BRIEF

Implementation Science and Practice in the Education Sector

Aaron R. Lyon, PhD

Decades of research has produced a wide variety of evidence-based programs and practices (EBPs) for use in schools and other community settings. However, EBPs alone are not enough to create positive change in systems. Successfully adopting new programs and practices requires deliberate and focused efforts to change professional practice. When new social, emotional, and behavioral programs or practices are adopted in schools, only 25-50% are likely to be implemented with sufficient fidelity (i.e., quality) to bring about their intended intervention effects.[1] Only *one in three* efforts to install new programs is successful.[2]

Widespread recognition of this longstanding gap between research and practice has given rise to a rapidly maturing field of implementation. Implementation science can help project leaders maximize efforts to improve classroom functioning and student outcomes by providing strategies to ensure that implemented programs have a greater likelihood of success.

Many state and local education agencies, including Project AWARE grantees, are interested in implementation frameworks to support their use of EBPs. This brief is written for education agency leadership, school administrators, and school mental health staff who are involved in driving the implementation of EBPs and innovative practices. The purpose of this brief is to help you better understand implementation principles and processes, and how they fit into your school mental health efforts. First, we describe key implementation concepts and strategies. Next, we outline the field of implementation science and practice, particularly as it relates to schools. Finally, we provide practical guidance for improving your use of research evidence surrounding social, emotional, and behavioral interventions in schools.

Key Terms

Like many fields, implementation has research and practice components. *Implementation science* focuses on producing new, generalizable knowledge about effective techniques for supporting program adoption and sustainment. *Implementation practice* applies that knowledge to install programs and practices in routine service delivery settings.

Implementation can be thought about in comparison to other ways that innovations spread in organizations (see Exhibit 1).[3] *Diffusion* refers to passive, unplanned, and untargeted spread of information or interventions. *Dissemination* refers to targeted distribution of information and intervention materials to a specific audience. Dissemination activities typically focus on improving a practice or policy audience's knowledge and awareness. However, dissemination is not enough to change professional behavior. In contrast, *implementation* means using deliberate strategies in specific settings to adopt new interventions, integrate them effectively, and change practice patterns.

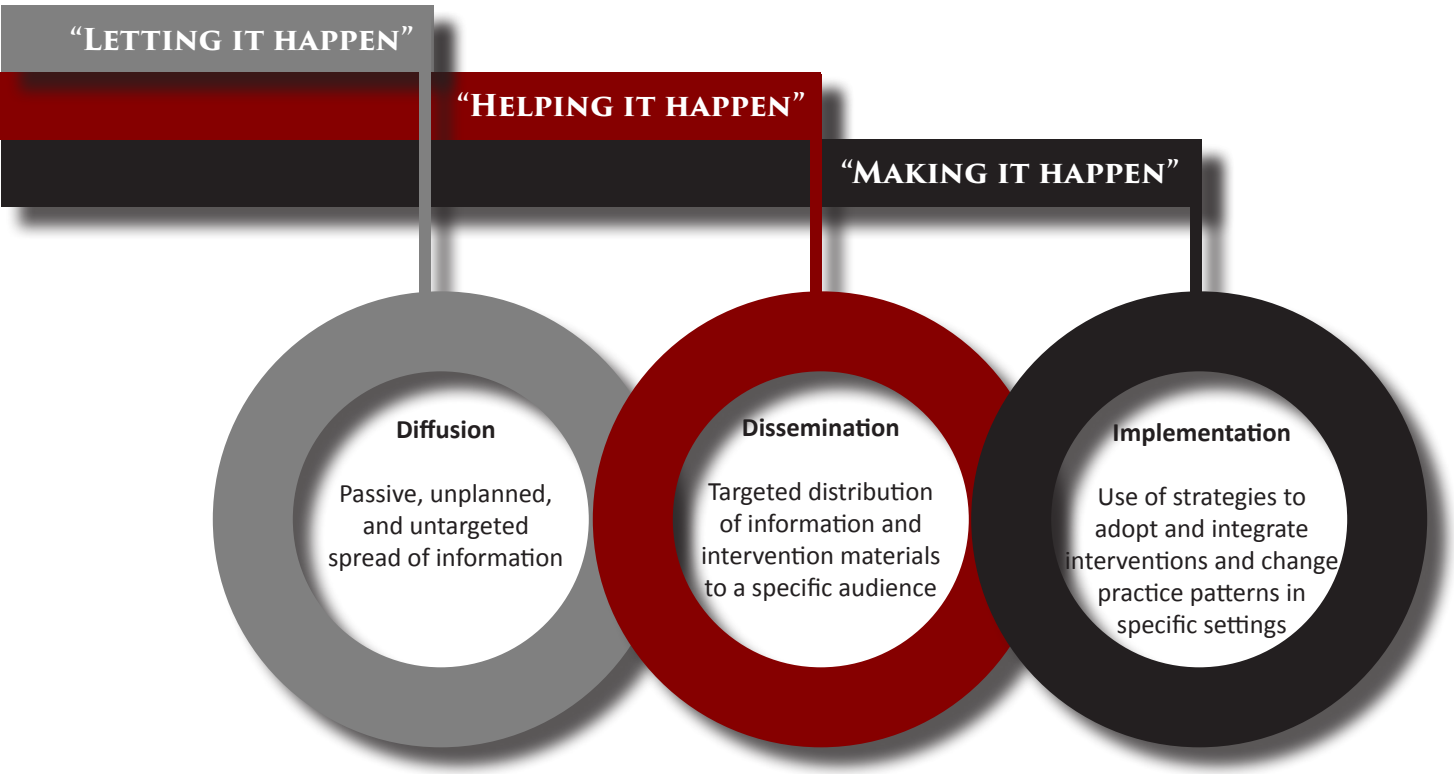

Exhibit 1: Definitions of Diffusion, Dissemination, and Implementation (from Greenhalgh et al.[3])

Implementation Objectives & Strategies

Implementation focuses on identifying and addressing multi-level factors that help or impede EBP adoption and sustainment. Most often, this is done by identifying and applying specific *implementation strategies.* Implementation strategies are systematic intervention processes to adopt and integrate evidence-based interventions or practices into usual services.[4]

Implementation strategies are designed to improve *implementation outcomes* and *service outcomes.* Implementation outcomes refer to the effects of an implementation strategy on the new intervention, practice, or service. Examples of implementation outcomes might include adoption, fidelity, or penetration/reach.[5] Service or intervention outcomes refer to the impact that the new intervention, practice, or service has on individuals, focus populations, or systems. For example, improvement in child and family functioning would be a service outcome. Exhibit 2 shows the relationship among implementation strategies, implementation outcomes, and service outcomes.

Strategies in Action. More than 70 implementation strategies have been identified.[7] The large majority of them are relevant to implementation and sustainment of EBPs in schools (see Exhibit 3 for examples). It is important to recognize that in most cases, full implementation is a long process, sometimes taking 2-3 years or more.[8] This is important to know because most projects use evaluation data to assess whether or not a new program is successful. Evaluation is an essential part of the implementation process. However, we need to consider whether a new program is fully implemented before using data to assess effectiveness. If we use the data too soon, an evaluation may wrongly conclude that the EBP was ineffective, when really the full program was never installed.

One of the most robust implementation science findings in the last 15-20 years is that one-time, "train and hope" professional development models are largely ineffective for producing professional behavior change.[9,10] No matter how long or intensive a training, the content is extremely unlikely to be used effectively in practice without post-training supports. For example, even trainings that last a week or more will be ineffective unless they are paired with supports like ongoing, targeted consultation or coaching. Implementation science research has also shown that even with high-quality implementation, sustained program use (i.e., continued application of the practice in a service context) is difficult to achieve.[11] Usually only parts of any given program are sustained in the long term. Often, only some of the individuals continue to use a program, or practitioners may continue to use only a subset of program components.[12]

Implementation Frameworks

There are numerous implementation frameworks. A framework is an important tool to help schools use implementation science to support specific programs. Selection of implementation strategies should be driven by one or more implementation frameworks. Implementation

frameworks articulate and organize key variables that need to be considered when implementing new programs and practices. Most implementation frameworks share a set of common themes. These include:

1. **Implementation unfolds over time or through stages/phases.** These phases may include pre-implementation (e.g., when systems are contemplating or exploring a change effort) and continue into a maintenance or sustainment phase.

2. **Implementation occurs in complex, multilevel systems.** Addressing multiple levels simultaneously has been found to result in improved implementation success. Levels most often include:

   - The intervention or practice being implemented
   - Service recipients (e.g., students)
   - Professionals/practitioners (e.g., teachers, clinicians)
   - The immediate organization or "inner context" in which implementation occurs (e.g., school buildings or districts)
   - The broader "outer context" (e.g., policy context, interorganizational linkages)

3. **There is a bidirectional relationship between settings and EBPs.** Both are likely to require some degree of adaption for implementation to be successful.

   - For EBPs, any adaptation should focus on components that are not considered critical to its effectiveness. Core EBP elements should not be adapted.
   - For settings, adaptation may focus on changing aspects such as organizational policies, leadership, or infrastructure.

Although more than 60 dissemination and implementation frameworks have been identified,[15] no one framework has been demonstrated to be superior or more consistently useful. The selection of an implementation framework should therefore be driven by the objectives and specific focus of the implementation project. A non-exhaustive list of implementation frameworks that have been successfully used in schools includes:

- Exploration, Preparation, Implementation, Sustainment (EPIS) Framework[16]
- Interactive Systems Framework (ISF)[17]
- The National Implementation Research Network's (NIRN) Active Implementation Frameworks (AIF)[9]
- The Multilevel Implementation Quality Framework[18]
- The Consolidated Framework for Implementation Research (CFIR)[1]

Exhibit 2: Conceptual Relationship Among EBPs, Implementation Strategies, and Outcomes (adapted from Proctor et al.[6])

Exhibit 3: Example Implementation Strategies for Schools (Lyon, Cook et al.[13]; adapted from Powell et al.[6])

Strategy	Definition	Examples
Conduct local consensus discussions	Include local teachers, staff, and stakeholders in discussions that address whether (1) the identified problem/need is important and (2) whether new practices to address the identified problem are appropriate.	School "A" identifies a need to improve classroom behavior as a high priority. School "A" administrators identify relevant stakeholders (e.g., teachers, counselors, and parents) to engage in a problem-solving process. Together, the group identifies the scope of the problem; helps select the Good Behavior Game as their EBP; and discusses ways to build school consensus about the objectives, timeline, and anticipated outcomes of implementation.
Identify and prepare champions	Identify and prepare key people who can dedicate themselves to supporting, marketing, and driving through an implementation process.	School "B" is preparing to implement a new, evidence-based social emotional learning (SEL) curriculum. The school distributes surveys to teaching staff asking them which colleagues they regularly approach when they have students who are experiencing problems. Teachers who are consistently nominated receive special training and (non-monetary) incentives to ensure their engagement in the implementation effort. These teachers are established as local experts on the intervention and serve as resources for their colleagues.
Recruit, designate, and train for leadership	Recruit, designate, and train leaders for the change effort so they can effectively engage in leadership behaviors that support others to adopt and deliver the new practice.	Clinicians at Community-based Mental Health Agency "C" frequently work in schools in the area, which is rural. One of these schools is beginning implementation of the Cognitive Behavioral Intervention for Trauma in Schools (CBITS). Clinical supervisors at the agency are given special supports (e.g., training, periodic consultation) to help them provide clear, consistent, positive messaging about CBITS.
Make training dynamic	Vary information delivery methods to be interactive, cater to different learning styles, and allow for professional development.	School "A" has begun implementing Good Behavior Game. The school provides in-person teacher training that involves active practice by everyone in attendance; opportunities to observe other instructors model program delivery; and direct feedback about teachers' performance during practice activities.
Promote adaptability	Identify the ways a new practice can be tailored or adapted to best fit with the school or classroom context and meet local needs. Clarify which elements of the new practice must be maintained to preserve fidelity.	Following the implementation of the CBITS group intervention, the intervention developers and the local implementers (i.e., school-based clinicians from Community Mental Health Agency "C") discuss aspects of the program that may be interfering with successful implementation. They identify needed adaptations for the school's large population of students who are immigrants and English language learners. They decide to change some of the relaxation exercises to more closely align with the experiences of immigrants. This discussion focuses on figuring out which examples in the program can be changed to be more culturally appropriate while keeping the critical components intact.
Provide ongoing consultation or coaching	Provide ongoing consultation or coaching with one or more experts in the strategies used to support implementing new practices.	For three months following initial training in the SEL curriculum, teachers at School "B" continue to receive in-person or phone-based support from the original trainers at regularly scheduled times (e.g., weekly or biweekly). On these calls, teachers are able to ask questions, receive feedback on implementation, problem-solve difficulties they encounter, and learn from their peers.
Facilitate relay of data to school personnel	Provide as close to real-time data as possible about key measures of intervention fidelity and student outcomes. Use integrated modes and channels of communication in a way that promotes use of the targeted new practices.	To support implementation of Schoolwide Positive Behavioral Interventions and Supports (SWPBIS), Education Agency "D" sets up quarterly data collection by a trained consultant using the Tiered Fidelity Index (TFI; a leading measure of PBIS fidelity). TFI data is then shared educators during quarterly staff meetings. In these meetings, administrators review PBIS implementation efforts over the past quarter and provide space for problem solving.
Provide system-level incentives	Provide system-level incentives to districts, schools, or related entities to participate and engage in an implementation effort involving a new practice.	A state committed to implementing SEL curricula in schools allocates specific funding and other resources to schools that have demonstrated ongoing commitment to SEL implementation. To decide which schools receive this funding, the state agency looks at schools' commitment to processes such as developing an implementation blueprint and timeline, releasing key champions from other responsibilities, participating in training and consultation, routinely collecting SEL fidelity data, and meeting fidelity benchmarks.

Implementation in the School Setting

The remainder of this brief focuses on the implementation challenges, considerations, and strategies that are particular to schools. School workforce issues, calendars, and organizational structures uniquely affect implementation processes in the education sector.[19]

Workforce and Implementation Agents. School staff are a diverse set of service providers. In some schools, dedicated behavioral support personnel and school-based mental health clinicians are available to lead EBP implementation, but administrators, teachers, and support staff are also key EBP implementers.[20] While the most appropriate personnel to implement a new program is sometimes dictated by the type or intensity of the EBP, schools and other organizations should think flexibly about the personnel in school buildings who might be appropriate to deliver prevention programs. For example, mental health personnel would be best to lead a CBITS trauma intervention, but SEL curricula would be delivered by classroom teachers and even other staff members (e.g., administrators, athletic staff). When choosing an intervention, think carefully about the personnel required to implement it. Many interventions are specifically designed for non-clinical school staff to implement.

Calendar and Timeline. The school calendar has clear implications for the sustainment of new programs. Summer break is a substantial transition point for both students and staff. No programs or practices can truly be considered sustained until they have continued to be implemented with fidelity over at least 2-3 consecutive school years. Addressing this reality is difficult and requires a commitment from all administrators and personnel involved in an implementation effort to avoid drawing conclusions about a program and its effectiveness until multiple years have passed. Communicate this clearly at the outset and seek formal and public commitments from stakeholders to "stay the course." Work with stakeholder leaders to identify ways to sustain buy-in over time.

Organizational Factors. Finally, as with any other setting, organizational factors are critical to implementation in schools. Among the most critical determinants of implementation success is implementation leadership,[21] and there is growing recognition that school leadership is essential for program success. Although principals may be the most relevant leaders for implementation efforts in many schools, also consider lower-level leaders or leadership teams that may be closer to implementation efforts. Special training or other supports can be used to help leaders at multiple levels in schools and related organizations support EBP implementation by creating a positive implementation climate. This climate is characterized by clear expectations, positive reinforcement for implementing (e.g., social recognition), and consistent messages to support the EBP effort.

Practical Recommendations for Implementation in Schools

Implementation and sustainment efforts should be deliberate in their planning and resource allocation processes. Picking and choosing different strategies based on what appears to work in the short term is unlikely to promote effective implementation in the long term. That said, the recommendations below and the strategies in Exhibit 3 provide a helpful starting place for integrating implementation principles in your efforts.

Get system-wide buy-in. Implementation always occurs over multiple levels, so it is critical to work toward achieving buy-in from a wide variety of stakeholders. For example, implementations of Positive Behavioral Interventions and Supports (PBIS) often include the requirement that at least 80% of staff endorse the implementation project.[22] Facilitate buy-in by including a range of stakeholders in decision making.[6] For instance, use local consensus discussions or stakeholder advisory boards to solicit input on implementation efforts and recommendations for improvements. On an individual level, promote buy-in through targeted communications, messages, or testimonials from people who are similar to or respected by your audience. For example, recent work has used testimonials from teachers about the importance of proactively supporting students to improve educators' beliefs and attitudes about EBPs prior to training and consultation efforts.[23]

Always provide post-training supports. Front-line service provider behavior change is highly unlikely without post-training supports such as consultation/coaching, prompts or reminders, active problem solving assistance, and clear accountability structures (see fidelity measurement, below). Post-training supports like these inevitably add cost to the efforts; providing ongoing consultation can increase the cost of an implementation initiative by 50%.[24] However, not including post-training supports may make the implementation unsuccessful and waste the resources devoted to the initial training.

Ensure fidelity through routine measurement. Measuring the success of implementation initiatives is critical. Importantly, we know that reports of fidelity from front-line service providers (e.g., teachers, clinicians) are not strongly associated with more objective observations. Because of this discrepancy, self-report methods along cannot tell you if implementation is going as planned. For this reason, evaluation of fidelity should be as objective as possible and come from an independent information source or sources (e.g., peer observation, student report of teacher practices, expert consultant ratings). Based on your fidelity assessment data, provide feedback, structured problem solving, and consultative supports to the implementers.

Note that even when implementation outcomes are adequate, you should not assume that student outcomes are improving without explicitly evaluating them as well. When possible, this may be most efficiently achieved using existing administrative data (e.g., student attendance, discipline). Your Project AWARE outcome measures can help you determine if EBP implementation is supporting your focus populations as expected.

Conclusion: Implementation as a Long-Term Process

The field of implementation science and practice is rapidly expanding. In the education system, where resources and time are limited, strategic implementation can often be the difference between programs that fail and programs that create sustainable change. More education leaders recognize the need for a deliberate process of implementation when starting new programs and practices in schools. Implementation is a lengthy and iterative process that involves planning, service integration, post-training support, evaluation, and collaborative problem solving. Sustaining buy-in across multiple levels of school leadership and stakeholders can produce the long-term dedication that is needed to successfully implement innovative practice for student mental health.

Additional Resources

Historically, most resources for implementation support in schools have been focused on specific programs or practices (e.g., PBIS), rather than providing cross-cutting information and supports that could be used to facilitate the implementation of any EBP. For further information on implementation in schools and related contexts, please see the resources below.

Web Resources

- SAMHSA's implementation guide: https://nrepp-learning.samhsa.gov/implement-program
- "Implementation in Schools" – a brief video funded by the Canadian Institutes of Health Research: https://www.youtube.com/watch?v=XdfPmL4MuIY
- The National Implementation Research Network's (NIRN) Active Implementation Hub: http://implementation.fpg.unc.edu
- The Consolidated Framework for Implementation Research's technical assistance website: http://cfirguide.org

Articles

- Cook, B.G., & Odom, S.L. (2013). Evidence-based practices and implementation science in special education. Exceptional Children, 79, 135-144.
- Forman, S. G., Shapiro, E. S., Codding, R. S., Gonzales, J. E., Reddy, L. A., Rosenfield, S. A., ... & Stoiber, K. C. (2013). Implementation science and school psychology. School Psychology Quarterly, 28(2), 77.
- Owens, J. S., Lyon, A. R., Brandt, N. E., Warner, C. M., Nadeem, E., Spiel, C., & Wagner, M. (2014). Implementation science in school mental health: Key constructs in a developing research agenda. School Mental Health, 6(2), 99-111.

Works Cited

1. 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(1), 3-35.
2. Damschroder, L. J., Aron, D. C., Keith, R. E., Kirsh, S. R., Alexander, J. A., & Lowery, J. C. (2009). Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. Implementation science, 4(1), 50.
3. Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., & Kyriakidou, O. (2004). Diffusion of innovations in service organizations: systematic review and recommendations. The Milbank Quarterly, 82(4), 581-629.
4. Powell, B. J., McMillen, J. C., Proctor, E. K., Carpenter, C. R., Griffey, R. T., Bunger, A. C., ... & York, J. L. (2012). A compilation of strategies for implementing clinical innovations in health and mental health. Medical care research and review, 69(2), 123-157.
5. Proctor, E., Silmere, H., Raghavan, R., Hovmand, P., Aarons, G., Bunger, A., ... & Hensley, M. (2011). Outcomes for implementation research: conceptual distinctions, measurement challenges, and research agenda. Administration and Policy in Mental Health and Mental Health Services Research, 38(2), 65-76.
6. Proctor, E. K., Landsverk, J., Aarons, G., Chambers, D., Glisson, C., & Mittman, B. (2009). Implementation research in mental health services: an emerging science with conceptual, methodological, and training challenges. Administration and Policy in Mental Health and Mental Health Services Research, 36(1), 24-34.
7. Powell, B. J., Waltz, T. J., Chinman, M. J., Damschroder, L. J., Smith, J. L., Matthieu, M. M., ... & Kirchner, J. E. (2015). A refined compilation of implementation strategies: results from the Expert Recommendations for Implementing Change (ERIC) project. Implementation Science, 10(1), 21.
8. Fixsen, D. L., Naoom, S. F., Blase, K. A., & Friedman, R. M. (2005). Implementation research: a synthesis of the literature.
9. Herschell, A. D., Kolko, D. J., Baumann, B. L., & Davis, A. C. (2010). The role of therapist training in the implementation of psychosocial treatments: A review and critique with recommendations. Clinical psychology review, 30(4), 448-466.
10. Joyce, B. R., & Showers, B. (2002). Student achievement through staff development.
11. Scheirer, M. A. (2005). Is sustainability possible? A review and commentary on empirical studies on program sustainability. American Journal of Evaluation, 26, 320–347.
12. Stirman, S. W., Kimberly, J., Cook, N., Calloway, A., Castro, F., & Charns, M. (2012). The sustainability of new programs and innovations: a review of the empirical literature and recommendations for future research. Implementation Science, 7(1), 17.
13. Lyon, A. R., Cook, C. R., Locke, J., Powell, B. J., & Waltz, T. J. (2017, October). Implementation Strategies to Support Adoption and Sustainment of Evidence-Based Behavioral Health Practices in the Education Sector. Paper presented at the 2017 Center for School Mental Health's 22nd Annual Conference on Advancing School Mental Health. Washington, DC.
14. Beidas, R. S., & Kendall, P. C. (2010). Training therapists in evidence-based practice: a critical review of studies from a systems-contextual perspective. Clinical Psychology: Science and Practice, 17(1), 1-30.
15. Tabak, R. G., Khoong, E. C., Chambers, D. A., & Brownson, R. C. (2012). Bridging research and practice: models for dissemination and implementation research. American journal of preventive medicine 43(3), 337-350.

16. Aarons, G. A., Hurlburt, M., & Horwitz, S. M. (2011). Advancing a conceptual model of evidence-based practice implementation in public service sectors. Administration and Policy in Mental Health and Mental Health Services Research, 38(1), 4-23.

17. Wandersman, A., Duffy, J., Flaspohler, P., Noonan, R., Lubell, K., Stillman, L., ... & Saul, J. (2008). Bridging the gap between prevention research and practice: The interactive systems framework for dissemination and implementation. American journal of community psychology, 41(3-4), 171-181.

18. Domitrovich, C. E., Bradshaw, C. P., Poduska, J. M., Hoagwood, K., Buckley, J. A., Olin, S., ... & Ialongo, N. S. (2008). Maximizing the implementation quality of evidence-based preventive interventions in schools: A conceptual framework. Advances in School Mental Health Promotion, 1(3), 6-28.

19. Owens, J. S., Lyon, A. R., Brandt, N. E., Warner, C. M., Nadeem, E., Spiel, C., & Wagner, M. (2014). Implementation science in school mental health: Key constructs in a developing research agenda. School mental health, 6(2), 99-111.

20. Eber, L., Weist, M., & Barrett, S. (2013). An introduction to the interconnected systems framework. Advancing education effectiveness: Interconnecting school mental health and school-wide positive behavior support, 3-17.

21. Aarons, G. A., Ehrhart, M. G., Farahnak, L. R., & Sklar, M. (2014). Aligning leadership across systems and organizations to develop a strategic climate for evidence-based practice implementation. Annual Review of Public Health, 35, 255-274.

22. Horner, R. H., Sugai, G., Todd, A. W., & LewisPalmer, T. (2005). School-wide positive behavior support. In L. Bambara & L. Kern (Eds.), Individualized supports for students with problem behaviors: Designing positive behavior plans (pp. 359 – 390). New York: Guilford Press.

23. Cook, C. R., Lyon, A. R., Kubergovic, D., Wright, D. B., & Zhang, Y. (2015). A supportive beliefs intervention to facilitate the implementation of evidence-based practices within a multi-tiered system of supports. School mental health, 7(1), 49-60.

24. Olmstead, T., Carroll, K. M., Canning-Ball, M., & Martino, S. (2011). Cost and cost-effectiveness of three strategies for training clinicians in motivational interviewing. Drug & Alcohol Dependence, 116, 195-202.