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Abstract

Many speech-language pathologists (SLPs) are underprepared to serve children with ASD, despite a growing need and increased expectation for ASD expertise. To understand this practice gap, 60 SLPs and 26 parents of children with ASD were surveyed regarding SLP knowledge and competency. Of concern was that only about 50% of SLPs correctly identified ASD defining criteria. Respondents rated eight SLP practices as Important to Very Important, but SLPs reported being only Somewhat Competent to Competent. The parents' rating of SLP competency was significantly lower than parental ratings of importance for one educational practice, use of non-standardized assessment and observational methods. Also, parents rated the development of the Individualized Education Program significantly higher in importance than SLPs rated it. Findings varied for ASD specialty sub-groups. Results support socially valid improvements in preparation for SLPs on the frontlines of assessment, treatment, and development of health and educational systems for children with ASD.

Introduction

The Centers for Disease Control (CDC) indicated prevalence for autism spectrum disorders (ASD) among 8-year olds at an astonishing rate of 1 in 59 US children diagnosed in 2014 (Baio et al., 2018). This was an increase from about 7 in 1000 sampled children at the start of the 21st century to almost 15 in 1000 children for 2014. Although reporting agencies and methods differ, all indicators pointed to a doubling in prevalence, and the CDC concluded data likely represent a true increase. Parents of children with ASD and speech-language pathologists (SLPs) are two groups impacted by substantial increases in the past two decades. After all, significant increases in ASD result in overwhelming numbers of children needing assessment, early intervention, preschool programs, and general and special educational services.

SLPs are called upon as key early providers. That is, parents are referred to SLPs by primary care physicians when their children have not started talking. Although late language emergence is a characteristic of developmental language disorders associated with other developmental disabilities or nonspecific etiologies, it can be an early symptom of language disorder associated with ASD. More specifically, social communication deficits are core ASD features, and increasingly social communication deficits in 1-year olds can be reliably identified and serve as stable predictors (Pierce et al., 2019; Wetherby, Watt, Morgan, & Shumway, 2007). For these reasons, SLPs serving pediatric populations have substantial responsibility to differentially identify characteristics of ASD for children presenting with late language emergence. After identification, SLPs intervene across childhood to facilitate language development and social interaction skills - starting with prelinguistic behaviors such as joint attention and gesture, evolving to intentional verbal communication to request and comment, and building to multi-word utterances and literacy skills. Early identification and provision of

speech-language treatment addressing language and social communication are critical for children with ASD and predictive of outcomes. Early identification of ASD is associated with school success for children as young as age 5 years (Volkers, 2016), and relatively better language ability is a significant positive prognostic factor for children with ASD (Koegel, 2000). Consistent with this, 93% of surveyed parents of children with ASD reported currently or previously utilizing speech-language therapy (Green, Pituch, Itchon, Choi, O'Reilly, & Sigafoos, 2006). SLPs and parents can form important partnerships early and over time to support and optimize outcomes for children with ASD.

The American Speech-Language-Hearing Association (ASHA, 2016; n.d.-a), the professional and certifying organization for SLPs, publishes guidelines defining scope of practice, roles and responsibilities, necessary knowledge and skills for practicing SLPs serving individuals with ASD, and up-to-date references for evidence-based practices. The challenge, however, is that speech-language pathology is a broad field that covers diverse populations and services. A master's degree, the level of preparation for certification, provides general preparation for many communicative disorders and practice settings but does not support specialization. Given this preparation model, SLPs needed to serve the increasing numbers of persons with ASD may not be suitably prepared.

Several studies have investigated the preparation and expertise of SLPs serving individuals with ASD (Cascella & Colella, 2004; Plumb & Plexico, 2013; Schwartz & Drager, 2006). Cascella and Colella (2004) surveyed school-based SLPs regarding ASD knowledge for aspects like atypical play behaviors and social interaction as well as understanding low-tech AAC applications and assessing verbal development. Sixty-nine percent of SLPs reported that undergraduate and graduate programs provided very little training in ASD, but 82% of

participants reported participating in continuing education on ASD. SLPs rated themselves as knowledgeable to very knowledgeable for behavioral descriptions of ASD but somewhat to minimally knowledgeable for dynamic assessment and assessing parent-child conversations. Schwartz and Drager (2008) surveyed SLPs' knowledge of ASD characteristics (e.g., True/False, "children must exhibit impaired social interaction to receive a diagnosis of autism") and self-rated ASD competency (e.g., Likert rating, "I feel competent in my ability to determine appropriate intervention goals for children with autism at all stages of therapy." p. 72) and found that SLPs were not knowledgeable of diagnostic criteria for ASD but were knowledgeable about general ASD characteristics. SLPs were relatively unsure of their skills for serving children with ASD. Of the 67 SLPs across 33 states, only 2 had an entire graduate course devoted to ASD, but 77% said they participated in one or more graduate classes that addressed ASD. When asked about the duration of ASD content, 81% indicated it was about one week. Plumb and Plexico (2013) documented increases in training provided to SLPs between 2006-2012. The more recent graduates were two times more likely to have had an entire course or to have had two or three courses that addressed the topic of ASD. Despite the increase in dedicated course work, those who graduated prior to 2006 expressed more confidence for counseling parents about early signs of ASD and providing social skills intervention. Work-related experience and continuing education were likely factors supporting greater confidence for the older group of SLPs compared to the more recent graduates.

SLPs are not the only group challenged to serve individuals with ASD effectively. Investigators have sought to delineate the skills and confidence for educators (Brock, Huber, Carter, Juarez, & Warren (2014) and other healthcare providers (Heidgerken, Geffken, Modi, & Frakey, 2005). Brock et al. (2014) concluded that evidence-based practices for children with

ASD were not being applied in Tennessee schools based on responses from 456 teachers, special educators and administrators. Teachers rated their confidence for implementing specific evidence-based strategies (e.g., time delay, peer-mediated interventions) between 2.12-3.54 on a Likert Scale (1=not at all confident to 5=very confident). Surprising, teachers were not interested in ASD continuing education opportunities.

Iadarola et al. (2015) reported a primary theme of tension between school-based personnel and parents of children with ASD. Focus group findings revealed that school personnel bemoaned a lack of parental follow-through and parents did not trust school personnel to meet children's needs. Parents expressed concerns regarding teachers' limited knowledge of behavior management, and both parents and teachers stated the importance of social skills but indicated a need for additional training. Bitterman, Daley, Misra, Carlson, and Markowitz (2008) found that parents of preschoolers with ASD were more likely to express dissatisfaction than parents of children with other developmental delays. Parents of preschoolers with ASD said their children received too few treatment hours weekly and too few opportunities with peers despite receiving significantly more hours of speech-language therapy and other services in and out of school (e.g., occupational therapy, behavior management, and one-to-one aides) compared to children with other disabilities. Spann, Kohler, and Soenksen (2003), like Iadarola et al. (2015), reported that social, language and communication were parent priorities. Almost half (44%) expressed dissatisfaction with school services and this increased to 83% for older children (15-18 years).

Given the increased need for high quality services for persons with ASD, specialization and certificate programs have emerged and are increasing (Barnhill, Sumutka, Polloway, & Lee, 2013). Specialization in ASD can mean a variety of things. Since 2001, third-party certification is available from the International Board of Credentialing and Continuing Education Standards

(IBCCES, n.d.). Board certified behavior analysists, teachers, SLPs, and others can become Certified Autism Specialists ™ by meeting IBCCES educational, professional experience and continuing education standards. Barnhill et al. (2013) surveyed higher education institutions about the ASD credentialing practices of special education programs. They found that, of institutions offering ASD coursework (n = 90), 22% provided no specific certification, 29% offered a completion certificate, 18% provided state licensure or an endorsement, and 20% provided a degree concentration. ASHA recently approved the formation of a Specialty Certification Board in ASD (ASHA, n.d.-b). The SLP specialty certification program in ASD is expected to encompass a set of minimum standards – 450 clinical hours with persons with ASD; 60 hours of continuing education in ASD at an intermediate or advanced level; and a passing score on standardized assessment. Other fields with ASD as part of their scope of practice, such as psychiatry and pediatrics, report a relatively low rate of ASD specialists, such that recruiting trainees and staffing programs with trainers is challenging (Hsu, 2018; Marrus et al., 2014).

In summary, the prevalence of ASD has increased steadily in ways that tax existing providers and services, and there is a corresponding push to develop and identify ASD expertise. Previous survey studies revealed limitations in the ASD training of SLPs and other professionals, and investigations of the perceptions of parents of children with ASD revealed dissatisfaction with school-based personnel's knowledge and training. Our first aim was to compare perspectives of SLP and parents, two primary stakeholder groups. Research questions to address this aim were:

(1) Are there significant differences between SLPs and parents regarding accurate knowledge of diagnostic criteria and associated characteristics of ASD?

(2) Are there significant differences between and within SLP and parent groups for ratings of the importance of and SLP competency for targeted ASD assessment and intervention tools?

(3) Are there significant differences between SLP and parent groups for ratings of the importance of select educational practices associated with ASD?

Our second aim was to investigate parents' and SLPs' perceptions regarding ASD specialists. We asked:

(4) Are there significant differences in parent and SLP perceptions regarding which professions they perceived as being ASD specialists?

(5) What are SLPs' perceptions regarding the need for ASD specialty?

Lastly, we conducted an unplanned, post hoc analysis to address:

(6) Are there significant differences for key survey items for SLPs who self-reported as ASD specialists compared to non-specialists.

Understanding gaps in knowledge and perception for SLPs compared to the parents of children with ASD can support improved training of SLPs, a group of critical service providers.

Method

Participants

Eighty-six individuals participated: 60 SLPs and 26 parents of children with ASD. All but one SLP and 22 of 25 parents were female. Most SLPs were aged 26-35 years (38%). Participants were from the lower Alabama, Gulf Coast region: SLPs practiced in Alabama (61%), Florida (28%), Mississippi (9%), Georgia (2%), and parents resided in: Alabama (54%), Mississippi (34%), Florida (4%), and Texas (4%). Parents were primarily college-educated, and 91% of SLPs held Master's degrees. SLP experience levels were split with 30% of SLPs having 1-5 years of experience and 32% reporting 16+ years. Only 2 SLPs reported less than one year of

experience. A majority of SLPs (74%) worked in schools. When asked about their education, SLPs reported having no courses that solely addressed ASD in undergraduate (87%) or graduate (81%) programs, but 72% reported having one or two graduate courses that addressed ASD for up to two weeks. Seventy-five percent of SLPs said they sought continuing education in ASD.

Survey Creation

Separate surveys for SLPs and parents were created but sections overlapped to enable group comparisons. Surveys were created using Survey Monkey, an online provider with a secure server and SSL encryption. Each survey had a cover page with the title, contact information, and Institutional Review Board (IRB) details. If consenting, participants saw a brief overview of the survey purpose and some relevant statistics regarding ASD. Definitions of ASD were not provided because this information was surveyed.

The first section (Figure 1), "Characteristics of Autism" Questions #2-9 in both the SLP and parent surveys, assessed knowledge of the diagnostic criteria and some associated characteristics for ASD. These eight questions were modified from the true/false format of Schwartz and Drager (2008) to "Agree," "Disagree," or "Uncertain." The next section (Figure 2), "Effective Speech-Language Services for Children with ASD," questions were developed by investigators based on ASHA expectations for SLP roles and responsibilities (ASHA, 2016; n.d.-a) as well as tools considered to have emerging or established evidence (Bellini, Peters, Benner, & Hopf, 2007; Bopp, Brown & Mirenda, 2004; Goldstein, 2002; Koegel, 2000; LaRue, Weiss, & Cable, 2009; Mancil, 2009; National Autism Center, 2015). Responses for the first multi-item question, #10, addressing the importance of speech-language methods included: "Not Important (1.0)," "Minimally Important (2.0)," "Important (3.0)," and "Very Important (4.0)." Responses for the second question, #11, addressed SLP competency in using these tools when serving children with ASD (See Figure 2). Response options included: "Not Competent (1.0),"

"Somewhat Competent (2.0)," "Competent (3.0)," "Very Competent (4.0)." Together these questions probed the groups' perspectives regarding, first, the importance of assessment and intervention tools, and, second, the competency of SLPs in using these tools. Similarly, question #12 was a multi-item question designed to assess the importance of SLPs' knowledge, awareness, and effectiveness for core practices. Example questions included, "Rate your knowledge of current trends and issues in the field of autism," and "Rate your effectiveness in communication with team members (the family, other educators or service providers) for clients with autism spectrum disorders." Responses used a Likert scale with the options: "Not Important (1.0)," "Minimally Important (2.0)," "Important (3.0)," "Very Important (4.0)."

Insert Figures 1 and 2 About Here

Investigators developed the last section, entitled "Autism Specialists," for SLPs and parents to report their impressions regarding ASD expertise. First, they rated the likelihood that various providers (e.g., SLP versus psychologists or nurses) have specialized skills for ASD. Likert scale responses ranged from "Highly Unlikely" to "Highly Likely." The SLP survey had a follow-up yes/no question that asked if SLP respondents identified as an autism specialist. The SLP group had a final multi-item question on a Likert scale ranging from "Strongly Disagree" to "Strongly Agree" comprised of statements related to ASD specialists (e.g., "I usually like having assistance and direction from another professional or "autism specialist" when developing appropriate programs for children with autism").

Survey validity was addressed in two ways. Some items were adapted from prior studies that investigated ASD knowledge by SLPs (Cascella & Colella, 2004; Schwartz & Drager) or SLP preparation for another specialized population, traumatic brain injury (Hux et al., 1996). Most items were developed by the investigators and face validity was addressed by expert and

stakeholder review. Six faculty members from speech-language pathology and psychology reviewed both surveys, and two parents of children with ASD reviewed the parent survey. Feedback resulted in improved descriptions for educational practices, survey set up, and the content and organization for demographic information.

Procedures

To ensure human subjects protection, the university IRB approved survey materials and procedures. Recruitment was initiated in the lower Alabama, northern gulf coast region of the US. No attempt was made to conduct a national survey. Parents were recruited by word-of-mouth; from parent support organizations; and outreach via sending flyers home in the backpacks of children with ASD enrolled in local, specialized schools. Community SLPs working in pediatric clinics or school systems were recruited via regional professional groups and by word-of-mouth. Estimates for the numbers reached during recruitment were 238 SLPs and 291 parents. Following recruitment, 63 SLPs and 33 parents initiated the surveys, response rates of 25% and 12% for the SLP and parents, respectively. Three SLP and seven parent respondents were excluded because they completed the wrong survey or completed less than two thirds of the items. In total, there were 60 SLP participants and 26 parents.

Data Analysis

From Survey Monkey, responses were downloaded to Microsoft Excel spreadsheets and then imported to SPSS (IBM, 2015). Question one data were categorical; therefore, proportions of parents and SLPs who responded similarly were calculated and chi square tests were used to test group differences. Questions two, three, and four consisted of Likert scale items converted to numerical scales. Descriptive statistics were means, standard deviations, and ranges. Analyses of variance (ANOVAs) with repeated measures were used to test for significant differences within

and between groups, and Greenhouse-Geisser was selected to adjust for non-sphericity. Follow-up tests were conducted as applicable and Bonferroni corrections were applied to decrease the likelihood of incorrectly rejecting the null hypothesis. Question five responses were summarized as percentages of SLPs for Likert scale categories. No within group or between group comparisons were conducted. Lastly, *t* tests were used to investigate differences between SLPs who self-reported as ASD specialists and those who self-reported non-specialists.

Results

To address the first research question regarding knowledge of ASD diagnostic criteria and associated characteristics, parents and SLPs responded to eight survey questions (Figure 1). Only 52% (31/60) of SLPs and 44% (11/26) of parents were 100% accurate for Questions #2-5 regarding diagnostic criteria. Parents said “yes” self-injury was an aspect of the diagnosis more often than the SLPs, and SLPs did not indicate that restricted, repetitive behaviors were part of the diagnosis as often as the parents. For Questions #6-9, 97% (58/60) of SLPs and 92% (23/26) of parents responded correctly. Parents were unsure about gross and fine motor deficits as an ASD characteristic, and they agreed “children with autism never make eye contact” more often than the SLPs. Chi square tests of group differences were nonsignificant.

The second research question addressed the importance of assessment and intervention procedures considered best practices for children with ASD as well as the competency exhibited by SLPs for these. SLPs and parents on average rated all assessment and intervention tools as Important to Very Important (Table 1). The mixed model ANOVA/Greenhouse-Geisser revealed a significant main effect for the within-subjects factor of Importance, F (5.36, 428.64) = 3.70, p = .002. The between-subjects factor Group (SLP v. Parent) and the Interaction term (Importance X Group) were nonsignificant. Given the main effect, separate repeated measures ANOVAs

were conducted for each group to test differences in Importance ratings. SLP Importance ratings (Table 1) were significantly different, F (4.45, 244.81), p <.001; however, differences within the Parent group for Importance ratings were nonsignificant, F (4.57, 114.16) = 0.765, p = .566.

Of particular interest for research question two were differences between Importance ratings and SLP Competency ratings. Although Importance and Competency are separate constructs, Likert scales were created to rate them similarly (e.g., 2 = “Somewhat Important” and “Somewhat Competent”) and eight paired samples *t*-tests with a Bonferroni correction were conducted within each group. When comparing SLP ratings, statistical significance was found for six of the eight practices (Table 1). For these, SLPs rated practices as Important or Very Important but rated their competency as only Somewhat Competent. Parents’ perceptions of importance and SLP competency revealed one statistically significant difference: Parents rated use of Non-Standardized Assessments and Observational Methods as significantly more important than SLP competency for this skill.

For the third research question, SLPs’ and parents’ ratings of the importance of SLPs’ knowledge and effectiveness for educational practices associated with ASD were compared (see Table 2). Parents rated all as Important to Very Important, means of 3.5 or higher. Similarly, SLPs rated five of the eight 3.5 or higher. The mixed model ANOVA/Greenhouse-Geisser revealed a significant main effect for the within-subjects factor Educational Practice and the interaction term Educational Practice X Group. To understand differences for educational practices within groups, separate group ANOVAs were conducted. Despite a significant main effect of Importance for the Parent group, F (2.55, 63.80) = 3.53, p = .025, pairwise comparisons were not statistically significant. This was most likely because of consistently high ratings for all eight. For the SLP group, a significant main effect of Importance was revealed, F (4.96, 282.53)

= 7.80, p <.001, and statistically significant pairwise comparisons are shown in Table 2. Eight independent samples *t*-tests were conducted to test group differences given the significant interaction and results are shown in Table 2.

Insert Table 2 About Here

The fourth research question addressed perceptions of SLPs and parents regarding which professions are likely to be ASD specialists. Respondents rated the likelihood of 10 professions being ASD specialists (Table 3). The ANOVA (10 Professionals X 2 Groups) revealed a significant main effect of Professional (F [6.60, 514.84] = 30.84, p < .001) and a significant interaction effect for Professional X Group (F [6.60, 514.84] = 2.471, p = .019). Independent samples *t* tests revealed one significant difference shown in Table 3. Next, for research question five, the SLPs, but not parents, rated statements regarding their access to or work with ASD specialists and their consideration of becoming an ASD specialist (Table 4). All said that children in schools could benefit from an ASD specialist, and 98% agreed they would collaborate with an ASD specialist if available. Furthermore, 70% said they would be interested in becoming an ASD specialist, even if that meant additional academic training.

Insert Tables 3 and 4 about here.

When SLPs were asked if they considered themselves ASD specialists, 19% agreed. This unplanned finding led to a post-hoc analysis of data with the SLP group divided into ASD Specialists and Non-Specialists. ASD Specialists reported having sufficient clinical and educational training compared to those who were Non-Specialists, t (56) = 4.03, p = <.001. This perception was despite nonsignificant group differences (p > .006) in degree-based training and continuing education. Instead, specialists reported a significantly higher number of children with ASD on career caseloads than Non-Specialists, 21-25 compared to 11-15 individuals,

respectively (t [42] = 2.60, p = .013). When key survey responses were examined for the specialist subgroups, ASD Specialists were significantly more accurate for understanding ASD characteristics, Questions #6-9, (t [46] = 3.51, p = .001) than Non-Specialists, 100% and 93%, respectively. And, ASD Specialists had competency self-ratings significantly higher than Non-Specialists for two tools: Milieu Teaching, t (56) = 3.01, p = .004, and Non-standardized Measures and Observational Methods, t (56) = 2.86, p = .006.

Discussion

This study was the first to compare directly survey responses of SLPs and parents regarding critical components of effective speech-language practice with children with ASD, and findings illuminate the practice gap between SLP preparation and expectations for SLP expertise serving children with ASD and their families. The first finding was that only about 50% of SLPs answered questions about ASD diagnostic criteria accurately. This result was surprisingly low; after all, surveyed SLPs had pediatric experience and the majority worked in schools. Knowledge for defining ASD was not significantly different for parents compared to SLPs, but it is not parents' responsibility to identify ASD. Imagine the impact of not having sufficient ASD knowledge by pediatric SLPs when 1 in 59 US children are diagnosed with ASD by age 8 and parents report speech-language therapy as the highest frequency service? It is critical that SLPs in pediatric settings acquire a strong understanding of ASD diagnostic criteria, because often it is SLPs who first see late-talking children. A lack of knowledge by SLPs can delay developmental evaluations. Although ASD diagnosis can be accurate for two year olds, most children are evaluated after age three and are not diagnosed until after four, too late for early intervention.

Our estimate of SLPs' knowledge of ASD represented an improvement compared to Schwartz and Drager (2008). SLP accurate responding for the core feature of social interaction impairment was 97%, up from 79% reported by Schwartz and Drager, and for restricted,

repetitive behaviors was up to 73% compared to their 52%. Course work has increased over time (Plumb & Plexico, 2013), a likely factor supporting increases in SLP knowledge. Plumb and Plexico, however, found that SLPs who had been out of school longer were more knowledgeable than recent graduates, implying that continuing education and experience were critical components. Our findings also suggested that experience was more important than formalized continuing education. Our SLP specialist sub-groups did not report significantly different pre-professional training or continuing education. Instead, ASD specialists reported significantly larger career ASD caseloads compared to non-specialists. Differences seemed small: career caseloads of 20 or more compared to an average of 11-15 career clients. Do SLPs who have served 15-20 clients with ASD, begin to acknowledge their expertise? Perhaps increased experiences lead SLPs to undertake independent study, not reported as continuing education. Serving even a few more children, given ASD heterogeneity, may broaden SLP knowledge.

A second finding was that SLPs rated their competency for ASD practices as significantly lower than their importance ratings, confirming our hypothesis that SLPs lacked confidence for specialized skills needed to effectively serve children with ASD. In particular, SLPs indicated lower competence for applied behavior analysis and functional communication training but not the behavioral methods of discrete trial training or milieu teaching. We judged this result to be due to lower importance ratings, not lower competency ratings, for discrete trial training and milieu teaching. We argue that SLPs do not have sufficient knowledge to accurately judge importance, especially for milieu teaching. Consistent with our interpretation, significant differences were found for ASD specialists' competency self-ratings compared to non-specialists' self-ratings for milieu teaching. Findings are noteworthy, because milieu teaching is an evidence-based treatment for children with ASD (e.g., Kaiser & Yoder, 1992; Mancil, 2009).

The ASD specialists also reported higher self-rated competence compared to non-specialists for non-standardized measures and observational methods. This leads us to the one significant difference between parents and SLPs when rating SLP competency. Parents of children with ASD perceived SLPs' competent use of non-standardized and observational methods significantly lower than parent-rated importance. Parents may know that standardized test procedures create difficult testing environments and unrealistic standards for their children with ASD. In direct conflict with parents' perceptions were the SLP group's relatively higher self-ratings for non-standardized and observational methods compared to competency for other skills. We propose that despite competence, SLPs tend to over-rely on standardized assessments for several reasons. One factor is the interpretation of federal laws that lead to almost exclusive use of standardized assessments for service eligibility and progress monitoring in school settings. A second factor is pre-professional training that traditionally emphasizes administering standardized tests. And lastly, non-standardized and observational methods are deemed too time-consuming to be undertaken by busy school-based SLPs. A re-examination of non-standardized and observational methods is worthwhile, and improved training could increase efficient use.

One of our more revealing findings was that SLPs rated the importance of IEP/IFSP development significantly lower than parents of children with ASD. SLPs, 74% of whom worked in schools, did not value the IEP/IFSP development process at the same level as parents. For parents, IEP/IFSP development often consists of one annual meeting with team members to discuss current functioning, goal areas, and accommodations. This yields high stakes for parents, unlike SLPs who participate in many IEP/IFSP meetings. Perhaps familiarity for SLPs results in reduced appreciation inconsistent with parental expectations. White (2014) investigated state-

level school system complaints filed between 2004-2009 by parents of children with ASD and found that almost three fourths listed the IEP process as the problem.

SLPs also rated the importance of knowledge of current trends significantly lower than the parents of children with ASD. One reason may be that SLPs know that some trends (e.g., use of hyperbaric oxygen or glutathione supplements) are not part of their practice. In fact, it is SLPs' responsibility to avoid recommending treatments with no evidence, or worse yet, considered not effective (e.g., ASHA, 2018 position on facilitated communication). We are not suggesting that SLPs engage in discredited practices; however, SLPs can listen and counsel parents seeking information and deciding how to allocate resources. For this reason, SLPs need to stay abreast of information available to families of children with ASD.

The last consideration is the need for ASD specialists. Clearly SLPs and other professionals serving children with ASD can be better prepared, but the appropriate level of preparation needed, a combination of pre-professional course work and clinical practice plus work experience and continuing education, is unclear. SLPs surveyed indicated that they would use the support services of an ASD specialist in schools, and the majority indicated willingness to develop ASD specialty with training. Third-party certification processes, like IBCCES or the SLP Specialty Board Certification in development with ASHA, cost hundreds of dollars initially and annually on top of other annual certification and licensure costs. Furthermore, there has been no research regarding the impact of ASD specialists compared to non-specialists on the quality of services or outcomes for children with ASD.

Study limitations are primarily associated with the sample. Recruitment focused on a relatively small region with established practice gaps. (Campbell, Ellis, Baxter and Nicholls [2007] found that the average age of ASD diagnosis in Alabama is six years old and 23% of

those diagnosed received the diagnosis outside of the state of Alabama.) Our survey recruitment relied on convenience sampling, limiting comparisons between the sample and the population. Some of our demographic findings support generalization to the population. Specifically, the age, gender and educational background of participants was in keeping with expectations for the greater population of SLPs and mothers. It is possible, however, that survey participants have a vested interest in ASD. One indication of this was the relatively high number of SLP respondents, 19%, who considered themselves ASD specialists. Also, groups were not aligned: The parents of children with ASD were not necessarily being served by the SLPs surveyed. Notwithstanding limitations, this investigation provided a direct comparison of parents' and SLPs' perceptions in a region of the US struggling to support the needs of the ASD community.

Conclusion

SLPs, despite their substantial role serving children with ASD and their families, continue to report being underprepared for ASD specialized knowledge and skills. Both SLPs and parents exhibited weaknesses for correct identification of ASD defining features. SLPs said they are only somewhat competent for skills they considered very important. Parents generally reported that SLPs were competent, except for the use of non-standardized and observational assessments. Also, SLPs' ratings of importance were lower than parents' ratings for the IEP/IFSP process and knowledge of current trends. Lastly, SLPs who were ASD specialists demonstrated more knowledge and greater competence than non-specialists. Findings make clear the need for improved training for SLPs, including consideration of the need for ASD specialty, with the aim to deliver maximally effective speech-language services for children with ASD.

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Table 1

Parent and SLP Group Mean Ratings of Importance and SLP Competency for Surveyed Skills

	Parents			SLPs		
Importance	*M*	*SD*	Range	*M*	*SD*	Range
Sign Language	3.19	.98	1-4	3.30	.85	1-4
Discrete Trial Training (DTT)	3.38	1.13	2-4	**3.02**[1]	1.11	2-4
Applied Behavior Analysis (ABA)	3.62	.90	2-4	3.50	.60	2-4
Augmentative/Alternative Communication (AAC)	3.58	.76	1-4	3.50	.68	1-4
Functional Communication Training (FCT)	3.46	1.10	1-4	**3.68**[2]	.68	2-4
Milieu Teaching Paradigm	3.15	1.22	1-4	3.10	1.20	2-4
Social Skills Training	3.46	1.33	2-4	3.69	.50	2-4
Non-standardized Observation Measures	3.46	1.24	1-4	3.36	1.01	2-4
Competency						
Sign Language	2.73	1.40	1-4	**2.60**[3]	1.03	1-4
Discrete Trial Training	2.92	1.23	1-4	2.92	.93	1-4
Applied Behavior Analysis	3.04	1.11	1-4	**2.71**[3]	.89	1-4
Augmentative/Alternative Communication	3.04	1.22	1-4	**2.77**[3]	.87	1-4
Functional Communication Training	2.96	1.22	1-4	**2.75**[3]	1.13	1-4
Milieu Teaching Paradigm	2.73	1.28	1-4	2.77	1.11	1-4
Social Skills Training	2.84	1.21	1-4	**2.88**[3]	.76	1-4
Non-standardized Observation Measures	**2.62**[4]	1.41	1-4	**2.95**[3]	.79	2-4

Note. Likert scales were: “Not Important/Competent” (1.0), “Somewhat Important/Competent” (2.0), “Important/Competent” (3.0), and “Very Important/Competent” (4.0).

[1]SLPs rated DTT significantly less in Importance than FCT or Social Skills Training

[2]SLPs rated Importance of FCT significantly more than Milieu Teaching Paradigm

[3]SLPs rated their Competency significantly less ($p < .006$) than Importance for 6 of 8 skills

[4]Parents rated Importance significantly higher than SLPs' Competency for Non-standardized Observation Measures.

Table 2

Parent and SLP Perceptions of the Importance of Educational Practices Associated with ASD

	Parent			SLP		
	M	*SD*	Range	*M*	*SD*	Range
ASD Characteristics	3.92	.272	3-4	**3.75**[1]	.628	3-4
Current Trends	**3.85**[2]	.368	3-4	3.43	.722	2-4
Identification Process	3.50	.860	3-4	3.32	.797	2-4
Ongoing Assessment	3.92	.272	3-4	3.69	.650	3-4
Health and Medical Issues	3.69	.884	2-4	3.63	.688	2-4
IEP/IFSP Development	**3.92**[3]	.272	3-4	3.48	.911	1-4
Team Member Communication	3.92	.272	3-4	**3.85**[1]	.577	3-4
Counseling Parents	3.65	.846	3-4	3.68	.676	2-4

Note. Ratings based on a Likert scale: "Not Important" (1.0), "Somewhat Important" (2.0), "Important" (3.0), and "Very Important" (4.0).

[1]SLPs rated Team Member Communication and Knowledge of ASD Characteristics significantly more important than Knowledge of Current Trends and Educational Identification Process

[2]Ratings by Parents for Knowledge of Current Trends were significantly higher than by SLPs.

[3]Parents rated Importance significantly higher than SLPs for IEP/IFSP Development

Table 3

Parents' and SLPs' Ratings and Rankings for Likelihood of Providers Being Autism Specialists

	Parent				SLP			
	M	*SD*	Range	Rank	*M*	*SD*	Range	Rank
Pediatrician	3.20	.96	1-4	7	3.02	.71	1-4	6
Nurse	**2.96**[2]	.94	2-4	9	2.32	.78	1-4	10
Neurologist[1]	3.64	.59	2-4	3	3.62	.56	2-4	3
OT	3.44	.77	2-4	5	3.42	.68	2-4	5
SLP[1]	3.64	.64	2-4	3	3.71	.49	2-4	2
PT	2.80	1.00	1-4	10	2.98	.71	1-4	7
Psychologist[1]	3.73	.67	1-4	2	3.58	.59	2-4	4
Counselor	3.16	.99	1-4	8	2.85	.72	2-4	9
Educator /Teacher	3.24	.93	1-4	6	2.98	.76	1-4	7
Behavior Analyst[1]	3.83	.49	2-4	1	3.75	.44	3-4	1

Note. Likert scale: "Highly Unlikely" (1.0), "Not Likely" (2.0), "Likely" (3.0), and "Highly Likely" (4.0).

[1]SLPs' rated four professionals significantly more likely to be ASD specialists than others. Similarly, parents' ratings for the four were significantly higher than for nurses and physical therapists.

[2]Nurses were rated significantly more likely to be ASD specialists by parents than SLPs.

Table 4

SLP Perceptions Regarding Access to, Use of, and Future Option of being an ASD Specialist

	Strongly Disagree 1.0	Disagree 2.0	Agree 3.0	Strongly Agree 4.0	Not Sure	*M* (*SD*)
I usually like having assistance and direction from another professional or "autism specialist" when developing appropriate programs for children with autism**.**	0% (0)	8% (5)	**48% (29)**	42% (25)	2% (1)	3.28 (0.76)
I feel that I have enough clinical and educational training to deliver effective intervention to children with autism.	0% (0)	25% (15)	**60% (36)**	13% (8)	2% (1)	2.83 (0.72)
I feel that I could have benefitted from receiving additional coursework and training in the area of autism**.**	0% (0)	8% (5)	**50% (30)**	42% (25)	0% (0)	3.33 (0.63)
I feel that children in public school systems could benefit from access to autism specialists**.**	0% (0)	0% (0)	33% (20)	**65% (39)**	2% (1)	3.60 (0.67)
If I knew that I could work with or have access to an autism specialist, I would use that person as a resource**.**	0% (0)	2% (1)	41% (24)	**58% (34)**	0% (0)	3.56 (0.53)
I would be interested in becoming an autism specialist even if that meant participating in additional academic training**.**	7% (4)	23% (14)	**33% (20)**	32% (19)	5% (7)	2.80 (1.12)

Note. Frequencies are reported in percentage of respondents (number of respondents). The most frequent response category is bolded.

SLPs Self Perceptions of Speech-Language Services for Children with Autism Spectrum Disorders

3. Characteristics of Autism

Please consider the following questions that relate to characteristics of autism, particularly as currently defined for a diagnosis. Answer to the best of your knowledge.

2. Children exhibit impaired social interaction in order to receive a diagnosis of autism.

◯ Agree ◯ Disagree ◯ Uncertain

3. Children exhibit self-injurous behaviors in order to receive a diagnosis of autism.

◯ Agree ◯ Disagree ◯ Uncertain

4. Children exhibit behaviors and interests that are repetitive and stereotyped in order to receive a diagnosis of autism.

◯ Agree ◯ Disagree ◯ Uncertain

5. Children exhibit impaired communication skills in order to receive a diagnosis of autism.

◯ Agree ◯ Disagree ◯ Uncertain

6. Children with autism can exhibit over-sensitivity or under-sensitivity to pain.

◯ Agree ◯ Disagree ◯ Uncertain

7. More boys are diagnosed with autism than girls.

◯ Agree ◯ Disagree ◯ Uncertain

8. Some children diagnosed with autism demonstrate uneven gross motor and fine motor skills.

◯ Agree ◯ Disagree ◯ Uncertain

9. Children diagnosed with autism never make eye contact.

◯ Agree ◯ Disagree ◯ Uncertain

Figure 1. Section 3, Characteristics of Autism, questions #2-9, was adapted from Schwartz & Drager (2008).

SLPs Self Perceptions of Speech-Language Services for Children with Autism Spectrum Disorders

4. Effective Speech-Language Services for Children with ASD

This section addresses perceptions of the importance of different diagnostic and treatment tools used in serving children with autism. There are no right or wrong answers. We simply are interested in the opinions and experiences of speech-language pathologists.

10. Rate the importance of each of the following methods with regards to effective speech-language services for children with autism spectrum disorders:

	Not Important	Minimally Important	Important	Very Important	Not Sure/ Not Applicable
Rate the importance of teaching sign language in addition to spoken words (for example, say and sign "cookie" for a picture or object cookie) as part of speech/language treatment for children who are minimally verbal.	◯	◯	◯	◯	◯
Rate the importance of speech/language methods based on discrete trial training (that is, a high number of practice repetitions of target skills led by the clinician, often using behavioral techniques).	◯	◯	◯	◯	◯
Rate the importance of applied behavior analysis techniques (for example, reinforcement, prompting, fading, and extinction) as part of speech/language treatment methods.	◯	◯	◯	◯	◯
Rate the importance of alternative/augmentative communication training, including Picture Exchange Communication System, as part of speech/language treatment methods (for example, picture boards, computer-based devices that talk, or the use of picture symbols to request desired objects and activities).	◯	◯	◯	◯	◯
When considering speech/language intervention, rate the importance of the speech-language pathologist's ability to carry out Functional Communication Training (FCT; that is, replacement of challenging behavior (e.g., tantrum) with a functional communication (e.g., say or sign "drink") so the child is able to express his/her needs).	◯	◯	◯	◯	◯
Rate the importance of speech/language services based in a Milieu Teaching Paradigm (that is, a naturalistic learning environment with manipulation of antecedents, modeling, and directives, "Say 'my turn.'").	◯	◯	◯	◯	◯
Rate the importance of speech/language services that incorporate social skills training (for example, teaching scripts for conversations with peers).	◯	◯	◯	◯	◯
Rate the importance of using observational methods and/or criterion-referenced procedures (e.g., language sampling) instead of, or in addition to, standardized procedures when assessing children with autism spectrum disorders.	◯	◯	◯	◯	◯

List any other speech/language treatment methods important in serving children with autism spectrum disorders.

Figure 2. Section 4 question #10, "Effective Speech-Language Services for Children with ASD," included importance ratings for select speech-language pathology methods considered part of best practices for SLPs. Note that for the parent survey (not shown) the introductory language at the top read, "We are interested in the opinions and experiences of parents of children with autism." Section 4 question #11 (also not shown) addressed the same items but asked, "Rate your/the therapist's ability to…." in the SLP and parent surveys, respectively.