

## **IMPLEMENTATION FIDELITY**

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### **Defining Implementation Fidelity**

The concept of implementation fidelity, sometimes called adherence or integrity, is a determination of how well a program is being implemented in comparison with the original program design. The definition put forth by CSAP (2001) is: the degree of fit between the developer-defined elements of a prevention program, and its actual implementation in a given organization or community setting. Evidence-based programs are developed and tested over time using theory to build the program components. It is implementation of these program components that is expected to influence program outcomes. Fidelity is the faithful implementation of the program components. Deviations from, or dilution of the program components, could have unintended consequences on program outcomes. There are five primary components examined when considering program fidelity (Dane and Schneider, 1998):

1. **Adherence** (or integrity, fidelity) refers to whether the program service or intervention is being delivered as it was designed or written, i.e., with all core components being delivered to the appropriate population; staff trained appropriately; using the right protocols, techniques, and materials; and in the locations or contexts prescribed.
2. **Exposure** (or dosage) may include any of the following: the number of sessions implemented, length of each session, or the frequency with which program techniques were implemented.
3. **Quality of Program Delivery** is the manner in which a teacher, volunteer, or staff member delivers a program (e.g., skill in using the techniques or methods prescribed by the program, enthusiasm, preparedness, attitude).
4. **Participant Responsiveness** is the extent to which participants are engaged by and involved in the activities and content of the program.
5. **Program Differentiation** identifies the unique features of different components or programs that are reliably differentiated from one another.

It is well established that the effects achieved in clinical trials (pilot efficacy studies) are rarely achieved when the program is implemented by others under normal (non-laboratory), real life conditions (effectiveness trials). There is often some lowering of effects, typically a result of less attention being placed on implementation quality. As empirically-based programs are disseminated widely (go to scale), greater attention must be devoted to identifying the factors that influence implementation effectiveness, which lies, in part, in the delivering the programs with fidelity. Fidelity of implementation is influenced by varying factors ranging from organizational factors to personal beliefs and experiences. If empirically-based programs are to be adopted on a widespread basis, and continue to achieve the same level of outcomes as found in the research trials, it will be necessary to understand the importance of fidelity and how fidelity of implementation is achieved and maintained.

## **Factors Influencing Fidelity**

The research literature suggests some evidence for several potential key factors that influence fidelity, including preplanning, program characteristics, training and technical support, integration of the program, organizational and implementer characteristics. These factors are briefly highlighted here.

### **Preplanning**

The motivations for adopting a program often dictate its success or failure. Interventions that are adopted based upon an empirically documented need, after a more exhaustive information search, and with activities that are initiated within the organization rather than by forces external to it, are implemented with higher quality.

*References: Blueprints News, 2001; Ellickson and Petersilia, 1983; Gendreau, Goggin, and Smith, 1999; Gottfredson and Gottfredson, 2002; Petersilia, 1990.*

### **Program Characteristics**

Certain features specifically related to the program, such as complexity and structure, can impact implementation. Clarity of goals and the specific procedures to put the innovation into place are necessary, but also must be easy to understand. Data suggests that having a set curriculum with activities that are viewed as relevant, attractive, and easy to use enhances program adoption in the classroom. Thus, manuals and other materials, such as handouts, structured activities and implementation standards, provide a clear program structure and reduce deviations from the intended content.

*References: Blakely et al., 1987; Durlak, 1998; Ellickson and Petersilia, 1983; Gottfredson and Gottfredson, 2002; Mihalic and Irwin, 2003; Mihalic, Fagan, and Argamaso, 2008; Petersilia, 1990; Perry, Murray, and Griffin, 1990; Taggart, Bush, Zuckerman, and Theiss, 1990).*

### **Training and Technical Support**

Training imparts the knowledge, skills, and desire to successfully implement programs. Beyond these basic goals, training sessions help decrease resistance and generate enthusiasm and commitment to the program, all of which are necessary for success. Several studies have demonstrated a relationship between teacher training and program success. For example, trained teachers have been shown to be more prepared, more likely to implement, implement with greater fidelity, and achieve better student outcomes, compared to untrained teachers.

After initial training sessions are conducted, staff turnover may threaten implementation fidelity if untrained staff delivers the program. It is important to provide retraining in subsequent years to ensure continued program involvement and rekindle commitment. Without support over time, implementers may stop using a program or fail to fully deliver it. Likewise, some may deviate from the intended program, and additional training and corrective feedback can be used to encourage these implementers to get back on course. For example, teachers may gradually replace experiential learning activities and interactive techniques with the traditional didactic

strategies they are accustomed to using. Failure to adopt behavioral teaching approaches has been associated with less favorable student outcomes in at least one study, so teachers may need additional training or assistance to become more proficient in these methods.

*References: Connell, Turner, and Mason, 1985; Durlak and DuPre, 2008; Flay, 1999; Fagan and Mihalic, 2003; Mihalic and Irwin, 2003; Mihalic, Fagan, and Argamaso, 2008; Fors and Doster, 1985; Gager and Elias, 1997; Gingiss, 1992; Gottfredson and Gottfredson, 2002; Hunter, Elias, and Norris, 2001; Lynch, Geller, Hunt, Galano, and Dubas, 1998; McCormick, Steckler, and McLeroy, 1995; Parcel et al., 1991; Perry, et al., 1990; Ross, Luepker, Nelson, Saavedra, and Hubbard, 1991; Taggart et al., 1990.*

### **Integration**

Success involves more than simply selecting effective programs and importing them into a school, agency, or community. Ongoing, serious attention must be given to linking programs to the stated goals or missions of the implementing organization; making programs visible and a part of the culture and mainstream practices of the agency; and having programs carefully planned and carried out by well trained personnel using engaging materials and procedures.

Program integration cannot occur unless the culture and attitude of the school, agency, or community are receptive to new programs and innovations. There may be differing community philosophies regarding the need for the program and mission of the organization; however, these differences can be overcome when members of the community agree on the need for change and relevance of the intervention and are involved in the planning.

*References: Durlak and DuPre, 2008; Fagan and Mihalic, 2003; Gager and Elias, 1997; Gendreau et al., 1999; Kramer, et al., 2000; Fullan, 1992.*

### **Organizational Characteristics**

There are various organizational factors that facilitate a high-quality implementation, such as a positive organizational climate, agency stability, shared decision-making, community support and interagency linkages. The success of every program is dependent upon strong administrative support. Effective leaders are able to motivate others by opening channels of communication and articulating a clear vision. Active leadership is demonstrated in priority setting, resource allocation (including time), policy change to accommodate the program, scheduling and integrating the program into the system, and personal involvement. It is especially important in school-based programs to have the support of principals. One study showed that significant intervention effects were only found in settings where both principal support and implementation quality was high; neither by itself predicted intervention effectiveness.

*References: Durlak and DuPre, 2008; Dunworth et al., 1999; Gager and Elias, 1997; Kam et al., 2003; McCormick et al., 1995; Mihalic et al, 2002; Paparozzi, 1994; Petersilia, 1990.*

### **Implementer Characteristics**

The support, motivation, and buy-in of implementing staff are crucial to implementation success. Program success is fostered by individuals who carry out an initiative with high shared morale, good communication, and a sense of ownership. Buy-in can be fostered by including implementers in the planning process, providing training and other technical support, and by scheduling regular meetings throughout the year so that staff can discuss problems. Providers who recognize a specific need for the innovation, believe the innovation will produce desired benefits, feel more confident in their ability to do what is expected (self-efficacy), and have the requisite skills are more likely to implement a program with greater fidelity. It is also important to designate a program coordinator who champions the innovation and guides its daily operations. In the Blueprints replications of the Life Skills Training Program, the presence of a strong program champion was associated with implementation fidelity.

*References: Durlak and DuPre, 2008; Ellickson and Petersilia, 1983; Fagan and Mihalic, 2003; Gager and Elias, 1997; Hunter et al., 2001; Petersilia, 1990.*

## Profidelity vs. Adaptation

As empirically-based programs become more popular and are disseminated “at scale,” the issues surrounding fidelity are important to understand. There was a time when the field didn’t know what worked to prevent delinquency. Today, we have a vast array of evidence-based programs from which to choose. However, even though communities are increasing their implementation of evidence-based programs, they are often not obtaining the same magnitude of results that were found in the original research trials. One of the main reasons for this is lack of fidelity to the implementation model.

The issues surrounding implementation, including fidelity, are providing rich new ground for research. Currently, there are two opposing perspectives regarding fidelity, as well as an attempt to bridge the gap between the two. There are those who advocate for strict adherence, “profidelity,” to the original demonstration model (*Elliott and Mihalic, 2003; Mihalic, 2003*). In this model, program deviations are expected to result in a lessening of program effectiveness. In the opposing camp are persons who support a “proadaptation,” or “reinvention,” perspective that allows freedom in modifying a program to fit local needs (*Berman and McLaughlin, 1978*). Contrary to the profidelity position, this model promises greater likelihood of program effectiveness, and longer program life, when adopters are able to maintain flexibility in adapting the program. Adaptation may occur as either an addition (enhancement) or deletion to the original model, a modification of existing program components, or changes in the manner or intensity of administration of program elements. Bridging the gap are those who try to reconcile the two positions by arguing that some adaptation to accommodate local needs is acceptable as long as the causal mechanism of the program is preserved, but beyond a certain point the program will be diluted beyond compromise (*Backer, 2002; Bauman, Stein, and Ireys, 1991; Hall and Loucks, 1978*). The latter two views envision program change as inevitable.

In actuality, the two opposing perspectives may be somewhat closer to the middle camp in this debate since both understand the importance of adhering to core theoretical components. The problem is that it is usually difficult to define the core theoretical components of a program. Profidelity proponents strive to maintain all program components because it is rarely understood which components are actually “core” and which are not. Because most interventions are tested with all program components intact, it is impossible to know which of these actually provide the active ingredients that drive the outcomes. Profidelity advocates believe that until these active ingredients can be isolated, a program should be delivered in a manner similar to the delivery in the research trials that proved its effectiveness. It must be proven empirically that a program component is optional or modifiable.

These opposing perspectives allow for empirical testing, and there has been some work in this area in which program impact evaluations have been conducted in conjunction with process evaluations to understand how program fidelity affects program outcomes. Program life is not considered an appropriate outcome for determining the importance of fidelity. Some programs have been quite successful in maintaining program life but have not demonstrated effectiveness

(e.g., DARE). Sustainability, at the expense of achieving behavioral reductions in drug use and violence, is not a reasonable criterion for determining the impact of fidelity. Some of the studies to determine the impact of fidelity upon efficacy (i.e., behavioral outcomes) are examined below.

### **Studies Examining Fidelity**

There are relatively few studies that have been conducted that can fully resolve the debate between the profidelity and adaptation camps. However, some evidence is available from meta-analyses and other pooled studies, as well as individual program studies.

### **Supports Profidelity**

#### *Meta-analyses and Examination of Other Pooled Studies*

Meta-analyses demonstrate that monitoring of program implementation (*DuBois, Holloway, Valentine, and Cooper, 2002; Smith et al., 2004*) and better implemented programs produce more change (*Gresham et al., 1993; Wilson and Lipsey, 2000*). In a recent systematic review of prevention and health promotion programs, 45 of 59 programs (76%) showed a positive relationship between the level of implementation and at least half of all program outcomes (*Durlak and DuPre, 2008*). It should be noted that although this review supports the important role of implementation fidelity, the authors argue for finding the right mix of fidelity and adaptation.

The best interventions can reduce recidivism by about 40 percent. Thorough implementation was found to be a significant factor in relation to recidivism effects. Intervention effects were larger when attention was given to the integrity of the program implementation. Additionally, programs of more than six months= duration were, on average, more effective than those of shorter length. Table 1 shows the independent contribution of several program characteristics, described below, to recidivism rates. The comparison is the recidivism rate of routine probation, or treatment-as-usual services found in the control groups of these 200 studies. The base rate of 50 percent approximates that found in these control groups. The figure shows the successive decreases in recidivism if a minimal program (programs found to have smaller effect sizes in the meta-analysis, incomplete implementation, and less than six months duration) is added to routine services, then if that minimal program is upgraded to a more effective intervention (with larger effect sizes), if the program is thoroughly implemented, and with a longer duration. Similar results were also found for institutionalized offenders (*Lipsey, 1999*).

#### Expected Recidivism w/ Various Intervention Characteristics for Non-institutionalized Offenders

<u>Intervention Characteristics</u>	<u>Recidivism</u>
Routine Probation (P)	50%
P + Minimal Program	46%
P + Best Intervention Type (B)	40%
P + B + Good Implementation (I)	35%

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A meta-analysis of 196 school-based violence prevention programs demonstrated that implementation quality made the largest contribution of any variable to effect size. This means that programs with successful program implementation resulted in larger mean change effect sizes (*Wilson and Lipsey, 2000*). In a larger sample of 249 school-based violence prevention programs, they found that implementation quality or dosage was related to larger effect sizes in 3 of 4 service formats (selected/indicated programs, special schools or classes, and comprehensive/multimodal programs). Implementation quality was modestly associated with effect size for universal programs, but didn't reach statistical significance (*Wilson and Lipsey, 2007*).

A meta-analysis of 143 drug prevention programs showed that well-implemented programs achieved a mean effect size 0.34 greater than poorly implemented programs, a substantial difference over the 0.30 mean effect size derived from all the programs (*Tobler, 1986*).

An examination of 181 experimental studies published between 1980 and 1990 in seven journals known for behaviorally-based interventions was reviewed. Only 15% of the studies had systematically measured and reported integrity data, and only 35% had operationally defined treatments. There were moderate positive correlations found between the degree of treatment fidelity and level of treatment outcome, indicating that treatment fidelity was associated with larger effect sizes (*Gresham et al., 1993*).

In a review of 34 rigorously evaluated programs to prevent mental disorders in school-age children, 11 of the 34 studies (32 percent) utilized implementation information as a source of data for outcome analyses. Four studies that examined dosage-response relationships indicated that higher quantities of the intervention resulted in better outcomes. Seven studies examined adherence and verified that, when significant results were found, higher fidelity was related to stronger program outcomes (*Domitrovich and Greenberg, 2000*).

Assessments in the field of corrections (specifically, Intensive Supervision Programs) have also verified the importance of program implementation in reducing recidivism. In 13 Massachusetts sites, an inverse relationship was found between the degree of implementation scale and offender recidivism (*Byrne and Kelly, 1989*).

### ***Individual Program Studies***

The preponderance of evidence in individualized studies supports the profidelity camp. The generalized trend is that high fidelity samples generally achieve stronger outcomes, as well as a greater number of outcomes, and some results are only achieved in high fidelity samples.

There are several examples of studies which have yielded stronger and a greater number of prevention effects for high-fidelity samples than for full samples (*Allen, Philliber, and Hoggson, 1990*;

*Dane and Schneider, 1998; Flay, 2000; Gottfredson, Gottfredson, and Hybl, 1993*). For example, in an evaluation of the Life Skills Training program, results in the full sample indicated that the prevalence of heavy drinking, and weekly and monthly cigarette smoking was significantly lower for the intervention groups than the control group, and heavy smoking was significantly lower in one of the intervention groups than the control group. There were, however, no significant differences for the monthly, weekly, or 3 drinks or more per occasion rates, nor were there significant differences for marijuana use. In contrast, in the high fidelity sample, the results were stronger, and more outcomes became significant. The experimental groups were significantly lower than the control group for all measures of cigarette use, weekly alcohol use, 3 drinks or more per occasion, drunk, weekly marijuana use, monthly marijuana use, and monthly alcohol use (*Botvin, Baker, Dusenbury, Botvin, and Diaz, 1995*).

Some programs only have significant effects in the high-fidelity samples (*Botvin, Baker, Dusenbury, Tortu, and Botvin, 1990; Fagan, 1990*). For example, the Child Development Program was evaluated in 12 program schools, however, only five of these schools showed clear evidence of widespread program implementation. There was no clear evidence of positive program outcomes for students at all 12 program schools; however, at the five high-fidelity schools, there were significant declines in alcohol and marijuana use and an increase in students' sense of school as a community, compared to control schools (*Battistich, Schaps, Watson, Solomon, and Lewis, 2000*).

### **Mixed Findings**

Some evidence is mixed. Thirteen studies that had considered the impact of fidelity on outcomes included five studies that contained pure measures of dosage. The evidence relating dosage to program outcome was inconsistent, with two studies showing significant positive effects, and three studies reporting non-significant effects. Five of the 13 studies included pure measures of adherence. Four of these studies utilized Dr. Gilbert Botvin's Life Skills Training Program and demonstrated predominantly positive or mixed effects of adherence. The fifth study, utilizing the Midwestern Prevention Project, showed non-significant effects. Only one study examined quality of delivery, the Midwestern Project, and found no significant effects. However, the measure was a teacher-reported global rating of how well the program worked. This is not a true measure of quality of delivery, because there is only an assumption that delivery was good if teachers perceived that the program worked well (*Dane and Schneider, 1998*).

A study of seven nationally disseminated education and criminal justice programs in 70 sites is cited as evidence for adaptation, defined as either an addition to the original program model or as a modification of existing program components. Deletions of components were unacceptable. While fidelity to the core elements of the program predicted effectiveness, incorporation of locally tailored enhancements improved the program's performance. However, modifications had no impact on effectiveness (*Blakely et al., 1987*).



## **Supports Adaptation**

In the systematic review of prevention and health promotion programs (*Durlak and DuPre, 2008*), three of the 59 studies assessed adaptation, and all three found a positive effect for adaptation on program outcomes (*Blakely et al., 1987; Kerr et al., 1985; McGraw et al., 1996*). However, these studies provide only weak support for adaptation.

In the Kerr et al., 1985 study, data from one small city junior high school showed that implementation declined over three observation periods as teachers adopted some teaching practices, eliminated others, and refined their favorite program skills. Although these modifications lowered implementation scores, students in experimental and control classrooms continued to differ on on-task and off-task behavior. However, the correlations between implementation and outcomes became weaker. In their second example from an inner city junior high school, implementation was weak through the first two observation periods. As a result, intensive staff development activities were instituted prior to the third observation period which improved implementation. Student behavior paralleled changes in implementation, and behavioral differences between experimental and control students emerged during the third observation period, reflecting higher implementation.

In the McGraw et al., 1996 study of CATCH, the percentage of classroom sessions modified by fifth grade teachers was associated with changes in dietary self-efficacy and knowledge, suggesting that modification of the sessions by teachers had a beneficial effect on the outcomes. This was not true of fourth grade teacher-modified sessions, nor was it true for the outcome of dietary intentions.

The most commonly cited study supporting the adaptation argument is a Rand report on educational innovations (*Berman and McLaughlin, 1977*). They found three patterns of implementation: (1) cooptation, adapting a program without any accompanying changes in organizational behavior; (2) mutual adaptation, adapting a program with accompanying changes in organizational behavior; and (3) non-implementation, failure to adopt and implement a program. Mutual adaptation was the most effective strategy for implementation. However, it has been noted that the program models studied were mostly loosely defined policy statements rather than well-specified programs. Their measure of implementation was the extent to which projects met their own goals, and there was no true measure of component-specific fidelity (*Blakely et al., 1987; Datta, 1981*). Later, the argument was advanced that there was no global best strategy, but that profidelity may work best with well-defined programs, and adaptive strategies may be better when the innovations are relatively unstructured (*Berman, 1981*).

## **Conclusion**

While three studies showed a positive effect for adaptation on program outcomes, it should also be noted that studies that have allowed for detailed documentations of adaptations have shown that most adaptations are not planned changes, but occur as a result of lack of understanding,

preparation, or time (*Jackson-Newsom, et al., draft*). The most frequently cited reason for deviations from fidelity was that facilitators ran out of time (*Hill et al., 2007*). This suggests that the critical, active ingredients of a program may be compromised when the program is adapted to meet the needs of the community or implementing agency, if the theory underlying the program is not well-understood.

The study examples provided above, taken as a whole, suggest that unless attention is given to implementing programs with fidelity, money, time and other resources may be wasted providing programming to youth that is having little to no impact on the desired behaviors that are the object of change.

## **Recommendations for Enhancing Fidelity**

1. Reviews of studies indicate that a large number fail to operationally define the treatment to be implemented. Program designers must operationally define the core components of the intervention that are necessary and sufficient to achieve the outcomes desired. Program designers should be encouraged to conduct research that informs the fidelity-adaptation debate. For instance, a core components analysis to empirically identify the components that are essential to achieving successful outcomes, or analyses that vary the treatment dosage to determine the minimal thresholds necessary, should be conducted.
2. Implementers should be provided with information to help them understand the program theory and the causal model. A thorough understanding of how and why the program works will enhance fidelity. This knowledge also helps to ensure that any modifications made will be guided by the need to preserve the underlying causal mechanisms of the program.
2. Program designers should create fidelity of implementation instruments that can be used by sites desiring to implement their programs. The creation of these instruments should be as important as the creation of manuals, handbooks, and other program materials.
3. The quality of implementation can be enhanced by proper training, technical assistance, and ongoing supervision. Implementing sites should purchase training and technical assistance packages from the program designers. This will help ensure that all implementers gain an understanding of the basic theoretical underpinnings of the model they are implementing and will impart to them the skills, confidence, and support necessary to conduct the program.
4. Treatment integrity should be routinely monitored, either internally or by an outside agency, to ensure that programs are being implemented with fidelity. Programs should be fully accountable to their funders for program fidelity. It is especially useful for the grant monitor to conduct site visits at multiple points to answer questions, identify problems, and provide feedback on implementation.
5. Studies reporting on treatment outcomes should also include measures of implementation fidelity to distinguish between poorly designed studies and those that may be effective but have been implemented with poor fidelity. Funders and publishers should promote standards for assessing fidelity as part of their review criteria.
6. Funders should support research on dissemination, including studies to identify the factors which influence fidelity of implementation. For instance, how might variations in training and technical support, implementer characteristics, and organizational support systems affect implementation.

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