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Special Educators as Intervention Specialists: Dynamic Systems and the Complexity of Intensifying Intervention for Students With Emotional and Behavioral Disorders

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Abstract

We present a dynamic systems perspective for the intensification of interventions for students with emotional and behavioral disorders (EBD). With this framework, we suggest behavior involves the contributions of multiple factors and reflects the interplay between the characteristics of the student and the ecologies in which he or she is embedded. Building from a discussion of the application of dynamic systems theory to ecological intervention, we propose four types of data are needed to guide intervention intensification: universal/probabilistic knowledge and strategies, implementation science practice elements, person-oriented developmental analysis, and person-in-context interactional analyses. We discuss practice implications and propose two types of specialists: *intervention specialists* who provide direct services and have expertise adapting interventions across the academic, behavioral, and social domains and *intervention specialist coordinators* who direct intervention intensification activities across service sectors and design and monitor long-term intervention plans focused on developmentally relevant outcomes. Finally, we consider implications for research and professional development.

Keywords

intensive interventions, dynamic systems, ecological theory, correlated constraints

There have been a range of advances in intervention development and the delivery of services to youth with emotional and behavioral disorders (EBD). This includes systems of care/wraparound services (Eber, Sugai, Smith, & Scott, 2002; Epstein, Kutash, & Duchnowski, 2004), schoolwide positive behavioral interventions and supports (Horner, Sugai, & Anderson, 2010), school-based mental health services (Cappella, Frazier, Atkins, Schoenwald, & Glisson, 2008), implementation science initiatives (Conroy et al., 2015; Schoenwald et al., 2011), and emerging work on data-based intervention intensification (Danielson & Rosenquist, 2014; Kern & Wehby, 2014). Although these advances have had an important impact on interventions for students who experience behavioral difficulties, there continues to be a significant need to promote the use of research innovations into the daily practices of educators and related professionals who work with students with EBD (T. W. Farmer, 2013; Kauffman, 2015).

In some ways, we believe the innovations listed above have grown beyond the capacity of existing special education service delivery models, and we propose that the current emphasis on intensive interventions provides the field with an opportunity to rethink the role, training, and professional responsibilities of special educators who are specialists in the area of interventions for students with EBD. During this era of non-categorical services, inclusion, and universal approaches to promote a one-size-fits-all special education delivery framework, we realize the idea of a special educator as a specialist and not as a generalist seems antiquated and anathema to the current culture of education. However, we maintain that students with EBD have complex intervention needs that require the careful guidance of a specialist.

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Specifically, students with serious EBD experience complicated developmental challenges that warrant the attention of special education experts who can effectively identify efficacious intervention leverage points, coordinate efforts across service sectors and contexts, and not only produce short-term successes but also direct the preparation of dynamic but sustainable individualized programs of support to promote youths' long-term adaptation and productive outcomes.

Accordingly, the goal of this article is to outline a conceptual rationale and framework for refocusing the role of special educators for students with EBD as that of intervention specialists who have expertise across the fused domains of academic, behavioral, emotional, and social functioning. With the use of the term fused, we are purposefully recognizing that it is necessary to understand that students' difficulties tend to span multiple, interwoven domains that make it difficult to address problems in one domain in an isolated fashion without careful consideration and focus on the contributions of other domains. We begin by viewing interventions for students with EBD through the lens of dynamic systems/developmental science perspectives. From this backdrop, we discuss the strengths and limits of tiered-models of intervention and evidence-based practices (EBPs). Then we discuss the need for two distinct but complementary types of school-based intervention specialists for students with EBD. Next, we describe the complexity of the service needs of students with EBD in relation to the roles of intervention specialists and the delivery of intensive interventions. Finally, we conclude with implications for research and the development of professionals to address the intensive intervention needs of students with EBD.

Dynamic Systems, Developmental Science, and Intervention Intensification

Dynamic systems theory (DST) has become integral to the study of development and focuses on clarifying how multiple factors and processes contribute to human functioning and outcomes (Smith & Thelen, 2003). DST has been applied to the study of teaching and learning (Steenbeek & van Geert, 2013), childhood pathways to mental illness (Sameroff, 2000), and the development of antisocial behavior (Dishion & Snyder, 2004; Granic & Patterson, 2006). The core features of a DST perspective of human development are that (a) multiple variables operate as an interconnected system and have the continual potential to change each other and the trajectory of the development of the individual; (b) patterns of growth are probabilistic and may reflect general linear model estimates, but the adaptation and outcome for a particular individual may diverge significantly from central tendencies; (c) there may be multiple causes and pathways to the same outcomes; (d) the same variables and pathways may produce distinct outcomes for different youth; and (e) development involves the ongoing adaptation of the individual and the context to each other (Cairns & Cairns, 1994; T. W. Farmer, 2013; Sameroff, 2000; Smith & Thelen, 2003).

Building on DST, developmental science is an interdisciplinary framework that merges related disciplines (e.g., psychology, sociology, neurobiology, education) to identify factors that contribute to pathways and critical outcomes in the life course including school adjustment, educational attainment, and mental health (Magnusson & Cairns, 1996). Developmental science posits that social-interactional processes dynamically link individuals and contexts in ways that promote stability, adaptation, and growth in human behavior and functioning (Bronfenbrenner, 1979; Cairns, & Cairns, 1994; T. W. Farmer, Gatzke-Kopp, Lee, Dawes, & Talbott, 2016).

This framework suggests that the adjustment difficulties of students with EBD are likely to reflect the dynamic interplay between the characteristics and proclivities of the student and the contexts in which he or she is embedded (T. W. Farmer, 2013; Sameroff, 2000). This means the factors and processes that support EBD are constantly changing but in complex ways that sustain each other and tend to consolidate adjustment difficulties (T. W. Farmer & Farmer, 2001; Sameroff, 2000). Thus, standardized EBPs that can be pulled from a shelf and used by any teacher are likely to have limited impact on the factors and processes that contribute to sustained difficulties and poor outcomes of students with EBD (T. W. Farmer, Gatzke-Kopp, et al., 2016; Kauffman, 2015). Instead, it may be necessary to use multi-factored data-based interventions that are carefully coordinated by an expert intervention specialist to address how various development factors operate as a system to contribute to the maladaptive patterns of students' with EBD (T. W. Farmer & Farmer, 2001; Kern et al., 2015; Reinke et al., 2014).

Four concepts of developmental science are particularly relevant for creating intensive interventions and for guiding the efforts of EBD intervention specialists: correlated constraints, social synchrony, behavior as a developmental catalyst, and systems reorganization. The term *correlated constraints* refers to the network of associations of internal (e.g., academic skills, social-cognitive processing skills, cognitive and neurophysiological regulation of emotion and behavior) and ecological (e.g., family, peer group, neighborhood, school, community resources) subsystems that operate as a synergistic system (Magnusson & Cairns, 1996). Because these subsystems are bi-directionally linked and their contributions are fused in the functioning of the individual, they tend to promote stability in each other and continuity in behavior patterns. *Social synchrony* refers to the coordination of the interactions between individuals such that the acts of one support the acts of the other (Cairns & Cairns, 1994). With processes of social synchrony (i.e., imitation, reciprocity, complementarity), the behavior of

two or more students may become coordinated in ways that elicit and reinforce specific social interactions, behavior patterns, and relationships that sustain the students' emotional and behavioral difficulties (T. W. Farmer, Reinke, & Brooks, 2014). As correlated constraints and social synchrony contribute to pathways of youth, behavior may operate as a *developmental catalyst* by serving as a leading edge in development as it promotes alignment between the various subsystems that make up the developmental system (Magnusson & Cairns, 1996). Behavior can change rapidly in response to changes in a specific subsystem and momentary change in behavior may prompt adaptation in other subsystems. Consequently, while correlated constraints and social synchrony tend to foster conservation or stability in functioning they can also promote *systems reorganization* that results in adaptation and realignment of developmental trajectories (Cairns & Cairns, 1994). This occurs when behavior adjusts in response to changes in a particular subsystem, and the change in behavior promotes sustained change in other subsystems such that the factors realign in relation to each other and induce adaptation in the functioning of the student (T. W. Farmer & Farmer, 2001).

Although development is probabilistic and does not follow a lockstep pattern, and while systems reorganization is a complex and dynamic process, we propose that it is possible to use the conceptual and empirical foundations of developmental science to help guide the creation and delivery of intensive interventions for youth with EBD. EBD should not be viewed as a condition inherent in the child that unfolds overtime in a distinct and unwavering manner. Rather, the development of EBD reflects the adaptation of the capacities and proclivities of youth to the contexts in which they are embedded (T. W. Farmer & Farmer, 2001; Sameroff, 2000). By identifying correlated constraints and processes of social synchrony that contribute to and reinforce emotional and behavioral difficulties, intervention specialists can target specific skills and capacities of the student (e.g., academic ability, instructional focus, self-regulation strategies, social goals, information processing skills) and aspects of the ecology (e.g., family and/or peer interactional processes at home and in the neighborhood, classroom social dynamics, instructional practices, teachers' management of classroom behavior, school and community mental health stressors) that are most likely to be amenable to intervention. From this base, the intervention specialist can carefully guide individual and ecological level strategies with the goal of changing behavior and promoting changes in other subsystems in a data-driven systematic manner. These efforts will likely evolve over time and involve significant adaptations to specific strategies and the identification of new intervention targets as the developmental system begins to reorganize (see T. W. Farmer, Chen, Hamm, Moates, Mehtaji, Lee, & Huneke, 2016; T. W. Farmer & Farmer, 2001).

Strengths and Limits of Tiered Models of Intervention and EBPs

Since the passage of the Education for All Handicapped Children Act (PL 94-142, 1975), many changes have been made in the delivery of special education for youth with high incidence disabilities. In the 1990s, there was an intensive push to include students with disabilities in general education (Zigmond, 2003). With the emphasis on establishing the general education classroom as the primary setting to educate students with disabilities, there was a growing focus on developing non-categorical delivery approaches in which services are not linked to a student's disability classification (e.g., emotional/behavioral disorders, learning disabilities, intellectual disabilities), but to specific instructional and related learning support needs.

With this shift in service delivery, multi-tiered frameworks have been established to address the learning needs of struggling youth in general education settings. The Individuals With Disabilities Education Act of 1997 (IDEA) requires positive behavioral supports as well as functional behavioral assessments (FBAs) to promote students' productive engagement in school. Likewise, the 2004 reauthorization states that "In determining whether a child has a specific learning disability, a local education agency may use a process that determines if [he or she] responds to scientific, research-based intervention as part of the evaluation process" (20 U.S.C. §1414[b][6]).

Two complementary forms of multi-tiered frameworks have been established. Response to Intervention (RTI) programs have been developed to address the academic needs of struggling students, while Schoolwide Positive Behavioral Interventions and Supports (SWPBIS) have been created to address students' behavioral, social, and emotional needs. Both RTI and SWPBIS involve three-tiered systems. Tier 1 entails primary (i.e., universal) learning and/or behavioral support strategies to promote the productive learning and engagement of all students. Tier 2 is comprised of secondary (i.e., selected) learning and/or behavioral strategies to address the needs of small groups of students who are unresponsive to universal approaches, but who can be successful with moderate supports and adaptations. Tier 3 consists of tertiary (i.e., targeted) approaches in which strategies are individualized to the specific needs of students who are not responsive to secondary strategies. As stated in the reauthorization of IDEA (2004), a critical feature of multi-tiered approaches is that students' intervention needs are determined in relation to their response to scientific, research-based strategies (Fuchs, Fuchs, & Stecker, 2010).

As part of the refinement of tiered systems of support, there has been a corresponding focus on the development and evaluation of intervention strategies that align with each of the tiers. The creation, validation, dissemination, and implementation of EBPs is critical to ensure that

teachers use practices grounded in scientific evidence rather than unsupported fads, subjective opinion, anecdotal accounts of effectiveness, or convenience (Cook et al., 2015; Kauffman, 2015). By establishing tiered frameworks to guide instructional and management strategies, it is possible to develop standard practices that enhance the capacity and effectiveness of all teachers to meet the needs of students generally, as well as to identify students who need more specialized and tailored interventions (Vaughn & Swanson, 2015; Wehby & Kern, 2014). The importance of this point is that when teachers implement EBPs with fidelity, it is expected that the overall quality of instruction is improved and students are being afforded the best opportunity for academic success and social-emotional adjustment. However, there is no expansive catalog of EBPs where a specific strategy can be identified for a given situation. Thus, it is necessary for special education professionals to use their judgment and follow core guidelines for utilizing, modifying, and tailoring interventions to particular circumstances when EBPs are scarce (The Council for Exceptional Children's Interdivisional Research Group, 2014). Accordingly, the Council for Exceptional Children has established standards for identifying EBPs (Cook et al., 2015), and a variety of resource guides and information sources have been established to facilitate teachers' effective implementation of EBPs (see Torres, Farley, & Cook, 2014).

In addition to the fact that there will generally be an inherent need to tailor interventions for students with disabilities that requires specialized knowledge and skill (Fuchs & Fuchs, 2015; Kauffman, 2015), there are several associated limits to multi-tiered systems and EBPs. First, EBPs within multi-tiered systems typically focus on a single developmental factor or area of difficulty and are not designed to consider how other factors (i.e., correlated constraints, social synchrony) may contribute to or sustain the problem. For example, it is common for teachers to say an intervention worked for a short period only for the problem to return. While teachers may point to such cases as evidence a strategy is ineffective or the student is intervention resistant, another explanation is plausible and reflects the complexity of the behavioral difficulties of students with EBD. That is, the intervention is generally effective, but correlated constraints are operating to limit sustained behavioral change. Second, teachers and administrators may view the use of multi-tiered systems as the required and sufficient form of intervention for a struggling student even when strategies are not effectively adapted or tailored to a student's specific needs and the student continues to experience problems (T. W. Farmer et al., 2014). Third, many general education teachers may not have the skills, knowledge, or resources necessary to effectively deliver EBPs or to collect relevant data and make necessary adaptations to intensify efforts as the intervention progresses (T. W. Farmer, Chen, et al., 2016; Fuchs & Fuchs, 2015). Fourth, while multi-tiered systems are likely to raise the quality of the practices of teachers who are least prepared or skilled for working with struggling students, the expectations to follow EBPs in a lockstep fashion may result in constrained professionalism that inhibits the types of adaptive expertise and skills necessary to effectively individualize interventions for students with disabilities (De Arment, Reed, & Wetzel, 2013; Wills & Sanholtz, 2009).

This does not mean tiered systems and EBPs are ineffective—on the contrary, they are an important foundation for the intervention process (T. W. Farmer et al., 2014; Kauffman, 2015). Yet, while multi-tiered programs and EBPs are a critical core for intervention intensification, they are by definition standardized, probabilistic, and meant to be responsive to general trends in the needs and functioning of a population (Cook et al., 2015; T. W. Farmer, Gatzke-Kopp, et al., 2016). In contrast, individual students with EBD, by the nature of their disabilities, have needs that are unique, constantly changing, and context dependent (T. W. Farmer, 2013). Accordingly, students with EBD require interventions that are responsive not only to the immediate antecedents and consequences of their behavior but also to the complexities of their developmental histories, the ecologies in which they are embedded, the interactional dynamics they experience, and the goals and opportunities they have for the future (Dishion & Snyder, 2004; Eber et al., 2002; Epstein et al., 2004; T. W. Farmer & Farmer, 2001; Wehby & Kern, 2014). This requires the service and guidance of experts to adapt and plan complex interventions that carefully span multiple domains.

The Need for Special Educators Serving as Intervention Specialists

Intervention intensification means moving from the security of implementing standardized EBPs to the uncertainty of navigating uncharted territory by collecting data and individualizing interventions to address the specific characteristics, needs, and circumstances of the student. Such efforts should be guided by theory, knowledge, experience, and data that build on the general (i.e., nomothetic) but move to the specific needs of the student (i.e., idiographic).

Efforts to do this are likely to require two distinct types of expertise. As shown in Figure 1, the inner core (i.e., the area contained by the bold arrows) depicts a proximal view of school adjustment. Reflecting correlated constraints, this model suggests that each student experiences the demands of three major domains of school functioning: academic, behavioral, and social. The bidirectional arrows linking these domains suggest that each affects the others. Furthermore, the bidirectional arrows going to the center indicate that this is a dynamic system with ongoing

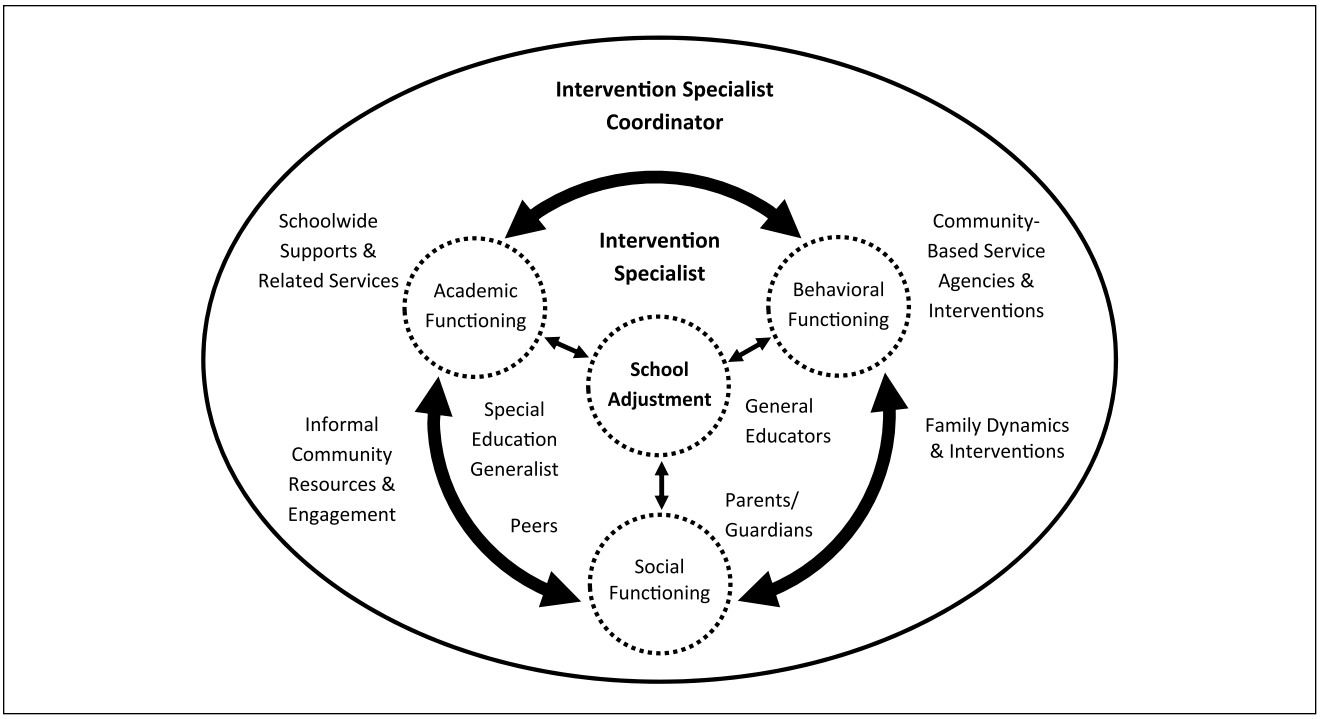

Figure 1. Correlated constraints/ecological model for individualizing intensive interventions.

feedback from school adjustment, which can help foster adaptation or stability in the three domains. The inclusion of parents, teachers, and peers in the inner core suggests that these individuals are part of the microecology that affects the various domains of functioning and students' overall school adjustment. Moving outside the proximal core, four key ecological components are indicated: schoolwide supports and related services, community-based service agencies and interventions, informal community resources and engagement, and family dynamics and interventions. These four components provide the general ecology and context supports that contribute to a student's proximal school experiences, functioning, and adaptation. This complex ecological system not only contributes to a student's school adjustment, but it is also likely to significantly affect the intensification process and should be addressed or utilized in a manner that involves careful coordination across the various components.

Types of Intervention Specialists for Students With EBD

As outlined above, the roles of special educators who provide services to students with EBD spans a range of responsibilities and expertise. Beyond instruction to students, special educators are expected to select and adapt EBPs, provide collaborative support and guidance to general educators, engage in direct and/or "check-in" support and monitoring of students who are served primarily in general education settings, and coordinate communication and activities with students' parents or caregivers. In addition, these professionals are responsible for the development and monitoring of students' individualized education programs as well as individualized behavioral interventions plans to address specific discipline concerns. Furthermore, some of these individuals may be responsible for coordinating communication and efforts across related service providers within a system of care.

It is not likely that one individual can do all these things well or has the training, experiences, and expertise to be effective in all these roles. Yet, we contend that to effectively intensify interventions for students with EBD and to provide the levels of intervention support necessary to reorganize developmental systems and realign developmental trajectories, there is a strong need to have all of these roles filled in a consistent and coordinated manner. We propose there is a need for two distinct types of EBD special educational experts: *intervention specialists* to address students' proximal functioning/adjustment and *intervention specialist coordinators* to provide ecological support and guidance across the system of factors both within the school and the community that serve as a dynamic context for students' daily school experiences.

Intervention specialists. First, we propose that there is a need for intervention specialists serving as *adaptive experts* who

provide direct services to students. As depicted in Figure 1, the intervention specialist is responsible for proximal interventions to address correlated constraints (i.e., academic, behavioral, social) that contribute to the targeted student's school adjustment. The term *adaptive expert* refers to teachers who approach their role from the perspective of problem solvers who continually identify ways to adapt to the learning support needs of students, as opposed to following specific routines and expecting students to adapt to their instructional or classroom management style (De Arment et al., 2013). Adaptive expertise centers on teachers' use of knowledge in efficient and innovative ways and has been described as the "gold standard for becoming a professional" (Hammerness, Darling-Hammond, & Bransford, 2005, p. 360). As De Arment and colleagues observe, innovation and problem solving about individual–environment interactions is the hallmark of special education, and adaptive expertise should be viewed as a core feature in the preparation of special educators.

Consistent with this view, we propose that direct service providers for students with EBD should be adaptive experts who have a strong conceptual understanding of correlated constraints and DST, a broad knowledge of EBPs, the capacity and experience to collect data in-stream and use this knowledge to adapt and intensify interventions, and an extensive background in managing both students and classroom contexts. Furthermore, we expect these adaptive experts to be able to identify when they need consultation support and to work with intervention specialists, behavioral analysts, mental health professionals, and other related services providers to share information and to help identify the possible need for interventions in other contexts that may contribute to the adjustment of the student in the classroom. We propose that intervention specialists should be master's-level teachers who have a strong knowledge of developmental and ecological systems perspectives as applied to fostering school adjustment and who have been explicitly trained in the intensification and adaptation of EBPs for students with EBD.

Intervention specialist coordinators. Building from the knowledge that schools are likely to be the point of entry for mental health services for many youth (E. M. Z. Farmer, Burns, Phillips, Angold, & Costello, 2003), there has been an increased focus on establishing school-based mental health programs (Cappella et al., 2008; Eber et al., 2002; Epstein et al., 2004). Yet, the coordination and utilization of these services for the purposes of the intensification of interventions for students with serious EBD is in the early stages and in many cases is more prevention oriented than focused on the reorganization of developmental systems and developmental pathways. In schools that have relatively high concentrations of students with EBD, there is a need for advanced-level intervention specialists who are able to coordinate across SWPBIS, RTI, school mental health, and prevention services, and to also maintain linkages with community agencies.

The goal is to establish a system of services that corresponds with various developmental subsystems that contribute to EBD, and to build infrastructure supports to promote the efficient and effective intensification of interventions that span ecological and service needs that go beyond the purview of general special educators and intervention specialists who focus on the proximal environment. As we depict in Figure 1, there is a need for intervention specialist coordinators who are responsible for supporting and monitoring intervention infrastructure and service delivery frameworks both within the school and extending out to family and community services and resources. While the general infrastructure monitoring and coordination is in some ways administrative, we expect the intervention specialist coordinator to have a caseload of students and to serve as a link between the proximal efforts of the intervention and other related service professionals both in the school and the community. Consistent with research indicating that the effective uptake and adaptation of EBPs requires coaching, consultation, and continuous professional development support (e.g., Conroy et al., 2015; Motoca et al., 2014; Reinke et al., 2014), we view the intervention specialist coordinator as having a leadership role in training and support for teachers and other school professionals who provide services for students with EBD. Equally important, we view this role as being responsible for working with family members as well as informal and formal community resources and agencies to establish data-capture and continuous progress monitoring protocols to focus on both systems- and student- level indicators to help guide the evaluation and improvement process for such programs. Also, we view the intervention specialist coordinator as being responsible for the development and monitoring of students' long-range intervention plans with a focus on developmental trajectories and key adolescent and early adulthood outcomes. Therefore, we propose that intervention specialist coordinators should have prior experience as intervention specialists, and advanced post-master's training in services coordination, intervention intensification, professional development training and leadership, and the application of life course developmental and ecological theory to the design and implementation of long-range intensive intervention plans.

The Complexity of Intervention Intensification for Students With EBD

The poor outcomes of students with EBD are well documented and include academic failure, truancy, school dropout, involvement in substance use, criminality, low post-secondary educational and occupational attainment,

and adulthood mental health adjustment problems (Bradley, Henderson, & Monfore, 2004; Chen, Culhane, Metraux, Park, & Venable, 2016; Wagner & Newman, 2012). Students with EBD tend to experience a host of developmental and ecological risks that are likely to contribute to their chronic adjustment difficulties as well as their inauspicious outcomes. To optimize the productive growth and positive outcomes of students with EBD, professionals should be attuned to developmental history factors that may provide insights into the intervention intensification process, current ecological factors that may affect intervention effectiveness and the student's adaptation, and the immediate antecedents and consequences that maintain behavior patterns.

Developmental History Factors of Students With EBD

The school adjustment difficulties of students with EBD tend to reflect the interplay of problems across multiple subsystems including academic skills, language difficulties, social information processing problems, peer rejection, affiliations with unproductive peers or peers with social and behavioral risks, involvement in bullying and victimization, and problematic interactions with teachers and peers (Cairns & Cairns, 1994; Chen, Hamm, Farmer, Lambert, & Mehtaji, 2015; Hollo, Wehby, & Oliver, 2014; Lane, Carter, Pierson, & Glaeser, 2006; Shores & Wehby, 1999). Furthermore, many youth with EBD experience multiple out-of-home placements, have been involved in significant trauma including abuse and neglect, and have a history of coercive interchanges with parents/caregivers (Chen, Culhane, Metraux, Park, Venable, & Burnett, 2016; Dishion & Snyder, 2004; Dorsey et al., 2012; Granic & Patterson, 2006; Seifert, Farmer, Wagner, Maultsby, & Burns, 2015).

Efforts to understand the developmental history of youth with behavior problems will depend on whether the disorder has been manifested (i.e., is consolidated across multiple subsystems). When problem behavior is associated with difficulties in only one or two subsystems, the focus of intervention is likely to be prevention (T. W. Farmer & Farmer, 2001). That is, building from a cumulative risk or cascade model of development, the goal of preventive intervention is to identify problems early in the developmental sequence and to ameliorate difficulties before they affect other subsystems or domains of functioning (Dishion & Snyder, 2004; Granic & Patterson, 2006). But for many students with EBD, their difficulties have consolidated across multiple subsystems (i.e., academic, behavioral, communication, ecological, family, peer, social-cognitive) early in their school careers (T. W. Farmer & Farmer, 2001). For these youth, a correlated constraints theoretical framework rather than a cascades model may help clarify how their problems have become fused across multiple subsystems and may be valuable for guiding treatment efforts (T. W. Farmer, 2013). The distinction between cascades and correlated constraints models is important because once problems have become consolidated across multiple subsystems the focus moves from prevention to treatment, and the aim is to foster systems reorganization (see T. W. Farmer & Farmer, 2001). An important aspect of a dynamic systems framework approach to intervention involves understanding how the interaction between the characteristics of the student and the ecology operate in relation to each other and become fused in the expression of maladaptive patterns (T. W. Farmer, 2013; T. W. Farmer, Gatzke-Kopp, et al., 2016; Sameroff, 2000).

Ecological Considerations, Setting Events, and Shadows of Synchrony

As indicated above, development involves the ongoing alignment of the characteristics of the individual and the various contexts or ecologies in which he or she is embedded. The concept of ecology is critical in the treatment of EBD. However, there are two distinct but complementary conceptualizations of ecological theory that are important for understanding the intervention intensification process for students with EBD. First, as outlined by Bronfenbrenner (1979), it is possible to view the various contexts youth experience as being hierarchically layered systems that influence each other and the functioning of the student. These subsystems include *microsystems* that are the immediate contexts experienced by youth (i.e., family, classroom, peer group, school, and neighborhood), *mesosystems* that are the linkages among the various microsystems (i.e., individuals who are common across multiple contexts, communication across contexts, and consistency of knowledge, attitudes, and behaviors among various microsystems), *exosystems* that are broader structural or institutional aspects of the social system that the child does not experience directly but which serve as a context for micro- and mesosystems (i.e., parents' workplace, local policies, and the availability and use of resources), and *macrosytems* that involve the cultural values, ideologies, and laws that help to shape the functioning and developmental contributions of the various ecological subsystems.

The second conceptualization of ecological theory is reflected in the re-education framework outlined by Nicholas Hobbs (1982) in the book *Troubled and Troubling Children*. Hobbs posited that EBD does not rest within the child or the ecology but in interactions between the two. From this perspective, interventions aimed at promoting the productive and sustained adjustment of students with EBD should take into consideration that (a) problem behavior can be ameliorated by bringing the needs and capabilities of the student into alignment with the demands and resources of the various ecologies in which the child is embedded, (b) to do this it is necessary to identify the

child's strengths and corresponding resources in the ecology that reinforce and sustain these strengths, and (c) it is also necessary to foster new competencies in the student to help her or him adapt to the ecology while also promoting new capacities and relationships within the environment (T. W. Farmer et al., 2014).

These two perspectives merge to suggest that intervention is not simply about changing the student. Rather, it is necessary to understand that behavior reflects efforts of the student to adapt to the ecology (Sameroff, 2000). Thus, intervention should include a focus on managing and structuring ecologies to reduce factors that elicit and maintain emotional and behavioral difficulties while promoting factors that reinforce desired behaviors and competencies (T. W. Farmer et al., 2012). Because youth are involved in multiple ecologies that may not be well aligned, this can be a daunting task that goes beyond the capacity of the classroom teacher to assess or manage. However, the concepts of setting events and shadows of synchrony may be useful tools that intervention specialists can use to help guide and coordinate efforts across ecologies.

The term *setting events* refers to variables in the natural ecology that set the occasion for or alter the predictive power of discriminative stimuli and associated consequences (Wehby, Symons, & Shores, 1995). Because the behavior of students with EBD is sensitive to multiple stimuli and consequences, setting events may create the general conditions that evoke and maintain a student's behavior and can impact whether a specific contingency is enacted (Boyd, Conroy, Asmus, & McKenney, 2011). Accordingly, setting events may include a variety of factors in the classroom (e.g., a student's social role or reputation, peer affiliations, a classroom or instructional activity) or outside the classroom (e.g., events in the cafeteria, hallway, or the school bus; circumstances, activities, or events in the home or community) that evoke and support specific patterns of behavior (T. W. Farmer et al., 2012; Shores & Wehby, 1999). In this sense, setting events may provide the context for patterns of synchrony in which a student's problem behavior is coordinated with the behavior of others and may involve coercion or deviancy training (Cairns & Cairns, 1994; Dishion & Snyder, 2004; Granic & Patterson, 2006). *Shadows of synchrony* refers to social-interactional processes in which a student responds to the acts or activities in one setting based on his or her experiences in another setting, even though the contexts and individuals involved may be different (Cairns & Cairns, 1994). The proclivity to synchronize behaviors with others may result in spillover situations in which the student behaves in ways that elicit the actual stimuli and consequences of a problem from a different setting and may create social roles and relationships that sustain behavior patterns across settings (T. W. Farmer, Gatzke-Kopp, et al., 2016).

Classroom Antecedents and Consequences of Problem Behavior

As part of IDEA, schools are required to conduct FBAs to identify the antecedents and consequences that support the problem behavior of students with disabilities. However, detailed analyses of the classroom social interactions of students with EBD suggest that problem behavior can be maintained by a broad range of antecedents and consequences that preclude the possibility of pinpointing a specific cause or consequence that sustains the behavior (Shores & Wehby, 1999; Wehby et al., 1995). On this count, FBA was developed primarily with individuals with intellectual disabilities and concerns have been expressed about extending this framework to students with EBD (Sasso, Conroy, Stichter, & Fox, 2001). Advances have been made in the use of FBA for students with EBD, and it can be an important tool to guide individualized intervention (Hansen, Wills, Kamps, & Greenwood, 2014). But in many cases, it is possible that complex behaviors are being maintained by multiple mechanisms (e.g., correlated constraints) and, in such circumstances, it may help to identify settings, events, and patterns of social synchrony that elicit and support the behavior (T. W. Farmer et al., 2012; Shores & Wehby, 1999). The scouting report approach has been developed to identify classroom ecological leverage points and associated setting events and shadows of synchrony to supplement FBA as a technique to help guide context-level interventions (T. W. Farmer, Chen, et al., 2016).

Implications for the Intensification of Interventions

Four points come to the forefront to guide intervention intensification. First, efforts to identify a specific cause and associated strategy to address a behavior problem are likely to be ineffective or short-lived because problems are multidetermined and reflect fused contributions across multiple subsystems. This means it is necessary to have coordinated strategies that are constantly monitored and adjusted in response to each other. Second, the intervention needs of students with EBD are moving targets. Teachers cannot just find an intervention and stick with it. Rather, there is often a need to make nuanced but data informed in-stream modifications to a strategy to get out in front of an emerging problem or to promote new competencies. This has to be done with care to prevent upsetting a pattern of success, while also not creating a self-fulfilling prophecy that results in new problems. Third, interventionists need to deal with what is in front of them while being aware that factors outside the immediate context may also be contributing to the problem. This means the classroom teacher is likely to need the support or partnership of a specialist who can work effectively with service providers outside the classroom to address

associated issues (i.e., correlated constraints) that contribute to the student's school adjustment. Fourth, although it is often helpful or necessary to have services in place to address developmental history and ecological concerns, these problems can't be allowed to come into the classroom, and care has to be taken to prevent rescue or escape interactions and relationships that may undermine the effectiveness of a strategy or the authority of the teacher who is in charge of the student in the immediate context. In other words, the developmental and ecological context of the intervention needs of students with EBD cannot be ignored—but this is complex work that requires multiple professionals working in concert to reorganize the developmental systems of students with EBD and their corresponding adjustment trajectories (T. W. Farmer, Gatzke-Kopp, et al., 2016).

Creating the Knowledge Base to Guide Intervention Intensification

The following sections discuss the types of knowledge and data needed in the intervention intensification process for students with EBD. Also, considerations for research on the design and delivery of dynamic interventions that address correlated constraints are discussed.

The Knowledge Base for Intervention Intensification

Building from the foundations of DST, implementation science, and developmental science, we propose four distinct types of information that can guide the intervention intensification process: universal/probabilistic knowledge and approaches, practice elements within implementation science, person-oriented perspectives, and person-in-context interactional analyses. We briefly describe each of these frameworks and highlight their potential contributions to the intensification of interventions for students with EBD.

Universal/probabilistic frameworks. Universal intervention centers on what we know about human behavior from a central tendency framework. General linear model statistics are at the core of this framework, and the focus of this perspective is on what we typically expect to see across most individuals in a given population given a specified developmental level and context. With this approach, group-level cluster-randomized control trials can identify standard strategies that tend to be effective with the general population. Because development is probabilistic, there is likely to be a small group of youth at both tails on the general linear curve for whom universal strategies do not adequately meet their needs. For these youth, two questions emerge: (a) Can the universal intervention be adapted in a standard way that meets the needs of some of the students who are nonresponsive to the universal strategy (i.e., students within Tier 2)? and (b) Do some youth need an approach that is markedly different from standardized practices (i.e., different from Tiers 1 and 2)? Students in the latter group are likely to need specialized supports that build on highly individualized developmental knowledge as well as data-driven experimental trials of instructional and context modifications (T. W. Farmer, Gatzke-Kopp, et al., 2016; Kern et al., 2015; Wehby & Kern, 2014). To facilitate the intensification process, both survey and observational/experimental data collection within Tier 1 and Tier 2 contexts is a critical step to identify what interventions, for whom, and under what circumstances (T. W. Farmer, Chen, et al., 2016; T. W. Farmer, Gatzke-Kopp, et al., 2016; Kern & Wehby, 2014).

Practice elements of implementation science. As part of the intervention intensification process, there is a need to develop approaches that help guide the modification of standardized approaches to meet the unique needs of specific classrooms, cultures, and instructional/resource supports to ensure the effective but tailored uptake of EBPs. Implementation science is designed to address this need. Implementation science is "the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practices" (Eccles & Mittman, 2006, p. 1). While implementation science has promise for transferring efficacious EBPs into school settings for students with EBD, the complexity of needs across diverse ecologies present unique challenges (Conroy et al., 2015). One strategy to address this complexity involves the concatenation of practices that comprise EBPs (Dishion, 2011). Recent work has focused on the delivery of practice elements (i.e., discrete principles or skills) found in multiple EBPs in community settings (Institute of Medicine, 2015). Practice elements (i.e., evidence-based kernels) are individual skills or practices common across treatment protocols that may be associated with outcomes (Chorpita & Daleiden, 2009; Embry & Biglan, 2008).

Although mental health research has identified practice elements for a variety of youth outcomes (Chorpita & Daleiden, 2009; Garland et al., 2008), efforts to identify practice elements in school-based intensive interventions are absent. The practice element approach has promise for identifying and maximizing the utility of intensive interventions in school settings. First, it is efficient: Rather than needing numerous EBPs, there would be a small set of evidence-informed practice elements matched to specific behavioral and learning needs of students (Schoenwald et al., 2011). Second, the approach would be more flexible than current efforts, allowing the practice elements to address the needs of schools or teachers who may want practice elements that address multiple student learning and behavioral problem areas (e.g., Southam-Gerow, Chorpita, Miller, & Gleacher, 2008). Third, new research findings can

be integrated into the practice element approach as the research base matures. Finally, the practice element approach may be more consistent with the way teachers deliver practices to students with intensive needs, allowing for a broader application across diverse classroom contexts (McLeod et al., 2016).

Person-oriented developmental analyses. In developmental science, the person rather than the variable should be central in the analysis of human growth (Cairns & Cairns, 1994). The focus is not on how specific variables affect functioning in the general population but on how variables coalesce within individuals. The aim is to identify specific "packages of variables" (i.e., correlated constraints) and to clarify how correlated constraints contribute to adaptation (Magnusson & Cairns, 1996). This approach makes it possible to identify expected outcomes of youth who have similar individual/ecological/developmental characteristics and experiences and to link this information to response to intervention data (T. W. Farmer, Gatzke-Kopp, et al., 2016). A critical aspect of person-oriented approaches is the possible use of prodigal analysis. Prodigal analysis involves determining typical developmental pathways and outcomes for youth in a specific configuration of variables and identifying students who diverge from the expected trajectory as a function of mediating or moderating factors including intervention (Cairns & Cairns, 1994). This approach yields insight into factors that contribute to developmental reorganization and realignment of trajectories and can add to response-to-intervention data by enhancing our ability to move from nomothetic to idiographic approaches. This should make it possible to create a database of what is likely to work for whom in specific contexts and circumstances (T. W. Farmer, Gatzke-Kopp, et al., 2016). Relatedly, there is a need to extend beyond our current emphasis on the generalization of interventions/outcomes across settings by focusing on the consolidation of intervention impact across subsystems in a student's developmental system (T. W. Farmer & Farmer, 2001). As interventions are implemented, it is necessary to collect data on how changes in behavior are related to changes in relevant developmental subsystems (T. W. Farmer, Gatzke-Kopp, et al., 2016). When both the generalization and consolidation of desired behaviors are achieved, it is likely that a student will maintain new patterns and experience the expected and preferred associated outcomes.

Person-in-context interactional analyses. Because behavior is the leading edge of development, and because it tends to be coordinated with others within the contexts in which it occurs, it is important to conduct observational analyses to identify how setting events and processes of social synchrony elicit and sustain specific patterns (Boyd et al., 2011; T. W. Farmer, Chen, et al., 2016; Wehby et al., 1995). We view this as an iterative and recursive process that needs to be responsive to the dynamics of developmental adaptation. Accordingly, we have found that it is useful to begin with general observations to identify factors that may contribute as setting events that serve as potential intervention leverage points in the classroom and to follow this with interviews with key stakeholders (i.e., teachers, students, parents) to identify potential social dynamic factors that contribute to social synchrony or shadows of synchrony (T. W. Farmer, Chen, et al., 2016; Motoca et al., 2014). Building on these data, surveys and structured interactional analyses can be conducted to identify social dynamic processes, distinct patterns, and partners that contribute to problem behavior and associated correlated constraints (T. W. Farmer, Lane, Lee, Hamm, & Lambert, 2012; Gest, Madill, Zadzora, Miller, & Rodkin, 2014). In turn, FBAs and experimental intervention trials may be used and augmented by repeating these steps as students respond to intervention efforts (T. W. Farmer, Chen, et al., 2016; T. W. Farmer & Farmer, 2001).

The need for EBD practitioner-scientists. To develop protocols for preparing intervention specialists and coordinators, as well as to guide the intervention intensification and service delivery processes, there is a need for research that is distinct from experimental trials that focus on creating EBPs. There is a need for practitioner-scientists who are embedded within schools and who serve in intervention specialist or intervention specialist coordinator roles. These individuals need to be directly linked to university research programs, and they should be trained as doctoral-level researchers. However, their role should be one of acting as experts and documenting their activities to work with research teams on the development of expert protocols, strategies, and professional development programs in intervention adaptation and the coordination of the delivery of intervention intensification services.

Implications for the Future

Efforts to promote the long-term adjustment and productive outcomes of students with significant EBD should be viewed as highly complex instantiations of applied developmental science (T. W. Farmer, Gatzke-Kopp, et al., 2016). As outlined in this review, the emergence, stability, and progressive growth of chronic emotional and behavioral difficulties involve multi-layered subsystems including genetic, neurophysiological, cognitive, sensory-communication, and emotional regulatory factors operating within the individual and ecological, cultural, social-interactional, institutional, and social-political factors operating within the various contexts in which the student is embedded (Cairns & Cairns, 1994; Sameroff, 2000). Furthermore, the behavior of the individual and associated behavioral processes operate as a leading edge in development by linking and fusing various subsystems into a holistic developmental

system that is unique to each specific student (Cairns & Cairns, 1994; T. W. Farmer et al., 2012). A key point here is that when we intervene with behavior we are indirectly intervening with other developmental subsystems which, in turn, may constrain or support the impact of intervention and the long-term adjustment and outcomes of youth. However, the most critical point of this perspective is that intervention should focus on both the generalization and consolidation of behavior with the goal of reorganizing developmental systems and realigning trajectories (T. W. Farmer & Farmer, 2001).

Because development is a moving target and involves the dynamic, mutual alignment of the features of the student and the specific contexts in which he or she is embedded, momentary processes of adaptation may result in behaviors, individual capacities, and ecological constraints that prompt pathways to long-term problems and inauspicious outcomes (Cairns & Cairns, 1994; Sameroff, 2000). This means there are two distinct but equally critical aspects of effective intervention intensification: the careful coordination of intervention efforts to work across subsystems in a manner that promotes developmental reorganization and realignment, and the continuous monitoring of natural developmental processes to address potential or emerging problems and to foster natural supports that can enhance the student's long-term adaptation.

Although a dynamic systems perspective of intervention intensification may likely require intricate and extensive levels of effort in terms of scope and time, we must remember we are working with youth who are at the most extreme level of need in terms of risk for long-term adjustment difficulties and poor outcomes; youth for whom the process of adaptation, itself, contributes to disorder—youth who have individual characteristics and experiences that interact with their ecological circumstances in ways that create and sustain their disability (T. W. Farmer et al., 2012; Sameroff, 2000). In many cases, these are youth who have experienced significant trauma, instability in their care and support, and a series of interactions and settings that collectively support behaviors that maintain their difficulties. These youth are experiencing a condition that is not desirable, but they are youth who deserve and have a right to the highest level of professional support and treatment to promote their long-term adjustment (Kauffman & Badar, 2013).

Fortunately, work within the field for the past several decades has created a strong foundation for a dynamic systems approach to intervention intensification for EBD. SWPBIS and RTI programs serve as an excellent base for universal support needs for all students and for identifying youth who have needs that go beyond what are typical in the general population (Horner et al., 2010). Systems of care and wraparound services provide a delivery framework and approach for the coordination of individualized interventions that span efforts across child service sectors (Eber et al., 2002; Epstein et al., 2004). Implementation science with the focus on practice elements of intervention makes it possible to move beyond the static, standardized delivery of EBPs to the identification of common aspects of EBPs that can serve as a core for customization and tailoring to students' individualized needs (Dishion, 2011; McLeod et al., 2016). Ecological intervention and the concept of setting events help us understand the interplay between the individual and the context and support the identification of particular leverage points for dynamic, person-in-context individualized strategies (T. W. Farmer, Chen, et al., 2016; Hobbs, 1982; Shores & Wehby, 1999). Developmental science provides a conceptual and analytic framework for bringing this all together and gives us ways to think about and assess how various subsystems operate in concert. With person-oriented and prodigal analyses, we can couple developmental and RTI data to better identify what works for whom, when, and under what conditions. Thus, we are at a juncture where we have the capacity to support the intensification of interventions for students with EBD in ways that enhance their adaptation and promote their productive outcomes.

But we must take several steps to fully realize this potential. While recognizing that EBD is an undesirable condition, we must address the stigma of special education services for students with EBD by providing expert supports and strategies that are clearly recognized as giving youth with this disability the greatest opportunity for promoting their adjustment and living productive lives that are meaningful to them (T. W. Farmer, 2013; Kauffman & Badar, 2013). To do this, we must recognize that the education and treatment needs of students with chronic EBD are not likely to be effectively met by general education teachers implementing standardized EBPs. These students need direct care support of intervention specialists who are adaptive experts and ecological support of intervention specialist coordinators. This will require attracting individuals with strong competencies and experiences commensurate with this work and providing them extensive training, resources, and compensation that is consistent with being a clinical expert.

To accomplish this, we need to augment clinical trials with more comprehensive programs of research and training. This work should merge SWPBIS, RTI, and dynamic systems perspectives and should situate special education services for students with EBD in the context of applied developmental science (T. W. Farmer, Gatzke-Kopp, et al., 2016). At the forefront of such efforts, there is a need for funding mechanisms to establish laboratory schools with strong SWPBIS and RTI programs, school mental health services, and service delivery frameworks that include the involvement of intervention specialists working with practitioner-scientists. This work should

involve collaborative university partners for training and research support. The research support should focus on an array of areas including merged RTI and dynamic systems data collection and use; analytic approaches to move from nomothetic to idiographic strategies; the design, monitoring, and tailoring of service delivery and professional development frameworks; and data-capture systems for planning, monitoring, and adapting intensive intervention plans. This work must be done with an eye toward the transportability of such programs to other schools. Furthermore, laboratory schools should serve as training sites for intervention specialists and coordinators and should focus on the development of dynamic training curricula for both types of specialists.

In closing, the field of special education for students with EBD has reached a pivotal point that has important implications for developmentally vulnerable youth who are at great risk for long-term adjustment problems and poor outcomes. We cannot expect general education teachers using EBPs to provide effective intervention for students with EBD any more than we would expect a high school physics teacher to direct a space flight or a general practitioner to perform brain surgery. Emerging efforts to establish a science of intervention intensification for youth with EBD give us a tremendous opportunity for reestablishing special educators as intervention specialists who are experts in this area. A dynamic systems perspective provides compelling confirmation of the need for such personnel. By merging RTI and person-in-context perspectives and analytic frameworks, we should be able to prepare these specialists as applied developmental scientists who have a high level of expertise that is critical for the positive growth and adaptation of youth who would otherwise be likely to experience significant adjustment difficulties and poor outcomes throughout their lives.

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