LSHSS

Training and Knowledge in Autism Among Speech-Language Pathologists: A Survey

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Autism is believed to be the fastest growing developmental disability in the United States today. It is estimated that the prevalence of all types of autisim is approximately 60 persons for every 10,000 (Fombonne, 2005). With each passing year, the prevalence of autism appears to be rising across the United States and throughout the world. Even with extensive research currently being conducted, there are still many questions about this puzzling disorder that remain unanswered.

Since Kanner's first report of autism in 1943 (Kanner & Eisenberg, 1956), the diagnostic criteria for autism have changed considerably. The publication of the *Diagnostic and Statistical Manual of Mental Disorders,* 3rd edition, revised (*DSM–III–R;* American Psychological Association [APA]) in 1987 significantly altered all previous diagnostic criteria for autism in specific terms. Although a focus on core deficits in social interaction, communication, and behavior has been fairly consistent throughout, it was in the *DSM–III–R* that the notion of the triad of impairments was first specifically documented. Deficits in the areas of social interaction, verbal and nonverbal communication, and repetitive stereotyped interests were all required for a positive diagnosis of autism, in addition to an "early onset during childhood" (APA, 1987). With the publication of the *DSM–IV* (APA) in 1994, diagnostic criteria were fine tuned, and a more precise onset of before 3 years of age was established.

Autism and Speech-Language Pathology

In order for a child to receive a diagnosis of autism using the criteria established in the *DSM-IV*, the child must exhibit at least one diagnostic criterion falling into the category of "qualitative impairments in communication" (APA, 1994, p. 70). Beyond this, social interaction impairments also have a significant effect on communication, specifically social communication and pragmatics. As deficits in communication are a diagnostic criterion for autism, speech-language pathologists (SLPs) should be knowledgeable about this disorder.

Recently, the American Speech-Language-Hearing Association (ASHA) published a series of documents outlining guidelines and

ABSTRACT: **Purpose:** The current study was designed to answer the following questions: (a) What knowledge do school-based speech-language pathologists (SLPs) have concerning autism? (b) What educational and clinical training do SLPs receive in autism? (c) Do SLPs have confidence in their ability to provide services to children with autism and their families?
Method: An original 52-item survey was designed to answer the research questions. Participants were recruited through e-mail and were asked to respond to a Web-based survey.
Results: Sixty-seven school-based SLPs practicing in 33 states across the United States responded to the survey. Most participants had accurate knowledge about the characteristics of children with autism; however, they had mixed perceptions of diagnostic criteria for autism. Although most participants did address autism at some level of their educational training, little time was spent discussing the topic. Additionally, some SLPs lack confidence in their abilities to provide services to children with autism.
Conclusion: The return rate for participants was small, and it is difficult to generalize the results. However, the majority of respondents reported that they could have benefited from additional training in the area of autism. As a result, it may be necessary to consider strategies for providing this training.

KEY WORDS: autism, training, knowledge, diagnosis, characteristics, survey

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the roles and responsibilities of SLPs in the diagnosis, assessment, and treatment of autism spectrum disorder (ASD) (ASHA, 2006a, 2006d). These documents clearly specify that SLPs, among other members of the team, play a critical role in screening, diagnosing, and enhancing the social communication of individuals with autism (ASHA, 2006d). Additionally, the Child Neurology Society and the American Academy of Neurology, through a multidisciplinary consensus panel, have stated that all professionals involved in early health care, including SLPs, need to be familiar with the signs and symptoms of autism and be able to recognize the need for further diagnostic evaluation (Filipek et al., 1999). Specifically, SLPs have responsibilities at both the screening level and the diagnosis and evaluation level of autism (Filipek et al., 1999).

With the increased prevalence of children with autism, the majority of SLPs working in the public schools will have children with autism on their caseloads. In a report issued by the Center on Personnel Studies in Special Education, 82.8% of school-based ASHA-certified SLPs regularly serve students with autism/pervasive developmental disorder (PDD) (Whitmire & Eger, 2003). The field of speech-language pathology encompasses working with a large variety of populations. It is clear, however, that school-based SLPs need to develop specialized competencies to serve children with autism. It will be incumbent on professionals to seek out the knowledge and develop the skills necessary to serve individuals with ASD (ASHA, 2006b).

A body of literature exists within the field that is designed to evaluate the clinical and educational preparation of SLPs to work with different populations. The current literature explores training areas such as working with persons who stutter (Brisk, Healey, & Hux, 1997; Cooper & Cooper, 1985; Kelly et al., 1997), working with children who also demonstrate impairments in reading (Casby, 1988), working with children with hearing impairments (Moseley, Mashie, Brandt, & Fleming, 1994), working with clients who have experienced a traumatic brain injury (Hux, Walker, & Sanger, 1996), working with persons who use augmentative and alternative communication (Baladin & Iacono, 1998), working with persons who have undergone a tracheostomy (Manley, Frank, & Melvin, 1999), and working with children who are bilingual (Hammer, Detweiler, Detweiler, Blood, & Qualls, 2004). The results of these studies revealed an overwhelming feeling among SLPs of underpreparation to work with these more specialized populations.

In 1987 (before the *DSM-IV*), Stone developed a survey to determine what views a variety of professionals held regarding the etiology, diagnosis, and characteristics of autism. Information was collected from clinical psychologists, pediatricians, school psychologists, and SLPs, whose responses were then compared with responses obtained from 18 "autism specialists," as deemed in the study. (It should be noted that the disciplines of those regarded as autism specialists were not listed). The survey consisted of two sections: The first section contained statements related to facts and misconceptions about autism that were found in the literature at that time and asked that the professionals rank how much they agreed or disagreed using a Likert-type scale; the second section addressed diagnostic criteria and asked professionals to differentiate between which characteristics were required for a diagnosis of autism (according to the *DSM–III*) and which characteristics were helpful for a positive diagnosis of autism (based on current professional opinion).

The results of Stone's (1987) survey revealed a variety of interesting beliefs held by the professionals in the various fields. In the area of social and emotional characteristics, it was discovered that although the autism specialists viewed autism as a developmental disorder, many of the other professionals considered autism to be rooted in emotional factors. Many of the professionals agreed that children with autism are unable to show emotional attachment, a statement with which the autism specialists disagreed. When asked about cognitive features, the autism specialists and the clinical specialists disagreed with the statement that all children with autism possess special talents; all the other professionals agreed with this statement. Except for pediatricians, all remaining professionals agreed that most children with autism do not speak. In the area of descriptive features, all of the professionals (excluding the autism specialists) viewed autism as a more temporary disability that exists only in childhood (Stone, 1987).

Stone's 1987 study clearly demonstrated that many professionals in many disciplines did not possess accurate knowledge about autism and how it manifested in children. With changes in the prevalence of autism, professionals in the medical and educational fields can no longer consider autism a low-incidence disorder. Stone's research demonstrates the need for SLPs to receive specialized training regarding autism in order to adhere to the responsibilities outlined by ASHA, including screening, diagnosis, assessment, and intervention, among others (ASHA, 2006d).

More recently, Cascella and Colella (2004) conducted a survey of SLPs in Connecticut to determine their knowledge regarding PDD. The authors used Likert-type scale questions and self-report measures to explore practicing SLPs' preparation to work with students with PDD and their knowledge regarding behavioral characteristics of PDD. Results indicated that preprofessional training regarding autism is an area of great need within the field. As discussed by Cascella and Colella, one of the limitations of this study is that regional bias may have existed. All participants in the study were currently practicing in the state of Connecticut. Respondents had earned their highest degrees in 15 states; however, 78% of respondents earned their highest degrees in 3 of those 15 states: Connecticut, Massachusetts, and New York.

Although Cascella and Colella (2004) documented the need in Connecticut for more training in the area of autism, a more national view of SLPs' preprofessional training and knowledge of autism is necessary. Additionally, an understanding of SLPs' confidence and competency in working with this special population is needed. The purpose of the current study was to build on existing research regarding the knowledge and training of SLPs in the area of autism. Specifically, this study sought to begin to answer three important questions:

- What knowledge do school-based SLPs have concerning autism?
- What educational and clinical training do SLPs receive in autism?
- Do SLPs have confidence in their ability to provide services to children with autism and their families based on the training they have received?

METHOD

Survey Development

To determine the amount of knowledge and level of training that practicing school-based SLPs have regarding autism, an original

52-item survey was created (see Appendix). The survey consisted of four parts. Part I, Background Information, asked participants about their experience working in a school setting and, more specifically, their experience in providing speech and language services to students with autism. Questions in this section were modeled after the introductory section of Brisk et al.'s (1997) study concerning students who stutter. Part II, Clinical and Educational Training, sought to determine how much autism had been taught in the participants' coursework during their undergraduate and graduate studies. Questions involved the number of courses taken that addressed autism, how long autism was discussed in each course, and the larger discipline of each course taken (e.g., speech-language pathology, special education, etc.).

Part III, Characteristics of Autism, consisted of true/false and Likert-type scale questions designed to gain insight into what knowledge current SLPs had concerning autism. This section targeted information concerning diagnostic criteria, characteristics of children with autism, current myths, and the etiology of autism. Questions from this section were shaped using a variety of sources, including the *DSM–IV* (APA, 1994) and Stone's study on professional knowledge of autism (1987), and touched on myths currently circulating regarding autism. Part IV, Competency in Autism, was included in order to determine if currently practicing SLPs felt confident in their ability to provide effective services to students with autism. It also posed the question of whether the existence of autism specialists would be seen as a helpful asset to the field of speech-language pathology. Questions were adapted from the Clinical Management of Stuttering section of Brisk et al's (1997) study to reflect providing services to children with autism.

Throughout the survey, the term "autism" was consistently used, rather than the broader ASD or PDD. This term is consistent with terminology used in the Individuals With Disabilities Education Act (IDEA, 1997, 2004), the federal legislation under which children and youth with disabilities receive special education and related services. School-based SLPs should be familiar with this labeling system. The terminology was not defined or explained for the participants.

Procedure

Participants for the current study were obtained via two methods. In the first wave of the study, the coordinator of the Language, Learning and Education Special Interests Division (Division 1) of ASHA was contacted regarding the project. This division was chosen due to the probability that a large percentage of its members were currently employed in a school-based setting. An introductory e-mail was forwarded to the coordinator of the division, who then distributed the survey to the Division 1 listserv. The e-mail introduced the survey to potential participants and provided a Web link to the online survey. A total of 28 participants completed the survey in the first wave of the study.

For the second wave of the study, in an effort to increase the number of respondents, a mailing list was obtained from ASHA with the names and mailing addresses of 1,000 potential participants. All of the names received were persons who were (a) currently working in a school setting and (b) working with students aged birth to 17 years. Beginning with the first name on the list, every other name was entered into ASHA's membership directory to obtain their e-mail address. In the event that an e-mail address was not listed for a chosen participant, the next name on the list from the same state was chosen. If the original name chosen was the last person from a particular state, the previous name was chosen (to ensure that the participant was from the same state as the originally intended participant). The same introductory e-mail used in the first wave was sent to each potential participant individually by e-mail. A total of 400 e-mails were sent to potential participants in all 50 states. The final participant pool included 67 respondents—28 from the ASHA Division 1 listserv and 39 from the mailing list obtained from ASHA.

Data Reduction

In conjunction with the creation of the Web-based survey, an e-mail database was created for the sole purpose of receiving research data. For each participant, four e-mails (one for each section of the survey) containing participants' responses were sent automatically from the Web survey to the e-mail database upon completion of the survey. Any question(s) not answered by a participant received a response of "N." Once received, responses from each e-mail were transferred into a spreadsheet corresponding to the section of the survey. To obtain a mean response for each item on the survey, the responses from all participants who answered that question were averaged. If not all participants chose to answer an item on the survey, the average was calculated using the number of participants who answered that item, not the total number of persons who completed the survey.

RESULTS

Background Information

The 67 participants were practicing in 33 different states across the United States at the time of their response. The majority of respondents held their master's degree (94%; $n = 63$), with the remaining 4 participants holding a doctorate. Participants had earned their highest completed degree as far back as 1970 and were grouped into five date-of-degree categories: 1970–1979 (10.4%; $n = 7$), 1980–1989 (26.9%; $n = 18$), 1990–1999 (35.8%; $n = 24$), and 2000–2004 (26.9%; $n = 18$). The majority of participants earned their highest degree within the past 15 years (62.7%; $n = 42$). The number of years that the respondents had worked in a school setting paralleled the years in which they had earned their highest degree: 16 or more years (20.9%; $n = 14$), 11–15 years (13.4%; $n = 9$), 6–10 years (29.9%; $n = 20$), and 1–5 years (35.8%; $n = 24$). Respondents worked in a variety of settings, ranging from working with children in preschool through working with students in high school. Approximately 43% ($n = 29$) worked in more than one setting (e.g., worked in a preschool and elementary school); 26.8% ($n = 18$) worked in a specialized school setting.

All 67 participants reported that they had worked with at least one student with autism in their career. The number of SLPs who currently had students with autism on their caseload varied greatly and was broken down into seven ranges: 0 students (14.9%; $n = 10$), 1–3 students (28.4%; $n = 19$), 4–6 students (28.4%; $n = 19$), 7–9 students (13.4%; $n = 9$), 10–12 students (4.5%; $n = 3$), 13–15 students (0%; $n = 0$), and 16 or more students (10.4%; $n = 7$). Similarly, the number of students with autism that each respondent had worked with throughout his or her career varied and was again broken down into seven ranges: 1–5 students (10.4%; $n = 7$),

6–10 students (10.5%; $n = 7$), 11–15 students (17.9%; $n = 12$), 16–20 students (19.4%; $n = 13$), 21–25 students (10.4%; $n = 7$), 26–30 students (1.5%; $n = 1$), and 30 or more students (29.9%; $n = 20$). When looking at the caseload from each participant's career, 58.2% ($n = 39$) have worked with 20 or fewer students with autism.

Clinical and Educational Training

Participants received their highest degree from 54 different programs in 27 states. Fifty-five percent of participants received both their undergraduate and graduate degrees from the same university. The percentage of courses that addressed autism in respondents' undergraduate programs is shown in Figure 1. During their undergraduate studies, all 67 respondents reported that they had zero courses that solely addressed autism. The majority of respondents (56.7%; $n = 38$) reported having one or two courses that addressed autism, with 37.3% ($n = 25$) reporting that they had no coursework as an undergraduate student that addressed autism. Figure 2 shows the breakdown of the types of courses that addressed autism in respondents' undergraduate programs. Of those courses that did address autism, 68% ($n = 43$) were either a language disorders or general speech pathology course; these courses were likely to be mandatory for students pursuing a bachelor's degree in speech-language pathology or communication sciences and disorders. The amount of time that respondents spent in their undergraduate coursework on autism is shown in Figure 3. Eighty-one percent ($n = 34/42$) of reported undergraduate courses addressed autism for approximately 1 week.

Figures 1, 2, and 3 also show the percentage, type, and duration of attention within courses that addressed autism during the respondents' graduate programs. During their graduate studies, 2 respondents reported having a course that solely addressed autism. Just as in their undergraduate programs, 56.7% ($n = 38$) reported having one or two courses that addressed autism. The number of participants who had no coursework that addressed autism, as compared to coursework in undergraduate studies, decreased from 25 participants (37.3%, $n = 25$) to 15 participants (22.4%; $n = 15$). The percentage of courses that fell under the categories of language disorders and speech pathology increased to 78.3% ($n = 65/83$). As seen in courses during respondents' undergraduate studies, the majority of courses (59.2%; $n = 29/49$) addressed autism for a period of 1 week. Results indicated that 11 of the 67 participants (16.4%) received no coursework in their undergraduate or graduate programs that addressed autism.

Respondents were also asked about their clinical training in preparation to provide services to students with autism. Just more than half of the respondents (55.2%; $n = 37$) reported that they did not provide speech and language services to persons with autism as part of their clinical training. For those 30 participants who did see persons with autism during their clinical training, 50% ($n = 15/30$) reported having between 2 and 5 clients.

Characteristics of Autism

Results indicated that practicing SLPs may have mixed perceptions of what criteria are necessary for a child to receive a diagnosis of autism (Table 1). Although impairments in social interaction abilities is a diagnostic criterion for autism, 21% of the participants did not agree that this deficit was required for a child to receive a diagnosis of autism. Similarly, although stereotyped and repetitive behaviors are a required diagnostic criteria of autism, almost half of the respondents believed that these behaviors were not necessary for a positive diagnosis of autism. All but 1 participant agreed that the existence of self-injurious behaviors is not mandatory for a positive diagnosis, indicating that practicing SLPs are aware that this is not a true diagnostic criterion of autism. Communication impairments are an essential diagnostic criterion for autism, and 85% of the respondents agreed with this.

Practicing SLPs appeared to have more accurate knowledge regarding the characteristics of children with autism than they did regarding the diagnostic criteria (Table 1). All respondents agreed

Figure 1. Percentage of courses that addressed autism in respondents' undergraduate and graduate programs.

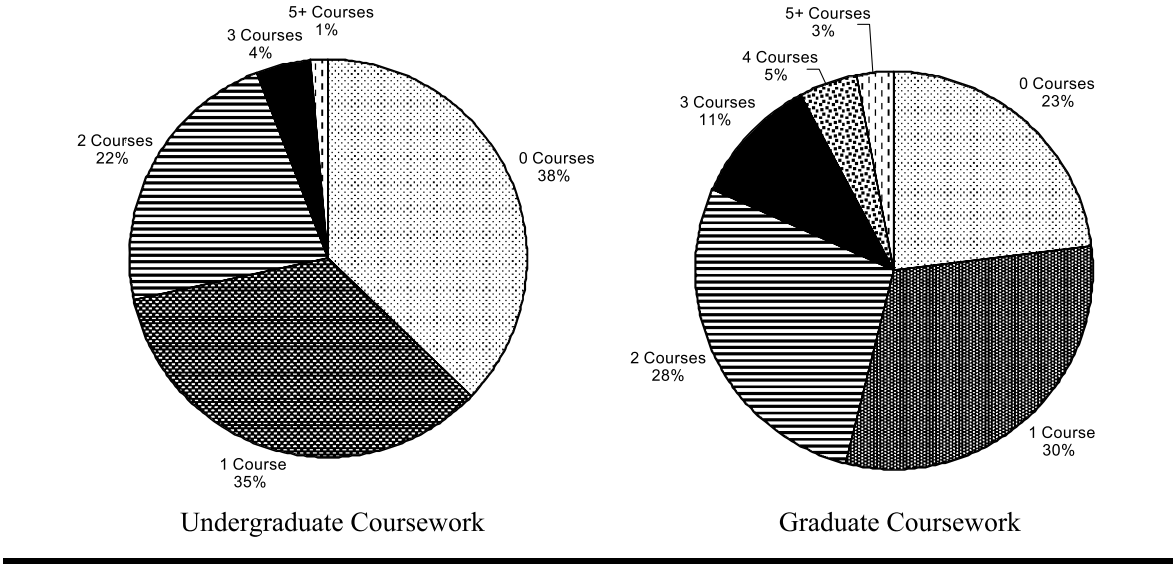
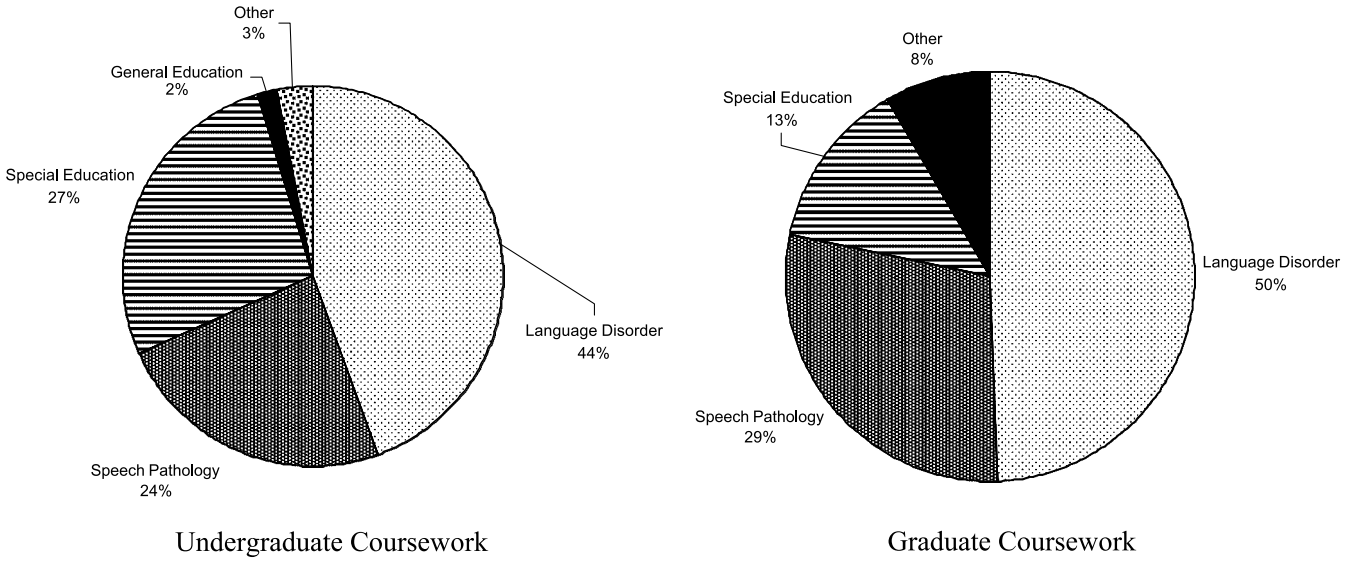


Figure 2. Discipline categorizations of coursework that addressed autism in respondents' undergraduate and graduate programs.



that currently more boys are diagnosed with autism than are girls. Eighty-eight percent of participants agreed that some children with autism exhibit over- or undersensitivity to pain stimuli. Almost all respondents also agreed that some children with autism demonstrate uneven gross motor and fine motor skills and disagreed with the perception that children with autism never make eye contact.

In response to the age at which autism manifests in children, 43% (n = 29) responded that the characteristics of autism first reveal themselves between the ages of 18 and 24 months. No participant believed that autism manifested before the age of 6 months. Seventy-three percent (n = 49) of respondents believed that autism manifests within the first 2 years of life (as determined by combining responses from the first four response choices on the survey), 18% (n = 12) believed that autism manifests between the ages of 2 and 3 years, and 9% (n = 6) believed that autism revealed itself after the child reached the age of 3 years.

Part III also contained Likert-type scale questions targeting SLPs' beliefs regarding the etiology of autism as well as additional characteristics of children with autism (see Table 2). Participants appeared to strongly disagree that emotional factors play a significant role in the etiology of autism (mean response = 1.59; scale 1.0 to 4.0); responses were almost evenly split on the statement asking if autism was a developmental disorder (mean response = 2.37).

Figure 3. Duration of attention to autism in respondents' undergraduate and graduate coursework.

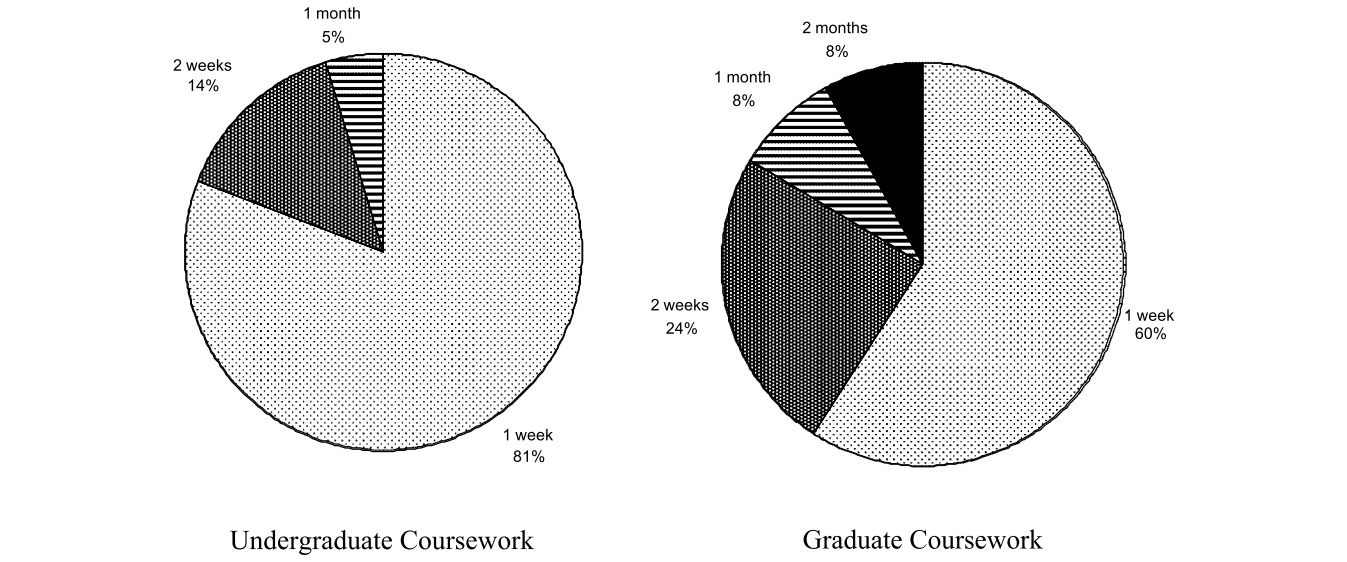


Table 1. Results of true/false questions regarding the characteristics of autism.

Survey statement	*Number of respondents*	*True*	*False*
Children must exhibit impaired social interaction to receive a diagnosis of autism.	66	52 (79%)	14 (21%)
Children must exhibit self-injurious behaviors to receive a diagnosis of autism.	67	1 (1%)	66 (99%)
Children must exhibit behaviors and interests that are repetitive and stereotyped to receive a diagnosis of autism.	67	35 (52%)	32 (48%)
Children must exhibit impaired communication skills to receive a diagnosis of autism.	66	56 (85%)	10 (15%)
Some children with autism exhibit over-sensitivity or under-sensitivity to pain.	67	59 (88%)	8 (12%)
More boys are diagnosed with autism than girls.	67	67 (100%)	0 (0%)
Some children with autism demonstrate uneven gross motor and fine motor skills.	67	64 (96%)	3 (4%)
Children with autism never make eye contact.	67	2 (3%)	65 (97%)

Table 2. Results of Likert-type scale questions regarding the characteristics of autism.

Survey statement	*Participants' response*		
I feel that emotional factors play a major role in the etiology of autism.	Strongly Disagree	1 2 3 4 (1.59)	Strongly Agree
I feel that children with autism are deliberately negativistic and non-compliant.	Strongly Disagree	1 2 3 4 (1.20)	Strongly Agree
I feel that children with autism do not show emotional attachment, even to parents.	Strongly Disagree	1 2 3 4 (1.48)	Strongly Agree
I feel that most children with autism do not talk.	Strongly Disagree	1 2 3 4 (1.70)	Strongly Agree
I feel that most children with autism are also mentally retarded.	Strongly Disagree	1 2 3 4 (1.81)	Strongly Agree
I feel that most children with autism have special talents and abilities.	Strongly Disagree	1 2 3 4 (2.58)	Strongly Agree
I feel that most children with autism are more intelligent than scores from tests indicate.	Strongly Disagree	1 2 3 4 (2.87)	Strongly Agree
I feel that autism exists only in childhood.	Strongly Disagree	1 2 3 4 (1.41)	Strongly Agree
I feel that with proper treatment, children can outgrow autism.	Strongly Disagree	1 2 3 4 (1.68)	Strongly Agree
I feel that autism is a developmental disorder.	Strongly Disagree	1 2 3 4 (2.37)	Strongly Agree
I feel that with even with early intervention, the prognosis for independent community functioning of children with autism is poor.	Strongly Disagree	1 2 3 4 (1.62)	Strongly Agree
I feel that when children with autism do not respond to a question/direction to which he or she has shown previous response to, that he or she is being stubborn and non-compliant.	Strongly Disagree	1 2 3 4 (1.40)	Strongly Agree

The overall average scores for all statements indicated that SLPs disagreed with the statements presented. Such responses indicated that SLPs disagreed with many of the myths that currently exist regarding children with autism, including their abilities and their potential. Only two statements received an average response score greater than 2.50, indicating that although the mean response fell below a true agree response, more participants agreed than disagreed with the information presented in these questions. The statements that received an average response greater than 2.50 included: "I feel that children with autism have special talents and abilities," (average score of 2.58) and "I feel that most children with autism are more intelligent than scores from tests indicate" (average score of 2.87). The increase in the number of participants who agreed with these two statements indicated that practicing SLPs are aware that children with autism have greater intellectual potential than they may exhibit. For the statement regarding whether or not children can outgrow autism, the average score was 1.68, indicating that SLPs agree that autism is a lifelong disability and is not something that can be outgrown or cured.

Competency in Autism

The results of Part IV are found in Table 3. Responses to the statements posed in this section revealed that 25.3% (n = 17) of participants did not feel competent in their ability to determine goals for children with autism, and 32.8% (n = 22) were not comfortable counseling parents of children with autism. In consideration of their academic and clinical training to work with students with autism, 73.1% (n = 49) felt that the training they received was adequate to prepare them to work with students with autism; however, 91.0% (n = 61) stated that they could have benefited from additional coursework and training concerning autism. Similarly, 79.1% (n = 53) believed that the existence of more postgraduate learning opportunities in the area of autism would be beneficial to the field. Concerning the existence of autism specialists, 82.1% (n = 55) felt that schools, in general, could benefit from autism specialists, and 85.0% (n = 57) would use an autism specialist as a resource in determining intervention goals for students with autism should that type of professional be made available to them.

DISCUSSION

Although the results of the current survey were more encouraging than those of Stone (1987), some professionals in the field of speech-language pathology do not demonstrate a clear understanding of what autism is and how it is diagnosed. This information is clearly part of the SLP's role in working with students with autism (ASHA, 2006d) and should be contributing to theory and

Table 3. Results of Likert-type scale questions regarding competency in autism.

Survey statement	*Participants' response*					
I feel competent in my ability to determine appropriate intervention goals for children with autism at all stages of therapy.	Strongly Disagree	1	2	3	4	Strongly Agree
				2.94		
I am comfortable counseling parents and guardians of children with autism.	Strongly Disagree	1	2	3	4	Strongly Agree
				2.85		
I usually like having assistance and direction from another professional or "autism specialist" when developing appropriate programs for children with autism.	Strongly Disagree	1	2	3	4	Strongly Agree
				2.98		
I feel competent I have enough clinical and educational training to deliver effective services to children with autism.	Strongly Disagree	1	2	3	4	Strongly Agree
				2.96		
I feel that I could have benefited from receiving additional coursework and training in the area of autism.	Strongly Disagree	1	2	3	4	Strongly Agree
				3.38		
I feel the existence of more post-graduate learning opportunities in the area of autism would be beneficial to the field.	Strongly Disagree	1	2	3	4	Strongly Agree
				3.33		
I feel that schools, in general, could benefit from "autism specialists."	Strongly Disagree	1	2	3	4	Strongly Agree
				3.24		
If I knew that an "autism specialist" was available in my school district, I would use that person as a resource.	Strongly Disagree	1	2	3	4	Strongly Agree
				3.42		
I would be interested in becoming an "autism specialist" even if it meant participating in additional training.	Strongly Disagree	1	2	3	4	Strongly Agree
				2.53		

clinical practice. It appears, however, that despite a deficit in knowledge of autism, some SLPs are more confident in providing services to children with autism than would have been anticipated. Questions could be raised regarding how SLPs can feel that they are providing adequate services when they appear to not have a firm grasp of the core deficits demonstrated by students with autism. Results indicated that although most participants did address autism at some level of their educational training, little time was spent discussing the topic. This is evidenced by the unbalanced knowledge that respondents had regarding the diagnostic criteria and characteristics of autism.

At least 10% of the respondents received their graduate degree before publication of the *DSM–III–R,* and at least 37% received their degree before the most recent revision to the DSM criteria. This may have impacted the knowledge base of some of the participants. Regardless, a significant percentage of participants demonstrated that they did not possess accurate knowledge of autism, nor were some confident in their abilities to provide services to students with autism, with a significant number of participants reporting that they felt they could have benefited from additional training.

Current Professional Training Programs

Most of the current literature on training programs in autism addresses the preparation of special education teachers but can be applied to SLPs as well. "If a teacher meets state standards for special education certification but has no coursework in or experience with autism, is that teacher 'highly qualified' to teach students with autism?" (Scheuermann, Webber, Boutout, & Goodwin, 2003, p. 197). The same question may be asked of SLPs. Personnel working with students with autism must possess specialized instructional and management skills as well as redesigned curriculum if a student with autism is to benefit from their education (Scheuermann et al., 2003; Simpson, 2004). In both bachelor's and master's programs, students pursuing degrees in speech-language pathology are, in some cases, not being exposed to autism; without exposure, students cannot be taught specific strategies to provide effective services to this specialized population.

ASHA has specifically addressed the knowledge and skills across 11 broad areas necessary for SLPs to adequately serve children with autism (ASHA, 2006b). It will be critical that preprofessional programs begin to address these competencies. SLPs need to have the training required to address this complex disorder of social communication. Additional areas of knowledge that are required to work with this population include augmentative and alternative communication to augment both expression and comprehension (Mirenda, 2003); collaboration, including working with families (Beatson, 2006) and working with other professionals (Peck & Schuler, 1987); and addressing challenging behaviors (Horner, Carr, Strain, Todd, & Reed, 2002), among others. SLPs are in an ideal position to help develop interventions that address the complex needs of children with autism within a social framework, such as that developed by the World Health Organization (WHO, 2001).

FUTURE DIRECTIONS

As in the education field, there is a shortage of "qualified professionals" to educate children with autism, and this gap is a significant challenge facing the field (Simpson, 2004). In an effort to increase the readiness of graduating clinicians, coursework in providing services to special populations should be available in all graduate programs in speech-language pathology. Although perhaps ideal, it is unrealistic to expect graduate programs to devote an entire course to autism and PDD, particularly because not all educational institutions have faculty who possess the knowledge base to teach such a course. It is reasonable, however, to expect that all graduate programs address autism in some focused manner. ASHA has provided direction on the areas that SLPs are expected to understand, and has compiled current evidence-based knowledge of the core characteristics and challenges of this population (ASHA, 2006c). This information should serve as the basis for the content in preprofessional programs.

Beyond including information about autism in speech-language pathology undergraduate and graduate programs, there are other ways to address increasing competencies in autism, such as through clinical education or courses in other disciplines, such as special education. Additionally, a variety of postprofessional training opportunities, such as in-service learning, have been and should continue to be widely available.

LIMITATIONS OF THE CURRENT STUDY

Several limitations exist with the design of the current study and must be considered when interpreting and placing value on the results obtained. The largest limitation was the sample size. Although several efforts were made to increase the sample size, including approaching multiple listservs (only one responded affirmatively) and different avenues of obtaining names of potential respondents, the resulting number of participants was low. It is possible that the results do not reflect the perspectives of the profession as a whole.

Because the return rate for participants was small (approximately 10% from the ASHA mailing list), it cannot be ignored that only SLPs with an interest in autism may have responded to the survey. Because participation was voluntary, SLPs without a true interest in autism may have opted not to respond. This may be reflected in the results. It is possible that the figures would be higher or lower depending on the particular respondents. For example, SLPs who chose not to respond may be even less confident in their knowledge and skills. However, given that this sample of respondents may have a higher interest in autism, and in fact, 30% of the participants had experience with greater than 16 students with autism, the lack of knowledge of diagnostic criteria is especially troubling.

In addition, although 33 of 50 states were represented in the participants, 14 states were only represented by 1 participant, and only one state (New York) was represented by more than 5 participants. Similarly, although participants received their highest degrees from 54 programs in 27 states, curriculum varies among different universities at different times. Different professors may have chosen to focus on different areas in their courses, and would therefore influence whether or not autism was addressed in that class. Also, the survey did not address postgraduate training, which is an avenue for training that many professionals can pursue.

Although the survey developed for the present study was based on several examples from the literature, the survey itself was not

validated. It is possible that some questions may have been confusing to participants. For example, the question that involved the length of time that autism was addressed in coursework had five possible answers (1 week, 2 weeks, 1 month, 1-1/2 months, and 2 months). This was done to limit the answers, to provide an objective measure, and because different institutions have different course requirements (e.g., quarter system, semester system, variations in credits). However, some respondents may have interpreted these options differently than other respondents, and the list was not completely exhaustive (e.g., what if autism was addressed in one class that met two times per week?).

Additionally, participants were asked to reflect on their experiences and knowledge about autism, without specific instructions about the definition of this term. Other related disorders, such as Asperger's syndrome, Rett's disorder, and PDD, Not Otherwise Specified (PDD-NOS) were not specifically mentioned in the current study. Because these disorders all fall within the same spectrum and share many diagnostic and behavioral characteristics, some participants, focused on the specific diagnosis of autism, may have had difficulty distinguishing the characteristics common to these disorders as a group from those that are distinctive to autism. Other respondents may have included all of these diagnostic categories in their responses. This may have particularly affected participants' responses regarding the diagnostic criteria. That is, to receive a diagnosis of autism, children must exhibit impairments in social interaction, stereotyped and repetitive behaviors, and impairments in communication. However, these criteria are not all necessary for other disorders on the spectrum, such as Asperger's or PDD-NOS. It is impossible to know whether participants were considering any of these diagnoses when completing the survey.

SUMMARY

The current survey of school-based SLPs explored their training, knowledge, and competency in working with children with autism. It suggests that current professionals in the field have an unbalanced understanding of autism and have some insecurities regarding their abilities to provide effective services to these students. The majority of respondents reported that they felt they could have benefited from additional training in the area of autism and the existence of autism specialists would benefit not just the field of speech-language pathology, but also the educational field in general. The results of the survey suggest that additional preparation is needed to better prepare SLPs to provide services to children with autism. Modifications to graduate programs to include coursework addressing autism (and other special populations), or other avenues of training (e.g., in-service learning, postprofessional training) may be necessary to ensure adequate preparation of graduating clinicians.

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APPENDIX (p. 1 of 2). THE AUTISM SURVEY: EDUCATION AND COMPETENCE WITH AUTISM

Background Information

1. Highest degree received:
( ) Bachelors ( ) Masters ( ) Doctorate

2. Date received highest degree:
( ) Prior to 1979 ( ) 1980–1989 ( ) 1990–1999 ( ) 2000–Present

3. Years of professional experience in the schools:
( ) 1–5 years ( ) 6–10 years ( ) 11–15 years ( ) 16+ years

4. Number of students currently on my caseload with autism/PDD:
( ) 0 students ( ) 1–3 students ( ) 4–6 students ( ) 7–9 students
( ) 10–12 students ( ) 13–15 students ( ) 16+ students

5. Approximate number of students with autism I have worked with in my professional career:
( ) 0 students ( ) 1–5 students ( ) 6–10 students ( ) 11–15 students
( ) 16–20 students ( ) 21–25 students ( ) 26–30 students ( ) 30+ students

If you answered 0 students, would you consider working with students with autism/PDD?
( ) Yes ( ) No

6. My typical session with a student with autism lasts:
( ) Less than 30 minutes ( ) 30 minutes ( ) More than 30 minutes

7. I see my students with autism for therapy ___ sessions a week:
( ) 1 session ( ) 2 sessions ( ) 3+ sessions

8. I see students in the following grade levels (Check all that apply):
( ) Specialized School ( ) Preschool ( ) Elementary ( ) Secondary (middle and high)

9. I have obtained continuing education credits related to autism since receiving my highest degree:
( ) Yes ( ) No

If yes, how many courses or lectures have you attended?
( ) 1–5 ( ) 6–10 ( ) 11–15 ( ) 16+

10. I currently practice and am licensed in the state of:

Clinical and Educational Training

1. I received my highest degree at the following university/college:
_____

2. I attended the same university for my undergraduate and graduate studies:
( ) Yes ( ) No

3. I completed ___ courses in my ***undergraduate studies*** that solely addressed autism:
( ) 0 courses ( ) 1 course ( ) 2 courses ( ) 3+ courses

I completed ___ courses in my ***undergraduate studies*** that addressed autism in some manner:
( ) 0 courses ( ) 1 course ( ) 2 courses ( ) 3 courses
( ) 4 courses ( ) 5+ courses

These courses fell into the following categories (Check all that apply):
( ) Special Education ( ) Language Disorders
( ) General Education ( ) Speech-Pathology with Special Populations
( ) Other

Approximately how much time was spent discussing autism and intervention with students with autism in each of these classes (Check all that apply):
( ) 1 week ( ) 2 weeks ( ) 1 month ( ) 1 ½ month
( ) 2 months

4. I completed ___ courses in my ***graduate studies*** that solely addressed autism:
( ) 0 courses ( ) 1 course ( ) 2 courses ( ) 3+ courses

I completed ___ courses in my ***graduate studies*** that addressed autism in some manner:
( ) 0 courses ( ) 1 course ( ) 2 courses ( ) 3 courses
( ) 4 courses ( ) 5+ courses

These courses fell into the following categories (Check all that apply):
( ) Special Education ( ) Language Disorders
( ) General Education ( ) Speech-Pathology with Special Populations
( ) Other

Approximately how much time was spent discussing autism and intervention with students with autism in each of these classes (Check all that apply):
( ) 1 week ( ) 2 weeks ( ) 1 month ( ) 1 ½ month
( ) 2 months

APPENDIX (p. 2 of 2). THE AUTISM SURVEY: EDUCATION AND COMPETENCE WITH AUTISM

5. As part of my clinical training (both undergraduate and graduate) I had a client or clients diagnosed with autism:
( ) Yes ( ) No

If yes, how many?
( ) 1 client ( ) 2–5 clients ( ) 6–10 clients ( ) 11+ clients

Characteristics of Autism

The following questions follow a true/false format. Please circle the corresponding letter to your response.

1. Children must exhibit impaired social interaction to receive a diagnosis of autism. T F
2. Children must exhibit self-injurious behaviors to receive a diagnosis of autism. T F
3. Children must exhibit behaviors and interests that are repetitive and stereotyped to receive a diagnosis of autism. T F
4. Children must exhibit impaired communication skills to receive a diagnosis of autism. T F
5. Some children with autism exhibit over-sensitivity or under-sensitivity to pain. T F
6. More boys are diagnosed with autism than girls. T F
7. Some children with autism demonstrate uneven gross motor and fine motor skills. T F
8. Children with autism never make eye contact. T F
9. Symptoms of autism usually manifest around:
( ) 0–6 months ( ) 6–12 months ( ) 12–18 months
( ) 18–24 months ( ) 24–36 months ( ) 36+ months

Please use the following scale to complete the following questions. If you are unsure about the answer, you may answer "N" for Not Sure.

4 – Strongly agree
3 – Agree
2 – Disagree
1 – Strongly disagree

1. I feel that emotional factors play a major role in the etiology of autism. _____
2. I feel that children with autism are deliberately negativistic and noncompliant. _____
3. I feel that children with autism do not show emotional attachment, even to parents. _____
4. I feel that most children with autism do not talk. _____
5. I feel that most children with autism are also mentally retarded. _____
6. I feel that most children with autism have special talents and abilities. _____
7. I feel that most children with autism are more intelligent than scores from tests indicate. _____
8. I feel that autism exists only in childhood. _____
9. I feel that with proper treatment, most children can outgrow autism. _____
10. I feel that autism is a developmental disorder. _____
11. I feel that even with early intervention, the prognosis for independent community functioning of children with autism is poor. _____
12. I feel that when children with autism do not respond to a question/direction to which he or she has shown previous response to, that he or she is being stubborn and noncompliant. _____

Competency in Autism

Please use the following scale to complete the following questions:

4 – Strongly agree
3 – Agree
2 – Disagree
1 – Strongly disagree

1. I feel competent in my ability to determine appropriate intervention goals for children with autism at all stages of therapy. _____
2. I am comfortable counseling parents and guardians of children with autism. _____
3. I usually like having assistance and direction from another professional or "autism specialist" when developing appropriate programs for children with autism. _____
4. I feel competent that I have enough clinical and educational training to deliver effective intervention to children with autism. _____
5. I feel that I could have benefited from receiving additional coursework and training in the area of autism. _____
6. I feel that the existence of more post-graduate learning opportunities in the area of autism would be beneficial to the field. _____
7. I feel that schools, in general, could benefit from "autism specialists." _____
8. If I knew that an "autism specialist" was available in my school district, I would use that person as a resource. _____
9. I would be interested in becoming an "autism specialist" even if that meant participating in additional academic training. _____

Any additional information or comments:

Note. Adapted from Brisk, Healey, and Hux (1997) and Stone (1987).