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## Comparing a Practice-Based Model with a Research-Based Model of social skills interventions for children with autism in schools



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### ABSTRACT

**Background:** Social impairment is the most challenging core deficit for children with autism spectrum disorder (ASD). Several evidence-based interventions address social impairment in children with ASD; however, adoption, use, and implementation of these interventions in schools is challenging.

**Method:** Ninety-two children with ASD who received one of three intervention models: a) School personnel adapted and implemented evidence-based social skills intervention (Practice-Based Model;  $n = 14$ ); b) University researcher developed and implemented evidence-based social skills intervention (Research-Based Model;  $n = 45$ ); or c) standard educational practices model (Inclusion Only Model;  $n = 33$ ) participated. The average age was 8.4 ( $SD = 1.6$ ) years; majority was male (88%) and white (52.2%). Typically developing classmates completed sociometric ratings to determine children's social network inclusion, and independent raters observed children on the playground using a time-interval behavior coding system to record solitary engagement and frequency of initiations.

**Results:** Separate linear regression models were conducted. Children in the Research-Based Model had significantly higher social network inclusion than children in the other two settings ( $p = .05$ ). Children in the Practice-Based Model had significantly lower solitary engagement ( $p = .04$ ) and more initiations on the playground than children in the University Developed Model ( $p = .04$ ).

**Conclusions:** The results suggest that researchers: 1) may learn from public school stakeholders who have lived experiences to better understand the context in which implementation occurs; and 2) should partner with schools to learn about their processes of adaptation and adoption in order to facilitate successful implementation of evidence-based practices for children with ASD. Interventions designed with implementation in mind may be more feasible and increase the chances of use in schools.

### 1. Introduction

A growing number of children with autism spectrum disorder (ASD) are included in general education settings with typically

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developing children (U.S. Department of Education, 2017). Among the symptoms associated with ASD, social impairment is one of the most challenging core deficits (Locke, Williams, Shih, & Kasari, 2017). It strongly affects the ability of children with ASD to develop peer relationships in school. Although inclusion is intended to increase children's exposure to typically developing peers, children with ASD often are on the periphery of their classroom's social networks (Chamberlain, Kasari, & Rotheram-Fuller, 2007; Kasari, Locke, Gulsrud, & Rotheram-Fuller, 2011) and their social involvement declines with age (Rotheram-Fuller, Kasari, Chamberlain, & Locke, 2010). Many children with ASD spend most of their recess time engaged in solitary activities (Kasari et al., 2011; Locke, Shih, Kretzmann, & Kasari, 2016). Without intervention and appropriate supports, social impairment in children with ASD is unlikely to improve and will persist through adulthood (Kasari, Rotheram-Fuller, Locke, & Gulsrud, 2012; Locke, Kasari, Rotheram-Fuller, Kretzmann, & Jacobs, 2013; Orsmond, Krauss, & Seltzer, 2004).

Several social skills programs have been developed to address these issues and many have shown efficacy in improving social outcomes for children with ASD (McConnell, 2002); however, few have been tested in schools. Of those programs that have been tested in schools, both adult-facilitated and peer-mediated models have demonstrated evidence of their effectiveness (Kasari et al., 2012; Laushey & Heflin, 2000). Adult-facilitated interventions involve creating opportunities for children to engage in structured activities with peers on the playground and providing in-vivo social skills coaching, whereas peer-mediated interventions entail training typically developing peers to interact with children with ASD (Bellini, Peters, Benner, & Hopf, 2007; Chan et al., 2009; Kasari et al., 2012; Rao, Beidel, & Murray, 2008). Although both types of interventions are promising, schools have not adopted, implemented, or sustained them in routine practice, in part, because these interventions were not developed to work with the limited resources and constraints that exist in public schools (Dingfelder & Mandell, 2011).

Creating robust, practice-ready interventions may require a shift from traditional university-developed research interventions to treatments that can feasibly be implemented in every-day practice (Weisz, 2004; Weisz, Chu, & Polo, 2004). Social skills interventions that are adapted for the contexts in which they ultimately will be used may have a better chance of being used and sustained than those developed in university-based research settings. Treatments that emerge from practice may have an advantage compared to university-developed interventions, in that much of the work of fitting the treatment to the setting has already been done (Weisz et al., 2004). Conducting research in partnership with community systems increases the likelihood that resulting interventions will be more relevant, tailored, and actionable than if they were developed in a research laboratory, which may ultimately serve to close the research to practice gap (Green, 2008; Green, Glasgow, Atkins, & Stange, 2009).

With these ideas in mind, we compared three different social skills intervention models to examine how they were associated with the social success of children with ASD. The first model included two schools that relied on their existing resources and school personnel to adapt and implement an evidence-based social skills intervention to support included students with ASD during recess. While their adapted program was based on proven-efficacious practices (e.g., adult- and peer-mediated interventions) and appeared promising, the outcomes associated with their program had not yet been determined. The second model included schools in which university researchers implemented a university-developed social skills intervention for children with ASD with limited involvement of school personnel or resources (e.g., playground equipment, staff, space). The third model included schools with standard educational inclusion practices and no additional targeted social skills interventions (a usual care control condition). The goal of this comparison was to examine whether: (1) the adapted program produced similar social outcomes to that of the university-developed research program; and (2) both improved over usual practice.

## 2. Methods

### 2.1. Participants

Children in this study ( $N = 92$ ) all had an ASD classification through the education system. Children in the first group (Practice-Based Model;  $n = 14$ ) came from two schools in a school district that adapted and implemented existing evidence-based social skills interventions (adult-facilitated and peer-mediated interventions) for included children with ASD. Children in the second group (Research-Based Model;  $n = 45$ ) comprised students from the intervention arms of a randomized trial of a university-developed social skills intervention for included children with ASD across 30 schools ( $n = 45$ ; BLINDED FOR REVIEW). Children in the third group (Inclusion Only Model;  $n = 33$ ) attended 18 schools that practiced inclusion in general education classrooms for children with ASD. The average age of students was 8.4 years ( $SD = 1.6$ ) and the majority of students were male (88%). Approximately 52% of students in the sample were white and 48% of students were from minority racial/ethnic groups. Independent evaluators assessed children in the Research-Based Model using the Autism Diagnostic Observation Scale (ADOS; Lord et al., 2000) and the Autism Diagnostic Interview (ADI; Lord, Rutter, & Le Couteur, 1994) to confirm an ASD classification. School records [i.e., Individualized Education Plans (IEPs)] were used to document autism eligibility classification in the other two groups. All children had appropriate verbal language abilities that allowed them to independently and reciprocally engage with others without assistive technologies. Demographic information is presented in Table 1.

### 2.2. Measures

#### 2.2.1. Friendship survey

In a group format, all consented and assented children were asked, "Are there kids in your class who like to hang out together? Who are they?" (Cairns, Cairns, Neckerman, Gest, & Garipey, 1988). This free-recall method was used instead of providing a list of children's names or pictures because the relative strength of children's tendency to recall classmates is an important indicator of the

**Table 1**  
Descriptive statistics across groups.

	Practice-Based Model (n = 14)	Research-Based Model (n = 45)	Inclusion Only Model (n = 33)	p
Age in years	8.71 (1.27)	8.22 (1.54)	8.50 (1.93)	.57
Male (%)	78.6	88.9	90.9	.48
Race/Ethnicity (%)				.03*
African American	0	6.7	9.1	
Hispanic	0	24.4	6.1	
Caucasian	92.9	42.2	48.5	
Asian	0	17.8	9.1	
Multiethnic	7.1	0	6.1	
Grade (n)				.57
PreK/K	0	0	2	
First	2	11	6	
Second	8	13	7	
Third	0	5	4	
Fourth	2	10	7	
Fifth	2	6	3	
Sixth	0	0	3	
Seventh	0	0	1	
Class Size (M, SD)	23.00 (1.71)	32.62 (16.20)	30.36 (9.48)	.05*

\*  $p < .05$ .

peers' salience in the classroom's social structure and provides a robust picture of the full set of peer networks (Cairns et al., 1988). Children were reminded to include girls and boys as well as themselves in groups. Children with reading and/or writing difficulties were interviewed individually. On average, 17.20 (SD = 3.02) children completed the Friendship Survey per classroom (range 8–30). A minimum of 50% of the classroom had to consent and assent to complete the Friendship Survey; some classrooms had 100% participation.

### 2.2.2. Coding social network centrality (Cairns & Cairns, 1994; Kasari et al., 2011)

Social network analyses were conducted in order to obtain each student's social network centrality score (Cairns & Cairns, 1994). Social network centrality refers to the prominence of each individual in the overall classroom social structure. Three related scores are calculated in order to determine a student's level of involvement in the classroom's social network: 1) the student's "individual centrality," 2) the group's "cluster centrality," and 3) the student's "social network centrality." Using methods developed by Cairns and Cairns (1994), the first two types of centrality are used to determine the third (Cairns, Gariépy, & Kindermann, 1990; Farmer & Farmer, 1996). Based on categorizations by Farmer and Farmer (1996), four levels of SNC are possible: isolated (no connections in the classroom), peripheral (child is in the bottom 30% of the classroom), secondary (child is in the middle 40% of the classroom), and nuclear (child is in the top 30% of the classroom). These four levels of involvement in the classroom's social structure, ranging from isolated to nuclear, were coded from 0 to 3, to provide a system for describing how well children with ASD are integrated in their informal peer networks.

### 2.2.3. Playground Observation of Peer Engagement (POPE; Kasari, Rotheram-Fuller, & Locke, 2005)

The POPE is a time-interval behavior coding system. Independent and blinded observers recorded children's engagement with peers on the playground, and frequency of social communicative behaviors (See Kasari et al., 2011 for a complete description of the coding system). Observers watched the child with ASD on the playground for 40 consecutive seconds and then coded for 20 s during the recess or lunch play period. Playground observations were an average of 14.5 min (SD = 1.08; range 11–15 min). The duration of the observation differed as schools varied in the length of their recess period. The observers noted the child's solitary engagement on the playground in each interval. Solitary engagement was summed for a total proportion of intervals where the child was alone on the playground. To account for varying intervals per observation, a percentage was calculated (number of intervals children spent in solitary engagement divided by the total number of observed intervals) for that observation period. Observers also recorded the total number of initiations to peers on the playground. The total number of initiations was divided by the duration of the playground observation to calculate a successful initiation rate, which was used in the analyses. Before beginning data collection, all observers were trained and considered reliable with percent agreement > 0.80. Observations were conducted within the same week as the Friendship Survey across all schools; however, data were not collected in the same month across all school sites. Data collection was completed towards the beginning of the school year, months October through December, when study activities commenced.

### 2.3. Procedure

Families of children with ASD in the two Practice-Based Model schools completed an informed consent form, and both schools provided a letter of participation, which was submitted to the IRB for approval. Research personnel visited the target child's (i.e., student with ASD) classroom and distributed consent forms to all children in the class. Children were informed that their classroom

**Table 2**  
Components of each intervention model.

	Inclusion	Intensity	Duration	Group Composition	Interventionist
Practice-Based Model	Full	Daily	School Year	Multiple children with ASD; multiple peers	Teacher and School Staff
Research-Based Model	Full	12 sessions	6 weeks	1 child with ASD; 3 peer models	Expert Clinician
Inclusion Only Model	Full	–	–	–	–

*Note:* Full inclusion is defined as 80% or more of the school day where children with ASD spend in a general education classroom with typically developing peers.

was selected to participate in a study to examine children's friendships, in order to protect the confidentiality of the child with ASD. Only consented and assented children in the classroom completed the Friendship Survey at a time that was convenient for their teacher. In addition, playground observations were conducted once per child with ASD. Data were gathered at the end of the school year when the social skills interventions had been completed.

Families of children with ASD from the Research-Based Model provided written consent to participate in the intervention trial. Data from the exit time point (i.e., after the intervention phase of the study was completed) were used for analysis in this project. Schools provided a letter of participation submitted to the IRB and an external Data Safety and Monitoring Board monitored all procedures. Friendship Surveys were administered to all consented and assented children in classrooms at the end of intervention. To reduce the likelihood of demand characteristics in student responding at the end of treatment, interventionists did not administer surveys. The playground observations were conducted twice at the end of the 6-week treatment phase and averaged for the purposes of these analyses. See REMOVED FOR BLINDED REVIEW for a more detailed description.

Data from the three schools with the Inclusion Only Model were gathered as part of a larger service project to the district. The school district hired an independent contractor to collect and code the data for informational purposes to make policy decisions around included children with ASD. The independent contractor and her team conducted surveys in a group format, with individual assistance provided to any students who needed additional help reading and/or writing. All data were de-identified prior to transfer to the study investigators.

#### 2.4. Practice-based intervention model

Table 2 contrasts the three intervention models. The two Practice-Based Model schools in this study adapted and implemented evidence-based interventions that incorporated adult-facilitated and peer-mediated strategies. The intervention components were borrowed from evidence-based social skills interventions and adapted to address the needs of their student population, while fitting within the schools' resources, mission, and infrastructure. The schools added additional sessions per week and modified curricular areas to align with individual IEP and classroom goals. These goals were embedded within the social skills group and included leadership, collaboration, and flexibility. School personnel implemented the program four days a week during the child's lunch period (30–45 min) with one day devoted to skill building using a group format throughout the school year. During the group session, school personnel met with children with ASD and a select group of typically developing peers (one-two peer models from the same class as the child with ASD who were willing to participate and whose parents provided consent; there were no other inclusion criteria) to address a variety of social skills (e.g. how to enter and exit a game, compromising, having a conversation, etc.) pertaining to their students' needs. Decisions about individualization of skills taught followed students' IEP goals and were made as a school team. Afterwards, during the lunch recess period, school personnel facilitated a structured game on the playground with children with ASD and their peers. During the game, school personnel participated in the game while providing in-vivo coaching to children with ASD, as needed.

#### 2.5. Research-Based Model interventions

The REMOVED FOR BLINDED REVIEW study systematically compared two intervention models in a  $2 \times 2$  design: child-assisted and peer-mediated interventions. In the child-assisted condition, children with ASD met with a trained interventionist during recess or lunchtime for 20 min twice weekly for six weeks (12 sessions total). The goal of the child-assisted program was to help children with ASD develop strategies to engage socially with peers through direct instruction. Didactic instruction, behavioral rehearsal, and practice with the interventionist were used to target each skill (see REMOVED FOR BLINDED REVIEW of skills), which were based on children's individualized needs and informed by teachers and parents. In the peer-mediated condition, three typically developing children from the target child's classroom were taught strategies for engaging children with ASD on the playground. Peer models were selected via teacher nomination and had to provide consent and assent in order to participate as peer models. There were no other inclusion criteria. The peer models met in a group format with a trained interventionist for 20 min twice weekly during recess or lunchtime for six weeks (12 sessions total). The goal of the peer-mediated program was to increase appropriate, meaningful social interactions for children with ASD by teaching typically developing peers strategies to interact with children who had social challenges. In both conditions, the university-based interventionist, an expert clinician, facilitated activities/games on the playground. See REMOVED FOR BLINDED REVIEW for a more detailed description.

## 2.6. Inclusion only model

Children with ASD in the Inclusion Only Model were included in classrooms for the majority of the school day (80% or more). In response to IEP goals for children with ASD, inclusion in a general education classroom was the intervention strategy; however, no other targeted interventions or services that specifically addressed social skills or social functioning were provided. Children with ASD participated in both structured and unstructured activities with the peers within their classrooms and were observed on the playground during unstructured times when they had the opportunity to engage with peers.

## 2.7. Statistical analysis

The Friendship Survey and POPE measures produced a number of sub-scores. To achieve the most parsimonious results, we a-priori selected the outcome variables that were consonant with stated intervention goals and have been documented as meaningful, ecologically valid outcomes of social skills interventions in previous studies (Kasari et al., 2012; Kretzmann, Shih, & Kasari, 2015; Locke et al., 2018). Therefore, the analyses examined sociometric ratings of classroom social network centrality, observed solitary engagement and successful initiation rates to peers on the playground (Kasari et al., 2011, 2012; Lang et al., 2011). We first report descriptive data characterizing each group (i.e. a Practice-Based Model, a Research-Based Model, and Inclusion Only Model) on the variables of interest. Analyses of variance (ANOVA) and chi-square analyses were used to test for differences among the three groups on the following variables: age, sex, ethnicity, grade, and class size. As seen in Table 1, the age, sex, and grade of the participants did not significantly differ between the three groups; however, ethnicity and class size did ( $p < .05$ ). Linear regression was used to test for associations between group membership and each social outcome. Due to concerns regarding statistical power, we only included variables in the adjusted model for which the groups differed at  $p < .20$ . In each model, we tested for group differences and wherever appropriate, controlled for ethnicity, which was grand-mean centered to facilitate intercept interpretability. Separate exploratory analyses including only the peer-mediated intervention arm from the Research-Based Model ( $n = 30$ ) in comparison to the Practice-Based Model and the Inclusion Only Model were conducted; however, there were no significant differences from the results presented below. Therefore, in the interest of maximizing our sample size, the Research-Based Model includes both the child-assisted and peer-mediated conditions ( $n = 45$ ). All analyses were conducted using PASW Statistics version 18.

## 3. Results

Means and standard deviations for all outcome variables by group are reported in Table 3.

### 3.1. Social network centrality

Children in both the Practice-Based Model ( $-0.50$ ;  $p = .05$ ) and the Inclusion Only Model ( $-0.54$ ;  $p < .001$ ), had lower social network centrality than the children in the Research-Based Model (Table 4).

### 3.2. Playground engagement and initiations

As shown in Table 4, children enrolled in the Practice-Based Model spent significantly less time in solitary engagement on the playground ( $p = .04$ ), than those in the Research-Based Model. On average, this difference was 17% less for the children in the Practice-Based Model compared to the Research-Based Model. Children in the Inclusion Only Model showed no significant differences in the percentage of time spent in solitary engagement from children in the Practice-Based Model or Research-Based Model. Children in the Practice-Based Model had a higher successful initiation rate than children in the Research-Based Model ( $p = .04$ ). Children in the Inclusion Only Model showed no statistically significant differences in the number of initiations to peers from children in the Practice-Based Model or the Research-Based Model.

## 4. Discussion

The purpose of this study was to examine the social outcomes of children with ASD participating in three different school settings: a) a practice-based model of intervention implementation (Practice-Based Model); b) a university-developed social skills intervention (Research-Based Model); and c) inclusion settings with no additional social skills support (Inclusion Only Model). Results indicated

**Table 3**  
Social outcome variables across groups.

	Practice-Based Model (n = 14)	Research-Based Model (n = 45)	Inclusion Only Model (n = 33)
Social Network Centrality	1.29 (.99)	1.78 (.74)	1.27 (.57)
Solitary Engagement (%age time)	.12 (.20)	.29 (.26)	.24 (.26)
Successful Initiation Rate	.79 (.21)	.63 (.24)	.67 (.27)

**Table 4**

Unadjusted (unadj. coeff.) and adjusted (adj. coeff.) models of social network centrality, solitary engagement and initiations to peers.

		Social Network Centrality				Solitary Engagement				Initiation Rate to Peers			
		Unadj. coeff.	p	Adj. coeff.	p	Unadj. coeff.	p	Adj. coeff.	p	Unadj. coeff.	p	Adj. coeff.	p
Group	Practice-Based Model	-.49	.03*	-.50	.05*	-.17	.03*	-.17	.04*	.16	.04*	.16	.04*
	Inclusion Only Model	-.51	.003**	-.54	.00**	-.05	.44	-.01	.88	.04	.52	.04	.52
Ethnicity	African American	.08	.80	.04	.91	-.21	.05*	-.26	.02*	.05	.70	-	-
	Latino	.35	.40	-	-	.07	.40	-	-	-.04	.65	-	-
	Asian	.22	.15	.05	.84	.04	.61	-	-	-.01	.88	-	-
	Multiethnic	.58	.21	-	-	-.26	.09	-.24	.11	.02	.92	-	-
Class Size		-.00	.63	-	-	.00	.82	-	-	.00	.36	-	-

\*  $p < .05$ .\*\*  $p < .01$ .

that children in the Research-Based Model had significantly higher social network centrality than children in either of the other two models. However, children in the Practice-Based Model were less isolated on the playground and had more successful initiations to peers than those in the Research-Based Model. Children with ASD in the Inclusion Only Model did not differ in solitary engagement or initiations to peers from either of the other groups.

Several implications can be drawn from these mixed results. First, while translation of evidence-based interventions from research to practice settings is challenging, these data suggest that researchers may learn from public school stakeholders who are able to adapt and use elements of proven efficacious interventions to meet the social needs of their students with ASD. In many ways, schools implementing the Practice-Based Model were successful (e.g., better playground engagement and successful initiations to peers) and in some ways their model may need refinement (e.g., improving the integration of children into classroom social networks). These results are promising, as they suggest that school attempts to adapt evidence-based social skills interventions may be feasible and successful, and that specific factors leading to student social gains in practice-based models are worthy of more rigorous examination (e.g., operationalized definitions of systematic adaption procedures, fidelity measurement). These findings point to the importance of partnering with schools to learn about the adaptation process to determine what is required to successfully implement and sustain evidence-based social skills interventions in public school settings.

Although the Practice-Based Model incorporated evidence-based intervention components similar to the Research-Based Model, there were two fundamental differences in implementation: 1) the agent of intervention differed between the Practice-Based and the Research-Based Model; and 2) the Research-Based Model incorporated a separate targeted peer education component that the Practice-Based Model did not use. Despite these differences, both models yielded elevated scores in different areas of social functioning. Perhaps, different types of intervention strategies (adult-facilitated vs. peer-mediated) may be needed to address distinctive domains of social ability (classroom inclusion vs. playground engagement); implications are discussed below.

First, the agent of intervention may affect the domain of social functioning targeted. The Practice-Based Model used school personnel, whereas clinically trained researchers implemented the University-Developed intervention. The use of school personnel may have resulted in better peer engagement than the use of research staff because school personnel were more of a constant presence in the school than research staff, who were only present twice a week. Facilitating structured activities on the playground every day may allow children with ASD the opportunity to learn and practice their social skills more consistently and ultimately result in better peer engagement. Using school staff to engage in these social practices may be an effective and sustainable strategy to improve peer engagement on the playground. Second, training peer models in strategies that build sensitivity, understanding, and patience may be an effective strategy to improve children's social network centrality within their classrooms. Directly working with typically developing peers and providing them with the tools needed to engage children with social difficulties, as done the Research-Based Model, may foster more peer acceptance of children with ASD into social circles, allowing for more peer engagement. As a result, different types of intervention strategies may be warranted to address different areas of social functioning in children with ASD.

These data suggest that practice-based research models may be helpful to bridge the chasm between university-developed interventions and what actually occurs in community practice (Glasgow & Emmons, 2007). To date, traditional university-developed research models have not been readily translated into school settings (Dingfelder & Mandell, 2011). In fact, the translation from traditional models of tightly controlled efficacy research trials to actual practice can take an average of nine years (Green, 2008) and often upwards of 17 years (Balas & Boren, 2000). Using practice-based models may be a way to reduce this research to practice lag while addressing common barriers to implementation of evidence-based practices in schools. Finding models of excellence in schools that have successfully adapted, implemented, and sustained evidence-based social skills interventions may give us insight in understanding how to improve children's social functioning from the schools' unique perspective to ensure feasibility and successful execution. For example, partnering with and learning from these schools may help to address some of the challenges that schools face when attempting to implement evidence-based practices (e.g. allocating time and resources, organizing staffing, individualizing programs). Understanding how schools with limited resources and financial constraints manage to adapt and implement evidence-based social skills interventions also may point to strategies for other schools to adopt. However, as of yet, the ways in which schools successfully adapt and implement evidence-based interventions is still unknown.

#### 4.1. Limitations

Because data for this study were drawn from multiple sources, teacher demographic data were not available, and we were confined to a cross-sectional analysis. A single observation was used to provide a snapshot of children's social behavior with peers on the playground, which does not inform the stability of social behavior over time. The cross-sectional design limits understanding of what changes might occur across the intervention period or school year between children in the Practice-Based and Research-Based Models. Longitudinal studies could determine the dosage or length of time needed to address different areas of social functioning in children with ASD and may elucidate issues associated with generalizability and program sustainability.

Furthermore, as fidelity was not collected in the Practice-Based Model schools, it is not possible to conclude that child improvements in social functioning were a direct result of the adapted intervention. However, the results are promising, and suggest that these schools successfully improved some domains of social functioning for their students with ASD, and that their practice-based models are worthy of more rigorous exploration. Learning from schools may allow us to develop and tailor interventions to maximize feasibility and successful implementation.

Another limitation was the small sample size of children with ASD in the Practice-Based Model. The field has only recently begun to explore practice-based evidence as it applies to social skills interventions for children with ASD. Increased understanding about the experience of children attending schools who are adapting evidence-based interventions for their individual settings could possibly reduce the amount of time it takes for evidence-based interventions to be translated into community settings. Further exploration with larger numbers of children with ASD from Practice-Based Models is necessary to understand the potential benefits of conducting practice-based research.

Despite these limitations, there are important implications related to this study. It is among the first to examine a practice-based model of social skills interventions for children with ASD in schools. Although social skills interventions may have the most meaningful results if implemented in school (Locke et al., 2013), there are little data on the best ways to implement evidence-based social skills interventions in schools in a way that achieves the same outcomes observed when they are implemented by expert, University-Developed interventionists or clinicians. Findings from this study indicate that students with ASD attending schools that have adapted evidence-based social skills interventions are demonstrating some positive gains in their social functioning. These findings suggest that there is benefit to further exploring factors that may be associated with a school's ability to adopt, adapt, and implement evidence-based social skills interventions for students with ASD. Evidence from other disciplines suggests that largely understudied school factors such as school culture (shared beliefs and expectations of a work environment) and implementation climate (staff beliefs on whether use of an innovation is expected, rewarded, and supported by their organizations) may influence implementation success in community contexts (Glisson & Green, 2011; Glisson & James, 2002; Glisson et al., 2008, 2010; Klein & Knight, 2005). Culture and climate may be important determinants of a school's capacity to implement evidence-based social skills interventions and sustain change (Atkins, Frazier, & Cappella, 2006); however, the constructs that predict implementation in other settings rarely have been studied in schools. Future studies should carefully consider the organizational factors that may impact the use and implementation of evidence-based social skills interventions in school settings.

#### Disclosure of potential conflicts of interest

The authors declare that they have no conflict of interest.

#### Author note

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