Debated in the field of autism spectrum disorder (ASD) is what constitutes an evidence-based practice. Numerous reviews of the “evidence,” using widely varying criteria for evaluating studies, have been published, contributing to the confusion on what is or is not evidentiary. Thus, the article by McGrew, Ruble, and Smith (2016) raises a number of timely issues.

At the heart of the article, the authors distinguish between evidence-based practice (EBP) as the term is currently used in ASD intervention research and evidence-based psychology practice (EBPP). This should be an unnecessary distinction. However, approaches have routinely been identified as EBPs based on idiosyncratic, simplistic criteria that do not do justice to a complex disorder like ASD. If adopted uncritically, these approaches are likely to yield suboptimal outcomes for affected individuals and their caregivers and contribute to shortsighted policy decisions. EBPP or true EBP integrates high-quality research findings with clinical expertise that recognizes the importance of other factors (e.g., client characteristics, culture) relevant to prescribing a particular treatment plan (Ioannidis, 2016). The authors have brought attention to a range of factors that are critical in choosing and applying an intervention in ASD. The fact that the authors need to remind us of the essence of EBPs (and EBPP) demonstrates how far afield we have gone in ASD clinical care.

Here, we elaborate on some of McGrew and colleagues’ (2016) comments about the evidence base and criteria for identifying EBPs, and we suggest research strategies to improve the quality of evidence.

**Missing the Forest for the Trees?**

As noted by McGrew et al. (2016), we have few high-quality intervention studies on which to judge intervention evidence in ASD. Although there have been hundreds of studies over the past couple of decades, the majority of these studies rely on single-case designs, usually evaluating the immediate effect of one intervention strategy on a particular target behavior with only a handful of participants. While single-case designs, with good experimental control, can be useful for refining specific intervention strategies, they are limited in determining the efficacy of interventions due to their inability to assess long-term change, focus on outcomes that may have questionable clinical relevance, and small sample sizes that have low generalizability to larger clinical populations and that preclude systematic identification of moderators—factors that indicate for whom an intervention may be best suited. Randomized controlled trials (RCTs) remain the gold standard for clinical evidence: They have the greatest potential for determining the efficacy of an intervention. Although they are increasing in numbers in ASD research, they are rarely replicated and fully powered, and they rarely go beyond simple “horse race” comparisons of treatment against...
no-treatment or poorly defined services as usual. Unfortunately, the current research supporting EBP in ASD is paper-thin.

Despite these limitations, several important evidence reviews have been published. Given the overreliance on single-case designs in the ASD field, many reviews have privileged this type of methodology, a radical departure from evidence reviews in other areas of medicine and mental health, such as clinical psychology (Tolin, McKay, Forman, Klonsky, & Thombs, 2015). Some reviews use “experts” who judge the criteria; others use their own idiosyncratic criteria to evaluate study methodology; still others create post hoc categories of EBPs based on informal groupings of available studies. Given the slim attention paid to quantification of effects and reproducibility, the risk of bias in these reviews is high (Ioannidis, 2016). Unsystematic review processes resulted in the identification of 27 EBPs in ASD in one of the research syntheses cited by McGrew and colleagues (2016). The approaches designated as EBPs include a patchwork of isolated techniques (e.g., time delay), types of techniques (e.g., prompting), packages that vary across studies and individuals (e.g., behavioral packages, which aim to reduce disruptive behavior using customized combinations of strategies), comprehensive models (e.g., early intensive behavioral intervention, or EIBI), software (e.g., computer-aided instruction), hardware (e.g., speech-generating devices), and treatment modalities (e.g., parent-implemented intervention and social skills training groups). Many of the approaches identified as EBPs overlap with each other (e.g., reinforcement, differential reinforcement, and extinction). Plainly, such reviews exaggerate the number of approaches that truly merit designation as EBPs. The results of these reviews can be confusing and viewed as serving the vested interests of a specialty group aimed at influencing community care and public policy.

To illustrate the mischief that unreliable reviews can incite, consider that, because single-case designs are especially common within applied behavior analysis (ABA), privileging these designs in reviews leads to the conclusion that most EBPs are derived from ABA. This in turn has provided a rationale for calls to restrict ASD practice to board-certified behavior analysts (BCBAs) who are trained in only one approach (ABA), as described by McGrew et al. (2016). Yet the large majority of RCTs in the ASD literature are on interventions that originated in other disciplines, such as psychology, speech–language therapy, and education, sometimes combined with ABA (Weitlauf et al., 2014).

Although limitations in the evidence base and review processes undermine the credibility of EBP in ASD, they are only the tip of the iceberg. If we are to truly make progress in understanding what works for which clients in what contexts (in other words, to effect a more personalized medicine approach), we must acknowledge the elephant in the room. As the authors suggest, assuming a single intervention represents the “only evidence-based treatment (or set of treatments) for ASD” and contending that only individuals within a single discipline can deliver it continues to stultify ASD intervention progress and client outcomes.

Any clinicians worth their salt (and this includes psychologists, behavior analysts, and others) recognize the complexity of disorders like ASD. As McGrew and colleagues (2016) note, while up to half of children receiving EIBI (the most popular ABA intervention, involving 20–40 hours of 1:1 therapy per week) make incredible progress when in a research study, the rest are poor or slow responders. Community programs may find even weaker outcomes. However, when the child responds poorly, we often do not know how to put the child on a more positive developmental course. For some the solution is to increase the dose of the same intervention and for others to decrease the dose, blaming the individual for not making progress. Others might note that EIBI encompasses many different techniques identified as EBPs, such as prompting and reinforcement, and might tweak how these techniques are implemented, yielding little change in the individual’s progress. Only clinicians who have multiple tools in their toolbox and who understand that a single intervention cannot be expected to work for all individuals with ASD will be able to make effective changes in the face of nonresponse. Additionally, good clinicians know when additional expertise is needed beyond their own discipline. They have an understanding of their own limits and respect the expertise of others.
In today’s marketplace nature of community interventions for ASD, we must tread carefully. There is danger in suggesting that only a narrow range of individuals can adequately intervene with ASD clients—many states have actually passed legislation favoring BCBA over well-seasoned clinicians with ASD experience from all other disciplines, including psychology, special education, and speech and language pathology. This policy runs the risk of reducing interventionists to technicians who lack clinical experience with multiple types of interventions, and thus are unable to be flexible in the face of the considerable response/nonresponse heterogeneity of ASD.

Clinically, how do we guard against such tunnel vision? First, we must insist on broader acceptance of disciplines that can effectively treat ASD. Indeed, clinical competence should include multiple approaches to intervention and, when expertise is lacking, should involve other disciplines. Our clinical programs need to incorporate the very qualities McGrew and colleagues (2016) suggest, including understanding the characteristics, preferences, and culture of the client and improving the judgments and expertise of clinicians in applying an EBP.

Opening the Black Box: The Path Forward

As researchers, we can help inform clinical practice and influence EBPs in ASD by conducting clinically relevant and meaningful intervention research. To do so, we must conduct more nuanced and relevant research. One way to improve EBP in ASD is to open the black box of interventions, to try to better understand the unique, effective elements of an intervention. Knowing which elements to apply, how long to wait for response, and then when to change course is critical as we move toward more personalized and effective interventions in ASD. Similarly, we must have greater recognition of when interventions are not necessary and when they are ineffective. To this end, we must publish failed trials (as painful as this can be) and forthrightly acknowledge the limitations of our pet intervention. This information will expand our knowledge and move us away from the misinformed belief that there is only one “evidence-based intervention” in ASD.

**Active Ingredients.** Studies are beginning to test whether some elements, such as dose, age, and agent of change, affect treatment outcomes. For example, for children with ASD who have comorbid anxiety disorder, working individually with the child and separately with the parent appears more successful than child therapy alone. Similarly, hands-on coaching of the parent in parent-mediated interventions appears more successful than parent education alone. Whether one approach to hands-on parent-mediated intervention is more effective than another is unknown. Treatment approaches and specific content of interventions are rarely compared head-to-head. Therefore, we have limited information on whether one type of intervention is more effective than another. However, given the evolution of various therapies in ASD, it is unlikely that merely testing some interventions head-to-head will be informative. For example, active ingredients are difficult to tease apart when two popular treatment approaches are compared (e.g., discrete trial training versus pivotal response training), as both contain elements of the other. Such efforts are particularly complicated when packaged, multifaceted interventions delivered at high doses weekly over several years are compared. Studies have rarely tested the active elements in these interventions; they may be more alike than different, but the question is whether there are unique elements that underlie why the intervention is effective, at least for some individuals.

To test active ingredients of interventions, we need to go beyond single-case design studies and small RCTs using sophisticated methodologies with larger sample sizes than previously reported. Specifically, we need methodologies that can disentangle the specific elements in multicomponent interventions (e.g., factorial experimental designs). We also need studies that can show which elements are most effective for treating particular client characteristics (e.g., adequately powered studies that assess a carefully chosen set of potential moderator variables). Such studies will allow therapists to select the elements or modules most likely to work for an individual client.

We have evidence in other areas of mental health that flexible application of intervention modules can lead to better outcomes than fixed, inflexible
application of one approach. To give clinicians this kind of flexibility, research that incorporates adaptive treatment designs (i.e., designs that modify treatment based on client progress) will help to establish a sequence of replicable decision rules for specifying whether, how, and when (timing), based on which measures, to alter the dosage (duration, frequency, or amount), type, or delivery of treatment(s) at decision stages in the course of care (Murphy, 2005). For example, one might learn that children with a certain profile of abilities do better beginning with a very structured ABA approach and then changing to a less structured, more developmental and naturalistic approach when responding well, or the opposite sequence with children who have a different profile.

Expanding Research Participation. To really affect community practice, we must also recognize the limitations of current research in which strict exclusionary and inclusionary criteria are applied. Most children with ASD have never been in a research study, and most interventions applied to children with ASD have never been tested. Thus, the “evidence base” does not reflect most children with ASD. Research participants are overwhelmingly middle-class, Caucasian, and of average-range IQ. We need to expand inclusion of research participants. Fortunately, recent research is beginning to address these limitations. For example, several research groups are studying minimally verbal individuals with ASD, a group previously excluded from most studies. Others have focused exclusively on girls, comorbidities in autism, or adults, all understudied topics in ASD. Finally, greater efforts are being made to work in community settings and enroll participants with low income, from ethnic minority and linguistically diverse backgrounds.

Meaningful Endpoints. Somewhat surprisingly, there is still not an agreed-upon endpoint for interventions in ASD. Most studies apply an array of potential endpoints with no a priori primary endpoint. Packaged comprehensive intervention studies often emphasize IQ as the endpoint despite the fact that IQ is not a core deficit of ASD. Not only do the majority of children with ASD function in the typical range of IQ, but IQ is at best weakly related to the social communication impairment that is the core feature of ASD or to everyday adaptive functioning. In contrast, interventions focusing on social communication impairment have used researcher-designed assessments that have not been widely adopted or observations requiring burdensome coding. Studies of associated features in ASD (e.g., anxiety, behavior problems) may use parent ratings as outcomes, which can lead to unblinded and potentially biased reporting when parents are targeted for implementing the intervention. Thus, there are problems with current conceptualization of endpoints and unequal, potentially biased evaluation of the evidence depending on these endpoints. Greater attention to meaningful outcomes and consensus on the adoption of appropriate endpoints will enable clinicians and researchers to effectively evaluate the evidence.

Last Thoughts
In the marketplace nature of what has become ASD clinical care, McGrew and colleagues (2016) have made a plea to consider more than just a cookbook approach in applying interventions and to incorporate clinical expertise in the delivery of interventions. Thus, the authors recognize the importance of true EBPP by reminding psychologists of the crucial factors included in EBPP beyond summing up the number of supporting studies for an approach (client characteristics, preferences, culture, and clinician expertise)—and offer a plea to other disciplines to do the same. That we have to overhaul EBPP in ASD shows how far away we have moved from reasonable integration of science and practice.

REFERENCES


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