Exceptional Children
2023, Vol. 89(3) 314-331

DOI: 10.1177/00144029221135572
journals.sagepub.com/home/ecx
SAGE

Promoting Paraeducators' Use of Evidence-Based Practices for Students With Autism

Ann M. Sam[1], Jessica R. Steinbrenner[1], Samuel L. Odom[1], Sallie W. Nowell[1], Victoria Waters[1], Yolanda Perkins[1], Mary White[1], Hariharan Swaminathan[2], and H. Jane Rogers[2]

Abstract

The purpose of this study was to examine the efficacy of a teacher-implemented professional development program to increase the fidelity with which paraeducators use evidence-based practices (EBPs) in instruction for children with autism. Employing a modified multiple-probe design, investigators implemented the Autism Focused Intervention Resources and Modules for Paraprofessionals (AFP) program in four special education and four inclusive classrooms enrolling students with autism. As the teacher initiated features of the AFP program focusing on individual EBPs, level changes in paraeducators' EBP fidelity increased markedly, with replications across paraeducators demonstrating experimental control. Statistical analyses produced large effect sizes, Goal Attainment Scale scores indicated student progress, and participants' ratings reflected strong social validity. School closure due to the COVID-19 pandemic prevented the completion of the study, but the pattern of effects suggests the efficacy of the AFP program as a program of professional development for paraeducators providing instruction for children with autism.

Parallel trends in special education are creating a need for innovative professional development that can occur in public schools. The first trend is the marked increase in the number of students with autism receiving special education services. The second trend is the dramatic shift in who provides special education instruction, with paraeducators now outnumbering special education teachers as service providers (U.S. Department of Education, 2022). These trends have coalesced to create a unique professional development need in the field of special education. The often complex instructional needs of students with autism are increasingly being addressed by paraeducators who report that they lack training to deliver instruction effectively (Sobeck & Robertson, 2019). The purpose of this study is to examine the effects of a professional development program for promoting paraeducators' acquisition and use of evidence-based practices (EBPs) for students with autism. Please note that both person-first language (e.g., "person with autism") and identity-first language (e.g., "autistic person") will be used in this article to honor varying preferences of some autistic self-advocates as well as other groups of individuals with disabilities.

[1]University of North Carolina at Chapel Hill
[2]University of Connecticut

Corresponding author:
Ann M. Sam, Frank Porter Graham Child Development Institute, University of North Carolina at Chapel Hill, CB 8040, Chapel Hill, NC 27599-8040, USA.
Email: ann.sam@unc.edu

Autism is a neurodevelopmental disorder that originates in early childhood, is displayed across the life span, and affects boys about 4 times more often than girls (Lord et al., 2022). The *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; American Psychiatric Association, 2013) and Individuals With Disabilities Education Improvement Act of 2004 (IDEA) identify the two defining characteristics of autism as impairments in social communication and repetitive and restrictive behaviors, with the severity of these behaviors varying across the spectrum. The Centers for Disease Control and Prevention has reported the prevalence rate as 1 in 44 students (Maenner et al., 2021), with this rate having risen over the past decade. The acceleration in prevalence is also reflected in a 120% increase in autistic students receiving special education service from 2010 to 2019 (U.S. Department of Education, 2014, 2022). For these students, legislation that governs policy and practices for general education (i.e., Every Student Succeeds Act [ESSA], 2015) and special education (i.e., IDEA, 2004) in the United States specify that practitioners must employ evidence-based interventions.

For this article, *paraeducator* is defined as "an individual who is employed in a preschool, elementary school, or secondary school under the supervision of a certified or licensed teacher" (20 U.S.C. § 7011[11]). Paraeducators were initially introduced to special education in the 1950s to conduct clerical tasks. With the passage of the Education for All Handicapped Children Act of 1975, their role expanded to provide instructional support under the supervision of a teacher. The passage of IDEA 1997 increased their role further to provide supports for students with disabilities in inclusive classrooms. In the early 2000s, the No Child Left Behind Act (2002; extended by ESSA in 2015) specified the role of teacher as supervisor and responsible for paraeducator training, and IDEA 2004 required paraeducators to participate in professional development (Nevin et al., 2008).

Although federal law requires training and professional development for paraeducators, the detailed review of state requirements by Massafra et al. (2020) revealed that 43 states do not require initial training and 40 states do not have provisions for ongoing professional development. When training is provided, the most frequent type of training tends to be one-time workshops without follow-up coaching (Walker et al., 2020), which is commonly acknowledged as a professional development method that does not lead to use of strategies with fidelity (Hall et al., 2010). In addition, researchers have reported that teachers usually do not receive training on how to supervise paraeducators or give them performance feedback (Reddy et al., 2021) and feel uncomfortable in that role (Douglas et al., 2016). Complicating these training and supervisory issues is the lack of clarity about respective roles in the classrooms (Mason et al., 2021), with teachers and paraeducators sometimes having different perceptions about the paraeducator's role (Zobell & Hwang, 2020). Taken together, these findings highlight the significant gap in professional development for paraeducators and their supervising teachers.

significant gap in professional development for paraeducators and their supervising teachers

The content of training (i.e., practices paraeducators need to be able to apply with fidelity) and the process (i.e., types of training and support) are two key issues relevant for professional development of paraeducators. As noted, both ESSA and IDEA emphasize that practices in schools must be based on research evidence. Systematic reviews of focused intervention practices have identified EBPs for students with autism. Specifically, the National Professional Development Center on Autism Spectrum Disorder (now the National Clearinghouse on Autism Evidence and Practice) has conducted three systematic reviews of the literature (Hume et al., 2021; Odom et al., 2010; Wong et al., 2015). After the Wong et al. (2015) review, the Office of Special Education Programs funded the Autism Focused Intervention Resources and Modules project (AFIRM; https://afirm.fpg.unc.edu) to develop online learning modules for each of the identified

EBPs. As of July 2022, the AFIRM website had over 264,000 registered users. AFIRM users reported the modules work well for teachers (Sam et al., 2020), but paraeducators indicated that a less text-based and more interactive approach to the content would be helpful. In addition, in their research on professional development for paraeducators working with autistic students, Brock et al. (2021) found a combination of online or teacher-led training and follow-up coaching "in the moment" to be an effective approach for supporting paraeducators' use of EBPs.

Although acquiring knowledge about specific EBPs is important, it is only the first step toward routinely implementing practices with fidelity in classes with autistic students. A rich literature has emerged demonstrating that with training and support, paraeducators can effectively implement EBPs. For example, in a recent meta-analysis of single-case-design (SCD) studies, Walker et al. (2020) found very large effect sizes in studies of paraeducators implementing a variety of individual EBPs (e.g., discrete trial training, pivotal response training, naturalistic interventions) with autistic students but also that the individuals training the paraeducators tended to be researchers. In their review of the literature, Brock and Anderson (2021) noted that there was an increasing trend in teachers providing the training in school settings. They also noted that characteristics of effective professional development training included (a) well-defined specification of the roles for the teacher and paraeducator; (b) focus on modeling, fidelity checklists, and performance feedback; and (c) the necessity for teachers to have time and support for training the paraeducator and supervision. In a manualized training package that teachers used with paraeducators, Sallese and Vannest (2022) incorporated these and other elements (e.g., self-monitoring, action planning) and found substantial increases in paraeducator delivery of behavior-specific praise to students in their special education program.

Researchers have made substantial progress in designing professional development for paraeducators working with students with autism; however, there are important next steps. From the literature to date, areas of need are clear delineation of roles and responsibilities, preparation for teachers to provide training and performance feedback to paraeducators, and preparation of paraeducators to implement a core set of EBPs rather than single practices. To address these needs, the authors designed the AFIRM for Paraeducators (AFP) program (see Figure 1).

areas of need are clear delineation of roles and responsibilities, preparation for teachers to provide training and performance feedback to paraeducators, and preparation of paraeducators to implement a core set of EBPs rather than single practices

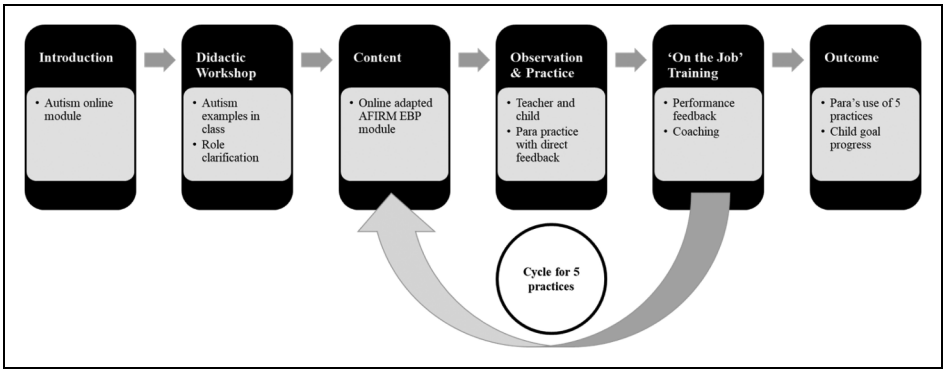

Figure 1. Operational framework for Autism Focused Intervention Resources and Modules for Paraeducators.

The AFP program begins with an introduction phase. The teacher and paraeducator complete an introductory online module about autism; meet separately with AFP staff to discuss roles and relationship, supervision, and delivering (for teachers) or receiving (for paraeducators) performance feedback; then meet jointly to discuss these topics. After these introductory meetings, the paraeducator and teacher engage in a learning cycle focusing on the first EBP, reinforcement. The learning cycle consists of the teacher and paraeducator completing EBP online training modules; the teacher completing a planning guide and recording a video in which they model the use of the practice according to the plan; the teacher and paraeducator reviewing the planning guide, watching the video and discussing the practice; the paraeducator then using the practice for instruction with an autistic student in the class; and finally, the teacher observing the paraeducator and providing performance feedback from a fidelity checklist. When the paraeducator reaches a criterion of 80% (i.e., in this study over a 2-week period), the learning cycle for reinforcement concludes. The teacher and the paraeducator subsequently repeat the learning cycles with three other EBPs (i.e., prompting, time delay, visual supports) and a supporting peer interaction practice. These EBPs were chosen as they are widely used and foundational for many other practices (Hume et al., 2021).

The purpose of the current study was to examine the efficacy of the AFP program when implemented in separate setting and inclusive classrooms. The research questions for this study were as follows:

1. Are there functional relations between AFP learning cycles and paraeducators' EBP fidelity?
2. Descriptively, when paraeducators employ EBPs with fidelity, do students make progress on their learning goals?
3. How well is the overall AFP program implemented?
4. To what extent are the aims, procedures, and outcomes associated with the AFP program socially valid?

The purpose of the current study was to examine the efficacy of the AFP program when implemented in separate setting and inclusive classrooms

Method

The current study employed a variation on a multiple-probe design and included a systematic replication by conducting the SCD study in two sets of four elementary school programs providing special education services for autistic students. The study was approved and monitored by the host university institutional review board. All adult participants and parents of student participants provided informed consent, and there were no reports of harm to participants resulting from the study.

Setting

The study occurred in elementary schools in a large school district located in the southeastern United States. The first multiple-probe design took place in four programs providing special education services in which students spent at least 80% of their school day in separate (i.e., special education) settings. The second multiple-probe design occurred in four programs providing special education services to autistic students in inclusive setting (i.e., the majority of their day in general education classes). In both sets of programs, paraeducators provided instruction that was planned and supervised by a special education teacher.

Participants

Research staff first recruited principals (i.e., for approval of the study in their elementary school) and then teachers and paraeducators. Teachers had to provide services for at least two students with a primary or secondary educational classification of autism and supervise at least one paraeducator. The paraeducators had to be working with at least two autistic students. Once teacher-paraeducator dyads were recruited, the classroom staff sent consent packets home to at least two autistic students in the classroom.

Table 1. Demographic Data for Educator Participants.

Variable	Teachers ($n = 8$)		Paraprofessionals ($n = 8$)	
	n or *M*	% or range	*n* or *M*	% or range
Gender				
Female	7	87.5%	5	62.5%
Male	1	12.5%	3	37.5%
Race or ethnicity				
American Indian/Alaskan Native	1	12.5%	0	0.0%
Black/African American	1	12.5%	4	50.0%
White	6	75.0%	4	50.0%
Highest level of education				
Bachelor's degree	5	62.5%	6	75%
Master's degree	3	37.5%	3	25%
Total years in current position[a]	4.63	2–12	1.75	0–3
Total years working in a school[a]	9.38	3–24	7.75	0–22
Total years working with students with ASD[a]	10.75	5–24	4.63	2–8

Note. ASD = autism spectrum disorder.
[a]Missing from one teacher.

Information about the teachers and paraeducators in the study appear in Table 1. The teachers and paraeducators included a mix of genders—primarily female—and races and ethnicities. Their experiences with students with autism ranged from 2 to 24 years, and experiences in schools ranged from 0 to 24 years. The classrooms ranged from kindergarten through fifth grade. The autistic students were primarily male (87.5%). A total of 24 students participated in different instructional contexts during the study. Twelve of the students were White non-Hispanic, two were Black, two were Hispanic, one was Asian, three were multiracial, and race or ethnicity was not available for four students.

AFP Program

The independent variable was AFP, which was described previously. As noted, teachers and paraeducators participated individually and jointly in a set of introductory activities, which was followed by a set of "learning cycles" that focused on four EBPs and one supporting peer interaction practice. After at least 2 weeks of practice (i.e., minimum of four sessions) and achieving 80% fidelity for at least three consecutive sessions, the dyad moved to the next EBP in AFP. EBP learning cycles varied in length from five to eight sessions based on time to achieve fidelity and logistics related to SCD (e.g., timing start of phases with school breaks). The operational plan for AFP in this study, with planned times allotted, can be found in the online supplemental material.

During initial implementation, AFP facilitators (i.e., research team members) provided support primarily to the supervising teachers. Facilitator responsibilities included (a) delivering the team introductory workshop, including completing of the teaming worksheet; (b) supporting teachers in completing planning guides; (c) evaluating teacher fidelity and providing booster training if needed; and (d) reviewing recorded teacher-paraeducator feedback sessions and providing coaching to the teacher as needed. For this study, the facilitators had a graduate degree and 15 or more years of experience working with teachers in. Facilitators were trained on AFP by investigators on the AFP research team.

Study Design

To evaluate the impact of AFP, an adaptation of the multiple-probe design across classrooms (Kazdin, 2011) was used. The intent of the design was to demonstrate the efficacy of AFP by repeated demonstrations of functional relation between the EBP learning cycles and paraeducators' fidelity of the EBP. Following multiple-probe design

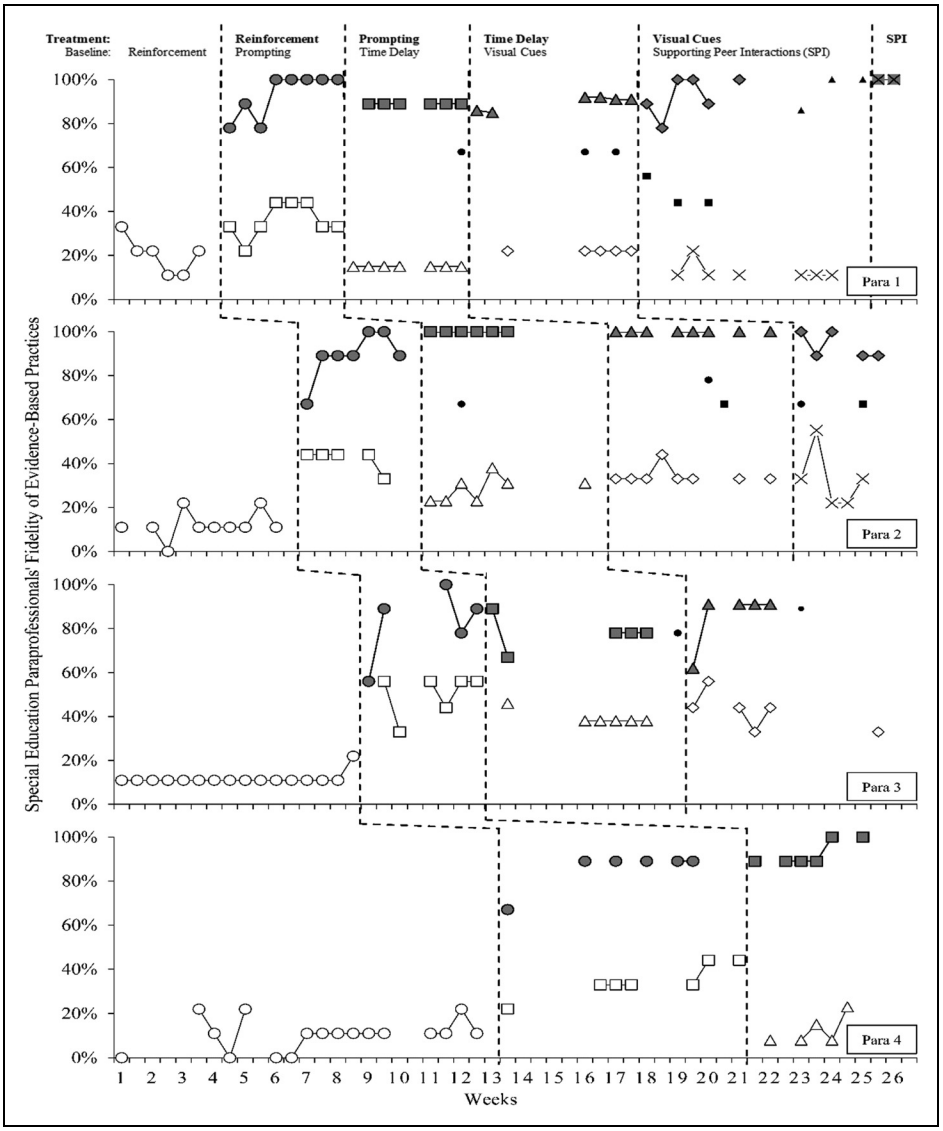

Figure 2. Paraprofessional fidelity for evidence-based practice (EBP) cycles in separate settings. Open elements represent baseline for specific EBP (e.g., reinforcement baseline), closed elements represent Autism Focused Intervention Resources and Modules for Paraeducators (AFP) implementation of EBP (e.g., reinforcement AFP implementation), reduced-size closed elements represent generalization (e.g., reinforcement generalization).

procedures, the onsets of the baseline and learning cycle phases were staggered across classrooms to allow demonstrations of functional relation. As can be seen from the first tier of Figure 2, the study began with baseline for the first EBP, reinforcement. The second phase included implementation of the learning cycle for reinforcement in one learning activity with an autistic student participant as well as the onset of the baseline data for prompting, the second EBP, in a different activity. When the reinforcement learning cycle ended, the prompting learning cycle began. At the same time, baseline data collection for time delay, the third EBP, began in a different activity. This same pattern continued for the next two learning cycles (i.e., visual cues and supporting peer interaction).

Prior to beginning the baseline data collection for a given EBP, the teacher selected a consented student (target student), identified a priority goal for that student that could be addressed using the specific EBP (see supplemental material for example goals), and chose a specified time and activity when the paraeducator would be targeting the priority goal for the selected student. Teachers selected different goals or students for each EBP learning cycle.

Baseline Phases. During baseline phases, the paraeducator implemented instruction as usual during the specified time and activity for addressing a priority goal of the target student. The facilitator recorded a 10-min video of the instructional session two times per week. During the baseline phase, the teacher completed the EBP e-learning module and the planning guide specific to the student goal. The facilitator recorded the teacher modeling the use of the EBP with at least 80% fidelity. When necessary, the facilitator provided coaching to promote teacher fidelity.

Intervention. After completing baseline, the paraeducator completed the EBP e-learning module, the teacher and paraeducator reviewed the planning guide, and the paraeducator reviewed the recorded teacher model of the EBP. Then, the paraeducator implemented instruction according to the AFP planning guide using the EBP to address the priority goal of the target student (e.g., reinforcement in Phase 2, prompting in Phase 3). The teacher provided feedback to the paraeducator on their fidelity at least once per week. The AFP facilitator recorded a 10-min video of instructional sessions two times per week.

Generalization. After the paraeducator completed the learning cycle for a specific EBP, research staff observed their use of the EBP in a learning activity with a different student in the class. For example, the teacher arranged a learning activity with a different student in which the paraeducator would use reinforcement. The facilitator did not support the teacher or paraeducator in planning for generalization and did not provide feedback to the teacher or paraeducator following the generalization session. Due to challenges with scheduling sessions, collecting data on paraeducator generalization was not possible for all dyads and EBPs.

Interruption of the Planned Design. During the course of the study, the COVID-19 pandemic led to the closure of schools. As such, the study had to be terminated before all of the phases could be completed for all programs, which we describe further in the Results and Discussion sections.

Dependent Variables

As a study of professional development, the primary dependent variable was paraeducators' fidelity of implementation of EBPs. The secondary variable focused on student performance on learning goals over a short period of time.

Paraeducators' Fidelity of Implementation. For each EBP, research staff employed fidelity checklists that indicated the steps necessary for correctly implementing the EBP. We have included the checklists in the supplemental material. The metric calculated was percentage of correct steps employed (i.e., correct steps divided by total number of steps). There were nine to 13 steps for EBPs that focused on steps evident during observation. To collect these data, a research staff member who was not the facilitator for the dyad observed the 10-min videotaped sample, noted previously, of the paraeducator during an instructional session and completed the checklist. Fidelity raters were trained in a 2-hr training session led by the co–principal investigator of the project. Training included reviewing the EBP fidelity form, watching sample sessions of the EBP, and coding together as a group. After training, the raters independently scored sets of two practice videos for each EBP. To begin the study, raters had to reach at least an 80% level of agreement with "gold standard" scores that had been generated through consensus of two lead study personnel. All raters achieve this criterion level after training. The formula for this and subsequent calculations on interrater agreement was the number of items for which two observers entered the same score divided by the total number of items and multiplied by 100.

Student Progress. An abbreviated Goal Attainment Scale (GAS) for the priority goal identified for the target student was the measure of progress. Goal attainment scaling (Kiresuk & Sherman, 1968) has been used in many educational studies to standardize measurement of progress toward goals (Ruble et al., 2022; Sam et al., 2021). In this study, the traditional GAS was not feasible, as it is designed to measure progress for individualized education program goals that are written to be obtained over an academic year or other extended period. Following a strategy initially suggested by Krasny-Pacini et al. (2017), the research team and teachers created an abbreviated GAS (mini-GAS) in which the goals were calibrated to be achievable within a relatively short period (~3–4 weeks). The GAS scales goals on a 0-to-4 scale (0 = initial performance, 1 = first progress benchmark, 2 = second progress benchmark, 3 = goal benchmark, 4 = benchmark for progress beyond goal). It is important to note that the progress benchmark ratings are based the data teachers and paraeducators collected on student performance. Prior to implementation of EBPs, supervising teachers reviewed the mini-GAS with paraeducators to confirm agreement on the anchors of the mini-GAS. The paraeducator and facilitator completed the mini-GAS rating on the final session when the EBP intervention phase concluded.

Interrater Agreement. To assess interrater agreement, a second research team member observed the videotaped sample of the respective instructional sessions for the EBP (i.e., baseline and intervention sessions) and completed the fidelity checklists. The formula for calculating percentage agreement was described in a previous section. Interrater agreement was assessed for 32% of the sessions, distributed across baseline, intervention, and generalization for each EBP. The mean interrater agreement was 93%, ranging from 78% to 100% across sessions. The means for baseline, intervention, and generalization phases were of 92%, 95%, and 91%, respectively. The mean interrater agreement for individual EBPs were 94% for reinforcement, 93% for prompting, 94% for time delay, 95% for visual cues, and 84% for supporting peer interactions. For the mini-GAS, the paraeducator and facilitator both rated mini-GAS goals for the final intervention session. The goals were scaled to be zero at the final baseline session by the teacher with support from the facilitator, so reliability was not taken at baseline. The correlation between the facilitator and paraeducator mini-GAS scores was high ($r = 0.93$, $p < .0001$), suggesting strong interrater agreement.

Assessment of AFP Implementation

The primary dependent variables in this study were measures of paraeducators' use of the EBPs with fidelity. They are a function of the delivery of the larger AFP program. To assess the overall AFP program implementation, the research team employed an implementation index approach (Steinbrenner et al., 2020). The research team designed the implementation index to be collected over the entirety of the AFP program. It included data on the initial introduction and the implementation and learning cycles. All index items were assessed on a 3-point scale (0 = minimal or no implementation, 1 = partial implementation, 2 = full implementation) with descriptive anchors for each level of implementation. Data were collected through the following sources: Learning Record System (online data collection system for e-learning modules), facilitator log, artifact review, and video recordings. A table that shows the index items and ratings is in the supplemental material.

Social Validity

Social validity assessment and analysis followed Wolf's (1978) classic conceptualization that proposed three constructs: (a) social significance, (b) acceptability of procedures, and (c) importance of effects. Data were collected in two ways. First, before and after completing each module, paraeducators rated on a 4-point Likert scale (1 = lowest and 4 = highest) knowledge about and comfort with using the respective EBP. Also, after the EBP was implemented, paraeducators rated quality, relevance, and acceptability. Second, to assess social validity of the overall AFP

program, the research team adapted the Usage Rating Profile–Intervention (URP-I; Briesch et al., 2013) to be appropriate for this population and intervention. Teachers and paraeducators rated 35 statements about the intervention on a 6-point scale where 1 = *strongly disagree* and 6 = *strongly agree*. Using a measure proximal to the training and a standardized measure originating more distally from the project allowed the multiple stakeholders (i.e., teachers, paraeducators) to address individual knowledge features and provide a more general evaluation of AFP social validity (Snodgrass et al., 2022).

Data Analysis

To address the first research question, a standard SCD process of visual inspection (Horner et al., 2005) determined the functional relations between the AFP procedures and paraeducator fidelity for the specific EBPs. For the second question, mini-GAS ratings scored at the end for each EBP treatment phase were examined. The third and fourth questions were addressed by examining the overall implementation index as well as teachers' and paraeducators' ratings of the AFP components and overall program. Finally, statistical analysis was used to supplement the visual inspection analysis (Horner et al., 2012) and determine effect sizes of the multiple-probe comparison. The statistical analysis, developed by Swaminathan et al. (2014), employed a Bayesian analyses within a multilevel model when there were at least three cases (i.e., three paraeducator-student dyads who completed a given EBP cycle). This analysis generated a between-participant standardized effect size (ES_{BP}).

Results

For the two SCD studies there were data collection gaps related to the school calendar (e.g., holidays, workdays) and school staff or student absences or conflicts. In the first classroom of the inclusive programs, the teacher changed jobs after the first phase of the study, so the study could not be completed for the paraeducator in that classroom. For all dyads, the study ended after Week 25, when schools closed related to the COVID-19 pandemic.

Pattern of Results for Paraeducator Fidelity Measures

Among the separate setting programs, the pattern of results was very similar for paraeducators (see Figure 2). Baseline percentages were uniformly low and substantially below the criterion level of 80% correct. The single possible exception was baseline for the reinforcement EBP in Dyad 4, where the trend was modestly accelerating, but the fidelity in the intervention phase was above the

Table 2. Mean Percentage Fidelity per Phase and Evidence-Based Practice.

	Reinforcement			Prompting			Time delay			Visual cues			Supporting peer interactions		
	BL	I	G	BL	I	G	BL	I	G	BL	I	G	BL	I	G
Study 1															
Para 1a	20	93	67	36	89	48	15	90	97	22	93	—	13	100	—
Para 2a	12	89	71	42	100	67	29	100	—	33	93	—	33	—	—
Para 3a	12	82	84	50	78	—	39	85	—	42	—	—	—	—	—
Para 4a	11	85	—	35	93	—	12	—	—	—	—	—	—	—	—
Study 2															
Para 1b	27	84	—	32	—	—	—	—	—	—	—	—	—	—	—
Para 2b	13	98	78	46	89	67	41	100	—	33	87	—	15	—	—
Para 3b	12	93	—	24	87	—	32	79	—	22	—	—	—	—	—
Para 4b	8	87	—	51	96	—	22	—	—	—	—	—	—	—	—

Note. BL = baseline; I = intervention; G = generalization.

performance that would have been expected if the trend line had been extended from baseline through intervention. When AFP was introduced for each respective EBP, there was an immediate level change, with data then showing a stable or accelerating trend. This pattern occurred for all baseline-and-treatment-phase comparisons, and there were zero instances of overlapping data points. Delayed onsets of baseline and intervention phases across paraeducators allowed four demonstrations of functional relations for reinforcement and prompting and three demonstrations for time delay. The premature termination of the study allowed for only two demonstrations of functional relation for visual cues and no demonstrations for peer interaction. Generalization probes were gathered for Paraeducators 1 to 3, indicating a mean fidelity percentage of 74% for reinforcement (eight probes conducted), 57.5% for

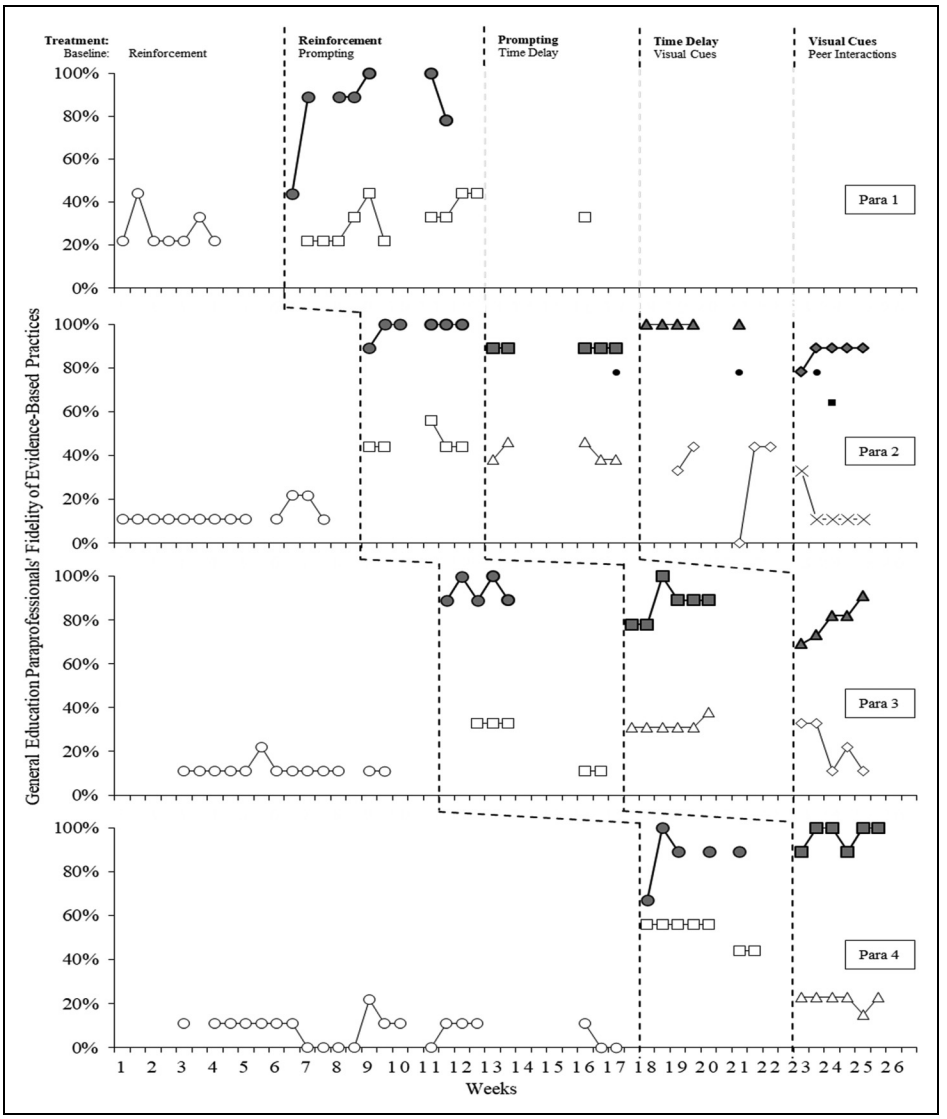

Figure 3. Paraprofessional fidelity for evidence-based practice (EBP) cycles in inclusive settings. Open elements represent baseline for specific EBP (e.g., reinforcement baseline), closed elements represent Autism Focused Intervention Resources and Modules for Paraeducators AFP implementation of EBP (e.g., reinforcement AFP implementation), reduced-size closed elements represent generalization (e.g., reinforcement generalization).

prompting (six probes conducted for Paraeducators 1 and 2 only), and 97% for time delay (two probes conducted for Paraeducator 1 only; see Table 2).

A similar pattern of results occurred for paraeducators in the inclusive programs (see Figure 3). As noted, Dyad 1 participated only in the reinforcement phase of the study. For the reinforcement phase, again relatively lower baseline percentages were followed by immediate increases when the intervention was implemented for the four classrooms. This effect occurred also for prompting in three of the classrooms. This number of replications allowed demonstrations of functional relation for the fidelity interventions for both EBPs. The same pattern occurred for time delay and visual cues, but due to the premature closure of schools, it could be demonstrated in only two dyads for time delay and one for visual cues. Because these latter findings follow the same pattern, the results are suggestive but fail to meet the criteria of minimum number of functional relation demonstrations to indicate experimental control. For the inclusive programs, limited generalization data were collected due to scheduling challenges. The exception was Dyad 2, where there were three probes for reinforcement for an average of 78% and one probe for prompting which was at 67% (see Table 2).

Statistical Analysis

The ES_{BP}, with 95% credibility interval (CI) in parentheses, for the EBPs in separate setting programs were 6.89 (CI: 6.18–7.38), 4.93 (CI: 4.28–5.24), and 4.74 (CI: 3.02–5.35) for reinforcement, prompting, and time delay, respectively. For the inclusive programs, effect sizes were 5.79 (CI: 5.15–6.12) for reinforcement and 3.70 (CI: 2.78–4.17) for prompting. Because the ES_{BP}s were positive and the CIs do not include zero, in the Bayesian sense there is a 0.95 probability that the interventions resulted in a positive effect for the EBPs having three replications.

Mini-GAS

The average mini-GAS ratings, completed independently by the paraeducator and the facilitator who was a member of the research team, are provided in Table 3. All students made progress on goals, with the average rating exceeding 3 (attains goals) for all EBPs but prompting. For prompting, average mini-GAS ratings were still above 2, which indicates that progress was

Table 3. Mini–Goal Attainment Scale (GAS) Scores for Evidence-Based Practices (EBPs).

		Facilitators		Paraprofessionals	
EBP	Students (*n*)	Mean final score	Range of final scores	Mean final score	Range of final scores
Study 1: Separate settings					
Reinforcement	5	3.2	3–4	3.2	3–4
Prompting	4	2.3	2–3	2.8	2–4
Time delay	3	3.3	2–4	3.0	1–4
Visual cues	2	3.0	3–3	3.0	3–3
Supporting peer interaction	0	—	—	—	—
Study 2: Inclusive settings					
Reinforcement	4	3.8	3–4	3.8	3–4
Prompting	3	2.7	2–3	2.7	2–3
Time delay	2	3.0	3–3	3.0	3–3
Visual cues	1	4	4–4	4	4–4
Supporting peer interaction	0	—	—	—	—

Note. Baseline scores for GAS are always 0; possible range of scores is 0 to 4. Number of students varies between practices because dyads completed different numbers of practices prior to halting data collection due to the COVID-19 crisis.

Table 4. Implementation Index Summary Scores.

	Teacher-paraprofessional dyads							
	Study 1 (separate setting)				Study 2 (inclusive setting)			
Component	1a	2a	3a	4a	1b	2b	3b	4b
Initial trainings	2.00	2.00	2.00	1.87	2.00	2.00	2.00	2.00
Reinforcement	2.00	1.57	1.43	1.71	0.29	1.57	1.14	1.29
Prompting	1.86	1.57	1.29	1.29	—	1.14	1.29	1.71
Time delay	1.86	1.86	1.71	—	—	1.29	1.14	—
Visual cues	1.71	1.71	—	—	—	1.29	—	—
Supporting peer interactions	—	—	—	—	—	—	—	—
Mean: Evidence-based practice (EBP) cycles	1.86	1.68	1.48	1.50	0.29	1.32	1.19	1.50
Mean: Overall	1.88	1.74	1.61	1.62	1.14	1.46	1.39	1.66

Note. Mean scores for EBP cycles were calculated only if teams completed the full EBP cycle. Fidelity measures used a 0-to-2 scale (0 = no/minimal implementation, 1 = partial implementation, 2 = full implementation).

still being made but had not yet reached the pre-established goal level.

AFP Implementation

Table 4 contains the Implementation Index summary scores. Overall, the implementation was strong for the initial trainings, with nearly all of the dyads completing the Introduction to Autism module and participating in the teaming workshops (i.e., nearly all had a rating of 2.0). For the EBP learning cycles, the level of AFP implementation was more variable, largely due to fewer-than-expected occurrences of practice, feedback, and monitoring; this was especially true for the dyads in inclusive settings. The summary scores indicated moderate to high fidelity, with mean EBP cycle ratings ranging from 1.14 to 2.00, except for the one dyad that opted out of the study after the first EBP cycle due to a teacher leaving their position (mean rating of 0.39).

AFP Social Validity

As noted, two types of social validity information were collected. First, the paraeducators' rating (i.e., a 4-point scale) of their knowledge about the individual EBP module increased from 2.58 ($SD = 0.84$) to 3.38 ($SD = 0.53$) as a result of taking the module. Similarly, their comfort with using the respective EBP increased from 2.76 ($SD = 0.86$) to 3.47 ($SD = 0.55$). The mean rating for quality was 3.70 ($SD = 0.46$), for relevance was 3.81 ($SD = 0.44$), and for usefulness was 3.75 ($SD = 0.47$). Whereas paraeducators' knowledge ratings reflected more the overall purpose of the modules, the other rating data (comfort, quality, relevance, and usefulness) reflected more the acceptance dimension of social validity. Second, for the URP-I (a 6-point scale), paraeducator and teacher participants rated AFP as socially significant and feasible to complete within their school schedule ($M = 5.05$, $SD = 0.79$). Also, they found the program procedures to be acceptable for targeting student goals and felt enthusiasm toward implementing the intervention practices ($M = 5.33$, $SD = 0.54$). Finally, they rated the program effects for their students positively ($M = 5.25$, $SD = 0.53$).

Discussion

The purpose of this study was to evaluate the efficacy and utility of the AFP professional development program for teachers and paraeducators with autistic students in a set of separate-setting and inclusive special education programs. Through an ongoing application of AFP learning cycles, consistent, rapid, and marked increases (i.e., relative to baseline) occurred in paraeducators' use of reinforcement, prompting, time delay, and visual cues. Other studies have demonstrated that with training, paraeducators can increase fidelity of EBP use (Kim et al., 2017; Ledford et al., 2017), but these studies have primarily focused on a single practice

with the researcher providing the training and feedback. In AFP, the foci was on a "package" of foundational EBPs and the teachers, rather than researchers, providing training, coaching, and feedback to the paraeducators.

Through an ongoing application of AFP learning cycles, consistent, rapid, and marked increases ... occurred in paraeducators' use of reinforcement, prompting, time delay, and visual cues

Paraprofessionals' generalized use of skills learned during training sessions has been examined in previous research, yielding generally positive if not entirely consistent results (Hall et al., 2010; Walker et al., 2020). In this study, the generalization data, although limited by schedules and the pandemic, suggested that initial training by the teacher with 3 to 4 weeks of coaching and performance feedback led to paraeducators' generalization of EBP use above the baseline level but on average below the previous fidelity level. Although it is common for generalization performance to be below intervention levels, a strong generalization effect would have been desirable. To address maintenance, researchers have used a very high mastery criterion (i.e., early 100%) for paraeducators to exit training (Bolton & Mayer, 2008) and a tiered training approach that involved group instruction followed by more individual training for paraeducators who do not demonstrate the mastery-level criteria after the group training (Brock et al., 2021). Incorporating such strategies could well have enhanced generalization and maintenance.

The onset of the pandemic and school closures limited the planned focus on the five EBPs, noted previously. Strong evidence did occur for three EBPs in the separate-setting programs and two in the inclusive programs. However, in terms of overall program efficacy, the pattern of immediate level changes when individual EBP training was initiated and its consistency across nearly all instances (i.e., across teacher and in the two different types of classrooms) suggests that the pattern of paraeducators' fidelity performance would have continued for the other EBPs that could not be implemented.

To supplement visual inspection analyses, ES_{BP} analyses revealed very large effect sizes for the paraeducators' fidelity data. Most of the ES_{BP}s in this study were out of the range of effect sizes typically expected for group-design studies. The effect of the EBP learning cycles on paraeducators' EBP fidelity was quite large and consistent, with overlap for only one baseline-and-treatment data point for the whole set of cases across the two studies. In group-design efficacy studies, it is common to have some overlap in performance on dependent variables between participants in treatment and control groups; and generally, the less the overlap, the greater the effect size (Hedges & Olkin, 2016). Although within-participant overlap in SCD studies is not directly comparable to between-group overlap in experimental group-design studies, an analogy can be drawn.

Statistical significance, even when large, does not necessarily convey accurately the clinical significance of a treatment (Ranganathan et al., 2015). In SCD and applied behavior analysis research, clinical significance has historically been assessed with social validity measures (Wolf, 1978). Paraeducators and teachers participating in the study rated importance, feasibility, and impact on students quite positively. These positive ratings are important because AFP could have changed the social dynamic that occurs between teachers and paraeducators. Professional roles for teachers (e.g., as a direct professional development provider for paraeducators) and relationships among teachers and paraeducators (e.g., teacher as active supervisor and paraeducator as recipient of supervision) are sometimes points of contention (Biggs et al., 2019). It is important to be aware of the social dynamics between teachers and paraeducators when AFP is implemented. In addition, the levels of fidelity were high and did appear to generate positive effects for students; however, the GAS was collected only during the intervention sessions. As such, these findings on student goal attainment are tentative and would need to be confirmed in an efficacy study that

examines student progress without AFP intervention occurring or the AFP effects in comparison with a group not receiving the AFP intervention (i.e., through a randomized controlled trial).

To monitor the short-term influence of paraeducators' use of EBPs on students' task performance, investigators adapted the standard GAS methodology to assess performance over a short period of time (4–5 weeks). Although used in other disciplines (Krasny-Pacini et al., 2017), this mini-GAS approach has not been frequently employed in classroom-based research involving autistic students. Independent ratings by the paraeducators and research staff were highly correlated, suggesting some confidence that the scale provides a reliable estimate of student performance. In this study, it indicated student progress toward identified goals. Similar to a previous point, SCD studies have found increases in student performance on instructional tasks as a result of paraeducators' use of an EBP (Walker et al., 2020), but this study was unique in describing changes in multiple students' performance resulting from different EBPs.

Because the AFP program introduced EBP learning cycles in a sequential manner, program efficacy (i.e., paraeducator fidelity) needed to be established at the individual EBP level (i.e., rather than a global assessment of fidelity). This then required a unique experimental design in which, after the first phase, the data for one EBP learning cycle (e.g., reinforcement) and baseline data for the next EBP learning cycle to be implemented (e.g., prompting) were collected in the same phase. Embedding baseline–learning cycle phase comparisons (A-B comparisons) within the traditional staggered onset across settings (i.e., teacher-paraeducator comparisons) of a multiple-probe design allowed the demonstration of functional relation between the AFP learning cycles and paraeducator fidelity. This sequential-onset design may prove useful in the future when examining interventions that have multiple components for which outcomes of each component are necessary for demonstrating efficacy of the entire intervention.

Practical Implications

The AFP pilot study has key implications for paraeducators and supervising teachers working in schools. AFP was successful in improving paraeducators' fidelity of use of EBPs, which is needed given the tremendous increase of paraeducators supporting instruction and services for autistic students (U.S. Department of Education, 2014, 2022) and the limited use of EBPs with students with autism (Sam et al., 2021). Additionally, AFP addresses logistical constraints in school districts for training (e.g., limited time and funding) by providing freely available e-learning resources that can be completed independently and a coaching model for supervising teachers. The social validity data support that AFP was feasible and practical for dyads providing special education services in separate-setting and inclusive programs. Additionally, with districts reporting teacher and paraeducator shortages due to COVID-19, AFP could be a useful tool to provide initial training and support for new paraeducators.

AFP was successful in improving paraeducators' fidelity of use of EBPs

Limitations

This study had several limitations. First, as noted, it was prematurely terminated because of the COVID-19 pandemic and school closures, thus not allowing the intended number of replications need to demonstrate efficacy for visual cues and supporting peer interactions. The pattern of results with other EBPs suggested that paraeducators could also implement these last two practices with fidelity after participating in AFP; however, these finding would need to be validated in a future study.

Second, although a standard mastery criterion was established, there was not a previous analysis of the level of mastery needed to support generalization and maintenance of the paraeducators' EBP fidelity, which were lower than occurred during the training. Additional attention to generalization and maintenance of paraeducators' use of EBPs

would have strengthened this study. Finally, given paraeducators, supervising teachers, and researchers were not naive to the study, observer and experimenter bias could be a potential issue.

Future Directions

Research is needed to evaluate further the AFP program. Researchers have suggested that level of fidelity and student outcomes may not have an entirely linear relationship (Holcombe et al., 1994; Mandell et al., 2013). Future research that examines the level of EBP fidelity (e.g., the specific components of the EBP) the paraeducator needs to provide in order to affect positively student performance could well increase the precision of the AFP approach. Future studies should also explore which features of AFP continued to be used by supervising teachers and paraeducators during maintenance and generalization and identify additional supports that may be needed to promote maintenance and generalization. In addition, a larger randomized study in the future would allow examination of moderating influences (e.g., backgrounds of the paraeducators and teachers; quality of school environment; economic resources of the school, community, families) on fidelity and child outcome.

Conclusion

In conclusion, the results of these studies suggest that AFP, delivered by teachers with support from AFP facilitators, produces changes in paraeducators' use of EBPs with autistic students. As with any SCD study, replications by other research groups would be necessary to provide conclusive evidence of AFP as an evidence-based professional development practice. Nevertheless, AFP does appear to be a promising approach to preparing paraeducators to work with students with autism in elementary school classrooms in the United States.

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.).

Biggs, E. E., Gilson, C. B., & Carter, E. W. (2019). "Developing that balance": Preparing and supporting special education teachers to work with paraprofessionals. *Teacher Education and Special Education*, *42*(2), 117–131. https://doi.org/10.1177/0888406418765611

Bolton, J., & Mayer, M. D. (2008). Promoting the generalization of paraprofessional discrete trial teaching skills. *Focus on Autism and Other Developmental Disabilities*, *23*(2), 103–111. https://doi.org/10.1177/1088357608316269

Briesch, A. M., Chafouleas, S. M., Neugebauer, S. R., & Riley-Tillman, T. C. (2013). Assessing influences on intervention implementation: Revision of the Usage Rating Profile–Intervention. *Journal of School Psychology*, *51*(1), 81–96. https://doi.org/10.1016/j.jsp.2012.08.006

Brock, M. E., & Anderson, E. J. (2021). Training paraprofessionals who work with students with intellectual and developmental disabilities: What does the research say? *Psychology in the Schools*, *58*(4), 702–777. https://doi.org/10.1002/pits.22386

Brock, M. E., Barczak, M. A., Anderson, E. J., & Bordner-Williams, N. M. (2021). Efficacy of tiered training on paraeducator implementation of systematic instructional practices for students with severe disabilities. *Exceptional Children*, *87*(2), 217–235. https://doi.org/10.1177/0014402920947641

Douglas, S. N., Chapin, S. E., & Nolan, J. F. (2016). Special education teachers' experiences supporting and supervising paraeducators: Implications for special and general education settings. *Teacher Education and Special Education*, *39*(1), 60–74. https://doi.org/10.1177/0888406415616443

Education for All Handicapped Children Act of 1975, Pub. L. No. 94-142, 89 Stat. 773 (1975).

Every Student Succeeds Act of 2015, Pub. L. No. 114-95 (2015).

Hall, L. J., Grundon, G. S., Pope, C., & Romero, A. B. (2010). Training paraprofessionals to use behavioral strategies when educating learners with autism spectrum disorders across environments. *Behavioral Interventions: Theory & Practice in Residential & Community-Based Clinical Programs*, *25*(1), 37–51. https://doi.org/10.1002/bin.294

Hedges, L. V., & Olkin, I. (2016). Overlap between treatment and control distributions as an effect size measure in experiments. *Psychological Methods*, *21*(1), 61–68. https://doi.org/10.1037/met0000042

Holcombe, A., Wolery, M., & Snyder, E. (1994). Effects of two levels of procedural fidelity with constant time delay on children's learning. *Journal of Behavioral Educucation*, *4*(1), 49–73. https://doi.org/10.1007/BF01560509

Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children*, *71*(2), 165–179. https://doi.org/10.1177%2F001440290507100203

Horner, R. H., Swaminathan, H., Sugai, G., & Smolkowski, K. (2012). Considerations for the systematic analysis and use of single-case research. *Education and Treatment of Children*, *35*(2), 269–290. https://doi.org/10.1353/etc.2012.0011

Hume, K., Steinbrenner, J. R., Odom, S. L., Morin, K. L., Nowell, S. W., Tomaszewski, B., Szendry, S., McIntyre, N. S., Yücesoy-Öskan, S., & Savage, M. N. (2021). Evidence-based practices for children, youth, and young adults with autism: Third generation review. *Journal of Autism and Developmental Disorders*, *51*, 4013–4032. https://doi.org/10.1007/s10803-020-04844-2

Individuals With Disabilities Education Act, Pub. L. 105–17, 111 Stat. 37 (1997).

Individuals with Disabilities Education Improvement Act of 2004, Pub. L. No. 108-446, 20 U.S.C. § 1400 *et seq*. (2004). https://ies.ed.gov/ncser/pdf/pl108-446.pdf

Kazdin, A. E. (2011). *Single-case research designs: Methods for clinical and applied settings* (2nd ed.). Oxford University Press.

Kim, S., Koegel, R. L., & Koegel, L. K. (2017). Training paraprofessionals to target socialization in students with ASD: Fidelity of implementation and social validity. *Journal of Positive Behavior Interventions*, *19*(2), 102–114. https://doi.org/10.1177/1098300716669813

Kiresuk, T. J., & Sherman, R. E. (1968). Goal attainment scaling: A general method for evaluating comprehensive community mental health programs. *Community Mental Health Journal*, *4*(6), 443–453. https://doi.org/10.1007/BF01530764

Krasny-Pacini, A., Pauly, F., Hiebel, J., Godon, S., Isner-Horoheti, M. E., & Chevignard, M. (2017). Feasibility of short Goal Attainment Scale method for pediatric spasticity clinic: The 3-milestone GAS. *Annals of Physical and Rehabilitative Medicine*, *60*(4), 249–257. https://doi.org/10.1016/j.rehab.2017.01.005

Ledford, J. R., Zimmerman, K. N., Chazin, K. T., Patel, N. M., Morales, V. A., & Bennett, B. P. (2017). Coaching paraprofessionals to promote engagement and social interactions during small group activities. *Journal of Behavioral Education*, *26*(4), 410–432. https://doi.org/10.1007/s10864-017-9273-8

Lord, C., Charman, T., Havdahl, A., Carbone, P., Anagnostou, E., Boyd, B., Carr, T., DeVries, P., Dissanayake, C., Givven, G., Freitag, C., Gottelli, M. M., Karsari, C., Knapp, M., Mundy, P., Plank, A., Scahill, L., Servili, C., Shattuck, P., . . . McCauley, J. B. (2022). The Lancet Commission on the future of care and clinical research in autism. *The Lancet*, *399*(10321), 271–334. https://doi.org/10.1016/S0140-6736(21)01541-5

Maenner, M. J., Shaw, K. A., Bakian, A. V., Bilder, D. A., Durkin, M. S., Esler, A., Furnier, S. M., Hallas, L., Hali-Landes, J., Hudson, A, Hughes, M. M., Patrick, M., Pierce, K., Poynter, J. N., Salinas, A., Shenouda, J., Vehorn, A., Warren, Z., Constantino, J., . . . Cogsdale, M. E. (2021). Prevalence and characteristics of autism spectrum disorder among children aged 8 years: Autism and Developmental Disabilities Monitoring Network, 11 sites, United States, 2018. *MMWR Surveillance Summary*, *70*(No. SS-11), 1–16. https://doi.org/10.15585/mmwr.ss7011a1

Mandell, D. S., Stahmer, A. C., Shin, S., Xie, M., Reisinger, E., & Marcus, S. C. (2013). The role of treatment fidelity on outcomes during a randomized field trial of an autism intervention. *Autism*, *17*(3), 281–295. https://doi.org/10.1177/1362361312473666

Mason, RA, Gunersel, AB, Irvin, DW, Wills, H. P., Gregori, E., An, Z. G., & Ingram, P. B. (2021). From the frontlines: Perceptions of paraprofessionals' roles and responsibilities. *Teacher Education and Special Education*. *44*(2), 97–116. doi:10.1177/0888406419896627

Massafra, A., Gershwin, T., & Gosselin, K. (2020). Policy, preparation, and practice . . . oh my! Current policy regarding the paraprofessional role and preparation for working with students with disabilities. *Journal of Disability Policy Studies*, *31*(3), 164–172. https://doi.org/10.1177/1044207320920004

Nevin, A. I., Thousand, J. S., & Villa, R. A. (2008). *A guide to co-teaching with paraeducators*. Corwin Press.

No Child Left Behind Act of 2001, Pub. L. No. 107-110, 115 Stat. 1425 (2002).

Odom, S. L., Collet-Klingenberg, L., Rogers, S. J., & Hatton, D. D. (2010). Evidence-based practices in interventions for children and youth with autism spectrum disorders. *Preventing School Failure: Alternative Education for Children and Youth*, *54*(4), 275–282. https://doi.org/10.1080/10459881003785506

Ranganathan, P., Parmesh, C. S., & Buyse, M. (2015). Common pitfalls in statistical analysis: Clinical versus statistical significance. *Perspectives in Clinical Research*, *6*(3), 169–170. https://doi.org/10.4103/2229-3485.159943

Reddy, L. A., Alperin, A., & Glover, T. A. (2021). A critical review of the professional development literature for paraprofessionals supporting students with externalizing behavior disorders. *Psychology in the Schools*, *58*(4), 742–763. https://doi.org/10.1002/pits.22381

Ruble, L., McGrew, J., Dale, B., & Yee, M. (2022). Goal attainment scaling: An idiographic measure sensitive to parent and teacher report of IEP goal outcome assessment for students with ASD. *Journal of Autism and Developmental Disorders*, *52*(8), 3344–3352. https://doi.org/10.1007/s10803-021-05213-3

Sallese, M. R., & Vannest, K.J. (2022). Effects of a manualized teacher-led coaching intervention on paraprofessional use of behavior-specific praise. *Remedial and Special Education*, *43*(1), 27–39. https://doi.org/10.1177/07419325211017298

Sam, A. M., Cox, A. W., Savage, M. N., Waters, V., & Odom, S. L. (2020). Disseminating information on evidence-based practices for children and youth with autism spectrum disorder: AFIRM. *Journal of Autism and Developmental Disorders*, *50*(6), 1931–1940. https://doi.org/10.1007/s10803-019-03945-x

Sam, A. M., Odom, S. L., Tomaszewski, B., Perkins, Y., & Cox, A. (2021). Employing evidence-based practices for children with autism in elementary schools. *Journal of Autism and Developmental Disorders*, *51*(7), 2308–2323. https://doi.org/10.1007/s10803-020-04706-x

Snodgrass, M. R., Chung, M. Y., Kretzer, J. M., & Biggs, E. E. (2022), Rigorous assessment of social validity: A scoping review of a 40-year conversation. *Remedial and Special Education*, *43*(2), 114–130. https://doi.org/10.1177/07419325211017295

Sobeck, E. E., & Robertson, R. (2019). Perspectives on current practices and barriers to training for paraeducators of students with autism in inclusive settings. *Journal of the American Academy of Special Education Professionals*, *131*(Winter), 151.

Steinbrenner, J. R., Hume, K., Odom, S. L., Morin, K. L., Nowell, S. W., Tomaszewski, B., Szendrey, S., McIntyre, N. S., Yücesoy-Özkan, S., & Savage, M. N. (2020). Evidence-based practices for children, youth, and young adults with autism. University of North Carolina at Chapel Hill, Frank Porter Graham Child Development Institute, National Clearinghouse on Autism Evidence and Practice Review Team. https://ncaep.fpg.unc.edu/sites/ncaep.fpg.unc.edu/files/imce/documents/EBP%20Report%202020.pdf

Swaminathan, H., Rogers, H. J., & Horner, R. H. (2014). An effect size measure and Bayesian analysis of single-case designs. *Journal of School Psychology*, *52*(2), 213–230. https://doi.org/10.1016/j.jsp.2013.12.002

U.S. Department of Education, Office of Special Education and Rehabilitative Services. (2014). 33rd annual report to Congress on the implementation of the Individuals With Disabilities Education Act. https://www2.ed.gov/about/reports/annual/osep/index.html#:~:text=The%20OSEP%20Annual%20Report%20to,all%20children%20with%20disabilities%20and

U.S. Department of Education, Office of Special Education and Rehabilitative Services. (2022). *43rd annual report to Congress on the implementation of the Individuals With Disabilities Education Act*.

Walker, V. L., Douglas, K. H., & Brewer, C. (2020). Teacher-delivered training to promote paraprofessional implementation of systematic instruction. *Teacher Education and Special Education*, *43*(3), 257–274. https://doi.org/10.1177/0888406419869029

Wong, C., Odom, S. L., Hume, K. A., Cox, A. W., Fettig, A., Kucharczyk, S., Brock, M. E., Plavnick, J. B., Fleury, V., & Schultz, T. R. (2015). Evidence-based practices for children, youth, and young adults with autism spectrum disorder: A comprehensive review. *Journal of Autism and Developmental Disorders*, *45*(7), 1951–1966. https://doi.org/10.1007/s10803-014-2351-z

Wolf, M. M. (1978). Social validity: The case for subjective measurement or how applied behavior analysis is finding its heart. *Journal of Applied Behavior Analysis*, *11*(2), 203–214. https://doi.org/10.1901/jaba.1978.11-203

Zobell, E., & Hwang, J. (2020). An examination of the current status of paraprofessionals through

their lens: Role, training, and supervision. *Journal of Special Education Apprenticeship*, *9*(1). https://scholarworks.lib.csusb.edu/josea/vol9/iss1/6

Authors' Note

This work was supported by the Institute of Education Sciences, U. S. Department of Education (Grant No. R324A170028).

ORCID iD

Samuel L. Odom https://orcid.org/0000-0003-1745-7915

Supplemental Material

The supplemental material is available in the online version of the article.

Manuscript received June 2021; accepted August 2022.