local groups working together to improve youth and family outcomes).

As part of the technical assistance provided to these sites through the initiative, program implementers and managers from the funded sites were invited to annual meetings to learn more about issues related to program implementation and measurement. During these meetings program representatives completed questionnaires regarding program planning and implementation, barriers and assets, outcome measurement, and technical assistance needs. To ensure that representatives sent by agencies were knowledgeable about program implementation details, the invitation for meeting attendance read, "[the meeting] *is intended for program staff directly involved in the day-to-day operation and management of these research-based prevention programs. It is not intended for those whose involvement is purely fiscal or administrative.*"

Thirty-two participants representing school-based ($N = 7$), community mentoring ($N = 11$), family prevention ($N = 4$), and family treatment ($N = 10$) programs completed surveys in 2002. This reflects a response rate of 52% of the 60 grantees funded between 1998 and 2001. Respondents included equivalent numbers of program managers and "frontline" implementers (e.g., program coordinators, therapists). Although not every program funded through the initiative was represented at the meeting (due to a host of reasons, including scheduling conflicts, distance, budgetary constraints, and agency priorities), all programs represented at the meeting provided data.

The programs represented within the school-based category included Botvin's Life Skills Training (LST), Promoting Alternative THinking Strategies (PATHS), and the Olweus Bullying Prevention Program. Community-mentoring programs included Big Brothers Big Sisters and Promoting Alternative Learning Skills (PALS). Family-focused prevention programs included Families and Schools Together (FAST) and Preparing for Drug Free Years (PDFY, later renamed Guiding Good Choices), while Functional Family Therapy (FFT) and Multi-Systemic Therapy (MST) represented family treatment programs. Each of these programs is described in detail in the

publication *Promising Approaches: A Research Guide to What Works* (Developmental Research and Programs, 2000). On average, programs had been operating nearly 2 years at the time of data collection ($M = 1.63$, $SD = 1.42$).

Measures

Open- and closed-ended questions were collected on providers' implementation experiences including program planning/site readiness, barriers and assets to implementation, lessons learned, and technical assistance needs. The instruments used to measure these constructs were developed for this project and later adapted to include additional questions on "program champion" and assets to program implementation (Mihalic, 2002).

Program Adherence

A single item measured whether or not providers adhered to the implementation plan ("How closely to the original plan do you feel the program is being delivered?"). Responses ranged on a 4-point scale from 1 (*just as planned)* to 4 (*a lot of changes from plan*). As no respondents reported "a lot of changes" the outcome variable was dichotomized into respondents reporting any program changes (collapsing values of 2 "almost as planned" and 3 "some changes from plan") and respondents reporting complete program adherence. It is important to note that two program representatives—one from each a school-based and community-based program—did not provide a response to this item. Hence, the results for these analyses reported below are based on 30 participants.

Implementation System

Each of the key factors of the implementation system were represented in constructs that include 4 items for implementer, 7 items for implementing organization, 7 items for program, 4 items for recipient, and 4 items for community context (see Table 1 for specific item descriptions).[1] Providers were asked whether each of the items was a barrier or asset to implementation. Response categories ranged from 1 (a significant barrier) to 5 (a significant asset) with 3 representing "neither a barrier nor an asset." As this study is descriptive and does not have sufficient sample size to examine the factor structure of the items, we report analysis separately by item.

RESULTS

Analytic Strategy: Nonparamteric Statistics

Kruskal-Wallis. The Kruskal-Wallis is used to statistically explore differences among more than two samples. It serves as the nonparametric analog to the one-way analysis of variance. The Kruskal-Wallis rank test (KW) is the method used to make general statements about differences.

Mann-Whitney (Wilcoxon). The Mann-Whitney (Wilcoxon) rank test is a two-sample permutation test based on the sum of ranks (equivalent to the parametric two-sample *t*

[1] A copy of the complete measure is available upon request from the second author.

Table 1. Characteristics of the Implementation System by Program Type

	Overall (N = 32)		*School based (N = 7)*		*Community based (N = 11)*		*Family based (N = 14)*	
Key characteristics	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Implementer								
Buy-in and support	3.97	1.02	3.50	1.22	4.00	0.71	4.14	1.10
Staff motivation toward the program	4.03	0.87	3.83	1.17	4.00	0.71	4.14	0.86
Time for the implementers to carry-out the program	3.45	1.12	3.17	0.75	3.11	1.17	3.79	1.19
Implementers prioritization of the program	3.64	1.13	3.17	1.17	3.63	0.74	3.86	1.29
Implementation organization								
Key staff participation in planning, decision-making, and problem-solving	3.58	1.12	3.33	1.21	3.82	0.98	3.50	1.22
Prioritization of the program by key staff	3.90	1.11	3.17	1.47	4.18	0.75	4.00	1.11
Cohesiveness and collaboration among all key stakeholders in the program	3.77	1.09	3.17	1.33	4.00	0.89	3.86	1.10
Sufficient resources allocated.	4.32	1.01	3.67	1.03	4.45	0.69	4.50	1.16*
Program coordinator or "champion"	3.70	1.24	3.00	1.55	3.70	1.16	4.00	1.11
Sufficient financial resources	3.87	0.99	3.67	1.03	3.91	1.14	3.93	0.92
Political climate	3.23	1.01	3.50	1.05	3.30	1.06	3.07	1.00
Program								
Quality of program/curriculum materials	4.00	1.26	2.67	1.63	4.09	1.04	4.50	0.85*
Program flexibility to adapt to community needs	4.06	0.96	4.17	0.75	4.27	0.79	3.86	1.17
Time required to implement the program	2.90	1.04	2.83	1.33	3.09	0.83	2.79	1.12
Long-term cost (sustainability)	2.67	1.15	3.50	1.05	2.55	1.04	2.38	1.19
Availability of training	3.93	1.23	3.33	1.37	3.80	1.03	4.29	1.27
Overall quality of training workshops	4.07	1.01	3.83	0.75	4.00	0.82	4.21	1.25
Ongoing communication with trainers	4.17	0.89	3.83	1.17	4.00	0.71	4.43	0.85
Recipient								
Identifying target population	3.70	1.09	3.17	1.17	4.00	0.67	3.71	1.27
Recruitment of target population	3.52	1.24	3.60	0.89	3.60	1.26	3.43	1.40
Retention of target population	3.61	0.99	3.60	0.89	3.50	1.18	3.69	0.95
Responsivity of target population	3.83	1.04	3.80	1.10	3.80	1.03	3.86	1.10
Community								
Communication and support with a collaborative system	3.73	1.14	3.50	0.55	3.82	1.47	3.77	1.09
Communication and support with parenting agencies	3.87	0.96	3.50	0.55	4.00	1.26	3.93	0.83
Community leader support	3.84	0.97	3.83	0.75	3.91	1.14	3.79	0.97
Support of parents	3.87	1.11	3.17	0.75	3.80	1.32	4.21	0.97

*$p < .05$; no p-value adjustments for multiple tests.

test). It provides a test of the differences in average ranks. Whereas the Kruskal-Wallis test is an omnibus test to determine whether differences exist among more than two groups, the Mann-Whitney (Wilcoxon) test assesses differences between specific pairs of groups; in this case these tests were used to assess differences between various program types (school, family, community) and program adherence.

For the results reported below, relevant nonparametric tests were used to assess whether group differences were statistically significant. Adjustments for multiple tests were not made because the lack of power due to small group sizes would render nonsignificant findings upon adjustment and we intend these results to be utilized for descriptive purposes and to inform future research.

Assessing Key Factors That Influence EBPPs by Program Type

Table 1 depicts items specific to key implementation factors of interest and their respective means and standard deviations across all three program types and separately for school-based, community-based, and family-based programs. One potentially promising pattern that emerges in Table 1 is that school-based programs report notably lower scores (denoting higher barriers) on all four implementer characteristics, all but one of the implantation organization characteristics, five of the seven program characteristics, and three of the four community characteristics relative to the overall mean and both community-based and family-based programs. Schools in particular report relatively low scores in the area of making the program a priority of the organization, having a strong champion, materials quality and resource allocation as well as parental and community support for their programs. Sufficient time for program implementation is a barrier common to all three program types whereas perceived sustainability potential is considered more of a barrier for community-based and family-based programs relative to school-based programs. Overall, school-based programs are characterized by greater perceived implementation barriers compared to the other program types.

The Relationship of Key Factors to Program Adherence

By collapsing across all program types, we examined how perceived barrier and asset ratings on all factors were related to self-reported adherence (changes made versus implemented just as planned). School-based programs were characterized by the least adherence as all school-based programs reported adaptations. Family-based programs reported the greatest adherence with 57% reporting that they implemented the program as planned. By comparison, half of community-based programs reported changes to the program. Means and standard deviations of these characteristics by program adherence are reported in Table 2.[2]

As shown in Table 2, in almost all cases representatives from programs that implemented with high adherence reported fewer barriers than did representatives from programs that reported making program changes. With the exception of four key characteristics, differences favored programs with greater adherence (in terms of greater perceived assets) and in some cases these differences were statistically significantly. Significant differences were found for specific items representing each of the five factors. Regarding implementer characteristics, buy-in from staff, prioritization of the program, and time spent on implementation were perceived as assets related to greater adherence. With respect to the implementing organization, there was a greater likelihood that sufficient resources would be allocated, and trends showing a more positive political climate of support and greater collaboration among key stakeholders. Representatives of programs with greater adherence were also rated as having better quality program materials. Regarding recipient factors, programs with greater adherence reported greater responsivity by recipients and a trend towards easier identification of recipient populations. Finally, significant differences favored programs with higher scores on all community factors including community support, leader support, agency support, and parent support. Hence, programs with greater perceived support were more likely to implement programs as planned. These

[2] Given that all schools reported program changes and that some of the key characteristics assessed may not be as relevant to school settings, results are reported both with schools included and excluded.

Table 2. Means and Standard Deviations for Key Characteristics by Adherence Group

	Including schools				*Excluding schools*			
	Changes made (N = 17)		*No changes made (N = 13)*		*Changes made (N = 11)*		*No changes made (N = 13)*	
Key characteristics	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Implementer								
Buy-in and support	3.63	1.15	4.38	0.65*	3.70	1.16	4.38	0.65
Staff motivation toward the program	3.81	0.98	4.31	0.63	3.80	0.92	4.31	0.63
Time for the implementers to carry-out the program	3.13	0.72	3.85	1.41*	3.10	0.74	3.85	1.41*
Implementers prioritization of the program	3.13	1.09	4.33	0.78**	3.10	1.10	4.33	0.78**
Implementation organization								
Key staff participation in planning, decision-making, and problem-solving	3.71	1.05	3.38	1.26	3.91	0.94	3.38	1.26
Prioritization of the program by key staff	3.65	1.22	4.15	0.90	3.91	1.04	4.15	0.90
Cohesiveness and collaboration among all key stakeholders in the program	3.35	1.22	4.23	0.60+	3.45	1.21	4.23	0.60+
Sufficient resources allocated	4.06	1.20	4.62	0.65*	4.27	1.27	4.62	0.65
Program coordinator or "champion"	3.56	1.50	3.85	0.90	3.90	1.45	3.85	0.90
Sufficient financial resources	3.65	1.17	4.15	0.69	3.64	1.29	4.15	0.69
Political climate	2.94	0.97	3.62	0.96+	2.64	0.81	3.62	0.96*
Program								
Quality of program/curriculum materials	3.41	1.37	4.69	0.63**	3.82	1.08	4.69	0.63*
Program flexibility to adapt to community needs	3.94	1.09	4.15	0.80	3.82	1.25	4.15	0.80
Time required to implement the program	2.71	1.05	3.08	1.04	2.64	0.92	3.08	1.04
Long-term cost (sustainability)	2.56	1.15	2.69	1.18	2.00	0.82	2.69	1.18
Availability of training	3.94	1.14	3.92	1.38	4.27	0.90	3.92	1.38
Overall quality of training workshops	3.88	1.11	4.31	0.85	3.91	1.30	4.31	0.85
Ongoing communication with trainers	4.19	0.83	4.15	0.99	4.40	0.52	4.15	0.99
Recipient								
Identifying target population	3.41	1.18	4.08	0.86+	3.55	1.21	4.08	0.86
Recruitment of target population	3.31	1.20	3.77	1.30	3.18	1.33	3.77	1.30
Retention of target population	3.40	0.91	3.85	1.07	3.30	0.95	3.85	1.07
Responsivity of target population	3.38	0.89	4.38	0.96*	3.18	0.75	4.38	0.96**
Community								
Communication and support with a collaborative system	3.18	1.07	4.42	0.79*	3.00	1.26	4.42	0.79**
Communication and support with parenting agencies	3.53	0.94	4.23	0.83*	3.55	1.13	4.23	0.83
Community leader support	3.47	0.87	4.23	0.93*	3.27	0.90	4.23	0.93**
Support of parents	3.47	1.12	4.38	0.87*	3.64	1.29	4.38	0.87

*$p < .05$; **$p < .01$.
+$p < .10$. No p-value adjustments for multiple tests.

findings suggest that increased support through multiple mechanisms for program implementers may serve as a potential avenue for increasing fidelity in the future.

The Relationship of Key Factors to Program Type

Community-based programs.. Of the 10 community-based programs that provided complete data, 5 reported making changes to program implementation and 5 reported adherence. Community-based program representatives reporting lower

adherence perceived more difficulties with sufficient time to carry out the program, recruitment of participants, and concerns regarding sustainability. As most of these programs targeted indicated and selective populations, the ability to recruit and retain participants may have led them to shorten or reduce aspects of the program implementation. The amount of time necessary to implement these programs (and associated costs) may also impact concerns regarding sustainability. When items from the five factors were examined by adherence within program type,[3] results were mixed with respect to four of the five factors for community-based programs—some characteristics of each factor were perceived as greater assets for programs that adhered whereas others were perceived as greater barriers. The only factor whose characteristics were consistently related to greater adherence was the community context that spans support from multiple sources. Additionally, community-based programs that showed adherence were likely to have greater resources, implementer buy-in, motivated staff, and program prioritization. Assets in terms of community support may be critical for increasing adherence for programs based in those contexts.

Family-based programs. Of the 14 family-based programs, 6 reported making changes to the program as designed, while 8 reported adherence. Family-based program representatives reporting changes had greater concerns regarding time (cost) necessary to run the program, recruitment of participants, and sustainability. As with community programs, recipient characteristics (indicated and selective populations) may contribute to changes in program implementation. For family *programs reporting no changes*, the characteristics of three factors—implementer, recipient, and community—were consistently rated higher than for programs where changes were made.[3] The highest rated factors were sufficient resources, the perceived quality of both the program and program materials, and parent support. In addition, implementer characteristics may be a key factor in increasing adherence as these programs are implemented by therapists who are highly trained. These factors as well as well-defined structure and continuous supervision afforded in some family programs (MST, FFT) may help to ensure fidelity.

As all school-based programs made some adaptations, we could not assess how factors related to adherence for these programs.

DISCUSSION

Summary of Findings

The goal of this study is not to fuel the debate on adaptation versus fidelity, but instead to describe key factors faced by community-based implementation of EBPPs and how they are descriptively associated with fidelity. The results indicate that providers of EBBPs are about equally likely to report implementing programs as planned versus making changes. In general, family-based programs achieved somewhat greater program adherence (57%) than community programs (50%), whereas no school-based programs reported absolute adherence. In school settings, academic pressures may force teachers to make adaptations (shortening lessons, reducing the number of lessons, etc.). Schools, as implementing organizations, have numerous goals and prevention of problem behaviors varies in its importance by district and state. The

[3] Results are not shown; but statistics are available from the first author upon request.

current "No Child Left Behind" policy landscape most likely results in schools being less favorable to additional tasks for teachers that distract them from a singular focus on improving students' test scores (Greenberg et al., 2003). As a result, competing academic demands may take precedence over prevention program components, thereby forcing teachers to cover only some program lessons (U.S. Department of Health and Human Services, 2002). Teachers also often report time constraints as a reason for being unable to complete all prevention components (Mihalic, 2002), an issue that is less commonly seen in community- and family-focused programs, although in this study sufficient time to implement programs was rated as somewhat of a barrier by implementers in all three programs.

Implications

Researchers have suggested that even the best developed programs are likely to be modified when they are widely disseminated and out of the controlled research setting to meet community, school, and participant needs (U.S. Department of Health and Human Services, 2002). To date, however, there has not been a generalizable model for predicting the quality of program implementation when programs "go to scale" and less is known about the factors that necessitate changes to program implementation. The present study provides a first descriptive step in formulating a universal model for predicting and planning for high-quality program implementation as empirically validated programs go to scale.

Although EBPPs are being implemented in a variety of settings in U.S. communities, there have been few quantitative reports of the factors that influence their implementation and adherence. Among the 32 program replications studied here, communities reported some factors as supporting implementation and others as of greater concern. On the positive side, 4 years of funding for these programs led to generally high ratings for having sufficient buy-in and support from the implementers (therapists, teachers, etc.), having sufficient resources at the organizational level, and perceived overall quality of the programs, their materials, training, and communication with program trainers. In addition, programs found positive receptivity from clients and relatively strong support from community leaders. In contrast, other factors were of greater concern and these included the long-term costs and potential for sustainability, lack of supportive political/administrative climates in the funded agencies/organizations, and concerns about the time that it takes to implement these EBPPs. Given the short-term (albeit 4 years is relatively long) nature of the funding, it is not surprising that there are concerns about sustainability and these may well be linked to how central prevention programming is to the main mission of the organizations.

In addition, the findings indicate that certain types of program may be implemented with stronger adherence or fidelity. Family-based programs appeared to achieve somewhat greater program adherence than community-based programs, and school-based programs showed the lowest adherence, likely due to greater conflicting demands. In general, programmatic changes were associated with perceived barriers whereas adherence/ fidelity was associated with perceived assets. It is not surprising that programs reporting adherence perceived nearly all characteristics within each of the five factors as assets when compared to programs reporting less fidelity. For both family-based and community-based programs, representatives who reported the highest perceived assets across all five factors also reported greater implementation adherence.

Likewise, for both family- and community-based programs, recipient characteristics was reported to be the greatest barrier for programs reporting changes in implementation. Community/school context was rated as the greatest asset for community-based programs reporting adherence whereas implementer characteristics was rated as the greatest asset for family-based programs reporting adherence. It may be that programs with perceived barriers make changes to compensate for limited resources, compromised organizational support, difficulties in recruiting and/or maintaining target populations, and so on. Changes may have been responses, in part, to the need to adapt to and compensate for implementation limitations. As this study was cross-sectional, however, cause and effect cannot be differentiated here.

Study Limitations

One of the major limitations of this study was the small sample size, which was further reduced when examining differences by program type. Despite having only 32 programs, several patterns emerged in characterizing programs that report changes and programs that report adherence, thereby highlighting the potential importance of these variables as well as the need to conduct future studies with larger sample sizes. Larger sample sizes will increase the power for analyses and decrease the violation of normality assumptions, thereby enabling analyses to move out of the nonparametric framework into the parametric framework, in turn, facilitating prediction.

A second limitation is related to the measures we used to assess program adherence. For one, using only one self-report indicator of program adherence limits the reliability of our findings. Multiple assessments measuring other aspects of implementation (e.g., dosage, delivery techniques used, and objectives covered) would provide a more accurate evaluation of program fidelity. Additionally, the number of providers reporting perfect adherence may be inflated by social desirability tendencies intrinsic to self-reports. Previous research suggests self-report measures of program fidelity may tend to have a lower reliability and be skewed in the positive direction (Hansen, Graham, Wolkenstein, & Rohrbach, 1991). More reliable measures consist of in-depth surveys that ask specific questions regarding implementation processes (e.g., attendance data, topics covered, activities, delivery strategies) as well as observations (Hansen, 2002). In addition, although specific questions were conceptually grouped according to our conceptual model, due to the limited sample size it was not possible to examine the potential factor structure of these questions. Future research will benefit from larger samples in which conceptually driven factor structures can be assessed to create a stronger correspondence between the conceptual and measurement models.

Future Directions

The results found here indicate it is likely that a variety of program adaptations will take place as evidence-based programs go to scale, and that program adherence in real-world settings is likely to be influenced by implementer, implementing organization, program, program recipient, and community characteristics that vary by program type. If program developers and funding agencies intend for programs to be delivered as planned, it will be necessary for them to place greater emphasis on addressing barriers to implementation and provide guidance about possible adaptations that minimally compromise program success by considering real-world barriers

that limit implementing all program components. Second, given the importance of community support, it may be useful for developers and training organizations to devote more energy to establishing community coalitions or other supportive structures that serve to increase awareness and provide support of prevention efforts as well as facilitate implementation efforts.

Using interview and survey data collected from program providers, a next step in our research will be to explore the specific types of changes made to various programs. Also, from this data set we will examine which factors are related to sustainability. Not only is it important to understand the conditions under which program adherence is maximized, future research needs to examine processes underlying the extent to which these "proven" programs are sustained. The nature of the Pennsylvania Research-based Programs Initiative, with large-scale replication of evidence-based programs with 4 years of substantial grant funding, provides a unique test bed for examining these important issues of implementation and sustainability.

REFERENCES

Backer, T.E. (2000). The failure of success: Challenges of disseminating effective substance abuse prevention programs. Journal of Community Psychology, 28, 363–373.

Battistich, V., Schaps, E., Watson, M., & Solomon, D. (1996). Prevention effects of the Child Development Project: Early findings from an ongoing multisite demonstration trial [Special Issue]. Journal of Adolescent Research, 11, 12—35.

Botvin, G.J. (2001). Life skills training. Princeton, NJ: Princeton Health Press, Inc.

Castro, F., Barreran, M., & Martinez, C. (2004). The cultural adaptation of prevention interventions: Resolving tensions between fidelity and fit. Prevention Science, 5, 41–45.

Catalano, R.F., Berglund, M.L., Ryan, J.A.M., Lonczak, H.C., & Hawkins, J.D. (1998). Positive youth development in the United States: Research findings on evaluations of positive youth development programs (NICHD Publication). Washington, DC: U.S. Department of Health and Human Services.

Chen, H.T. (1990). Theory-driven evaluations. Newbury Park, CA: Sage.

Chen, H.T. (1998). Theory-driven evaluations. Advances in Educational Productivity, 7, 15–34.

Collaborative for Academic, Social, and Emotional Learning [CASEL]. (2003). Safe and sound: An educational leader's guide to evidence-based social and emotional learning programs. Chicago, IL: Author.

Developmental Research and Programs. (2000). Communities That Care prevention strategies: A research guide to what works. Seattle, WA: DRP, Inc.

Domitrovich, C., & Greenberg, M.T. (2000). The study of implementation: Current finding from effective programs for school-aged children. Journal of Educational and Psychological Consultation, 11, 193–221.

Drug Strategies. (1998). Safe Schools, safe students: A guide to violence prevention strategies. Washington, DC: Author.

Dusenbury, L., & Falco, M. (1995). Eleven components of effective drug abuse prevention curricula. Journal of School Health, 65, 420–425.

Elias, M.J. (1997). Reinterpreting dissemination of prevention programs as widespread implementation with effectiveness and fidelity. In R.P. Weissberg, T.P. Gullotta, R.L. Hampton, B.A. Ryan, & G.R. Adams. (Eds.), Healthy children 2010: Establishing preventive services. Issues in children's and families' lives (Vol. 8, pp. 253–289). Thousand Oaks, CA: Sage.

Elias, M.J., Breune-Butler, L., Blum, L., & Schuyler, T. (2000). Voices from the field: Identifying and overcoming roadblocks to carrying out programs in social and emotional learning/emotional intelligence. Journal of Educational and Psychological Consultation, 11, 253–272.

Elliot, D. (1998). Blueprints for violence prevention. Golden, CO: Venture.

Elliott, D.S., & Mihalic, S. (2004). Issues in disseminating and replicating effective prevention programs. Prevention Science, 54, 47–53.

Ennett, S.T., Ringwalt, G.L., Thorne, J., Rohrbach, L.A., Vincus, A., Simons-Rudolph, A., et al. (2003). A comparison of current practice in school-based substance use prevention programs with meta-analysis findings. Prevention Science, 4, 1–14.

Gottfredson D.C., & Gottfredson, G.D. (2002). Quality of school-based prevention programs: Results from a national survey. Journal of Research in Crime and Delinquency, 39, 3–35.

Greenberg, M., Domitrovich, C., & Bumbarger, B. (2001). The prevention of mental disorders in school-aged children: Current state of the field. Prevention & Treatment, 4, 1–63.

Greenberg, M.T., Domitrovich, C., Graczyk, P.A., & Zins, J.E. (2005). The study of implementation in school-based prevention research: Theory, research and practice. Promotion of Mental Health and Prevention of Mental and Behavioral Disorders (Vol. 3). Rockville: MD: Center for Mental Health Services, Substance Abuse and Mental Health Services.

Greenberg, M.T., Weissberg, R.P., Utne O'Brien, M., Zins, J.E., Fredericks, L., Resnik, H., et al. (2003). Enhancing school-based prevention and youth development through coordinated social, emotional, and academic learning. American Psychologist, 58, 466–474.

Hallfors, D., Sporer, A., Pankratz, M., & Godette, D. (2000). Drug free schools survey: Report of results. Chapel Hill, NC: University of North Carolina.

Hansen WB. (2002). Program evaluation strategies for substance abuse prevention. Journal of Primary Prevention, 22, 409–436.

Hansen, W.B., Graham, J.W., Wolkenstein, B.H., & Rohrbach, L.A. (1991). Program integrity as a moderator of prevention program effectiveness: Results for fifth grade students in the adolescent alcohol prevention trial. Journal of Studies on Alcohol 52, 568–579.

Harachi, T.W., Abbott, R.D., Catalano, R.F., Haggerty, K.P., & Fleming, C.B. (1999). Opening the black box: Using process evaluation measures to assess implementation and theory building. American Journal of Community Psychology, 27, 715–735.

Kam, C.M., Greenberg, M.T., & Wells, C. (2003). Examining the role of implementation quality in school-based prevention using the PATHS curriculum. Prevention Science, 4, 55–63.

Meyer, A., Miller, S., & Herman, M. (1993). Balancing the priorities of evaluation with the priorities of the setting: A focus on positive youth development programs in school settings. Journal of Primary Prevention, 14, 95–114.

Mihalic, S. (2001). The importance of implementation fidelity. Blueprints News, 2, 1–2.

Mihalic, S. (2002). Blueprints for Violence Prevention Violence Initiative: Summary of training and implementation (Final Process Evaluation Report). Boulder, CO: University of Colorado at Boulder, Center for the Study and Prevention of Violence.

Mihalic, S., Irwin, K., Fagan, A., Ballard, D., & Elliott, D. (2004). Successful program implementation: Lessons from Blueprints. OJJDP Juvenile Justice Bulletin. Washington, DC: U.S. Department of Justice.

Pentz, M.A. (2003). Evidence-based prevention: Characteristics, impact, and future direction. Journal of Psychoactive Drugs, 35(Suppl), 143–152.

Rohrbach, L.A., Grana, R., Sussman, S., & Valente, T.W. (2006). Type II translation: Transporting prevention interventions from research to real world settings. Evaluation & the Health Professions, 29, 302–333.

Rohrbach, L.A., Graham, J.W., & Hansen, W.B. (1993). Diffusion of a school-based substance abuse prevention program: Predictors of program implementation. Preventive Medicine: An International Journal Devoted to Practice and Theory, 22, 237–260.

Scheirer, M.A. (1994). Designing and using process evaluation. In J.S. Wholey, H.P. Hatry, & K.E. Newcomer, (Eds.), Handbook of practical program evaluation (pp. 40–68). San Francisco: Jossey-Bass.

Silvia, E.S., & Thorne, J. (1997). School-based drug prevention programs: A longitudinal study in selected school districts (Executive Summary, Final Report). Research Triangle Park, NC: Research Triangle Institute.

Tobler Research Associates. (1988). School-based drug prevention programs: Technical report. National Committee for Abuse Prevention. Sand Lake, NY: Author.

U.S. Department of Health and Human Services. (2002). Finding the balance: Program fidelity and adaptation in substance abuse prevention.

APPENDIX

Means and Standard Deviations for Key Characteristics by Adherence Group for Community- and Family-Based Programs

	Community-based				*Family-based*			
	Changes made (N = 5)		*No changes made (N = 5)*		*Changes made (N = 6)*		*No changes made (N = 8)*	
Key characteristics	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Implementer								
Buy-in and support	3.75	0.50	4.20	0.84	3.67	1.51	4.50	0.53
Staff motivation toward the program	3.75	0.50	4.20	0.84	3.83	1.17	4.38	0.52
Time for the implementers to carry-out the program	3.25	0.50	3.00	1.58	3.00	0.89	4.38	1.06
Implementers prioritization of the program	3.25	0.50	4.00	0.82	3.00	1.41	4.50	0.76
Implementation organization								
Key staff participation in planning, decision-making, and problem-solving	3.60	0.89	4.00	1.22	4.17	0.98	3.00	1.20
Prioritization of the program by key staff	4.20	0.45	4.00	1.00	3.67	1.37	4.25	0.89
Cohesiveness and collaboration among all key stakeholders in the program	3.60	0.89	4.20	0.84	3.33	1.51	4.25	0.46
Sufficient resources allocated	4.60	0.55	4.20	0.84	4.00	1.67	4.88	0.35
Program coordinator or "champion"	3.75	1.89	3.60	0.55	4.00	1.26	4.00	1.07
Sufficient financial resources	4.00	1.73	3.80	0.45	3.33	0.82	4.38	0.74
Political climate	2.80	1.10	3.80	0.84	2.50	0.55	3.50	1.07
Program								
Quality of program/curriculum materials	3.60	1.14	4.40	0.89	4.00	1.10	4.88	0.35
Program flexibility to adapt to community needs	4.40	0.55	4.00	1.00	3.33	1.51	4.25	0.71
Time required to implement the program	3.40	0.55	2.60	0.89	2.00	0.63	3.38	1.06
Long-term cost (sustainability)	2.20	1.10	2.60	0.89	1.80	0.45	2.75	1.39
Availability of training	3.80	1.10	3.80	1.10	4.67	0.52	4.00	1.60
Overall quality of training workshops	3.80	1.10	4.20	0.45	4.00	1.55	4.38	1.06
Ongoing communication with trainers	4.25	0.50	3.80	0.84	4.50	0.55	4.38	1.06
Recipient								
Identifying target population	4.00	0.71	4.00	0.71	3.17	1.47	4.13	0.99
Recruitment of target population	3.60	1.14	3.60	1.52	2.83	1.47	3.88	1.25
Retention of target population	3.20	1.30	3.80	1.10	3.40	0.55	3.88	1.13
Responsivity of target population	3.20	0.84	4.40	0.89	3.17	0.75	4.38	1.06
Community								
Communication and support with a collaborative system	2.80	1.48	4.60	0.89	3.16	1.17	4.29	0.75
Communication and support with parenting agencies	3.60	1.67	4.20	0.84	3.50	0.55	4.25	0.89
Community leader support	3.20	1.30	4.40	0.55	3.33	0.52	4.13	1.13
Support of parents	3.60	1.52	4.00	1.22	3.66	1.21	4.63	0.52

Note. No significance tests were preformed due to small cell sizes.