Professional Practice

Evidence-Based Interventions: Necessary but not Sufficient for a Profession of Scientist-Practitioners

By Steven R. Shaw, Laura Varona Prevez, & Shalaka Shah

“The life and soul of science is its practical application.”
— Baron William Thomson Kelvin

School psychology training programs take great pride in claiming to prepare scientist-practitioners consistent with the tradition of the Boulder model. Science as a basis for practice is also endorsed by government initiatives, such as in the case of the Individuals with Disabilities Education Act of 2004 and No Child Left Behind Act of 2001, in which research-based interventions became codified into law as the standard of practice. Moreover, the American Psychological Association recommended that evidence-based interventions (EBIs) be prioritized for all psychological services (American Psychological Association, 2006). Despite these efforts, many school psychologists find their practice influenced less by science and more by case law, legislation, regional and local regulation, tradition, standards set by eminent scholars and practitioners, and other factors unrelated or tangentially related to science. The recent movement toward a true scientist-practitioner model of practice is exciting and promising. EBIs have rekindled the spirit of the Boulder model and have resulted in near universal enthusiasm in school psychology research and practice. However, the EBI movement has limitations. Embracing evidence-based interventions is a necessary, but insufficient condition for developing a true profession of scientist-practitioners.

Using science as a basis for clinical decisions is relatively new (Bowen & Graham, 2013). Tradition, insight, experience, legal mandates, societal norms, books and workshops from eminent scholars, and clinical observation have informed numerous practices with minimal scientific support. Many school psychologists were trained in these non-research-based practices. However, such approaches are difficult to disprove because their support is based not on science, but on familiarity, tradition, habit, and comfort level. Other professions face this issue as well. For example, academic medicine has recently articulated the frustration of physicians’ continuing use of disproved or replaced yet comfortable, traditional, and established practices (Prassad, Cifu, & Ionnidis, 2012). Although there are a host of EBIs available in nearly all professional fields, the implementation of EBIs is not especially common, given the many obstacles EBIs face when it comes to real-world implementation (Addis, Wade, & Hatgis, 1999). Embracing and implementing EBIs is an important shift toward professionalism and responsiveness to the needs of children, families, and schools; yet implementation remains a challenge (Sanetti, 2013).

How are Evidence-Based Interventions Defined?

Evidence-based practice was a term first proposed in 1992 in reference to medical practices (American Medical Association Evidence-Based Working Group, 1992). Although originating in medicine, evidence-based models have spread to a variety of professions, including education and psychology (Rycroft-Malone, 2004). Among the criteria for classification as an evidence-based practice are that positive outcomes have been reported in peer-reviewed journals or documented effectiveness is supported by other sound evaluation
methods, and the judgment of informed experts (Glasgow et al., 2012). School psychology and other professions have used the term “evidence-based interventions” to specifically refer to the educational or mental treatments that have significant and compelling research support.

The most inclusive and relevant definition comes from the Evidence-Based Behavioral Practice Project, which entails making decisions about how to promote health or provide care by integrating the best available evidence with practitioner expertise and other resources, and with the characteristics, state, needs, values and preferences of those who will be affected. This is done in a manner that is compatible with the environmental and organizational context. Evidence is comprised of research findings derived from the systematic collection of data through observation and experiment and the formulation of questions and testing of hypotheses (www.ebbp.org).

Note that in this definition, there is no reference to published, peer reviewed research. The only reference is to the “best available evidence,” a phrase open to a host of interpretations (Chaudoir, Dugan, & Barr, 2013).

The central tenets of EBI are practices that are supported by the preponderance of results of research studies (Colquhoun, et al., 2014). The most heavily weighted research studies are published in refereed, peer-reviewed scientific journals. Research studies are evaluated based on the effect size of the intervention, the quality of research methodology, and the relevance of the research sample to the clinical population receiving the intervention. Randomized, double-blind control studies are considered to be the gold standard in research designs and such studies are given the most weight in integrating and supporting the quality of a practice (Bowen & Graham, 2013). Typically, theoretical papers and qualitative studies are not considered to be contributors to the evidence supporting EBIs. The goal of EBIs is to promote the use of effective practices and enhance public health by applying empirically supported principles of research design, outcome evaluations, case formulation, and intervention (Thompson, Estabrooks, Scott-Findley, Moore, & Wallin, 2007). Theoretical reviews and qualitative studies are not considered among the information used to support EBIs because most of these studies do not conform to the narrow set of methodological criteria and replicable nature that is characteristic of true evidence-based research (Addis et al., 1999). In the instance where a narrow set of methodological standards are not used, but where the evidence informs a specific clinical practice, it is best referred to by the more inclusive term of “research-based practice” rather than EBI.

The Challenges of Implementing EBIs

The usefulness of EBIs for general application and practice is fraught with challenges. Determining whether the preponderance of the research supports the effectiveness of an intervention in practice is a complex issue (Greenhalgh, Howick, & Maskrey, 2014). There are entire journals devoted to complex and detailed methods of synthesizing research through meta-analyses and literature reviews. Moreover, there is a well-known negative relationship between quality of research design and effect size (Higgins et al., 2013). That is, the best designed studies most often show the smallest effects of an intervention. A related tendency is that early versions of new interventions tend to have large effect sizes and poor research designs. As more sophisticated research designs are used, more recent studies tend to have lower effect sizes than early or original studies. There is a temptation to cherry-pick studies showing the largest and most compelling effect sizes to support an intervention despite methodological limitations (Luke, 2011). And there is also a temptation to accept new ideas whose effectiveness has not withstood several sophisticated and independent evaluations. Many heavily marketed interventions in education selectively present research showing positive effect sizes, are fairly new and have not been effectively evaluated, or their developers actively resist making data available for independent evaluation. In this fashion, there is a claim of evidence support, but such strategies do not fully meet criteria for EBI.

Unique characteristics of sample of interest in research and implementation. Even the most strongly and universally supported EBIs present questions for those making implementation decisions. Many studies
supporting EBIs are group studies that rely on mean differences between an intervention (i.e., experimental) group and a control group (Penuel, Fisman, Yamaguchi, Lawrence, & Gallagher, 2007). Studies identifying the characteristics of the participants with strong positive outcomes and other participants who are unaffected or negatively affected by the interventions are extremely rare. Given that many of the individual students with whom school psychologists work are often outliers and have had multiple unsuccessful intervention attempts, group studies may not assist in capturing the needs of students with special needs who deviate in many ways from the population targeted in the research supporting the EBI. When EBIs are supported by N=1 studies, the individual characteristics of the student are critical variables in determining the utility of the research for implementation.

**Relevance to target population.** Generalization of research supporting EBIs is a challenge. The demographic and learning characteristics of the sample are well described. However, rarely do the characteristics of the sample used in research match those of the target population that will receive the intervention. Studies have been conducted in structured settings such as university laboratories, in-patient psychiatric units, and private schools. Other studies take place with specific samples of populations such as students with autism, from northern Vermont, and other geographical or cultural characteristics that make samples from research unique and of questionable generalization. An understanding of the diverse demographic and contextual factors can affect the applicability and effectiveness of the intervention model that is used. Consequently, the match between the research sample and the target of the intervention dictates how researchers or field clinicians interpret the utility of a specific EBI for the current need. Many constructs and EBIs were developed and tested on university undergraduates and the ideas are then generalized to primary and secondary students. This is certainly a questionable practice. The match between sample of the study and the target sample receiving the intervention is a critical variable to consider in the implementation of EBIs.

**Resources.** Evidence-based interventions with strong research support may use resources that no school could possibly obtain. For example, the original studies supporting token economies took place in an in-patient psychiatric facility. Although the concept was well developed, the original studies had 24-hour per day supervision of the research subjects or clients, a team of professionals to implement the program, financial resources of the institution, and the availability of alternative treatments for those unaffected by the token economy (Ayllon & Azrin, 1968). Although the concept of token economies has worked well in multiple settings, the resources required to implement this intervention are often underestimated. Moreover, many EBIs were conducted with a small army of graduate students and supported by the resources of a large research grant. Before any EBI is implemented, an analysis of resources required and available needs to take place. The greater the deviation from the resources in the original supporting studies, the higher the likelihood of low treatment integrity and different outcomes from the original EBI supporting studies.

**Match to school culture.** The fit between school culture and EBI involves matching the values, theoretical orientation, community standards, teacher preparation, and openness to change and innovation to those explicit or implicit in the EBI. For example, an EBI based on behavioral principles may not be implemented effectively in a school with an inquiry-based approach to education, or a school using a humanistic philosophy, with teachers not well trained in behavioral methods. The match between EBI and the school culture requires analysis and evaluation of the characteristics of both.

**Context and treatment integrity.** Often an EBI is identified as having potential to solve an existing problem and is inserted into a system with little flexibility in the methods of implementation (Klein & Knight, 2005). Treatment integrity is a construct requiring implementation of EBIs to be as similar to the methods used in supporting the EBI as possible, the concern being that deviation from the methodology of the research supporting the EBI results in lower than expected outcomes. The downside is that context is not often considered. Labelling an intervention as an EBI with strong research support is much like the construct of validity for tests. The construct is not universal, but context specific. There may be strong support for one implementation setting and no support for its application in another setting. The fit of the EBI to the context in which the intervention is to be implemented is as or more important than the strength of the evidence supporting the interventions.

**A New Research-To-Practice Paradigm**
The emphasis on EBIs is a useful step in establishing school psychology as a profession that provides demonstrable outcomes based on scientific principles. Such an approach can only strengthen our professional standing within schools and other institutions. However, the danger is in the belief that EBI is the final destination in the development of a strong scientist-practitioner practice in the tradition of the Boulder model. EBI is a necessary, but not sufficient step. The next step involves implementation science. Implementation science is the study of methods to promote the integration of research findings and evidence into policy and practice (Forman et al., 2013). The primary question of EBI is: What works? The primary questions of implementation science are: How does it work? How robust are the outcomes of the interventions to variations in implementation? Under what conditions does it work? What specific expertise is required? What are the negative unintended consequences of application (e.g., side effects)? For which populations or individuals does it work? What resources are required for it to work? Is it consistent with the culture and values of the setting and personnel in which it is implemented? These are the next and most important questions to be answered. EBI is best thought of as an excellent starting point from which to launch a new wave of research methods in school psychology.

Evidence-based interventions can best be considered as a “proof of concept” (Michie et al., 2011). A large percentage of educational and psychological practices do not meet even the modest benchmark of being an EBI. However, a positive result from the What Works Clearinghouse (http://ies.ed.gov/ncee/wwc) or strong evidence from the preponderance of research in the field is not enough. By engaging in the goals and approaches of implementation science, evidence for how, when, where, why, and for whom becomes essential in the application of new ideas. There is a common complaint that the application of new research to educational practice takes 10 to 20 years or more. Moreover, the rejection of disproved ideas in practice (e.g., grade retention or corporal punishment) is also stubborn because of familiarity with old ideas and lack of perceived actionable alternatives. These issues are common because there is no map guiding psychologists and educators on ways to translate research to practice. Evidently, practitioners become lost or frustrated, surrender, and rely on habit and old familiar practices. Hence, the common refrain of the irrelevance of research to practice is reinforced. Application of implementation science in conjunction with EBIs allows science and practice to become the same construct—good practice based on good science. Using the methodologies of implementation science to support EBIs, school psychology has the potential to become a research-to-practice profession consisting of true scientist-practitioners.

School psychology has long been one of the most dynamic areas of psychology in terms of research-to-practice. The movements toward evidence-based interventions, research-based practice, and response-to-intervention models of service delivery are pushing school psychology away from tradition-based practice, testimonial evidence, and disproved techniques. Positive and even revolutionary evidence-based practices in the scientific literature provide limited information on implementation in school settings; hence, the importance of context and relevance. Knowing what works is essential; it is also critical to know how, where, when, why, and for whom do innovative practices work. The interdisciplinary field of implementation science has the potential to answer these questions and to comprise a new wave of research that will lead the implementation of innovations in education and psychology. This call is for school psychology to continue to provide leadership in the evolution of psychology by embracing implementation science as a tool to respond to the needs of schools, children, and their families. As the science of implementation develops, school psychology can realize the scientist-practitioner quality of the Boulder model.

References


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