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Commentary: *Three Critical Elements for Real-Time Monitoring of Implementation and Adaptation of Prevention Programs*

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Implementation support; Scaling up; Fidelity assessment; Continuous quality improvement

INTRODUCTION

We are at a place in history where the prevention science literature has established a cadre of evidence-based programs and practices (EBPPs) that have been proven, under controlled efficacy and effectiveness trials, to significantly improve the well-being of those served. Research in implementation science has also repeatedly demonstrated the importance of fidelity for realizing the benefits of these EBPPs when applied in real-world contexts. However, as a field, while we have ever-increasing evidence of ‘what’ systems and supports are needed to take EBPPs to scale, we continue to struggle with ‘how’ to successfully bring them to scale with quality in real-world service settings. The articles in this special issue of *The Journal of Primary Prevention (JPP)* further our understanding of the dimensions that need to be considered when scaling EBPPs and help inform what a scalable implementation support system would entail. The following commentary discusses implications for such a system and presents an example of using technology to support scaling up EBPPs while maintaining program fidelity and quality

ASSESSING IMPLEMENTATION AND ADAPTATION

Several articles considered the seeming dichotomy of fidelity and adaptation. As EBPPs have been disseminated into real-world settings, and research controls and resources are removed, ‘service drift’ can occur. Frontline providers may deviate from the prescribed program with additions, deletions, or modifications that lower fidelity to the model, and the quality of program delivery may suffer due to factors such as staff turn-over, resulting in less trained providers, and competing organizational demands, such as resource and time constraints on providers. Evidence suggests that declines in implementation quality

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Dr. DeRosier is the founder and owner of 3C Institute, the software development company which developed and disseminates the IMPACT implementation support system discussed in this article.

negatively affect program outcomes, resulting in fewer benefits for participants under everyday conditions compared to those achieved during research studies.

However, *Anyon and colleagues* argued that adaptation and fidelity should not be considered mutually exclusive and that careful consideration should be made of how program adaptations may actually enhance implementation within a particular community context. Standardized programs may not fully ‘fit’ within a given community, and it may be necessary to adapt lessons, examples, activities, or other program materials in order to increase their relevance and applicability for participants in that community. While adaptations by definition lower fidelity, some may actually improve implementation by enhancing the quality of program delivery and increasing participant responsiveness (e.g., engagement in the program). Therefore, we should not assume that all adaptations will result in poorer program outcomes.

Relatively little is known, however, about which adaptations undermine versus support implementation quality, and thereby outcomes. *Roscoe and colleagues* reviewed four established taxonomies for classifying adaptations and retrospectively evaluated the extent to which each facilitated defining adaptations made during implementation of a social emotional learning program. Their findings identified the relative pros and cons of using each of these taxonomies and underscored the need for further research to better understand how to consistently assess adaptations and which adaptations may negatively impact participant outcomes. As suggested by *Anyon et al.*, a critical distinction may be between those adaptations that maintain alignment with core program principles and components and those that do not.

Along these same lines, Greiner-Hill and colleagues examined a variety of implementation factors to determine those that were necessary to achieve positive outcomes for participants in an evidence-based family strengthening program. They compared sites with significant positive changes (‘*highly successful programs*’) to those yielding negative outcomes (‘*unsuccessful programs*’). Their analysis indicated that program success was related to within-site adaptations. However, sufficient provider training, moderate group size, and high parent engagement were necessary conditions to achieve success (i.e., success was not possible without the presence of these factors).

It is interesting that these factors were the ones found to be necessary for program success as they represent the three domains of implementation emphasized in the article in this JPP special issue by *Berkel et al.*, i.e., *fidelity* (as group size impacts quantity of content delivered), *quality* (as training impacts the provider’s skill in regards to delivering content), and *responsiveness* (greater participant engagement in the program). The authors noted that these three domains from Durlak and DuPre’s taxonomy (2008) are those that both most directly influence outcomes and are most likely to attenuate when a program is moved to scale.

Further, while fidelity and quality are often the subjects of investigation in studies of implementation, less is known about the third domain of responsiveness. The article by *Hanson, Fleming, and Scheier* examined participant engagement in the All Stars program

and found that self-reported student engagement was predictive of both proximal and distal student outcomes. Their findings contribute to this growing literature on responsiveness and underscore the importance of considering participant responsiveness in studies of EBPP implementation.

A CALL FOR REAL-TIME MONITORING OF IMPLEMENTATION AND ADAPTATION

It is notable that the studies in this special issue examining adaptations and implementation quality (*Anyon et al.*, *Griner Hill et al.*, *Hansen et al.*, and *Roscoe et al.*) relied primarily on retrospective data. In some ways, it is remarkable that robust findings were reported when data collection occurred after the EBPP was concluded. However, retrospective data, particularly when low response rates are also present, can introduce inaccuracies and biases. For example, providers who fail to respond to a survey about their adaptations may (or may not) be more likely to have made adaptations during the course of implementation, and those adaptations may be qualitatively different from those of providers who did participate in the retrospective study. Also, my self-evaluation of my engagement in an EBPP may vary considerably over the course of intervention and I may perceive myself as having been more highly engaged if I also believe the EBPP was successful in helping me in some way (particularly an issue if both engagement and outcomes are assessed via self-report).

It is critically important to create data collection systems that collect EBPP fidelity, quality, and responsiveness data **directly** from frontline providers and participants in a **timely** fashion. Access to real-time data, as implementation occurs, could truly move the implementation science field forward. Collecting data about how an EBPP session was implemented, and what adaptations were made, immediately following implementation of that session, and collecting engagement data from participants as the program unfolds, would remove retrospective data collection inaccuracies (e.g., memory issues) and lower reporting biases (e.g., responses not influenced by future events). Within-context monitoring would also aid our understanding of beneficial within-context adaptations and their impact on quality and outcomes.

In order to achieve this vision, three critical elements must be included in the data collection and reporting system. First, **data collection processes must be feasible for frontline providers**. As researchers, we believe more data are better; however, as practitioners, entering more data are burdensome. The more burdensome the data entry, the less likely providers will be to enter high quality data, or any data at all. Above all, we need to *respect the time and effort providers must take in entering data*. Ask only what you truly need to ask, minimize the need for any duplicative data entry, and structure data entry forms and processes to be as simple and user-friendly as possible.

Second, **data must be shared with providers in a timely, meaningful, and actionable manner**. If it is weeks or months before findings are shared, that data are neither meaningful nor actionable. However, if providers can see, in real-time, how fidelity to the model is linked with higher engagement or participant progress, motivation to deliver the EBPP with fidelity and high quality will increase. In my years designing and testing implementation

support systems, frontline providers have repeatedly expressed that understanding how their actions translate into benefits for participants is highly motivating and meaningful for them, and that if they knew when problems emerged, they would be highly motivated to take corrective action.

In light of the findings of *Mauricio, Ruddo-Stem, Dishion, Letham, and Lopez* in this special issue, a fruitful avenue for future research would be to investigate whether real-time feedback to providers results in changes in those attitudes and characteristics the authors found to be associated with higher fidelity (i.e., conscientiousness, openness, and work engagement/enthusiasm). Perhaps ‘provider readiness’ to implement an EBPP could be increased by providing meaningful and relevant feedback to providers during the course of implementation.

Third, while not a requirement per se, if the goal is to improve the quality of real-world implementation of an EBPP and thereby realize greater benefits for participants, **continuous quality improvement (CQI) supports should be data driven**. A powerful advantage of a software system that can (feasibly) collect data during the course of implementation and share findings with providers in real-time is the capacity to provide contextually-relevant and timely access to CQI resources. For example, if fidelity drops below a predefined benchmark or participant responsiveness is low, the system should be able to direct the provider to resources to support high fidelity implementation and recommendations for increasing engagement, respectively. These resources could take the form of brief videos or tip sheets with targeted helpful suggestions linked to particular data thresholds. For example, the system could direct the provider to a demo video to help prepare for the next session (and hopefully return fidelity to an acceptable benchmark) or send an alert with suggestions for how to increase participant engagement in the next session.

IMPACT IMPLEMENTATION SUPPORT SYSTEM

Consistent with the practical system described by *Berkel et al.* in this Special Issue, IMPACT (3cisd.com/implementation-support) is an example of how technology may be used to support scaling up EBPPs while maintaining fidelity and quality. As illustrated in Figure 1, IMPACT streamlines data collection, real-time reporting, and data-driven CQI through several **configurable** software modules. While some similarities in structure and delivery may exist, each EBPP is unique and requires customization to achieve specific data collection, reporting, and implementation support goals. Unfortunately, ground-up software development of a custom implementation support system is costly and time-consuming, such that few developers are able to provide computerized implementation supports for their EBPP. In response to the need for a cost- and time-efficient technology solution, the National Institute of Mental Health (NIMH) and National Institute of Drug Abuse (NIDA) funded the iterative development and refinement of IMPACT over the past 10 years.

3C Institute¹ is currently creating and conducting field tests of a series of IMPACT applications for a diverse menu of EBPPs, with funding from NIMH and in collaboration with the Annie E. Casey Foundation (AECF). To this end, 3C engages in a step-wise collaboration with EBPP developers to translate their existing implementation methods,

paper-and-pencil data collection forms, and reporting specifications, among others, into the IMPACT software platform.

Through this translation process, IMPACT applications are tailored to the needs and requirements of each EBPP, while maintaining a similar user interface (UI) and database management system. Figure 2 provides an example of a fidelity data entry form for a provider delivering the Coping Power Program (Lochman, Wells, & Linhart, 2008). Figure 3 provides a sample fidelity report with personalized feedback for CBITS (Cognitive Behavioral Intervention for Trauma in Schools; Jaycox, Langley, & Hoover, 2018).

Compared to constructing such a software system from scratch for each program, utilizing the same underlying technology infrastructure and repurposing customizable modules facilitate more rapid development of the implementation support system and significantly lowers costs to the developer. Further, a customizable modular system can be more easily (and affordably) updated and upgraded in the future. For example, as pilot data are accumulated, navigation and flow of the UI can be adjusted to improve usability for providers. Also, innovative implementation support advancements, such as the Lyssen audio processing and machine learning methodologies described by *Berkel et al.* could be feasibly integrated into such a system.

CONCLUSION

Real-time monitoring of implementation (fidelity, quality, responsiveness) and adaption would significantly advance prevention science research, and would support our broader efforts to improve the health and well-being of EBPP participants while scaling these effective interventions. Collecting data in the field would strengthen our research efforts and improve scientific knowledge on the linkages among implementation, adaptation, and outcomes. Further, greater understanding of how EBPPs are actually implemented in real-world settings, and the impact of particular types of adaptations, is crucial for informing how to scale EBPPs while attaining positive outcomes for participants.

IMPACT provides a concrete example of how a technology infrastructure can effectively support quality implementation of EBPPs at scale. 3C Institute's experience translating diverse EBPPs into IMPACT underscores the importance of considering three guiding principles when considering moving an EBPP to scale: Implement data collection methods that are respectful of providers' role in the assessment process; ensure data entry results in timely, meaningful, and actionable information for providers; and use data to drive provision of contextually relevant and timely CQI to effectively support providers in their delivery of the EBPP.

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Figure 1.
Modules included in the IMPACT implementation support system

Coping Power Program Return to "derosier@3cisd.com" user Clinician@3cisd.com

Dashboard Session Data Outcomes Data Reports Manage Groups

Current Group: Coping Power Youth

Session Data

Enter contact, fidelity, and progress data gathered during group and individual sessions.

Child Group Session Child Individual Session Parent Group Session

Session 2
Setting Long-Term and Short-Term Personal Goals
Hold: 11/05/2018

☒ Contact
Fidelity
☐ Progress

Child Group Session 2 Fidelity

How well did your group meet each objective?

Session Objective	Not at all	Partially	Completely
Review main points from previous group session	☐	☐	☐
Review weekly goal sheet and discuss the concept of setting and realizing goals	☐	☐	☐

Figure 2.
Example Fidelity Data Entry Form

Figure 3.
Example Fidelity Report