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REVIEW ARTICLE

Fidelity Outcomes for Autism-Focused Interventionists Coached via Telepractice: a Systematic Literature Review

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Abstract The purpose of this review was to synthesize fidelity features in telepractice studies focused on parent-, educator-, and therapist-directed treatments for individuals with autism spectrum disorder (ASD). A systematic search identified 19 studies for inclusion. Studies were summarized according to participant characteristics, dependent variables, training procedures, implementation fidelity of the intervention, intervention fidelity for the participants, outcomes for the individuals with ASD, generalization and maintenance of fidelity outcomes, study design, and social validity. Results indicate a variety of assessments and interventions were targeted for coaching with a variety of coaching procedures. All of the studies reported that participants were able to

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implement the assessment or intervention with increased fidelity following the training program. However, results were mixed in four studies in which some participants needed additional training beyond the intervention to meet the authors' preset performance standards. Implementation fidelity of the training procedures was not well reported. Overall, this developing literature base is best described as limited due to the small number of studies and the variability in procedures.

Keywords Autism · Telepractice · Telehealth · Training

The prevalence of autism spectrum disorder (ASD) in the U.S. has increased 114% in the past decade, from 1 in 150 (Centers for Disease Control and Prevention, CDC 2007) to 1 in 68 children diagnosed with the disorder (CDC 2014). ASD is a developmental disability characterized by difficulties in social-communication skills and engagement in repetitive and restrictive behaviors and interests (RRBI). It is a lifelong disorder for which there is no cure. The increasing prevalence of this disorder has provoked widespread public concern and led to issues related to treatment of individuals with ASD (McDonald et al. 2012). In particular, the increasing prevalence of ASD has generated a gap between available resources and consumer demand (Wainer and Ingersoll 2013). Long waitlists and a shortage of trained professionals result in delayed or denied services with drastic impacts on the well-being of individuals with ASD (Machalicek et al. 2016; Meadan et al. 2016).

This service–need gap is a continual problem in health care and education, and various delivery models have been researched to address this gap (Nelson and Palsbo 2006). For decades, the medical field has investigated the use of telemedicine as a means of extending the reach of health care providers (Augestad and Lindsetmo 2009). Telemedicine is defined as the use of telecommunication and online technologies to provide health care at a distance. Following the success of telemedicine, the field of telehealth emerged to expand the use of distance technology beyond medicine to the dissemination of other services, such as counseling and psychotherapy (Elford et al. 2000). The field of education has also begun to leverage distance technology to engage in telepractice. Telepractice involves the use of online instruction and videoconferencing to connect interventionists (e.g., parents, educators, therapists) with an expert at a distance (Symon 2001). In the past 10 years, researchers have begun to utilize telepractice to coach individuals to implement effective assessment and intervention practices for persons with ASD (Boisvert et al. 2010). A review by Boisvert and colleagues in 2010 identified eight studies that utilized telepractice to deliver services to individuals with ASD. Of those eight, five utilized telepractice to coach interventionists while implementing assessments and interventions for individuals with ASD. Since that review, a number of studies were published that further the literature base and investigate the use of telepractice to teach a varied population of interventionists including parents of individuals with ASD (e.g., Heitzman-Powell et al. 2014; McDuffie et al. 2013), behavioral therapists, (e.g., Wainer and Ingersoll 2013), and educators of students with ASD (e.g., Hay-Hansson and Eldevik 2013). There is now converging literature identifying

the telepractice delivery model as not only effective, but cost efficient (Lindgren et al. 2015), time efficient (Wacker et al. 2013a), and resource efficient (Lindgren et al. 2015; Wacker et al. 2013a).

In a broader view, telepractice is emerging as a promising delivery model to connect autism experts with consumers needing services. However, on an individual level, the outcomes for the consumers and individuals with ASD are mixed. For example, Meadan et al. (2016) examined the effects of telepractice training and coaching on a parent-implemented communication intervention. The authors found that parent skill varied after the first post-training phase and performance feedback was necessary for some parents to reach desired fidelity outcomes. In addition, the impact on child outcomes has been mixed. For example, Wainer and Ingersoll (2014) trained five mothers of children with autism to implement reciprocal imitation training (RIT) using a self-directed telepractice training program followed by individual coaching and follow-up. Although four out of the five mothers reached criterion in implementing RIT during individual coaching, there were mixed impacts on the children with three of the five children showing no effects.

There are several factors that might mediate parent-, educator-, or therapist-directed treatment outcomes. Two major variables are intervention fidelity and implementation fidelity (Barton and Fettig 2013). Implementation fidelity refers to the training procedures used to coach interventionists in implementing the procedures. Intervention fidelity refers to the fidelity of procedures as implemented by the interventionist. Intervention fidelity and implementation fidelity are both essential in ensuring positive outcomes for the individual with ASD (Barton and Fettig 2013). To further the current literature base, this review aims to synthesize fidelity features in telepractice studies focused on parent-, educator-, and therapist-directed (e.g., "interventionists") treatments for individuals with ASD. In particular, this review aims to capture the telepractice delivery models utilized and subsequent impacts on intervention fidelity (Barton and Fettig 2013). A review of this nature is intended to offer future directions for researchers and offer direction to practioners interested in utilizing telepractice technologies to connect high quality ABA coaches with ASD interventionists.

Method

Literature Search Procedures

A systematic search was conducted in the following online databases: ERIC (EBSCO), Medline Complete, Academic Search Complete, Psychology and Behavioral Sciences Collection, and PsycINFO. Publication year was not restricted, but results were limited to peer-reviewed research. Search terms to describe individuals with an ASD were combined with terms to describe telepractice. The terms for individuals with an ASD included "Asperger," "autis*," "developmental disab*," "ASD," and "PDD-NOS." The search terms to describe telepractice included "telehealth," "telepractice," "videoconferenc*," "telemedicine," "distance train*," "distance education," and "teleconference". This initial search was conducted in October 2014, updated in January 2017, and identified 329 studies once

duplicates were removed. Following the database search, an extended search of the reference lists of included articles was conducted and a forward search was conducted by searching the "cited by" function in Google Scholar. Additionally, a hand search of the references from two relevant reviews (e.g., Boisvert et al. 2010; Meadan and Daczewitz 2015) was conducted. The extended searches identified an additional 63 articles for a final total of 392 articles. Figure 1 documents the search procedures and inclusion/exclusion process.

Inclusion Criteria

To be included in this review, articles had to meet the following criteria: (a) include at least one participant with ASD (inclusive of ASD, pervasive developmental disability, or Asperger's syndrome); (b) have at least one dependent variable focused on fidelity of implementation of an intervention or assessment procedure by an interventionist who was at a distance from the specialist/expert for the duration of the training; and (c) use a form of telepractice to connect an expert or specialist to an interventionist. For the purpose of this review, telepractice was defined as the application of communication technologies (i.e., online instruction, videoconferencing software, or computerized software; Boisvert et al. 2010; Nelson and Palsbo 2006) to connect an expert to an interventionist across some distance. Studies that combined in-situ instruction
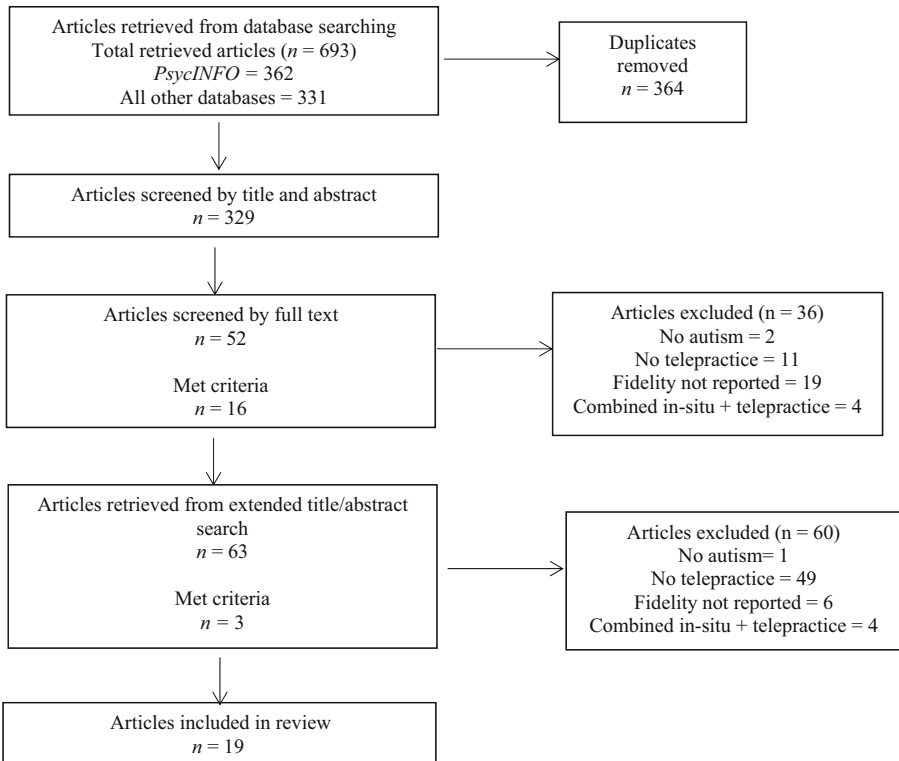

Fig. 1 Search graphic

with telepractice instruction, or in which the effects of the telepractice instruction could not be isolated, were excluded (e.g., McDuffie et al. 2013). Also excluded were studies that did not report fidelity outcomes (e.g., fidelity, accuracy.) (e.g., Ingersoll and Berger 2015; Wacker et al. 2013b). A total of 19 articles were identified after applying the inclusion criteria to all identified articles.

Descriptive Synthesis

Each included study was summarized according to the following variables: (a) characteristics of the participant with ASD (i.e., age, diagnostic information, gender), (b) characteristics of the interventionist (i.e., relationship to participant with ASD [teacher, parent, etc.], age, gender, and previous experience with the target assessment or intervention), (c) dependent variables for the interventionist(s), (d) dependent variables for the participant(s) with ASD dependent variable(s), (e) telepractice delivery methods utilized (i.e., online module, videoconferencing), (f) description of the training procedures (e.g., video models, written instruction, verbal instruction), (g) duration of training, (h) outcomes for the interventionist(s), (i) outcomes for the individual(s) with ASD, (j) fidelity of independent variable implementation, (k) study design, (l) generalization, (m) maintenance, and (n) social validity.

Establishing Inter-Rater Reliability

Inclusion Criteria A second independent rater reviewed 48% ($n = 189$) of the studies during the title/abstract search. The second rater read each title and abstract and rated them as "1" for potential inclusion in the review or "0" for articles that did not meet criteria for inclusion in this review. Resulting inter-rater reliability (IRR) was calculated as the number of agreements divided by the sum of the agreements plus disagreements and multiplied by 100 to obtain a percent. The resulting IRR was 93% for the title/abstract review. Following the title/abstract review, a comprehensive list of articles was developed for a total of 52 articles resulting from the initial search and 63 from the extended search.

The 115 articles resulting from the initial title/abstract review were systematically rated for potential inclusion in this review. IRR was established for 73% of the articles ($n = 84$). Each study was reviewed based on inclusion criteria and assigned a rating of "1" (meets criterion) or "0" (does not meet criterion). IRR was calculated using a percent agreement measure by dividing the total agreements by the total sum of items reviewed and multiplying by 100. The agreement for whether or not to include an article was 99%. Following the calculation of IRR, the two raters reviewed the discrepancies and came to a collaborative consensus for a final IRR of 100%.

Descriptive Synthesis A second independent rater coded 63% of articles ($n = 12$) for a measure of IRR. There were a total of 168 opportunities to establish agreement (i.e., 12 articles with 14 variables). IRR was calculated by dividing the total number of agreements by the sum of the agreements plus disagreements and multiplying by 100 to obtain a percentage. There were 14 disagreements for a total IRR of 92%. Upon instances of disagreements, the raters reviewed and came to a collaborative decision for a final IRR of 100% on the extracted data.

Results

Descriptive Review

Ten journals published the 19 articles included in this review. The highest concentration ($n = 5$) was published in the *Journal of Autism and Developmental Disabilities.* Publication dates ranged from 2009 to 2016. The resulting study summaries are presented in Table 1.

Participant Characteristics A total of 155 interventionists participated across the 19 studies. Five of the 19 studies taught teachers of individuals with ASD (26%), three taught therapists of children with autism (16%), and 10 included parents of a child diagnosed with ASD (53%). One study taught both therapists and teachers of individuals with ASD (5%).

Fourteen of the studies reported the gender of their participants, with 114 of the 155 interventionists being female (74%) and 16 of the 155 interventionists being male (10%). Five of the studies reported ages for their interventionists with an average age of 32 years (range 20–47 years). Fifteen out of the 19 studies (79%) reported whether the interventionists had prior knowledge on the targeted skills prior to their study. Three of the studies provided descriptive data by stating the participants had no prior experience. Eight provided results from a skill assessment (i.e., pre-test or baseline performance data) prior to the introduction of the training program. Four provided both descriptive data and assessment data regarding interventionists' prior knowledge.

Sixteen of the studies (84%) also included a total of 128 individuals with ASD as participants. Eleven of the studies reported the gender for 75 of the 128 (60%) participants with ASD with 65 male and 10 female participants. Twelve of the studies reported the age of their participants with ASD (86%). The average reported age of the participants was 3.83 years (range 1.3–16 years).

Dependent Variables Across the 19 studies, four prepared interventionists to implement assessments, 13 studies focused on behavioral or teaching interventions, and two conducted an assessment with a follow-up intervention. Of the six studies that included assessments, two taught interventionists to conduct a preference assessment, and four taught interventionists to conduct a functional analysis (FA) of challenging behavior. A total of six different strategies were taught across the nine studies focused on behavioral intervention and teaching strategies: functional communication training (FCT), discrete trial teaching (DTT), Early Start Denver Model (ESDM), reciprocal imitation training (RIT), incidental teaching (IT), and other behavioral teaching strategies (e.g., prompting, shaping, reinforcement procedures).

Fourteen of the 19 studies (74%) reported outcomes for participants with ASD. Over half of the 14 studies ($n = 9$; 64%) focused on social communication behaviors (e.g., spontaneous verbalizations, prompted verbalizations, joint attention). Four of the 14 studies (29%) collected data on the participants' challenging behavior (e.g., elopement, aggression, property destruction), and one study (7%) reported outcomes of preference assessments.

Table 1 Descriptive synthesis of included studies

Article	Participant characteristics	Dependent variables	Telepractice training phases	Description of training program
Alnemary et al. (2015)	*Interventionist*: Four male special educators with one to nine years of experience. Teacher age not provided. *Individual with ASD*: One male; diagnosed with ASD; 12 years old	*Interventionist*: Fidelity conducting FA	(1) Group training via videoconferencing and (2) one individual feedback session via videoconference	*Duration*: One 3-h group training and one 30-min individual training *Elements*: Group workshop included verbal instruction, role-play, written instruction. Immediate feedback provided via videoconferencing
Fisher et al. (2014)	*Interventionist*: Eight therapists recruited to provide direct services to individuals with ASD. Seven females and one male. Age not provided. They reported no previous experience with ABA. *Individual with ASD*: N/A	*Interventionist*: Fidelity implementing behavior reduction and skill acquisition protocols using discrete-trial and play based procedures	Intervention group received training including (1) Online modules (2) video-conferencing	*Duration*: 40 h *Elements*: (1) Online modules contained verbal and written instruction and knowledge assessments and (2) role-play with performance feedback and modeling during videoconferencing
Gibson et al. (2010)	*Interventionist*: One female preschool teacher with three years of teaching experience; teacher's age or previous experience with FCT not provided *Individual with ASD*: One male; diagnosed with ASD; 4 years old	*Interventionist*: Fidelity implementing FCT *Individual with ASD*: Percentage of intervals with challenging behavior (i.e., elopement)	One video-conferencing session	*Duration*: One 45 min session prior to implementing FCT with child participant *Elements*: Written and verbal instruction, modeling, role-play, and immediate feedback on role-play
Hay-Hansson and Eldevik (2013)	*Interventionist*: Seven teachers*; no previous experience implementing DTT; teachers' age and gender could not be extracted from overall sample *Individual with ASD*: Four children; age could not be extracted from the overall sample; gender not provided	*Interventionist*: Fidelity implementing DTT *Individual with ASD*: Stated they collected data on child behaviors but did not define the behaviors	Three video-conferencing sessions	*Duration*: Three 15 min sessions. *Elements*: Verbal instruction, modeling, and immediate performance feedback

Table 1 (continued)

Article	Participant characteristics	Dependent variables	Telepractice training phases	Description of training program
Heitzman-Powell et al. (2014)	*Interventionist:* Seven parents (from four families); M = 37.3 (range 32–47); parents' gender not provided. Parents' demonstrated less than 50% of the targeted skills during pre-test. *Individual with ASD:* None	*Interventionist:* Parent fidelity implementing six behavioral skills: preference assessment, structuring the environment, reinforcement, prompts and prompt fading, shaping, and general teaching procedures. *Individual with ASD:* Not applicable	(1) Eight online modules and (2) six video-conferencing sessions. Video-conferencing sessions held after modules two through seven	*Duration:* (1) Approximately 60 min per online module. (2) Each videoconferencing session ranged between 90 and 120 min. Approximate total training time = 17–20 h. *Elements:* (1) Eight online modules with fill-in the blank, drag and drop, and multiple-choice questions. Immediate written feedback was delivered during online module. (2) Verbal instruction, immediate performance feedback, and question and answer.
Ingersoll et al. (2016)	*Interventionist:* 27 parents; 26 females and one male; Age not provided. Pre-intervention data collected. *Individual with ASD:* 27 children with ASD or PDD-NOS; 19 males and 8 females. M = 43.26 months (range 27–73 months)	*Interventionist:* Parent fidelity implementing six dimensions of Project ImPACT (a social-communication program using naturalistic, developmental-behavioral intervention) *Individual with ASD:* Not applicable	Two experimental groups (self-directed and therapist-assisted). Both included (1) 12 online modules and therapist-assisted also included (2) 24 videoconferencing sessions	*Duration:* (1) Approximately 75 min per online module. (2) Videoconferencing sessions averaged 30 min. Approximate total training time = 15–27 h. *Elements:* (1) 12 online modules with written instruction, narrated slideshows, video examples, knowledge checks, reflection activities, and a discussion forum. (2) Verbal instruction and immediate performance feedback
Machalicek et al. (2009)	*Interventionist:* Three teachers; no previous experience; age or gender not provided	*Interventionist:* Fidelity implementing paired-choice preference assessments	(1) Written instructions provided prior to videoconferencing via email and (2) videoconferencing during	*Duration:* Two hours to conduct preference assessments *Elements:* (1) written instruction (2) Immediate performance feedback

Table 1 (continued)

Article	Participant characteristics	Dependent variables	Telepractice training phases	Description of training program
	Individual with ASD: Three male children; Two with autism and one with PDD-NOS; M = 4.94 years (range 2.8–7 years)	Individual with ASD: Preference of tangible items	implementation of preference assessment with child participants	
Machalicek et al. (2010)	Interventionist: Six female teachers; M = 27 years (range 22–32 years); no experience implementing a FA. Individual with ASD: Six children with ASD; M = 6 years (range 5–9 years); gender not provided	Interventionist: Fidelity implementing FA. Individual with ASD: Challenging behavior was individually defined but data not collected on student behavior.	Videoconferencing during interventionist implementation of FA with child participants	Duration: Average 75 min (range 60–95 min). Elements: Immediate performance feedback
Machalicek et al. (2016)	Interventionist: Three parents; All over 18 years of age; no experience implementing a FBA but previous ABA experience. Individual with ASD: Three children with ASD; M = 11 years (range 8–16 years); one male and two females.	Interventionist: Fidelity implementing FA and behavioral interventions. Individual with ASD: Challenging behavior	Videoconferencing during parent implementation of FA with child participants and during parent educator phase to train parents in behavioral interventions.	Duration: Functional analysis lasted a M = 95 min (range, 90–100 min). Parent education lasted between 45 and 90 min. Elements: Written instruction, verbal instruction, video modeling, and performance feedback
Meadan et al. (2016)	Interventionist: Three female parents; Age and previous experience not provided. Individual with ASD: Two male children and one female children diagnosed with ASD; M = 3 years (range 2–4 years)	Interventionist: Fidelity of implementing modeling, mand-modeling, and time delay with environmental arrangement. Individual with ASD: Communication responses	Videoconferencing for two phases: (1) Training and (2) coaching	Duration: (1) 45 min (2) One hour per week for approximately 3.5 months. Elements: (1) Verbal and written instructions, video modeling, question and answer and (2) performance feedback.
Neely et al. (2016)	Interventionists: Three female therapists; M = 21.3 years (range	Interventionist: Fidelity of implementing incidental teaching	(1) Online module and (2) videoconferencing	Duration: (1) not reported and (2) average time = 99 min 54 s

Table 1 (continued)

Article	Participant characteristics	Dependent variables	Telepractice training phases	Description of training program
	20–22 years); no training in incidental teaching *Individual with ASD:* Two male children and one female diagnosed with ASD; $M = 5.7$ years (range 4–8 years)	Communication opportunities *Individual with ASD:* Mands		*Elements:* (1) Verbal and written instructions, video modeling, step by step instructions, frequently asked questions, and a knowledge assessment. (2) Self-evaluation, video-based feedback, question and answer session, and planning for next session.
Suess et al. (2014)	*Interventionist:* Parents of three children with ASD; $M = 37$ years; previous experience, gender, and number of parent participants not provided *Individual with ASD:* Three male children diagnosed with PDD-NOS; $M = 2.91$ years (range 2 years 7 months – 3 years 3 months)	*Interventionist:* Fidelity implementing FCT *Individual with ASD:* Percentage of intervals with challenging behavior (SIB, aggression, property destruction, elopement, crying/screaming, noncompliance)	(1) Didactic training via video-conferencing provided and (2) alternating conditions of FCT sessions conducted via video-conferencing and FCT sessions conducted independent of coach	*Duration:* (1) Two one hour didactic trainings (2) one hour coaching sessions per week. Approximate total training time = 10 to 16 h *Elements:* (1) Written and verbal instruction. (2) Immediate performance feedback Parents also conducted FCT sessions outside of the coaching sessions. No feedback was provided during these sessions but the parents did videotape them for data collection purposes.
Vismara et al. (2016)	*Interventionist:* 24 parents. Five male and 19 female. Previous experience not provided. *Individual with ASD:* 24 children with ASD. 17 male and seven female. Mean age 29.94 months.	*Interventionist:* Parent fidelity of implementing ESDM *Individual with ASD:* Frequency of spontaneous verbalizations, prompted verbalizations, and spontaneous imitation; imitative functional play; joint attention behaviors	Two experimental groups (control and P-ESDM). Both used an (1) online website and (2) videoconferencing.	*Duration:* Control group received monthly videoconference feedback sessions that lasted 1.5 h and the treatment group received weekly 1.5 h videoconference feedback sessions. *Procedure:* (1) Website contained email, file upload program, social aspect (messaging, calendar, message board) and goal tracking program. Online modules included

Table 1 (continued)

Article	Participant characteristics	Dependent variables	Telepractice training phases	Description of training program
				written and video-based instruction, video examples, frequently asked questions and video examples). ESDM content was isolated to the treatment group's website. (2) Weekly videoconferencing included discussion of the past week's topic, demonstration of skill, and performance feedback for the treatment group.
Vismara et al. (2013)	*Interventionist:* Eight parents; Parents implemented ESDM below performance criterion during baseline phase. Age not provided. *Individual with ASD:* Eight children with ASD; M = 27.5 months (range 18–51 months); no gender provided	*Interventionist:* Parent fidelity of implementing ESDM *Individual with ASD:* Rate of child verbal utterances and joint attention skills	(1) Website with ten online modules and (2) 12 video-conferencing sessions. Interventionists completed one module per week and video-conferencing sessions were held after each module.	*Duration:* (1) Parents spent an average of 8 h and 53 min on the website (2) videoconferencing occurred once a week for 12 weeks (1.5 h/week) for approximately 18 h. Average total training time = 27 h *Procedure:* (1) Social aspect (secure messaging service, calendar, photos, and message board), modules (written and video-based instruction, step-by-step instruction, frequently asked questions and video examples) and a self-monitoring tool (2) Weekly videoconferencing included discussion of the past week's topic, demonstration of skill, and performance feedback.

Table 1 (continued)

Article	Participant characteristics	Dependent variables	Telepractice training phases	Description of training program
Vismara et al. (2012)	*Interventionist:* Nine parents of children with ASD (eight completed study); seven females and two males; previous experience was demonstrated with baseline condition; Age not provided *Individual with ASD:* Nine children with ASD (eight completed the study); eight males and one female; Six diagnosed with autism or PDD-NOS; $M = 28.89$ months (range 16—38 months)	*Interventionist:* Parent fidelity of implementing ESDM *Individual with ASD:* Frequency of spontaneous verbalizations, prompted verbalizations, and spontaneous imitation CBRS[a] measures: Attention and initiation MacArthur CDI vocabulary, MacArthur CDI comprehension, and Vineland	(1) DVD with ten modules and (2) 12 video-conferencing sessions. Interventionists completed one module per week and video-conferencing sessions were held after each module.	*Duration:* (1) Each module took approximately 20 min, (2) 12 one hour videoconferencing sessions. Approximate total training time = 15.3 h *Elements:* (1) Written instruction (readings; self-evaluation), independent activities, and video examples. (2) Verbal instruction and immediate performance feedback.
Vismara et al. (2009)	*Interventionist:* Five therapists[*]; all had previously read an article regarding the origins of the ESDM model; age and gender not provided *Individual with ASD:* Number of therapists trained via telepractice versus face-to-face cannot be extracted. $M = 33$ months (SD = 7.7). Gender not provided.	*Interventionist:* Fidelity implementing ESDM *Individual with ASD:* Functional verbal utterances, imitation, attention, and social initiations	(1) DVD for self-instruction, (2) didactic training delivered via video-conferencing and (3) two group feedback sessions via video-conferencing	*Duration:* (1) No duration provided for self-instruction. (2) Ten hours for the didactic training (3) Two hour video-conferencing session + one hour follow up telephone call *Elements:* (1) written instruction and video examples (2) written instruction, verbal instruction, video examples, and small group application activities (3) review of video examples and performance feedback
Wacker et al. (2013a, 2013b)	*Interventionist:* 20 parents (19 mothers and 1 father); $M = 34$ years; no previous experience	*Interventionist:* Fidelity implementing FA *Individual with ASD:* Percentage of intervals with challenging behavior	(1) Pre-assessment meeting via video-conferencing and (2) coaching via video-conferencing	*Duration:* One hour pre-assessment meeting plus coaching sessions (average 4.9 h, range 4 to 8). Total 5.9 h (range 5 to 9 h).

Table 1 (continued)

Article	Participant characteristics	Dependent variables	Telepractice training phases	Description of training program
	Individual with ASD: 20 children with ASD; diagnosed with PPD-NOS or ASD; M = 53.8 months (range 29–80 months); gender not provided			*Procedure:* (1) Verbal and written instruction (2) Verbal instruction, prompting, and modeling
Wainer and Ingersoll (2013)	*Interventionist:* Sample 1: Six female therapists. No previous experience; Age not provided. Sample 2: Three mothers of children with ASD. No previous experience. Age not provided *Individual with ASD:* Sample 1: Five male children with ASD. M = 56.2 months (range 35–74 months) Sample 2: Three male children with ASD. M = 61 months (range 26–88 months)	*Interventionist:* Fidelity implementing RIT *Individual with ASD:* Rate of imitation (prompted and unprompted imitation) per minute	Five online modules	*Duration:* The first four modules took between 4 and 12 min; final module took approximately 40 min. The amount of time between the final baseline session and first post-training session was 19–40 days (M = 29 days) for therapists and 23–36 days (M = 30 days) for parents. *Procedure:* Written and verbal instruction, video examples, knowledge assessments, and interactive learning tasks
Wainer and Ingersoll (2014)	*Interventionist:* Five mothers of children with ASD; previous experience provided in terms of a baseline phase with low and stable ratings of fidelity; age not provided *Individual with ASD:* Five children with ASD; M = 42.2 months (range 29–59 months); gender not provided	*Interventionist:* Fidelity of implementing RIT *Individual with ASD:* Rate of spontaneous imitation per minute	(1) Four online modules and (2) three video-conferencing sessions. Interventionists completed all four online modules prior to the video-conferencing sessions.	*Duration:* (1) Average of 100 min for online modules and (2) three, 30 min coaching sessions. *Procedure:* (1) Written and verbal instruction, active learning tasks, video examples, and written feedback on learning tasks (2) Collaborative problem solving, immediate verbal and written performance feedback, and question answering. One family was provided delayed performance feedback

Table 1 (continued)

Article	Implementation fidelity	Outcomes for interventionists (Intervention fidelity)	Outcomes for individual with ASD
Alnemary et al. (2015)	Not reported	All teachers improved fidelity of FA conditions but only one met performance criteria	Not reported
Fisher et al. (2014)	Not reported	Intervention group demonstrated large effects on treatment fidelity that were significant.	N/A
Gibson et al. (2010)	Not reported	The teacher implemented FCT with an average 90% fidelity during intervention sessions (range 87–100%)	Decreased elopement from an average of 96% of intervals during baseline condition (range 89–100%) to an average of 11% of intervals during FCT condition (range 6–16%)
Hay-Hansson and Eldevik (2013)	Not reported	Overall improvements in DTT implementation fidelity; effect size was .99 from pre-test to post-test and .93 from pre-test to follow-up	Not reported
Heitzman-Powell et al. (2014)	1) Embedded knowledge checks (2) Coaching procedures were scripted and coaches trained to 100% fidelity prior to coaching. Implementation fidelity was collected for 10% of the coaching sessions	Increased knowledge from 30.6% to 71.8% correct. Fidelity gains ranged from a $M = 61.20\%$ for preference assessment gains to a $M = 23.3\%$ for prompting and fading prompts	Not applicable
Ingersoll et al. (2016)	(1) Reported duration but not parent adherence to completion of module. (2) Coaches used a self-rating check list and 10% were scored by a second rater for reliability.	Significant effects on parent fidelity for both groups, however, the therapist-assisted group made greater gains.	Significant effects on child communication skills. Children in the therapist-assisted group made marginally larger but nonsignificant gains.
Machalicek et al. (2009)	Not reported	Interventionists implemented paired-choice preference assessments with 100% fidelity	Clear pattern of preferences. A ranking of eight preferred items was obtained for each participant.
Machalicek et al. (2010)	Collected implementation fidelity for 30% of coaching sessions	Teachers reached the predetermined performance criteria within 19 sessions.	Not applicable
Machalicek et al. (2016)	Not reported	Parents implemented FAs with fidelity. Parents reached fidelity criterion for implementing behavior plans during the parent educator phase	Reduced challenging behavior

Table 1 (continued)

Article	Implementation fidelity	Outcomes for interventionists (Intervention fidelity)	Outcomes for individual with ASD
Meadan et al. (2016)	Doctoral students served as coaches and a second member of the team evaluated their implementation fidelity for 100% of sessions.	however one parent demonstrated lower fidelity in follow-up (M = 74%, range 33–100%). Mixed results for the 45 min training alone but all parents met criteria following the coaching.	Increased use of targeted communication for all child participants
Neely et al. (2016)	(1) Required post-test verification of online module completion but not duration of completion (2) Two raters evaluated implementation fidelity for 40% of sessions	All therapists met the fidelity criterion within six sessions. All therapists increased the number of communication opportunities offered above baseline levels	Increased use of targeted mands for all child participants
Suess et al. (2014)	Not reported	FCT treatment fidelity was lower at the beginning of the study and increased throughout the study with no real differences between independent and coached sessions.	Decreases in challenging behavior noted for all child participants
Vismara et al. (2016)	(1) Tracked website usage (2) Collected implementation fidelity for therapists conducting parent coaching for 17% of sessions	None of the parents met fidelity during baseline. Five out of 14 parents met fidelity for treatment group at post-test and nine out of 14 at follow-up. Two out of 10 parents met fidelity for the control group at post-test and follow-up.	Children in both groups increased their rates of imitation but no significant effects noted. No significant effects for joint attention behavior.
Vismara et al. (2013)	(1) Tracked website usage (2) Collected implementation fidelity for therapists conducting parent coaching for 75% of sessions	Overall mean fidelity during intervention was 3.68 (SD = 0.51) with six of the eight parents achieving scores of 4.00 or higher; whereas the other two parents made improvements but did not meet the fidelity threshold.	Children increased their use of functional utterances but their bids for joint attention remained stable throughout the intervention.
Vismara et al. (2012)	(2) Collected implementation fidelity for therapists conducting parent coaching for 75% of sessions	Fidelity of ESDM: All parents were able to meet the fidelity criterion (at or above 4.00 fidelity rating) in an average of 6.41 weeks.	Children increased their verbalizations and imitations. Statistical significant on standardized measures.
Vismara et al. (2009)	Not reported		

Table 1 (continued)

Article	Implementation fidelity	Outcomes for interventionists (Intervention fidelity)	Outcomes for individual with ASD
		Therapist fidelity increased; however, only 50% of the sample was at the 85% fidelity threshold by the final training phase.	Cannot extract the child outcomes for the therapists who were trained via telepractice versus face-to-face condition
Wacker et al. (2013a, 2013b)	Not reported	Fidelity across participants averaged 96% without corrections and 97% with corrections	Identified functions of the children's behavior for 18 of the 20 children
Wainer and Ingersoll (2013)	Reported duration and knowledge assessment	Sample 1: All therapists improved their implementation of RIT; four reached the performance criterion Sample 2: All of the parents improved their implementation of RIT; two reached the performance criterion	Sample 1: All children increased their imitation rates per minute Sample 2: All children increased their imitation rates per minute
Wainer and Ingersoll (2014)	(1) Parent engagement with website was tracked (2) Coaching implementation fidelity not reported	Fidelity of implementing RIT: mixed results for self-directed learning but four out of five reached criterion with videoconferencing	Mixed results with two children demonstrating small increases and three no increase following online modules. During videoconferencing, three children experienced immediate effects that returned to baseline levels and two children had no effects

* Only interventionists who received training via telepractice were included in this review

[a] CBRS Child Behavior Rating Scale

Telepractice Delivery Method The 19 studies used a combination of four different delivery methods for their training programs: online modules, videoconferencing, online modules with videoconferencing, and DVD with videoconferencing. Half of the studies ($n = 9$) used videoconferencing only to prepare interventionists. The other seven studies were split between online modules ($n = 1$), videoconferencing with online modules ($n = 7$) and DVDs with videoconferencing ($n = 2$).

Description of the Training Program The procedures used to teach interventionists varied across the 19 studies in regard to duration and instructional elements. Although all of the studies utilized telepractice to deliver the instruction, 17 of the studies provided one-on-one instruction (89%), and two provided group instruction (11%). The number of instructional sessions varied between studies, with 18 of the studies reporting the total duration of the training program. Reported instructional times ranged from 40 mins to 44 h. Most of the programs included more than one session ($n = 18$, 95%). Although all of the programs included some form of didactic instruction, nine studies delivered the didactic instruction via videoconferencing (43%), eight used online modules/website (42%), and two provided DVDs to participants prior to videoconferencing. For example, Wacker et al. (2013a, 2013b) met with their interventionists for a 1 h pre-assessment meeting, prior to coaching, in order to conduct an FA. During this pre-assessment meeting, the interventionists were provided verbal and written instruction regarding behavioral assessment rationale and procedures. In contrast, Heitzman-Powell et al. (2014) had the interventionists complete an online module prior to meeting with the trainer via videoconferencing.

Instructional elements included a combination of (a) verbal instruction, (b) written instruction, (c) modeling, (d) role-play, (e) performance feedback, (f) question and answer, (g) video examples, and (h) interactive learning activities (e.g., assessing others' ability to implement RIT). Seventeen of the studies used verbal instruction (89%) and 18 incorporated written instruction (95%). Verbal instruction typically included the rationale of the intervention or assessment, introduction to the components of the intervention, or prompting during the implementation of the assessment or intervention. Written instructions included instructions outlining the implementation of the assessment or intervention (e.g., checklists, step-by-step instructions) and instruction on the rationale and support for the intervention or assessment.

Also commonly used by a majority of studies was performance feedback ($n = 17$; 89%). Across the 17 studies, 15 of the studies provided immediate one-on-one targeted performance feedback to the interventionists after viewing a live demonstration of the skill with a child participant. The other studies relied on delayed feedback for at least one of the participants (Wainer and Ingersoll 2014) or delayed video-based feedback (Neely et al. 2016). One study provided performance feedback in a group setting rather than one-on-one. Less commonly used instructional elements included modeling ($n = 5$, 26%), role-play ($n = 3$, 16%), interactive learning activities ($n = 6$, 32%), built–in question and answer opportunities ($n = 8$, 42%), and video examples ($n = 9$, 47%).

Duration of Training Duration of training was reported for a majority of the included studies, however, the completeness of the information varied. For studies that included an online module or website prior to video conferencing, duration of training via the

online module was reported in eight of the 10 studies (80%). The duration of engagement with online content ranged from 0.67–16 h. All of the studies using videoconferencing reported the duration of videoconferencing sessions. Durations ranged from 45 mins–21 h. One study reported a total duration of training of 40 h (Fisher et al. 2014) but did not differentiate between time to complete online module and time spent videoconferencing.

Fidelity of Training Program Ten of the 19 studies (53%) collected implementation fidelity for their training program. In four of the studies, the coaches were trained to criterion on the training procedures prior to the intervention, and fidelity data were collected throughout the study (Heitzman-Powell et al. 2014; Vismara et al. 2012; Vismara et al. 2013; Vismara et al. 2016). During the studies conducted by Machalicek et al. (2010) and Neely et al. (2016), the first author implemented the intervention and a second rater evaluated her adherence to performance feedback procedures throughout the study. For Meadan et al. (2016), doctoral students served as the coaches and a second member of the team evaluated their fidelity of coaching. For those utilizing online modules, studies reported adherence data through reported duration to complete online module content (e.g., Ingersoll et al. 2016; Vismara et al. 2013), access of online module content (e.g., Vismara et al. 2013; Vismara et al. 2016), or verification of completion of online module content through a knowledge assessments or interactive activities (e.g., Heitzman-Powell et al. 2014; Neely et al. 2016).

Outcomes for the Interventionists All of the studies reported interventionists were able to implement the assessment or intervention with increased fidelity following the training program. Twelve of the studies established a pre-set performance criterion for their interventionist. Pre-set performance criteria ranged from 80%–90% intervention fidelity (e.g., as measured by a fidelity rubric; Neely et al. 2016). Six of the studies reported that all of the interventionists met the performance criterion (50%). Six studies reported that some interventionists did not meet the performance criteria. For example, Vismara et al. (2016) reported that only five of the 14 parents enrolled in the treatment group met fidelity criterion at post-test. During follow-up, only nine of the 14 parents met fidelity. Similarly, in Vismara et al. (2013) and Vismara et al. (2009), only some of their participants met the fidelity thresholds following coaching. For Wainer and Ingersoll (2014), there were mixed results for parent intervention fidelity following the online module learning phase, but four of the five parents reached criterion with the videoconferencing feedback phase. Similarly, Meadan et al. (2016) saw mixed results for their parents following the initial didactic training phase, but all parents met criteria following the videoconferencing feedback phase. Finally, Alnemary et al. (2015) provided training in a group format and indicated that, although all educators improved their fidelity of implementing FAs, only one met the performance criteria.

Outcomes for the Individual with ASD Although a majority of the studies reported that data were collected on outcomes for participants with ASD ($n = 15$; 79%), outcomes in two studies were either not reported or could not be isolated for the participants with ASD.

For example, Vismara et al. (2009) assigned 10 interventionists to two groups and compared the effects of a training program delivered through telepractice versus on-

site. Although they collected data for the participants with ASD, the results were aggregated for the two groups and reported results were combined. Therefore, the results for the telepractice group could not be isolated.

Of the thirteen studies where the outcomes for the participants with ASD could be isolated, nine of the studies reported improvements in the targeted behaviors for all participants (69%), and two reported clear assessment outcomes (15%). Two studies reported mixed results with some participants demonstrating improvements and some maintaining pre-intervention levels (8%) or participants demonstrating improvements but no significant effects (8%). One study reported clear assessment outcomes for 18 of their 20 participants in terms of clear functions of their challenging behavior (8%).

Experimental Design Although all 19 articles reported outcomes for interventionists' regarding their implementation of an assessment or intervention, only 15 employed an experimental design to systematically manipulate the independent variable (i.e., the training program). Of the 15 studies, 40% ($n = 6$) used group design methodology and 60% ($n = 9$) used single-case design. Two studies employed a pre-experimental non-randomized pre/post design, and four utilized a randomized group assignment design with pre/post analysis. For the nine studies utilizing single-case methodology, the majority ($n = 8$; 89%) employed a multiple-baseline design across interventionists. The remaining study utilized a multi-element design without a baseline phase to evaluate parent's implementation of FCT during sessions coached via videoconferencing versus sessions implemented independent of coaching (Suess et al. 2014).

Maintenance and Generalization Nine of the 19 studies (47%) collected maintenance data on interventionists' implementation fidelity. Following the conclusion of the intervention, follow-up probes ranged from 1-week to 4-months. Six of the studies reported skills maintained above baseline levels at a 6-week follow up for ESDM, 2-month follow-up for DTT, 3-month follow-up for the ESDM, and at 2-, 3- and 4-month follow-up for naturalistic communication interventions. Three of the studies reported mixed results, with some interventionists returning to baseline levels for conducting an FA at 1- to 3-week follow-ups and implementing RIT at 1- to 3-month follow-ups, and some interventionists returning to baseline for social-communication skills (Meadan et al. 2016).

Three studies evaluated the generalization of the interventionists' skills. Hay-Hansson and Eldevik (2013) provided descriptive information indicating two of their three interventionists generalized DTT skills to the new child. Meadan et al. (2016) reported positive results for implementation of skills when no coaching was provided. Alnemary et al. (2015) found one of their four special educators met the preset criterion and collected generalization data with a targeted student. Results indicate that he generalized acquired assessment skills to the targeted student.

Social Validity Social validity of the training programs was reported for 11 of the 19 studies. Ten of these studies (91%) utilized a Likert-type questionnaire. Six studies used open-ended questions either in addition to a Likert-type questionnaire or as the primary means of evaluating social validity of the telepractice program. Results were positive across the studies with high acceptability for online modules and videoconferencing delivery methods. One study reported mixed results (Alnemary et al. 2015) with some

interventionists indicating issues with technical difficulties. In addition, Vismara et al. (2009) reported results of a social validity questionnaire in terms of variability between the groups assigned to the on-site training program versus the telepractice program. They found no difference in the satisfaction between the two groups. Vismara et al. (2016) reported validity for both the therapist-assisted and community based group with higher satisfaction noted for the therapist-assisted group. Of note, the community-based parents indicated in the open comments a need for additional videoconferencing time with the coach.

Responses to the open–ended questions found that interventionists found the video examples to be most helpful for learning the targeted intervention. Interventionists also identified performance feedback as a highly useful training procedure. Vismara et al. (2012) also found that, although interventionists were initially concerned about the level of support available through telepractice, by the end of the study, all of the interventionists reported that telepractice was as informative and valuable as face-to-face delivery methods. Although interventionists in Wainer and Ingersoll (2014) and Vismara et al. (2009) did indicate that there were some technology issues throughout the studies, they reported these issues were easily remedied. Overall, interventionists from Vismara et al. (2009) and Vismara et al. (2012) indicated that they would recommend telepractice approach to other parents of children with ASD.

Discussion

This review synthesized 19 studies identifying the impacts of telepractice training programs on interventionists' treatment fidelity for individuals with ASD. The 19 telepractice studies delivered training programs to 155 interventionists. A variety of assessments and interventions were taught including preference assessment, FA, FCT, DTT, incidental teaching, RIT, and the ESDM. Training procedures also varied in both duration and elements include verbal and written instruction, modeling, role-play, performance feedback, question and answer, video examples, and interactive learning activities. Training was delivered via online modules, videoconferencing, and DVDs. All of the studies reported interventionists were able to implement the assessment or intervention with increased fidelity following the training program. However, results were mixed in four studies as some participants needed additional training beyond the intervention to meet preset performance standards. In addition, coaches' adherence to training procedures was not widely reported. Overall, this literature base is best described as limited due to the small number of studies, variability in training procedures, and mixed results for some participants.

The first aim of this review was to synthesize the training programs and subsequent impacts on intervention treatment fidelity. The most common training procedure involved verbal and written instruction and performance feedback. Previous research supports the use of this training package as an effective means of training ASD interventionists (e.g., Ward-Horner and Sturmey 2012). Of the 19 studies included in this review, only two (Wacker et al. 2013a, 2013b; Wainer and Ingersoll 2013) did not specify the use of performance feedback as a component of their intervention. These results suggest performance feedback may be an active element necessary for effective

training of ASD interventionists via telepractice. These results confirm previous conclusions linking performance feedback to improved fidelity for interventionists working with individuals with disabilities (e.g., Brock and Carter 2016). However, the effect of the individual training elements cannot be isolated due to a variety of procedures. Isolating effective training elements is essential to improving usability and effectiveness of telepractice training programs (Ingersoll and Berger 2015). Future research might address this issue by conducting component analyses to isolate the active training elements.

Overall, there were positive results for the impact of the training programs on interventionist intervention fidelity. However, there were a couple of notable mixed results. First, the two studies that employed group training via videoconferencing reported mixed results (Alnemary et al. 2015; Vismara et al. 2009). Although these results could be mediated by the complexity of the skill (e.g., FAs were taught in Alnemary et al. 2015), these results challenge the validity of group training via videoconferencing. Future research might investigate ways to increase the effectives of group trainings as group trainings may be more economically feasible for resource constrained settings (e.g., schools). For example, schools may consider a workshop with follow-up feedback in the classroom (Brock and Carter 2016). Second, mixed results were noted for the effects of online modules on intervention fidelity (e.g., Wainer and Ingersoll 2014). In a couple of studies, content delivered via online modules did not equate to improved intervention fidelity until performance feedback was provided (e.g., Meadan et al. 2016). These results further support previous conclusions identifying performance feedback as an essential training component (Brock and Carter 2016; Rispoli et al. 2011).

The second aim of this review was to synthesize the reporting of implementation fidelity as potential moderator of subsequent intervention fidelity. Implementation fidelity was collected through reported duration of the training program and coaching fidelity. A strength of this literature base is a majority of the studies reported the duration of the training program. Although durations varied with the complexity of the skills being taught, the median duration of training was approximately 5.5 h for online modules and 8.5 h for videoconferencing. Although it has been shown that training duration does not necessarily impact training effectiveness (Brock and Carter 2016), training duration can potentially impact acceptance of procedures and subsequent intervention fidelity (Ingersoll and Berger 2015). Future studies should report access statistics when using a telepractice delivery model.

A major weakness of this literature base is the reporting of implementation fidelity. Only 10 of the 19 studies reported fidelity of the coaching procedures. For those using videoconferencing, procedures included a second rater observing the videoconference or a video-taped version of the videoconference and rating coach adherence to the coaching procedures. For online modules, studies either reported engagement through duration spent with the material or completion of a knowledge assessment. As intervention fidelity can moderate intervention fidelity and subsequent outcomes for individuals with ASD, reporting of implementation fidelity is vital. With less than half of the studies reporting implementation fidelity, the evidence supporting use of the telepractice delivery model as a means to facilitate high-fidelity intervention is limited.

Although all of the studies provided some demographic information regarding the interventionists, the descriptions were limited and typically did not include the age and gender of the participants, previous educational experience, or their previous experience with the skill being taught. As participant characteristics and previous experiences are likely to affect the success of the training, these descriptions are necessary to identify the populations for which the effects might generalize (Wainer and Ingersoll 2014). Interventionists' previous experiences may also correlate to intervention fidelity and the ease with which they acquire the skills (Vismara et al. 2013). Future researchers should provide comprehensive descriptions of interventionist participants to promote the external validity of this literature base and to serve as potential moderators of training effectiveness.

Limitations and Directions for Future Research

Although the literature base has advanced within the past 5 years, there are a number of limitations that may serve as suggestions for future research. First, a majority of the studies provided training using one-on-one instruction. Of the studies that used group training, there were mixed results suggesting that one-on-one instruction may be an essential component. However, this dependence on a specialist to deliver individualized training may delay interventionists' access to quality training programs and leave interventionists susceptible to controversial or ineffective treatments. Future research might investigate ways to maximize small group instruction to promote effectiveness of the instruction.

Second, although results suggest that telepractice did lead to initial acquisition of skills, the results were mixed for the maintenance and generalization of the skills. Of the studies that collected maintenance data, 33% reported that the skills did not maintain (e.g., Machalicek et al. 2010; Meadan et al. 2016; Wainer and Ingersoll 2014). In addition, only three studies reported generalization data with one report of descriptive data indicating that the interventionists generalized skills across their students (Hay-Hansson and Eldevik 2013), one reported positive results for implementation of skills without coaching support (Meadan et al. 2016), and one reporting generalization of skills for only one out of four interventionists (Alnemary et al. 2015). Although some skills may not be intended to generalize or maintain (e.g., parents conducing FAs; Wacker et al. 2013a, b), some assessments (e.g., preference assessments) or interventions (e.g., incidental teaching), would be intended to be used without ongoing coaching or support. However, the results from these studies do not indicate sustained behavior change. Fortunately, telepractice service models may allow for repeated follow-up assessments and coaching. In addition, telepractice can allow for more opportunity for coaches to follow-up with interventionists in the natural environment in which they will use the skills to help facilitate maintenance of skills (e.g., home for parent or school for educator). However, the current literature base is limited and future research should investigate ways to maintain and generalize skills learned via telepractice technologies

Although this review highlights the potential use of telepractice to facilitate early intervention, the fact that a majority of the participants with ASD were preschool or elementary age limits the generalizability of the outcomes. Although

one study did include adolescents and teenagers with ASD (Machalicek et al. 2016), the literature is limited, and it is not possible to conclude that similar results would be obtained for interventionists working with adolescents or adults with ASD. Therefore, future research might consider replicating or extending the previous research to include interventionists working outside of early childhood.

Finally, this review was limited to the information provided by the authors of the included articles within the confines of the published article. It is possible that the authors may not have provided all the information pertinent to the intervention. For example, some articles provided detailed descriptions of the participants with ASD and limited descriptions of the interventionists. These omissions may be due to publication restrictions or the availability of the data. Therefore, the conclusions of this review are constrained by the information provided.

Implications for Practice

This review demonstrates promise for the use of telepractice technology in practice. Overall, the use of telepractice to facilitate parent-, educator-, and therapist-directed intervention fidelity was linked with positive outcomes for the interventionists. In addition, improved behaviors were also noted for a majority of the participants with ASD. Therefore, the preliminary results suggest that telepractice may be an effective means of preparing ASD interventionists.

Of note, of the studies that assessed outcomes for the individuals with ASD, all included preschool and elementary aged children. These results are encouraging as previous research identifies that early intervention is correlated to improved functioning for individuals with ASD (Kuppens and Onghena 2012; Makrygianni and Reed 2010; National Research Council 2001). Telepractice may facilitate early intervention by allowing specialists to serve those populations who were previously inaccessible due to the barriers of distance, time, and money. However, practioners should exercise caution when using telepractice to prepare interventionists working with adolescents or adults with ASD.

With respect to the training components used, practioners may consider the use of didactic instruction including verbal/written instruction and individualized performance feedback. The combination of these training components appeared in the majority of the studies and was linked to increased intervention fidelity for the interventionists. In particular, individualized performance feedback may be an active element to effective training programs and verbal/written instruction may be necessary for more complex skills.

Although this literature base demonstrates promise, it is still developing. Practitioners should take care to evaluate the effectiveness of their program through continued progress monitoring. Practioners should also plan to embed some form of planned generalization (Gianoumis and Sturmey 2012; Stokes and Baer 1977) and to provide ongoing support to ensure adherence to intervention procedures. In addition, although the current literature base did provide some preliminary support for the use of telepractice, there is a need to advance the research in this area. Therefore, practioners should continue to rely on face-to-face training when feasible and supplement with telepractice where necessary.

Conclusion

The use of telepractice as a service delivery model has promise. However, there is still great variability in the training components employed with subsequent varying effects on intervention fidelity. In addition, there was limited focus on implementation fidelity in the existing literature base. Therefore, telepractice as a delivery model requires additional investigation before qualifying as an evidence-based delivery model.

Compliance with Ethical Standards

Ethical Approval   This article does not contain any studies with human participants or animals performed by any of the authors.

Informed Consent   This article does not contain any studies with human participants or animals performed by any of the authors.

Conflict of Interest   The authors declare no potential conflicts of interest.

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