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Implementation Science, Behavior Analysis, and Supporting Evidence-based Practices for Individuals with Autism

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ABSTRACT

Although applied behavior analysis researchers have created efficacious treatment and intervention practices for children and youth with autism spectrum disorder (ASD), there is a gap between research and practice. Implementation Science (IS) and Organizational Behavior Management (OBM), based with Applied Behavior Analysis, are two parallel fields that could close this gap. This paper provides descriptions of both IS and OBM, highlighting their commonalities and unique features. The paper concludes with examples of how researchers have used IS and OBM to promote practitioners' use of evidence-based practices and services for children and youth with ASD.

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Applied behavior analysis (ABA) has had a profound impact on socially significant behavior change, and individuals with autism have been primary beneficiaries of ABA practices (Peters-Scheffer, Didden, Korzilius, & Sturmey, 2011). Much has been learned from ABA about practices that are efficacious when implemented with fidelity (Wong et al., 2015). Yet, a gap exists between the knowledge generated by the science of behavior analysis and the routine use of practices with individual clients or students (Dingfelder & Mandell, 2011). Research indicates that it takes up to 17 years for new practices to be developed, evaluated, and integrated into routine care (Morris, Wooding, & Grant, 2011). Improving the efficiency and effectiveness of this process will increase the impact of ABA-based interventions and the science broadly.

In ABA there has been a strong tradition of focusing on the fidelity or treatment integrity of which an intervention is implemented (Gresham, Gansle, & Noelle, 1993). Intervention fidelity is recognized as a critical area of focus across human service disciplines (Durlak & DuPre, 2008; O'Donnell, 2008). However, closing the research to practice gap for children with ASD as well as other recipient groups requires a broader systems perspective that leads to "scaled up" use of effective practices with fidelity. The purposes of this paper are a) to articulate the need for increasing use of evidence-based intervention practices and services for individuals with ASD, b) to examine two disciplinary fields that have emerged to support the adoption and

implementation of new practices and/or services in existing programs (i.e., implementation science and organizational behavior management), and c) to provide examples of how each has been or could be used to support practitioners use of evidence-based practice and services for children and youth with ASD.

The case for the importance of effective programs for children and youth with autism spectrum disorder

The prevalence of autism has accelerated rapidly in the last 20 years. The Center for Disease Control and Prevention in the United States has reported a prevalence rate 1 in 59 school-aged children (Baio et al., 2018). Autism is characterized by challenges in social communication and restrictive and repetitive behavior (American Psychiatric Association, 2013), functioning that covers a wide spectrum of abilities, and associated co-morbidities such as intellectual disability and mental health disorders (e.g., social anxiety, depression, sleep disorders, seizures). Building on the early work by Ivar Lovaas and colleagues (Lovaas, Schreibman, & Koegel, 1974), researchers have actively developed and demonstrated the efficacy of ABA-based practices and programs for children and youth with autism (Wong et al., 2015). Despite the identification of evidence-based practices, the outcomes for young adults with ASD as they leave schools and transition into adulthood are among the worst of any disability group (Roux, Rast, Anderson, & Shattuck, 2017). That is, although practices with demonstrated efficacy exist (Wong et al., 2015), it appears that practitioners are not implementing them in programs and services for children and youth with autism (Hess, Morrier, Heflin, & Ivey, 2008).

Approaches to supporting adoption and implementation of effective practices

In response to the need for scaling up the use of effective practices in human services and also private industry, two relatively independent fields, Implementation Science and Organizational Behavior Management, have emerged. In the subsequent sections, each will be described and similarities between the two will be highlighted.

Implementation science

Two pioneers in Implementation Science (IS), Eccles and Mittman (2006), defined IS as the “study of methods to promote the adoption and integration of evidence-based practices, interventions, and policies into routine care” (p.1). As a discipline, IS emerged in response to the recognition that research was generating evidence of effective practices but practitioners were not implementing them in their own programs. The discipline has become formalized over the last two decades with the publication of the journal *Implementation Science*, in 2006, the formation of the Global Implementation Society (<https://globalimplementation.org/society/>), an international Global Implementation Initiative (<https://globalimplementation.org>), and currently a biennial schedule of international conferences.

Conceptual frameworks in implementation science

Conceptual frameworks in IS are a linked set of procedural components that lead to implementation to practices or services (Eccles & Mittman, 2006), and researchers have proposed a number of different conceptual frameworks (Albers, Milton, Lyons, & Shlonsky, 2017). To serve as illustrative examples, the authors have chosen two specific implementation frameworks: the Exploration, Preparation, Implementation, and Sustainment (EPIS) model (Aarons, Hurlburt, & Horwitz, 2011) and the Active Implementation Framework model developed by the National Implementation Research Network (Fixsen, Blase, Naoom, & Wallace, 2009; Metz et al., 2015). These frameworks reflect features or concepts often seen in other IS frameworks and have been the most frequently employed for promoting practices and services for individuals with ASD.

The EPIS model (see Figure 1) proposes that multiple factors affect the degree to which a program or practices (i.e., identified as innovation in this figure) is implemented. One set of factors operates outside of the context in which the practice, such as discrete trial training, would be implemented. These outside factors include service system policies, funding, and client advocacy, to cite just a few. Factors internal to the organization also that affect implementation include leadership, provider characteristics (e.g., openness to change), and quality of fidelity monitoring and support. Factors that can bridge these two types of influences are partnerships with community academic

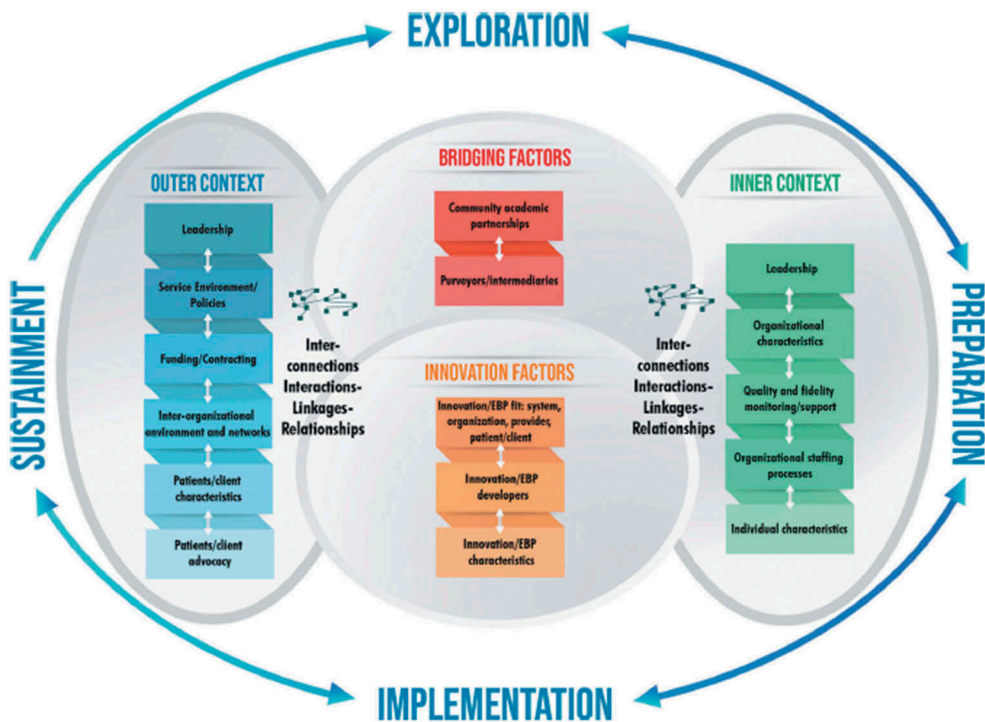


Figure 1. EPIS conceptual model. (Figure originally appeared in Moulins et al., 2019). Open access publication.

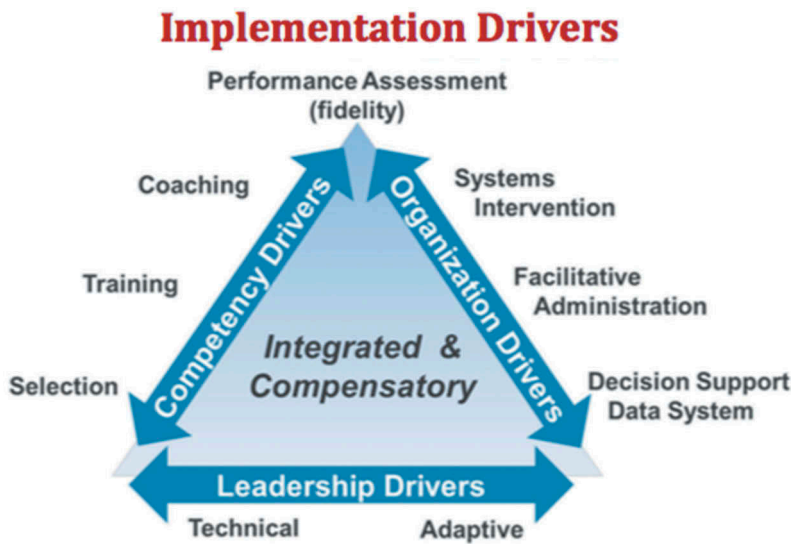


Figure 2. NIRN drivers (National implementation science network, 2015, reproduced with permission).

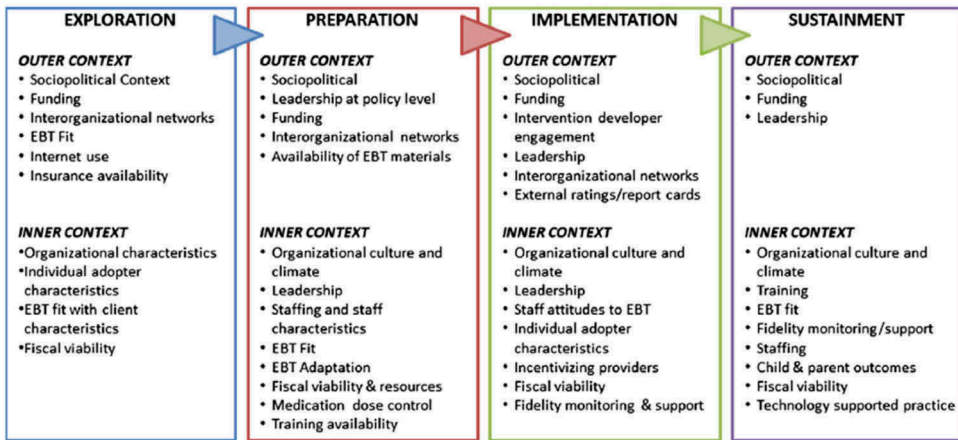
leaders and purveyors. In addition, factors related directly to the innovation itself, such as characteristics of the innovation and fit with the organizational context may affect implementation. The influences of these factors often operate in a reciprocal manner through interconnections and linkages.

The NIRN model, like EPIS, specifies factors operating on different dimensions, which are called implementation drivers (See Figure 2). Like the EPIS model, leadership plays a primary role, with the forms of leadership identified as technical (e.g., arranging time, providing funding) and adaptive (e.g., motivating). A second set of drivers are related to the organization and include variables at the systems level (e.g., specified in EPIS as outer context), facilitative administration, and a data system that informs decisions. The third set of drivers focus on actual selection of the practice or innovation, training to implement the intervention, and coaching to support implementation with fidelity.

Progressive phases of implementation frameworks

Many IS model developers propose that implementation of an evidence-based program or set of practices within an organization occurs in progressive phases. In their review of 25 implementation conceptual frameworks, Myers, Durlak, and Wandersman (2012) found that most models progress from early phases focusing on introduction of the program/practice to be implemented to later phases that focus on ensuring future use of the program (i.e., sustainment). As can be seen in Figure 3, the EPIS model (Aarons et al., 2012) focuses on four such phases: Exploration, Preparation, Implementation, and Sustainment, with steps and activities specified within each phase. Exploration involves needs and resource assessment, identification of potential EBP and consideration of how they would fit with the context, and organizational readiness. The Preparation phase includes planning how and when to integrate the EBP into the existing system. During the Implementation phase, the EBP is put in place with training, evaluating outcomes, and ongoing monitoring being key activities.

EPIS Model



NIRN Model

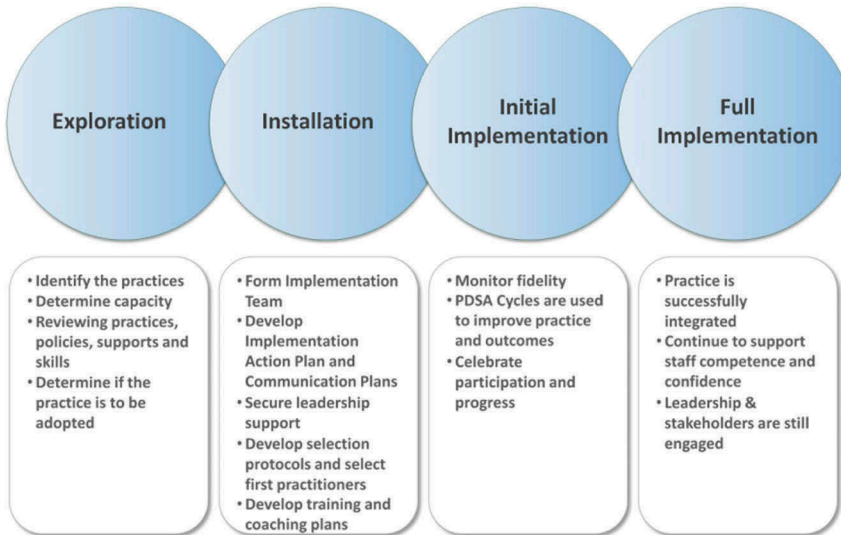


Figure 3. Progressive phases of EPIS (Aarons et al., 2011; open source) and NIRN (National implementation research network, no date; reproduced with permission).
EPIS ModelNIRN Model.

Sustainment involves ongoing leadership, funding, embedded EBP culture, and social network support. In the NIRN model (Figure 3), phases are similar in function. They included Exploration, Installation, Initial Implementation, and Full Implementation (National Implementation Research Network, n.d.), with the later phase including features that address sustainment across time. These temporal, progressive phases may be helpful in understanding the implementation process and factors as they are applied to unique service settings.

Key concepts of implementation science

In their review and analysis of the IS literature, Williams and Beidas (2018) proposed a shift from examination of specific IS models to examinations of specific “core determinates” that influence implementation. The convergence of these determinants (i.e., across reviews of IS conceptual frameworks) provides insight into the concepts that characterize the IS field. The description of IS for this paper relies most closely on the organization determinants that Williams and Beidas (2018) identified and the organization features articulated by Li, Feffs, Barwick, and Stevens (2018). We also have drawn from multiple concepts described in systematic reviews of the implementation science literature (Albers et al., 2017; Crabel et al., 2018; Damschroder et al., 2009; Fixsen, Blase, Naoom, & Wallace, 2009; Lyon et al., 2018). In their earlier review of 61 implementation and dissemination models, Tabak, Khoong, Chambers, and Brownson (2012) found that IS models often operate across levels of socio-ecological systems, similar to Bronfenbrenner’s ecological systems theory (Bronfenbrenner & Morris, 2006). In such a conceptual scheme, factors that influence implementation operate at a distal level, characterized by cultural and/or political variables, at an organizational level in which a new program/practice may be implemented, and at a proximal level close to the actual implementation itself. Key IS concepts are found in Table 1 and are ordered from the distal to proximal features.

Socio-cultural context refers to influences exerted through cultural or social norm, values, and priorities, perhaps historical events, and also broader social policies or regulations. For example, the rapid acceleration of ASD has increased the emphasis at the organizational (i.e., schools) and services level (i.e., classes and clinics) to implement EBP. *Organizational culture* refers to “shared assumptions, values, norms, and behavioral expectations” (Williams & Beidas, 2018, p. 10). Associated concepts include *organizational climate* (i.e., impact of work on implementers sense of personal well-being) and *implementation climate* (i.e., shared agreement about extent to which EBP use is expected/rewarded and organization policies support implementation). Another similar concept is the *perceived need for the intervention* by stakeholders and stakeholders’ involvement in designing key features of the implementation process (Albers

Table 1. Corollary features of implementation science and organizational behavior management (From Glenn & Malott, 2004; Glenn et al., 2016; Li, Jeffs, Barwick, & Stevens, 2018; Williams & Beidas, 2018).

Implementation Science	Organizational Behavior Management
<i>Macrosystem Level (Distal)</i>	
Sociopolitical Context	Meta-contingencies
<i>Organizational Level</i>	
Organization culture and climate	Interlocking Behavioral Contingencies (IBC) aligned in a Cultural Lineage
Leadership-champion	Leadership – integrates key processes or skills
Resources	Resources
Readiness to Implement	Degree of Consistent and Aligned IBC
<i>Microsystem Level (Proximal)</i>	
Teamwork-Collaboration-Communication	Teamwork – Collaborative behaviors-Communication
Data-based decision making	Data-based decision-making
Training	Training
Coaching	Behavioral Coaching/Performance Feedback

et al., 2017). *Leadership* is provision of guidance or direction for the organization and/or the implementation efforts. A similar concept of having a *champion* refers to influential members of the organization who support and advocate for implementation. *Resources* refer to the things needed for the implementation to be employed. They may include funding for implementation efforts, staffing and workload, and allocated time for staff (Li et al., 2018). The *readiness* of an organization refers to the degree that organizational members are psychologically and behaviorally prepared to make the necessary organization changes (Weiner, Amick, & Lee, 2008). Such readiness is tied to organizational resource capacity, compatibility of the organizational/practitioner culture and the program or practices to be implemented.

At the more proximal level, *teamwork* is characterized by the emotional valences of social networks of implementers and nature of informal and formal communication among implementers. *Evaluation, monitoring, and feedback* consists of leaders judging quality of their implementation but also leaders seeking feedback about the success of the program/practice implementation (Li et al., 2018). *Training* by direct implementers and even for leaders is a necessary but alone not a sufficient feature of the process that ensures a high level of implementation.

Applied behavior analysis and organizational behavior management

Similar to implementation scientists, behavior analysts have created a conceptual framework guiding their understanding of the inter-relationships of systems, organizations, and communities that effect implementation outcomes. This work exists in a sub-discipline of behavior analysis called organizational behavior management (OBM). The objects of study in OBM are both the behavior of individuals in organizations and the behavior of organizations as functioning entities (Glenn & Malott, 2004). OBM “focuses on what people do, analyzes why they do it, and then applies an evidence-based intervention strategy to improve what people do” (Cunningham & Geller, 2011, pp. 70–71). Its aim is to establish a technology of broad-scale performance improvement and organizational change so that employees are more productive and organizations and institutions are more effective in achieving their goals (<https://behavior.org/help-centers/behavior-in-organizations/#>). In 1982, the OBM Network (www.OBMNetwork.com) was founded to develop, support, and enhance the growth and vitality of organizational behavior management. A primary source of dissemination for OBM is through the *Journal of Organizational Behavior Management* (JOBM), which has been publishing research since 1977, although OBM work has also appeared in other scientific journals (e.g. *Behavior and Social Issues*).

Key concepts of behavior analysis and organizational behavior management

OBM behavior analysts start the process of intervention or organizational change by collecting baseline data on performance within the identified system., such as by conducting a Behavior Systems Analysis. The central premise of a Behavioral Systems Analysis is that organizations are complex systems and that changes in any one aspect of performance in an organization may affect the performance in other components of the organization (Ludwig, 2017). Therefore, a systems analysis would consider data on

the dynamic interactions among its internal components, the relationship of the components to the critical systems, and the performance of the organization as a whole (Rodriguez, Bell, Brown, & Carter, 2017). The goal of conducting a systems analysis is to design an intervention that will result in improvement in areas of poor performance, maintain components of high performance, and align individual performance with organizational goals (Brethhower, 1997).

At the individual level, a Performance Improvement Analysis could be used to determine the desired performance described in observable and measurable terms, and identify performance goals required to meet this performance. The baseline data obtained on the identified performance goals would lead to *training*, *coaching* and *performance feedback* for individuals who would be implementing the practice or program.

Identifying and manipulating contingent relationships is a hallmark of behavior analysis. On the systems level, *metacontingencies* are the focus, which Glenn et al. (2016) have defined as “reoccurring interlocking behavioral contingencies that have an effect on an aggregate product” (p. 13). These *interlocking behavioral contingencies* (IBC) occur when the behavior of one individual acts as the antecedent for another individual’s behavior and the consequences are shared by both individuals (Dagen & Alavosius, 2008). Most IBCs involve verbal behavior (e.g., rules) of participants or have a social component as described in Skinner’s book, *Verbal Behavior* (1957). For example, the rule-governed behavior (vocalized or covert verbal statements) of a worker on an assembly line is reinforced by an individual paycheck and also by contributing to a high-quality finished product that is sold and maintains the organization that employs all the workers (Glenn et al., 2016).

The aspect of the organization that is replicated, or stays the same over extended time, can be considered the *cultural lineage* (Glenn & Malott, 2004). Typically, the cultural lineage is maintained even when there are changes to the participants in the organization. For example, in the autism intervention model initially developed by McClannahan and Krantz (2006), the procedural features of the model have maintained when staff or even leadership leave the program. Similarly, it would be important to the success of an organization that individuals have the competencies needed to access the IBCs of the system. In this example, when a new staff member takes a job at one of the dissemination sites using this model, her competencies would need to be aligned with the staff performance expectations (e.g., appropriate delivery of behavior-specific praise, providing sufficient opportunities to respond), which would result in a positive evaluation from her supervisor.

Behavior analysts agree that *leadership* plays an essential role in initiating, shaping and sustaining socially significant changes at all system levels (Houmanfar & Mattaini, 2016). Effective leaders are highly skilled observers of the context, have knowledge about the competence of individuals that comprise the team and allocate tasks accordingly, ensure effective communication within the team and throughout the component and system, and use data to monitor fidelity and progress and to determine needed adaptations (Alavosius, Houmanfar, Anbro, Burleigh, & Hebein, 2017).

The functional relationships between meta-contingencies, their product, and the cultural or social consequences is clear in simple organizations, but increase in complexity in larger organizations. For example, Tourinho and Vichi (2012) illustrate this complexity by comparing individuals in a fishing village who only fish for sustenance (i.e., to gather and eat the product of their efforts—fish) with a similar

context when fisherman gather the fish to sell. The latter example requiring organization of specialized components (e.g., fleet maintenance, packaging fish). The management of each component would build and sustain interlocking behavioral contingencies (i.e., individual's performance of their specific jobs) that lead to the common goal (e.g., wage payment used for sustenance).

Frequently emitted individual behaviors having a cumulative, socially significant effect have been called *macrobehaviors*. Glenn et al. (2016) referred to these as “socially-learned operant behavior observed in the repertoires of several/many behaviors of members of a cultural system” (p. 18). There are occasions when these macrobehaviors result in a *cultural cusp* – or the point where there is a significant sociocultural change in the system, organization, or community. An example of a system of interlocking contingencies that resulted in a cultural cusp is reflected in efforts to promote seat belt use in the U.S. in the early 1980s. In 1984, as a result of data linking seat belt wearing to the prevention of serious injury and death during automobile accidents, the U.S. Congress enacted legislation that required drivers and passengers to wear seat belts. Tickets for not wearing seat belts were contingently administered by police (Geller, Bruff, & Nimmer, 1985). Information about the data for the consequences of not wearing a seat belt in an accident became more publicized, and short pointed messages (e.g., “Click it or Ticket”) began to appear in the public media. Also, community-based interventions were developed (Geller et al., 1985) to positively reinforce seat belt use. The convergence of initiatives created interlocking contingencies that increased seatbelt use by 70% over two decades. Behavior analysts would identify this as a cultural cusp, resulting in seatbelt use becoming a cultural norm in U.S. society.

OBM research focus

Similar to implementation scientists, OBM researchers conceptualize factors that influence practitioners' use of interventions or practices as occurring at the systems, organization, and community levels (Glenn & Malott, 2004). However, in a review of studies published in *JOBM* from 1998 to 2009 (VanStelle et al., 2012) and a subsequent update focusing on human services research (Gravina et al., 2018), authors found that the majority of the research focused on the performer level, with relatively few studies targeting organizational and community level variables. The most common interventions were antecedent and training interventions with most of the studies also including feedback and praise. This trend appears to be shifting with more recent publications in OBM focusing on systems change and manipulation of interlocking behavioral contingencies. For example, in 2016 two issues of *JOBM* had a special section focused on applications of behavioral science devoted to sociocultural challenges (Houmanfar, 2016). There was also a recent special section of *JOBM* focused on leadership and cultural change (Houmanfar & Mattaini, 2016).

Exploring linkages between IS and OBM

Although IS and OBM developed somewhat independently, both have a common goal of promoting individuals' use of an innovation, program, or practices (e.g., use of EBPs for children with ASD by teachers, seat-belt use by drivers and passengers). In this section, commonalities between the two fields and well as one unique difference are examined.

The necessity of an operationalized program/practices

To employ IS or OBM models or concepts, the program or practices to be implemented must be operationally defined (Crabel et al., 2018). Whether the goal is promoting teacher's use of EBP for students with autism or employees' "safe lifting" in an industry setting, each feature of the program must be specified, ideally with measures of fidelity or treatment integrity. This has sometimes been called the "it" of implementation, and without such clear specification the implementation process is either inefficient or impossible.

Key concepts

Common key concepts in IS and OBM appear in [Table 1](#). These concepts are organized from distal to proximal influences. IS acknowledges the influence of factors happening at the sociocultural and sociopolitical level (Atkins, Rusch, & Mehta, 2016), while Glenn and Malott (2004), from an OBM perspective, have discussed environmental complexity (e.g., government regulation, economic fluctuations). At the more proximal organization level, primary concepts in IS are organizational culture and climate, whereas OBM has similar concepts embedded in the cultural lineage of the organization. Leadership is highlighted in both IS and OBM. The concept of readiness for implementation is a common IS concept and is paralleled in OBM by the degree to which the IBCs necessary for successful implementation are aligned with goals within and across system components and levels of hierarchy. A term related to readiness that is consistent for both IS and OBM is the access to or allocation of the necessary resources (e.g., funding, staff time) to support implementation.

At the most proximal level, teamwork/collaboration/communication among staff who will be implementing the practice/program and perhaps their supervisors is key elements for both IS and OBM. Similarly, both ideally depend on data collection to inform decisions, and some form of direct training for individuals implementing the program/practices. Both IS and OBM researchers have long been well aware that workshops or training without performance feedback in context are ineffective (Stein, 1975). This has been demonstrated in research across varied settings and participants (Yoon, Duncan, Lee, Scarloss, & Shapley, 2007).

Supporting implementation of interventions and services for children and youth with ASD

A growing body of work directly applies IS and OBM concepts and practices to support the use of EBPs in programs for children and youth with ASD. This area of study aims to accelerate the integration of EBP and improve sustainment of interventions across

service settings. Some reports are based on identifiable conceptual frameworks while others examine individual features of IS and OBM as identified in [Table 1](#).

IS conceptual frameworks applied to ASD

Several recent implementation research efforts have employed IS frameworks to select strategies and target outcomes and guide study procedures. For example, following the EPIS conceptual framework, Stahmer and colleagues adapted an identified EBP for ASD (i.e., pivotal response training) to fit the school/classroom context (Stahmer, Suhrheinrich, Reed, & Schreibman, 2012), which addresses an Innovation Factor (see [Figure 1](#)). As part of a randomized efficacy trial of the adapted practice, significant associations between inner context variables (i.e., leaders' early involvement in recruitment and provision of space; teachers' attitudes toward intervention) and implementation outcome variables (i.e., fidelity, use, sustainment) were identified (Suhrheinrich, Rieth, Dickson, & Stahmer, [in press](#)). In a similar line of research, Brookman-Frazee and colleagues have also used EPIS to guide work focused on improving the use of evidence-based strategies with youth with ASD presenting with challenging behavior in community mental health programs. This included extensive effort to address Innovation/Context Fit by developing an intervention based on parent need (Brookman-Frazee, Baker-Ericzén, Stadnick, & Taylor, 2012), provider need (Brookman-Frazee, Drahota, & Stadnick, 2012), and service delivery context (e.g., weekly psychotherapy/counseling session lastly approximately 50 minutes).

Additional ASD services research guided by the EPIS framework is currently in progress. In a protocol publication (i.e., description of a study that is planned but for which results are not yet reported), Brookman-Frazee and Stahmer (2018) describe barriers to implementation across community mental health and education service settings supporting youth with ASD and are currently conducting a randomized trial evaluating implementation interventions aimed at Inner Context factors: improving organizational leadership of implementation and improving provider attitudes toward adopting new EBPs (Brookman-Frazee, & Stahmer, 2018). Also in process is an exploratory study examining the association of EPIS outer and inner context variables on use of EPBs in educational services for students with ASD (Stahmer, Suhrheinrich, Schetter, & Hassrick, 2018). The relationship between classroom-level outcomes and multiple inner and outer context factors is being explored, including: inter-organization networks, implementation climate and leadership, provider attitudes, and leadership and coaching practices (Stahmer et al., 2018).

Researchers have also employed the NIRN conceptual framework to ASD services research. To promote teachers' use of EBPs for children with ASD in 12 states, Odom, Cox, and Brock (2013) used the NIRN conceptual framework to develop statewide systems of professional development and reported changes in classroom quality and teachers' use of EBPs. In addition to student academic outcomes, the authors also evaluated competency drivers such as teacher fidelity as a training and coaching outcome. Also, with high school programs for students with ASD, Odom, Duda, Kucharczyk, Cox, and Stabel (2014) proposed using the NIRN framework to promote the use of a comprehensive treatment model, which resulted in implementation in the treatment group of a cross-site RCT study (Steinbrenner, Odom, Hall, & Hume, 2019).

Prior to training teachers, the research team completed other strategic Installation procedures, including establishing and implementation team and securing leadership support. In an inservice training program in Hong Kong, Ho, Lam, Sam, and Arthur-Kelly (2018) followed a NIRN-based implementation model that prepared teachers of student with ASD to teach recognition of and reaction to emotion signals from others. The training program moved from exploration to installation to implementation phases, resulting in teachers implementing the model well and reporting positive outcomes for their students. In summary, there is a substantial, and growing, body ASD services research utilizing IS frameworks.

IS and OMB concepts

Although most of the identified conceptual frameworks for supporting implementation of EBP for children and youth with ASD have emerged from the IS discipline, there are several shared concepts in OBM (see Table 1). For example, at the *macrosystem level*, international initiatives exist that influence sociopolitical context and meta-contingencies inherent in IS and OBM implementation conceptualizations. The *Autism Speaks Global Public Health Initiative* (<https://www.autismspeaks.org/global-autism-public-health-initiative-gaph>) and the World Health Organization (https://www.who.int/mental_health/action_plan_2013/eb_resolution_childhood/en/) proactively work with government leaders to create supports for use of EBPs and services for children and youth with ASD. In the U.S., initiatives that resulted in changing state insurance laws have changed the contingencies for access to services for many families of children with ASD (Mandell et al., 2016). Employing an ethnographic approach to study factors affecting implementation of EIBI programs in Sweden, Roll-Pettersson, Olsson, and Ala'I-Rosales (2016) noted as barriers the tensions among national service agencies, which reflects the influence of sociopolitical contextual factors and meta-contingencies.

At the *organizational level*, Williams et al. (2019) examined the association between organizational culture and climate, as predictor variables, with teacher fidelity and use of three EBPs in elementary school programs for children with ASD. Teachers in schools with “comprehensive” profiles (i.e., high proficiency culture, positive climate) had significantly higher fidelity for two of the three EBPs examined and more positive work attitudes as compared with schools having school profiles reflecting less supportive organizational cultures and climates. Similarly, Kratz et al. (2019) defined organizational climate as the degree that teachers perceive a practice as being feasible as well as being expected and rewarded by supervisors. They found a significant association between public school teachers’ perceived climate and the fidelity with which teachers implemented the *STAR program* (i.e., an ABA comprehensive treatment program) with students having ASD.

Although implicit in many of the IS conceptual frameworks, researchers from both the OBM and IS literature propose *leadership* as a distinct construct associated with implementation of evidence-based practices (Lyon et al., 2018). In addition to leadership style, leaders have control of *resources* (e.g., staff time, space, funding for training) that they may chose to allocate or not allocate to implementation efforts. *Readiness and degree of aligned IBC* are similar IS and OBM constructs that may influence implementation of EBPs. Hustus and Owens (2018) defined readiness at the practitioner level

as support for or resistance to adoption and implementation of practices. For example, Stahmer and Aarons (2009) used the EBPAS to assess practitioners' attitudes toward use of EBPs in their programs, with the hypothesis that such attitudes may affect implementation, and Kratz et al. (2019) reported that teacher attitudes did predict EBP fidelity. Readiness and alignment of IBC also extend up the organizational level to include program administrator's intention to support implementation of an intervention (e.g., provision of training, time for planning, aligning recognition for teachers' efforts to implement). Although similar in concept to organizational climate, readiness or the degree of aligned IBC may be used to determine if necessary prerequisites for success are in place in an organization and may predict the success with which EBPs or other evidence-based programs are likely to be adopted and used with fidelity.

At the microsystem or context most proximal to children/youth with ASD, a number of strategies have been employed to promote teachers use of EBPs. Most of the implementation research has occurred at this level for both IS (Moulins, Dickson, Stadnick, Rabin, & Aarons, 2019) and OBM (Gravina et al., 2018). A comprehensive review of this literature is beyond the scope of this paper, but examples can be provided. As noted, common point of agreement for both IS and OBM is that didactic training through workshops, while important for introducing concepts, will usually not lead to implementation of EBPs. Hall, Grundon, Pope, & Romero (2010) and Smith, Parker, Taubman, and Lovaas (1992) documented these "noneffect" phenomena, respectively, for paraprofessionals working with preschool children having ASD who participated in a one-day workshop and group home staff who attended a week-long training.

One key feature for promoting implementation from both the IS and OBM perspective is *behavioral coaching*. In their Collaborative Model for Promoting Competence and Success, Ruble et al. (2019) employed initial assessment and consultation to establish transition goals for adolescents with ASD, and then provided behavioral coaching for the teachers to promote implementation of the transition plans, finding positive effects on goal attainment. Other researchers have similarly demonstrated the importance of coaching and particularly the role of *performance feedback* in supporting teachers adoption and use of EBPs (Stahmer et al., 2015).

Leaders in OBM and IS also identify *teamwork, collaboration, and communication* as a key influence on implementation. For example, in the inservice training program previously noted, Ho et al. (2018) employed a collaborative teaching model that involved initial introduction of skills to be learned, immediately practicing newly learned concept, communicating their experiences with other teachers learning the instructional strategies, and observing other teachers implementing the intervention lessons.

Conclusion

For children and youth with ASD, ABA has generated a great deal of knowledge about effective interventions and human services for this population, yet the gap between research and practice remains wide. To bridge this gap, both IS and OBM have developed unique and common strategies to support practitioners in learning, implementing, and sustaining effective approaches for children and youth with ASD. IS researchers have developed a number of identifiable conceptual frameworks for implementation, with several being used directly with children and youth having ASD. In

addition, IS and OBM have in common a number of individual practices that researchers have employed in supporting teachers' and practitioners' implementation of EBPs. Taken together, these fields provide helpful guidance to support the adoption, use, and organizational scale-up of EBPs for children and youth with ASD. IS and OBM practices are especially important when considering international deployment of EBPs for children and youth with ASD, as inter-organizational networks, cultural political factors, and meta-contingencies vary among nations. Also, the relevance IS and OBM extends beyond practices and services for children and youth with ASD. For behavior analysis to move forward as a discipline that addresses socially and globally important problems, professional development programs in institutions of high education that train ABA practitioners will be required, especially in countries where these programs do not currently exist. Initiating and sustaining such training programs will require institutional and organizational changes. The IS and OMB strategies highlighted in this paper could be instrumental in achieving such changes.

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