

Demographics of Preschoolers Who Require AAC

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In recent years, there has been a growing awareness of the need to provide children who have complex communication needs (e.g., those with autism, cerebral palsy, Down syndrome) with augmentative and alternative communication (AAC; Cress & Marvin, 2003; Ronski & Sevcik, 2005). AAC may include the use of manual signs, communication boards/books, high-tech electronic devices, and other forms of unaided and aided communication. Providing AAC services to children with complex communication needs is an integral part of service provision for speech-language pathologists (SLPs; American Speech-Language-Hearing Association [ASHA], 2005), and understanding the demographic profiles of children requiring AAC is therefore essential.

Demographic information is also needed to support funding efforts for services. Clinicians, administrators, and researchers all face significant challenges in their efforts to obtain funding for children who have communication disorders. Services for children

with complex communication needs may be even more costly than those for other children, both in terms of the need for intensive speech and language services and the need to purchase costly AAC technologies. Whether funding is sought to support direct clinical services (e.g., increasing the number of SLPs within a school district, purchasing AAC equipment), preservice or in-service training (e.g., providing training for clinicians and educators), or ongoing research efforts, being able to provide current demographic information to funding sources is critical (Matas, Mathy-Laikko, Beukelman, & Legresley, 1985; Weiss, Seligman-Wine, Lebel, Arzi, & Yalon-Chamovitz, 2005).

Toward this end, a number of researchers have reported various types of demographic information pertaining to individuals who use AAC. Matas and colleagues (Matas et al., 1985) surveyed the school-age population in rural and urban sections of the state of Washington and found that 0.3% to 0.6% of the total school population and 3% to 6% of the special education population could not use speech as their primary means of communication.¹ Similarly, Burd and colleagues (Burd, Hammes, Bronhoeft, & Fisher, 1988) found that 2% of all students receiving special education services in the state of North Dakota were “nonverbal,” defined by these authors as children who produced no more than 15 intelligible words. In a more recent study, Simpson, Beukelman, and Bird (1998) found that SLPs who worked in public schools in the state of Nebraska had an average of 5.8 students on their caseloads; these authors did not report what percentage of the SLPs’ caseloads this represented or other prevalence data.

Although these studies have been valuable resources to the AAC field, few authors have reported overall prevalence data, and the data that are available are quite dated. It is reasonable to anticipate changes in these data for several reasons. There may be actual increases in the number of individuals with severe communication disorders due, in part, to medical advances such as improved

ABSTRACT: Purpose: The purpose of the investigation was to gather demographic information pertaining to preschoolers who require augmentative and alternative communication (AAC).

Method: To obtain this information, a survey was developed and then distributed to preschool speech-language pathologists (SLPs) in Pennsylvania.

Results: Results indicated that approximately 12% of preschoolers receiving special education services required AAC. These children came from diverse ethnic and racial backgrounds, had a wide variety of disabilities, used a range of AAC systems, and required services from a wide range of educational professionals.

Implications: The findings indicate the pressing need for all preschool SLPs to be prepared to provide services for children who require AAC.

KEY WORDS: augmentative and alternative communication, demographics, prevalence, multicultural, preschoolers

¹A range is reported as these researchers conducted two separate studies within two different areas in the state of Washington.

neonatal care. Further, there is an increased awareness of the need to provide AAC to children with a wide variety of disabilities (e.g., Koul & Lloyd, 1994; Ratcliff & Beukelman, 1995), which also may yield increases of identification. In addition, few of the studies reported above included preschoolers who used AAC. It is possible that the prevalence of preschoolers is different from that of the school-age population. For example, the prevalence might be higher for preschoolers if a significant number of school-age children develop functional speech by the time they enter school; alternatively, the prevalence might be lower if AAC services are delayed while families and professionals wait to see if the child develops functional speech, despite policies that censure such an approach (ASHA, 2005). Given the vital importance of early intervention for children who use AAC, it would be useful to obtain prevalence data for this segment of the AAC population.

It is also important to obtain other types of demographic information for preschoolers who require AAC. For example, although several researchers have reported data on the disabilities of individuals who require AAC and the types of AAC systems they use (e.g., Matas et al., 1985; Murphy, Marková, Moodie, Scott, & Boa, 1995; Weiss et al., 2005), it also would be useful to gather information relating to the ethnic and racial backgrounds of these children. The U.S. population is diverse in nature, and researchers have stressed the importance of addressing the specialized communication needs of children from diverse backgrounds who need AAC (e.g., Soto, 2000). Modifications in clinical practices may be required in order to address the needs of these children and their families. Further, providing demographic information pertaining to race and ethnicity may direct researchers toward diverse populations that require further research in order to enhance clinical practice. Finally, such data assist investigators in securing funding for future multicultural and multi-ethnic research efforts.

The purpose of the proposed study was to investigate these issues. The specific research question was: What are the prevalence and characteristics of preschoolers aged 3;0 (years;months) to 5;11 who require AAC in the state of Pennsylvania? To answer this question, a survey of SLPs in the state of Pennsylvania was conducted.

METHOD

To obtain information on the demographics of preschoolers who require AAC, surveys were distributed to early intervention SLPs in Pennsylvania between January and June of 2003. In Pennsylvania, special education services, including speech and language services, are provided by special education agencies; there were 35 such agencies at the time the survey was conducted. However, as no comprehensive listings of preschool SLPs working within these agencies were available to the public, the surveys could not be mailed directly to the SLPs. Contact information for each early intervention supervisor (i.e., special education administrators who were in charge of each early intervention program), however, was available through the Pennsylvania Department of Education. Therefore, early intervention supervisors were contacted and were asked to distribute the surveys to the preschool SLPs within their respective special education agencies.

Ensuring a high response rate is critical for any self-administered survey (Dillman, 2000). In the current investigation, there were two

major threats to achieving a high response rate. First, self-administered surveys typically are distributed directly to survey respondents (Dillman, 2000), but in the present investigation, the surveys needed to be distributed and collected through a secondary source (i.e., the early intervention supervisors), thus creating additional steps in the survey process. Second, each supervisor was responsible for ensuring the return of multiple surveys; if any given supervisor failed to participate, a relatively large number of surveys would not have been returned. Therefore, a modified snowball sampling technique (Walonick, 2005) was used to help ensure a high response rate. Snowball sampling relies on referrals from initial participants to generate additional participants. The technique was modified in that for the present investigation, the actual participants (i.e., the SLPs) were not contacted; instead, early intervention supervisors were contacted and asked to provide the names of other supervisors who might be willing to distribute the surveys to their preschool SLPs. Initially, one early intervention supervisor was randomly selected and contacted via telephone by the first author. This supervisor agreed to distribute the surveys to the SLPs within her special education agency, and she provided the names of several other supervisors whom she believed would be willing to participate; the second group of supervisors then provided the names of several additional supervisors. All of the supervisors in the 11 agencies who were contacted agreed to distribute the surveys. Due to limited time and resources, no further supervisors were contacted after approximately one third of the supervisors (i.e., 11) agreed to distribute the surveys.

The 11 agencies sampled encompassed both rural and urban areas in multiple parts of the state; the majority of these agencies were located in the northwestern, central, and southeastern parts of Pennsylvania. These agencies encompassed approximately 30% of the total number of school districts in Pennsylvania (149 out of 501 districts) and 24% of the counties (16 out of 67 counties). Of the school districts sampled, 67% were urban and 33% were rural, which closely mirrored the state as a whole (71% and 29%, respectively; Center for Rural Pennsylvania, 2005). The overall U.S. population is slightly more urban in nature (i.e., 79% urban, 21% rural; U.S. Census Bureau, 2000).

To determine the number of preschoolers in each of the surveyed agencies, the first author asked each participating early intervention supervisor how many children between the ages of 3;0 and 5;11 had active individual educational plans (IEPs) for the month during which the survey was conducted; these figures were readily available in all cases. These numbers were then totaled. Within the 10 agencies from which surveys were returned (one agency failed to return any surveys), a total of 8,742 students between ages 3;0 to 5;11 were receiving special education services. A total of 189 early intervention SLPs worked within these 10 agencies.

Survey Development

The survey was developed in a series of stages, as recommended by Dillman (2000). These stages included the following: developing an initial draft, securing feedback on the survey from an expert panel, executing a pilot study, and creating a final draft. The terminology used in the survey was consistent with the terminology used by the Pennsylvania Department of Education Bureau of Special Education.

Two pilot studies were conducted to ensure appropriateness of the survey instrument and procedures. For the first pilot study, the early intervention supervisors completed the survey; SLPs completed the surveys for the second pilot study. Initially, the survey was

developed with the intention of having the early intervention supervisors complete all of the information on the children who required AAC within their respective special education agencies, and the initial draft was developed and the first pilot study was conducted using this approach. After the initial draft of the survey and cover letter were developed, an expert panel consisting of several SLPs who worked in early intervention, a university professor with expertise in child language disorders, and an early intervention supervisor critiqued the survey and cover letter. Items were revised based on their feedback, and the pilot study was then conducted. Surveys were sent to 5 early intervention supervisors; only one survey was returned. Follow-up calls were made to the supervisors who failed to complete the surveys. The supervisors indicated that filling out the surveys was too time consuming because it involved compiling information from many different SLPs. Therefore, the surveys were revised and restructured for completion by the SLPs within each special education agency. A second pilot study, in which surveys were sent to 2 special education supervisors who then distributed the surveys to the preschool SLPs within each agency during monthly staff meetings, was then conducted. The majority of surveys were returned in both cases (6/11 for one agency, and 10/11 for the other), and the supervisors in both agencies reported that the survey procedures were manageable. One slight change was made to the surveys following this second pilot study (i.e., the ordering of one of the questions was changed). The resulting survey (see Appendix) contained two main sections: (a) an information page containing definitions, examples, and other instructions; and (b) demographic questions pertaining to the preschoolers who required AAC who were on the SLPs' caseloads.

Information page. To ensure consistency across participants with respect to which preschoolers on their caseloads to include in their responses, the first page of the survey consisted of an information page containing a definition of AAC, different types of AAC systems, examples of children who might require AAC, and other relevant information.

Demographic section. This section included questions pertaining to the following, with respect to preschoolers who required AAC: prevalence, age, sex, racial/ethnic group, disability classification, AAC system use, and also the types of special education personnel who provided services for these children. Racial/ethnic categories were consistent with those listed in the 2000 U.S. Census (U.S. Census Bureau, 2000). The categories listed in the disability classification and special education service providers' sections were consistent with the most recent categories listed by Pennsylvania's Bureau of Special Education (Pennsylvania Department of Education, 2001).

Survey Distribution

The following steps from Dillman (2000) were employed to distribute and collect the surveys: contacting early intervention supervisors via telephone to secure their participation, mailing the survey to the early intervention supervisors so that they could distribute them to SLPs at staff meetings, contacting the supervisors via telephone and/or e-mail to remind them to return the surveys, and sending thank you notes to the supervisors via e-mail.

The mailings were sent to 11 different special education agencies in Pennsylvania; in all but one case, one supervisor was in charge of all of the early intervention SLPs for a given special education agency and personally distributed the surveys. (The one exception was a very large metropolitan area in which the early

intervention supervisor distributed the surveys to each SLP supervisor within the agency.) Each mailing included the surveys, the consent forms, a cover letter for the supervisor, and a large self-addressed stamped envelope for returning the surveys. The supervisors were instructed to distribute one survey and one consent form to each SLP at the next staff meeting and to provide the following verbal instructions to the SLPs: (a) Read the first page of the survey carefully (which contained definitions and instructions); and (b) remember that children who need AAC may include more than just the children who have devices. The supervisors were instructed to collect the surveys at the end of the meeting after the SLPs filled them out, place the surveys in the envelope provided, and return the surveys to the first author within a few days.

To maximize response rates, several follow-up steps were taken (Dillman, 2000). On the day before each supervisor was to distribute the surveys, the investigator called and/or e-mailed the supervisor to remind him or her to distribute and collect the surveys during the staff meeting on the following day. One to two weeks after the surveys were to have been distributed, the first author contacted the supervisors by phone and/or e-mail either to thank them for returning the surveys or to remind them to place the surveys in the mail. If necessary, the investigator contacted supervisors 2 to 3 weeks after the surveys were to have been distributed to remind them to return the surveys.

RESULTS

Response Rate

Ten of the 11 supervisors (91%) returned at least one survey. Out of 212 SLPs within these 11 agencies, 144 responded to the survey, yielding an overall response rate of 68% (see Table 1). This response rate compares favorably with the response rates of other surveys of SLPs that have been published in recent years (e.g., 60% and 54% for King, 1998, and Simpson et al., 1998, respectively). There was a wide range of response rates across the 11 special education agencies (range = 0%-100%; median = 69%). All of the following results are based on the 10 agencies from which at least one survey was received.

Table 1. Total number of preschool speech-language pathologists (SLPs) and number of surveys returned for each special education agency sampled.

	<i>Number of SLPs</i>	<i>Number of surveys returned</i>	<i>Percentage of surveys returned</i>
	11	9	82
	11	10	91
	11	6	55
	13	8	62
	16	11	69
	17	4	24
	19	15	79
	20	12	60
	21	19	90
	23	0	0
	50	50	100
Total	212	144	68

Table 2. Number and percentage of preschoolers who required augmentative and alternative communication (AAC) belonging to various racial/ethnic groups.

<i>Race/ethnicity</i>	<i>Number of preschoolers requiring AAC</i>	<i>Percentage of preschoolers requiring AAC</i>	<i>Percentage of total PA population (2000 PA Census)</i>
American Indian/Alaska	2	<1	<1
Asian/Pacific	23	2	2
Black/African American	216	22	10
White – Hispanic/Latino	104	10	3
White – Non-Hispanic	651	65	84

Demographics

Prevalence. A total of 1,009 preschoolers between the ages of 3;0 and 5;11 from the 10 different special education agencies throughout Pennsylvania required AAC. The total number of children who were receiving special education services within these 10 agencies was 8,742. Therefore, approximately 12% (i.e., 1009/8742) of the preschoolers who were enrolled in special education services required AAC.

The total number of preschoolers receiving SLP services, as reported by the 144 SLPs who completed surveys, was 4,192. A mean of 24% of the preschoolers receiving speech/language services required AAC (i.e., 1009/4192). The mean number of children on each SLPs' caseload who required AAC was 7 (i.e., 1009/144), with the mean overall caseload size being 29 (i.e., 4192/144).²

Sex. Approximately 71% of the preschoolers requiring AAC were male (i.e., 728/1021³) and 29% were female (i.e., 293/1021).

Race/ethnicity. The findings regarding the number of children requiring AAC across various racial and ethnic backgrounds are reported in Table 2. The majority of the children requiring AAC were White – Non-Hispanic (65%), 22% were Black/African American, and 10% were White – Hispanic/Latino. Table 2 also lists the percentage of individuals in these categories from the most recent census data for the state of Pennsylvania (U.S. Census Bureau, 2000).

Primary disability. Table 3 contains the results regarding the types of disabilities of the preschoolers who required AAC. More than one third of the preschoolers had a primary diagnosis of developmental delay, and another third were classified as having autism/pervasive developmental disorder (PDD). The two other categories with a substantial number of children were speech/language (17%) and multiple disabilities (10%). In addition to primary disabilities, survey respondents were also asked to indicate if the children had cerebral palsy, hearing impairments, and/or visual impairments. Relatively few children had these types of secondary disabilities, with 10% or less in each category.

AAC systems. The SLPs were asked to indicate what types of AAC systems the preschoolers were using, including gestures, signs, real objects, picture communication boards/books, and/or voice output systems. Respondents were permitted to indicate more than one AAC system per child. Results indicated that the preschoolers used a variety of AAC systems, with more than half making use of

²The SLPs were not asked to report the full-time or part-time status of their employment, so no conclusions can be drawn regarding the size of their caseloads relative to the number of hours that they worked each week.

³The total number of children in each category is the total reported by the survey respondents for each survey question and varies slightly across categories.

gestures and picture boards/books (see Table 4). Relatively few children (15%) used voice output devices to communicate.

Special education service providers. The respondents were asked to indicate the types of professionals from whom the children received services. Results indicated that more than 75% of the preschoolers required services from a special education teacher and an occupational therapist, and approximately 50% received services from a physical therapist (see Table 5). Further, some preschoolers also required the assistance of other service providers, including personal care aides and behavior specialists.

DISCUSSION

Increased Prevalence

The most critical finding of this study is the significant number of preschoolers who required AAC; in the current investigation, approximately 12% of the preschoolers who received special education services required AAC, and this finding is almost surely an underestimate. There were 45 SLPs within the 10 agencies who did not return surveys (i.e., out of the 189 total SLPs within the 10 agencies, 144 surveys were returned, yielding 45 missing surveys). If any of these 45 SLPs had children who required AAC on their caseloads, the numerator for the prevalence figure (i.e.,

Table 3. Number and percentage of preschoolers who required AAC with various primary and secondary disabilities.

<i>Type of disability</i>	<i>Number</i>	<i>Percentage</i>
Primary disability		
Developmental delay	378	38
Autism/PDD	323	33
Speech/language	165	17
Multiple disabilities	103	10
Deaf-blind	6	<1
Traumatic brain injury	6	<1
Other	13	1
Secondary disability ^a		
Cerebral palsy	94	10
Hearing impairment	30	3
Visual impairment	71	7

^aChildren who received one of these labels also received a label in the "primary disability" category above.

Table 4. Number and percentage of preschoolers who required AAC who use various types of AAC systems.

Type of AAC system	Number	Percentage
Gestures	626	62
Signs	356	35
Objects	312	31
Picture boards/books	635	63
Voice output systems	146	15

Note. Respondents could indicate multiple AAC systems for each child.

1009) would have increased, as this number was taken directly from the actual surveys that were returned. However, the denominator (i.e., 8742) was a fixed number based on the total number of children who were receiving special education within the 10 agencies and would not have fluctuated based on the number of surveys returned or the content of the missing surveys. Therefore, any children who required AAC who would have been listed on any of the 45 missing surveys would have caused this figure to increase.

Further, on average, nearly one fourth of the children on the SLPs' caseloads in the current investigation required AAC. The mean number of children who required AAC on the preschool SLPs' caseloads was slightly higher in the current investigation (i.e., 7 students per caseload) than for the school-aged SLPs in the Simpson et al. (1998) investigation (i.e., 6 students per caseload), although comparisons of these figures should be made with caution due to methodological differences between the studies. In any case, it is evident that this population now factors significantly into service provision for preschool SLPs. These results clearly indicate the pressing need for SLPs to be prepared to provide early intervention for children who require AAC. Although gains have been made in providing pretraining programs for SLPs and other educators (e.g., Koul & Lloyd, 1994), there are still many practicing SLPs who have not received formal AAC training. Further, many myths about AAC—such as using AAC only as a last resort—still exist among many professionals (Ronski & Sevcik, 2005). Such common misconceptions may prevent young children from receiving the AAC services they require, and given the high percentage of students needing AAC on the caseloads of preschool SLPs, it is critical that SLPs be prepared to provide AAC services to young children (Cress & Marvin, 2003).

It is interesting to note that the prevalence of preschoolers receiving special education services in Pennsylvania who required AAC who were identified in this study (i.e., approximately 12%) was greater than the prevalence of school-aged children who were identified in the 1985 study by Matas et al. (i.e., 3%–6%). This difference may have occurred due to a number of factors. First, there were important terminology differences between the two investigations. Matas and colleagues used the term “non-oral” in their survey to identify students who required AAC, but in the current investigation, “children who require AAC” was used instead. In addition, survey respondents in the current investigation were provided with an updated definition of AAC, a list of various types of AAC systems that children might use, and multiple examples of children with a wide variety of disabilities who might benefit from AAC. Further, they were instructed to include children who needed but were not yet using AAC in the survey. This information may have

Table 5. Number and percentage of special education service providers from whom preschoolers required AAC received services.

Special ed service provider	Number	Percentage
SLP	973	100
Special education teacher	863	89
Occupational therapist	748	77
Physical therapist	492	51
Personal aide	84	9
Vision specialist	56	6
Behavior specialist	92	10
Other ^a	12	1

^aAll children in this category received services from a nurse and/or a teacher of the hearing impaired.

prompted SLPs to include children in the survey who would not have been included in the Matas et al. investigation. Medical advances such as improved neonatal care also may have contributed to the increased prevalence. Another contributing factor may be actual increases in the prevalence rates of children with specific disabilities who can benefit from AAC; specifically, increases in PDD rates have recently been reported (Chakrabarti & Fombonne, 2001), and many of the children included in the surveys were reported to be on the PDD spectrum. It is also possible that differences in geographic location may have impacted the results: SLPs in Pennsylvania were surveyed for the current investigation, and those in Washington State were surveyed in the Matas et al. study. Also, as the AAC field has grown for the past 20 years, the awareness of and need for AAC has grown as well (e.g., ASHA, 2005; Koul & Lloyd, 1994; Ratcliff & Beukelman, 1995). Yet another possibility is that there are inherently more preschoolers who require AAC than school-age children; Matas and colleagues included school-aged children in their investigation, but the present study focused exclusively on the preschool population. Some children who require AAC during the preschool years may eventually develop speech that is functional to meet their communication needs (e.g., Sutton & Dench, 1998) and may no longer require the use of AAC. Alternatively, it is possible that the overall number of children receiving special education services may increase for the school-age population; if such an increase exists, then the percentage of children receiving special education services who require AAC would decrease for school-age children, even without a decrease in the actual number of children requiring AAC. Future survey research that includes both preschool and school-age children who use AAC who are located within the same geographic areas is required to answer these questions.

Diverse Backgrounds and Needs of Preschoolers Who Require AAC

Sex and ethnic/racial diversity. Findings in past investigations have indicated that more males than females tend to have communication disorders. For example, in a recent study investigating current rates of PDD, approximately 79% of the children with PDD were male (Chakrabarti & Fombonne, 2001); another investigation indicated that approximately 73% of children with speech impairments were male (Keating, Turrell, & Ozanne, 2001). In the current investigation, approximately 71% of the children who

required AAC were male; thus, the pattern of a higher prevalence of communication disorders among males held true for the preschoolers who required AAC.

The finding that the preschoolers came from a variety of racial and ethnic backgrounds reflects the diversity of the United States and, more specifically, the locales in Pennsylvania that were surveyed. The higher percentages for the “Black/African American” and “Hispanic/Latino” categories in the current study versus the figures for the state as a whole (see Table 2) may have been due to the fact that approximately 25% of the survey respondents worked within one very large special education agency that was located in a major metropolitan area; a higher proportion of these two racial/ethnic groups lives in this area as compared with much of the remainder of the state (i.e., 45% of children requiring AAC within this agency were Black/African American and 18% were White – Hispanic, with 32% being White – Non-Hispanic). The diverse nature of the population of children using AAC illustrates the need for preservice training and continuing education for SLPs and other service providers to ensure that AAC services are responsive to the needs of diverse populations. Although the AAC field has made progress with investigating the complex issues of introducing AAC and other assistive technologies to individuals and families from diverse ethnic and racial backgrounds (Soto, 2000), there is a dire need for further research in this area of the AAC field.

Variety of disabilities. The SLPs indicated that the preschoolers who required AAC had a variety of primary disabilities, including autism/PDD, developmental disabilities, speech and language disabilities, and multiple disabilities; relatively few children had deaf-blindness or traumatic brain injuries. It is difficult to compare these results with the findings of other researchers because the disability categories listed on surveys have varied across studies. For example, only one U.S. survey that was located listed autism spectrum disorders as a potential disability for individuals who required AAC (i.e., Simpson et al., 1998); however, approximately one third of the children requiring AAC in the present investigation were classified under this diagnosis. Generally speaking, however, the findings from the present survey are in alignment with past findings, in that children with a wide range of disabilities may require AAC. These findings indicate the need for SLPs to be prepared to provide AAC services for children with many different types of disabilities and communication profiles.

Variety of AAC systems. Two main points of interest arise from the results pertaining to AAC systems. First, the results reflect the multimodal nature of communication for children using AAC, and SLPs must have the knowledge and skills to support communication across various communication modes, including both unaided and aided modes. Second, the results indicated that relatively few of the preschoolers used voice output devices to communicate. The relative lack of speech-generating devices could be due to a number of factors. One potential reason is that some SLPs may not have prescribed high-tech systems due to a lack of knowledge of and experience with these AAC technologies; even SLPs who take graduate-level AAC courses may gain minimal hands-on experience with these technologies (Ratcliff & Beukelman, 1995). Additionally, limited funding within school districts for high-tech AAC systems may have been a factor; SLPs may be reluctant to prescribe expensive technologies for young children before success with light-tech systems, such as communication boards, has been established. It is also possible that some SLPs may have believed that voice output systems were only appropriate for children with intact cognition, although this is not in alignment with current evidence or best

practices (e.g., Romski & Sevcik, 2005; Romski & Sevcik, 1996). Voice output systems may, in fact, be a preferred mode of communication for some young children who require AAC, even over unaided modes of communication (Iacono & Duncum, 1995). Thus, SLPs need to be aware of the potential benefits of using voice output systems with young children who require AAC.

Variety of professionals. Most of the preschoolers received services from many different professionals, including special education teachers, occupational therapists, physical therapists, personal aides, and others. These results illustrate that a wide range of professionals are involved in working with children who use AAC and indicate the need for professionals other than SLPs to have knowledge and skills in AAC. Unfortunately, these other professionals are even less likely to receive AAC training in their undergraduate and graduate studies (e.g., Koul & Lloyd, 1994).

Limitations

There were several limitations with the current investigation that should be noted. Most importantly, a modified snowball sampling procedure (Walonick, 2005) was used instead of a sampling procedure that would have better ensured that the sample was representative of a broader population (such as systematic or stratified sampling). The fact that the percentage of school districts that were urban versus rural closely mirrored the state of Pennsylvania as a whole strengthens the argument that the results can at least be generalized to the state as a whole. However, caution must be taken when generalizing the results to broader areas. Future demographic research that expands the sample size and uses a proportional, stratified random sampling procedure (Fowler, 2002) would help to ensure that a representative sample is obtained.

Several factors may have introduced a degree of bias into a portion of the results. First, the fact that a snowball sampling procedure was used created a sampling bias, as the supervisors were contacted based on their likelihood of responding to the survey. If the supervisors who were selected were inherently more supportive of AAC services, the survey results may have been impacted. For example, the SLPs working within these agencies may have been able to identify children who required AAC more readily than would SLPs within other agencies. Further, although the overall response rate was relatively high, there was a wide range of response rates across the different special education agencies. It is not known if the SLPs who ultimately returned the surveys may have been more (or less) likely to have children on their caseloads who required AAC. Also, because the SLPs filled out the surveys during staff meetings, survey responses were based on the SLPs’ memories and not on actual school records. It is possible that the accuracy of some of the data, such as the question pertaining to the various types of service providers from whom the students were receiving services, was therefore impacted.

Another limitation is that the supervisors who collected the surveys had the opportunity to examine the completed surveys if they wished, which may have influenced the SLPs’ survey responses. To circumvent this issue, future research that uses this methodology should include instructing respondents to place completed surveys in sealed envelopes before returning the surveys to supervisors.

Clinical Implications

The findings of this investigation clearly indicate that a substantial number of preschoolers on the caseloads of SLPs require

AAC. The preschoolers in the current investigation had a wide range of backgrounds and disabilities and used multiple modes of communication. Children who require AAC, then, have complex communication profiles and needs, and providing early intervention is critical for their development. Early intervention must ensure access to appropriate, functional communication (e.g., Cress & Marvin, 2003); promote ongoing language development (e.g., Binger & Light, in press); and address the communication patterns of communication partners (e.g., Kent-Walsh, 2003; Kent-Walsh & McNaughton, 2005). The results of the current investigation indicate the need for all preschool SLPs to be prepared to provide such services to the children on their caseloads and should assist in efforts to secure funding to ensure that high-quality AAC services can be provided for these children.

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APPENDIX. AAC PRESCHOOL SURVEY

This survey includes questions about some of the children with whom you work. Specifically, this survey is about the children who need augmentative and alternative communication (AAC). Please read the information below carefully, as it will help you answer the survey questions.

Definition of augmentative and alternative communication (AAC)

AAC involves using any methods in addition to or in place of speech to communicate (e.g., pictures, gestures). Preschoolers with a wide variety of disabilities may need AAC in order to share their needs, wants, feelings, and thoughts with others.

Types of AAC that preschoolers might use

Children may use any or all of the following forms of AAC: eye pointing, gestures, signs, objects, communication books or boards, PECS, voice output systems, or other systems.

Children who are deaf or hard of hearing

For the purposes of this survey, please do not include children whose primary diagnosis is deaf/hard of hearing. If a child who needs AAC has another primary disability and also has a hearing impairment, you should include that child (for example, a child with cerebral palsy who also has a hearing loss).

Children who may need AAC but aren't currently using AAC

Some preschoolers may not be receiving AAC services yet, and some have been exposed to AAC but are not yet successful with the AAC systems that have been tried. Please do include any children who may need AAC.

Examples of children who need and/or use AAC

- Jenny has mental retardation, and she has limited speech that is very hard to understand. She mainly uses gestures, such as eye gaze and pointing, to communicate, and she also occasionally uses a picture communication book.
- Tony has severe apraxia of speech, and his speech is very difficult to understand. He pantomimes elaborately and sometimes gathers objects from around the room to help get his point across.
- Marcus has autism and uses schedule boards containing line drawings and photographs to help him transition from one activity to another.
- Maria has multiple disabilities and responds to very few stimuli. Her main forms of communication are by looking toward desired objects and by crying.

Assistive technology devices and services

To obtain the most accurate information, it is critical to identify all children who need and/or use AAC. *If a child meets the above criteria, include the child in the survey, regardless of whether or not "assistive technology devices and services" is checked on his or her IEP.*

Demographic Information

1. Each of the following questions pertains to children on your caseload who need and/or use AAC.

List the number of children for each item.

- a. As of today, what is the total number who need and/or use AAC?
____ (If "0," go to #2: **Training Needs**. If "1" or more, continue with this section)
- b. How many in each **age group** need and/or use AAC?
____ 3;0-3;11
____ 4;0-4;11
____ 5;0-5;11
- c. How many **males and females** need and/or use AAC?
____ male
____ female
- d. How many in each **racial/ethnic group** need and/or use AAC
(you may indicate more than one ethnic group per child)?
____ American Indian or Alaska Native
____ Asian or Pacific Islander
____ Black or African American (not Hispanic)
____ Hispanic or Latino
____ White (not Hispanic)
- e. Of those who need and/or use AAC, how many have the following **primary disabilities**?
(Cannot have hearing impairment as primary disability)
____ autism/ PDD
____ developmental delay or mental retardation
____ multiple disabilities
____ deaf-blindness
____ traumatic brain injury
____ speech or language impairment
____ other (Please specify: _____)
Of these children, how many also have:
____ cerebral palsy
____ hearing impairment (without deaf-blindness)
____ visual impairment (without deaf-blindness)

- f. Of those who need and/or use AAC, how many use the following **AAC systems**? (You may indicate more than one AAC system per child)
- # _____ who use gestures (pointing, head nod, etc.)
 - # _____ who use signs (including adapted and unique signs)
 - # _____ who use real objects (e.g., holding a cup to indicate desire for a drink)
 - # _____ who use picture communication boards/books containing photographs or line drawings
 - # _____ who use electronic systems that talk (e.g., BIGmack, Tech/Talk, DynaVox)
- g. Of those who need and/or use AAC, how many have each of the following **special education service providers** (including services that are contracted out)?
- # _____ who have a special education teacher
 - # _____ who have a speech-language pathologist
 - # _____ who have an occupational therapist
 - # _____ who have a physical therapist
 - # _____ who have a personal aide
 - # _____ who have a vision specialist/consultant
 - # _____ who have a behavior specialist/consultant
 - # _____ other (Please specify: _____)
2. As of today, what is the TOTAL number of children aged 3 years, 0 months (3;0) to 5 years, 11 months (5;11) who are on your caseload?
- # _____

Thank you for your participation! Please return this survey to your early intervention supervisor. Call Cathy Binger at (xxx) xxx-xxxx or email her at _____ if you have any questions.

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