The undersigned, appointed by the Dean of the Graduate School of Fontbonne University, have examined the master's thesis entitled

Prevalence and Demographics of Augmentative and Alternative Communication (AAC)
Users Birth-21:
A Survey of Speech-Language Pathologists Serving Learners with
Complex Communication Needs (CCN)

presented by

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and hereby certify that in their opinion it is worthy of acceptance.

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Prevalence and Demographics of Augmentative and Alternative Communication (AAC) Users

Birth-21: A Survey of Speech-Language Pathologists Serving Learners with Complex

Communication Needs (CCN)

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Abstract

Augmentative and alternative communication (AAC) encompasses a wide range of tools, technologies, and intervention techniques that aim to foster and advance communication competence in individuals with complex communication needs (CCN). The individuals who utilize AAC span a range of ages, diagnoses, and cultures—but little data exists regarding prevalence of AAC use and the true nature of the population's heterogeneity. The purposes of this study were 1. to describe and analyze the population of pediatric AAC users (birth-21) in Missouri and 2. to evaluate the preparation speech-language pathologists (SLPs) have had to serve these learners. To gather this information, a survey was developed and disseminated to SLPs who were members of the Missouri Speech-Language-Hearing Association. The survey response rate was 4%. Results indicated that approximately 10% of children ages birth-21 on Missouri SLPs' caseloads used AAC. Reported AAC users were diverse in geographic area, disability type, and racial and ethnic identity. SLPs working with these children had a range of pre-service experiences. There was no statistically significant correlation between any type of professional preparation SLPs received and their comfort providing AAC services. Despite their level of professional preparation, all SLPs indicated areas related to AAC in which they sought more knowledge and experience. More effort must be made to ensure inclusion and quality of AAC courses in professional preparation programs, to better monitor the demographic profile of the population of Missouri children who use AAC, and to advance legislation that supports the needs of this population.

Prevalence and Demographics of Augmentative and Alternative Communication (AAC) Users

Birth-21: A Survey of Speech-Language Pathologists Serving Learners with Complex

Communication Needs (CCN)

Learners with complex communication needs (CCN) include individuals—children and

adults—who have severe speech or language difficulties that limit their daily functioning (Light

and McNaughton, 2012). Augmentative and alternative communication (AAC) systems may be

warranted for these learners to satisfy their various communication needs, allowing them access

to and participation in their social, academic, and religious/cultural environments. Considering

the profiles of these learners is of the utmost importance to the professionals who help to

empower them because, as Light and McNaughton (2012) asserted, "At the very center of the

field are the individuals with complex communication needs who require AAC" (p. 197).

Neglecting background and identity of the population is neglecting key contextual factors that

the American Speech-Language-Hearing Association (ASHA) states must inform the

formulation of effective, individualized service delivery (2016b). The task of identifying and

tracking learners with CCN is difficult because the population is inherently diverse: Differences

in etiologies, access, and needs are only a few of the factors contributing to the well-established

heterogeneity of the population (Teachman & Gibson, 2014). As a result, there exists a dearth of

statistics and research pertaining to the prevalence of AAC users in the nation or in each state

(Binger & Light, 2006). Recent estimates from Beukelman and Mirenda (2013) projected that

1.3% of individuals in the United States present with CCN. In the 2016-17 reporting year, the

U.S. Department of Education determined that 6,435 children in Missouri received early

intervention under Part C of the Individuals with Disabilities Education Act (IDEA) (U.S.

Department of Education, 2017c). Under Part B of IDEA, 128,623 Missouri children ages 3-21

qualified for services and 24.4% of these learners qualified under that category of speech or

language impairment (U.S. Department of Education, 2017a; U.S. Department of Education,

2017d). It is unclear how many of these children receiving special education services in Missouri

use AAC. Even less information is available about AAC subpopulations delineated by

race/ethnicity or geographic region. More explicit data is necessary to expand the evidence base

for AAC assessment, prevention, and intervention (Lund & Light, 2006; Millar, Light, &

Schlosser, 2006; Romski et al., 2015) and improve the overall quality of education and care

provided to learners who use AAC.

The goals of this study are 1. to describe and analyze the population of pediatric AAC

users (birth-21) in Missouri and 2. to evaluate the preparation speech-language pathologists

(SLPs) have had to serve these learners. Obtaining data related to this population has clinical and

practical implications. Results of this study will add to the existing, albeit limited, research

regarding prevalence and demographics of AAC users who may qualify for services under

IDEA. Knowledge of population demographics will improve professional preparation to serve

diverse learners with CCN, facilitate interprofessional collaborative practice, increase funding to

research evidence-based practices and provide services (Binger & Light, 2006; Hirdes, Ellis-

Hale, & Pearson Hirdes, 2009), and substantiate the need for legislative efforts that support

positive outcomes for these learners. Knowledge of practitioners' preparation will further

identify areas of research and priorities for improvements in service delivery to better meet the

needs of an ever-changing, dynamic population.

The questions addressed in this preliminary study include: (1) What is the prevalence of

AAC use among learners ages birth-21 in Missouri? (2) How does the demographic profile of

this specific population (e.g. race/ethnicity, socioeconomic status (SES), gender identity)

compare to those of the general national and state populations? (3) How prepared are Missouri

SLPs to provide services to learners who use AAC? (4) What are the needs of current SLPs

working with learners who use AAC? The hypotheses that will be tested in the current study are

that AAC users in Missouri will be more racially and ethnically diverse compared to existing

state averages, and that SLPs preparation to serve learners who use AAC and their current

comfort level providing services will correlate strongly.

Literature Review

This review of extant research follows the organization of topics as they are presented in

the study. First, demographic trends of learners with complex communication needs will be

outlined. Second, research on AAC systems and multimodality will be examined. The third

section will address research regarding service delivery models for AAC assessment and

intervention. Finally, research on professional preparation and preservice training in AAC will be

delineated.

Demographic Trends in the Field of AAC

The number of learners ages birth-21 who use AAC continues to increase over time due

in part to medical advances and assistive technology acceptance. More children with complex

medical and communication needs are surviving and living longer, placing them in need of

alternative access to speech and language (Light & McNaughton, 2012). Additionally,

augmentative and alternative communication use has increased as a result of evidence that AAC

does not impede natural speech development and that it can be used with a wide variety of

children (Beukelman & Mirenda, 2013; Finke et al., 2017). As the number of AAC users

increases, so too does the diversity of these individuals: The educational landscape of the United

States is rapidly changing as the overall population evolves. Contextual factors such as age and cultural identifications, when compounded with medical/educational diagnoses, greatly shape the needs of learners with complex communication needs.

Age

It is now more common that AAC is included as a communication option in early intervention (EI), or before children attend school. Positive changes in attitudes toward technology coupled with evidence of AAC supporting verbal speech have contributed to earlier AAC implementation (Light & McNaughton, 2012). It is well-established that EI promotes language development, but Romski and colleagues (2015) assert that AAC inclusion can help to reduce communication gaps in learners with CCN. In contrast to the reported benefits of AAC and EI, there is still an underutilization of assistive technology in EI settings (Bruce & Bashinski, 2017). The benefits of AAC for older students with CCN has been well-researched in the past and continues to be an area of interest as more children are educated in inclusive settings and in neighborhood schools (Light & McNaughton, 2012; Finke et al., 2017). To best meet the needs of learners, it is also important to consider the social, culturally-relevant language used amongst peers their age. Consideration of age carries developmental factors and social obligations: Learners must be competent across contexts, which may require working knowledge of contemporary jargon, emojis, and other social communication patterns that change with age groups (Harris, 2015). As AAC becomes more widely accepted amongst families, professionals, and society, it is vital that SLPs be equipped with the knowledge and skills necessary to differentiate instruction to learners based on developmental and chronological age.

Racial and Ethnic Identity

ASHA, in their Code of Ethics (2016a), mandates that service be delivered in a

nondiscriminatory manner, and that professionals be responsible for preventing, assessing, and

treating communication disorders in individuals from culturally and linguistically diverse

backgrounds. AAC operates under larger educational and social contexts (Kulkarni & Parmar,

2017). While the general U.S. population continues to grow, this increase includes more persons

from non-dominant backgrounds and individuals from other nations (U.S. Census Bureau, 2014).

Non-dominant backgrounds are those that have been historically marginalized in the United

States. Based on the 2010 U.S. Census, 27.6% of the population identified as non-white and the

2020 Census is expected to demonstrate an increase in this percentage, given national trends

(U.S. Census Bureau, 2010). Soto and Yu (2014) cited migratory patterns as evidence for the

influx of AAC users who maintain diverse backgrounds. Fannin (2016) stressed that changing

demographics are crucial to heed as typically underrepresented groups in society will soon

become the majority populace. This also means that more children from culturally diverse

backgrounds will need to be served in early intervention and school settings. Learners with CCN

who use AAC and who identify as belonging to a non-dominant group have lived experiences

which are critical for the SLP to be cognizant of when considering individuals' needs (Harris,

2015).

Fannin (2016) also described a cumulative risk model which brings attention to the

multiplicative effect of demographic factors on access to and success with AAC. For children

from non-dominant backgrounds, general risk factors for speech and language difficulties are

compounded by unmet need for AAC and SLP services (Stronach & Wetherby, 2017),

governmental obstacles (Harris, 2015), and other barriers to implementation which result in

disparities in service provision compared to white peers. Attention to racial and ethnic

demographics extends beyond superficial cultural competence: Knowledge, consideration, and

respect of other cultures and backgrounds prevents ignorance and inequitable service delivery.

English Language Learners

In 2016, the U.S. Census estimated that 13.2% of the population came from "non-

American backgrounds" and that 21.1% of individuals over 5 years old were English Language

Learners (ELLs) (U.S. Census Bureau, 2016). In order to maximize competence for ELLs who

use AAC across settings, communication systems should include all languages used in the home

and educational environments (Fannin, 2016). Kulkarni and Parmar (2017) stressed the

importance of including families in the collaborative decision-making process, as these

caregivers have extensive knowledge of the learner's communication profile and can help bridge

the gap to improve AAC use. This point is echoed by Harris (2015) who deemed families and

learners who use AAC important stakeholders in the AAC system design process, as they can

ensure the system's appropriateness and effectiveness with regard to cultural considerations.

Building rapport and creating parity with families from non-dominant communities helps to

prevent system abandonment (Kulkarni & Parmar, 2017; Rush & Shelden, 2011). With stronger

family-provider relationships, families are more likely to maintain use of an AAC system. The

unique needs of ELLs who use AAC warrant dynamic assessment and service provision by

bilingual SLPs, or other SLPs who maintain cultural humility and who appropriately collaborate

with interpreters.

Socioeconomic Status

Socioeconomic status (SES) is positively correlated with healthcare access, educational

opportunities, and nutrition—all of which impact communication development (Inglebret,

Bailey, Clothiaux, Skinder-Meredith, Monson, & Cleveland, 2017). For learners from low SES

homes who use AAC, exposure to vocabulary may be lower, which influences vocabulary

selection and use on the AAC system; however, access to resources poses a greater barrier both

in its tangibility and long-term implications (Fannin, 2016). Furthermore, Fannin explained that

limited access to resources creates a negative feedback loop resulting in health disparities that

extend beyond racial and ethnic lines as well as geographic boundaries. These children must be

recognized. AAC users from families with low SES deserve equitable service provision and

advocacy to obtain the necessary supports. SLPs who provide considerate assessment and

intervention will help to eliminate a learner's barriers to participation and facilitate achievement

outcomes commensurate with same-age peers (Beukelman & Mirenda, 2013; Fannin, 2016).

Primary Diagnosis

Another way in which learners with complex communication needs vary is by primary

disability diagnosis. While children with certain disorders or levels of functioning were once

barred from accessing AAC, ASHA now maintains a zero-exclusion policy when it comes to

selecting clients who may qualify for AAC use (Meinzen-Derr, Wiley, McAuley, Smith, &

Grether, 2016). The Individuals with Disabilities Education Act (IDEA) is the central policy

regarding funding of special education services, including access to assistive technology like

AAC, in the public sector (Beukelman & Mirenda, 2013). The Missouri State Plan for Special

Education defines the disability categories that qualify children ages 3-21 for special education:

[Children] having been properly evaluated as having Intellectual Disability, Hearing

Impairments and Deafness, Speech or Language Impairments, Visual Impairments

including Blindness, Emotional Disturbance, Orthopedic Impairments, Autism,

Traumatic Brain Injury, Other Health Impairments, a Specific Learning Disability, Deaf

Blindness, or Multiple Disabilities and, who because of that disability, require special

education and related services. As allowed under 34 CFR 300.8 implementing IDEA, the

State of Missouri also defines a child with a disability to include children ages three (3)

through five (5) who have been properly identified as a young child with a developmental

delay. (Vandeven, 2017, p. 23)

It should be noted that the Plan makes no explicit mention of augmentative and alternative

communication when describing assistive technology. Of the disability categories, Beukelman

and Mirenda (2013) declared intellectual disability (ID), cerebral palsy (CP), autism spectrum

disorder (ASD), and childhood apraxia of speech (CAS) as the most common etiologies that

often warrant AAC use. Many individuals with intellectual disabilities (ID) have CCN, making

them candidates for AAC, though Sigafoos, van der Meer, Schlosser, Lancioni, O'Reilly, and

Green (2016) reported the percentage of people with ID who have CCN as "anywhere from 25 to

70%" (p. 255). Binger & Light (2006) found that 38% of Pennsylvania's preschoolers who used

AAC had a primary diagnosis of ID and Kent-Walsh, Stark, & Binger (2008) noted that 34% of

Florida's school-age AAC users had ID. Learners with ID have been historically excluded from

inclusive educational settings, the settings which will provide them the most opportunity for

growth (Beukelman & Mirenda, 2013). It has been estimated that 20-50% of children with ASD

have CCN (Finke et al., 2017). Learners with ASD who use AAC require intensive pragmatic

interventions to bolster their social communication and overall competence when interacting

with family, peers, and teachers (Beukelman & Mirenda, 2013). CP, a group of disorders

affecting mobility and physical posture resulting from disruptions to fetal development, is

present in 1 out of every 500 births and communication disorders occur in 30% of the population

(Beukelman & Mirenda, 2013). These individuals possess specific needs for physical access that

must be considered during assessment and in the development of an appropriate multimodal

AAC system. AAC may be a suitable intervention approach for children with CAS, a motor

speech disorder occurring in 0.2% of pediatric learners (Beukelman & Mirenda, 2013). AAC is

beneficial to children with CAS (and suspected CAS) as it facilitates natural speech production,

provides a means for repairing communication breakdowns, and allows them to develop more

complex utterances for social communication and academics (Beukelman & Mirenda, 2013).

Prevalence and demographics data for the whole field of AAC is lacking (Binger &

Light, 2006); moreover, it is evident that this general paucity of research has a trickle-down

effect into more low-incidence populations—such as children with hearing loss (Meinzen-Derr et

al., 2016)—and to figures of cultural identity. Accurate and descriptive data is critical to obtain

so that evidence-based practices for more specific users may be developed, access to AAC and

intervention may begin earlier, and so that SLPs are prepared to educate these learners should

they appear on caseload. Children with CCN ages birth-21 with whom SLPs work may present

with multiple diagnoses or other chronic health conditions which significantly impact their

functioning. SLPs are interprofessional collaborative team members who assess strengths and

needs of learners who use AAC, provide services to these children and their families (Stadskleiv,

2017), and partake in consistent communication with other stakeholders in order to regularly

report progress and make modifications to the AAC system.

Multimodal AAC Systems Used by Learners with CCN

AAC systems are comprised of a wide array of tools, technologies, and interventions which aim to support communication competence. The unique needs of each learner with CCN are met by AAC systems that are individualized, flexible, and culturally conscious. No-tech or unaided AAC requires the learner to use their own body to produce communication, like signs. Aided AAC involves external equipment for communication. Low-tech options may include communication books or writing, and high-tech options include speech-generating devices (SGDs) (Beukelman & Mirenda, 2013). Utilizing a combination of aided and unaided AAC defines a multimodal system. Multimodal systems allow each learner to access communication through all channels available to them, promoting quick, effective communication across more contexts than could perhaps be possible through one modality alone (Brady et al., 2015). The system, and learner, should be adaptable to all environments by incorporating different AAC forms or languages for code-switching (Soto & Yu, 2014). Learner input, family involvement— by way of communication partner training—and interprofessional collaboration are all means of preventing system abandonment according to ASHA's Practice Portal (ASHA, n.d.). It is imperative, then, that multimodal AAC systems are appropriate for the learner to increase their participation in natural environments.

Service Delivery for AAC

Learners who use AAC are served in a variety of settings including schools, hospitals, and the home by a variety of professionals. These settings are becomingly increasingly inclusive due to an influx of diverse learners and with the legislative efforts like IDEA (Binger & Light, 2006; Light & McNaughton, 2012), meaning more learners with CCN are accessing the general education curriculum in inclusive education. Beukelman & Mirenda (2013) explained that for

education to be inclusive, students who use AAC are members of the classroom culture, participants in all activities, and recipients of knowledge and skills to be applied across academic contexts. The SLP's caseload is increasingly large and may include learners who receive full-day or partial education in general education classrooms and resource rooms (Light & McNaughton, 2012), or those who receive response to intervention (RTI) supports (Grether & Sickman, 2008). In all of these settings, team-based approaches to assessment are standard for AAC, but intervention should also reflect interprofessional collaboration to be considered best practice (Beukelman & Mirenda, 2013). Ogletree, McMurry, Schmidt, and Evans (2018) argued that the advent of easy-to-access technology is shifting assessment from a complex team effort to a more streamlined process, though this may not always favor learner outcomes. Obtaining information related to settings and interventions used with children with CCN has financial implications. Kent-Walsh and colleagues (2008) contended that research on service-delivery and evidence-based practices in these settings aid in the procurement of funding for more research, trained professionals, and AAC systems.

Interprofessional Collaborative Practice (IPCP)

Team-based service delivery is best practice for learners with CCN who use AAC, but Cooper-Duffy and Eaker (2017) shared parents' disappointing perspectives of IPCP: Many families of children with severe disabilities reported a marked lack of interprofessional practice (p. 182). More learners with CCN are being educated in inclusive environments, but few teachers reported receiving coursework related to AAC (Kessel & Sickman, 2010). In healthcare settings, nurses who provide much of the care for children with CCN reported similar gaps in training (Downey & Happ, 2013). There are intentional ways SLPs can promote collaboration with team members and other professionals. Apart from co-treating, and seeking input from other

professionals, the SLP's role includes educating professionals about AAC and the learners who

use it, through consultation or in-service presentations (Kessel & Sickman, 2010).

Speech-language pathologists also collaborate with families. Neither learners nor their

families can be excluded from the team, as both law and best practice (IDEA; Rush & Shelden,

2011). Mandak, O'Neill, Light, & Fosco (2017), however, shared that the existing research does

not provide professionals with guidance on forming collaborative partnerships with families.

They recommended providing specific AAC coaching in the home, during EI or other stages, to

coach families to use AAC systems so their child has more access to language models (Mandak

et al., 2017). SLPs must be equipped, then, to also coach and educate families from diverse

backgrounds, including ELLs and other marginalized communities. Oftentimes, white American

professionals dominate the decision-making process, limiting true family-centered and client-

centered practice (Kulkarni & Parmar, 2017). As Rush and Shelden (2011) asserted, SLPs with

open minds will better collaborate with children, families, and professionals which increases the

overall quality of service delivery.

Professional Preparation of SLPs Serving Learners Who Use AAC

AAC is ever-changing, requiring the infusion of new ideas, contemporary principles, and

effective strategies to keep abreast of technological and demographic shifts. According to

Ratcliff, Koul, & Lloyd (2008), AAC service providers must have a range of knowledge and

skills to appropriately educate individuals with CCN. Areas of necessary knowledge include

awareness of communication partners and family systems, understanding and working

knowledge of different components of AAC systems, and strategies that are effective for various

learners. Exposure to these content areas and opportunities to engage with AAC are provided by

professional preparation programs. Although professionals acknowledge that the above areas are

important to the advancement of professional practice, there is a shortage of graduate programs

offering AAC training and a lack in the quality of existing programs (Costigan & Light, 2010).

Furthermore, SLPs reported reduced confidence in providing necessary services to learners who

use AAC, despite the technology becoming more mainstream (Assistive Technology Industry

Association, 2012; Ratcliff et al., 2008). In all types of educational facilities in 2018, SLPs spent

an average of 1.8 hours per week providing "technological support" with AAC (ASHA, 2018a).

Given the discrepancy between time spent providing AAC services and confidence in the service

provided, there exists a great need for more intensive, high-quality pre-service training. In

addition to reported lack of confidence in providing AAC services, SLPs reported a lack of

confidence in service delivery to a variety of cultural groups—groups that may include

individuals who require the use of AAC.

With an increasingly plural society, it is logical to assume that speech-language

pathologists will work with an equally diverse clientele. According to the ASHA Scope of

Practice, SLPs are to provide "culturally and linguistically appropriate" assessment and

intervention, and advocate for policies and programs which reduce barriers to care for all clients

(ASHA, 2016b). While SLPs reported feeling confident working with learners from diverse

racial and ethnic backgrounds, they were unprepared to provide services to English Language

Learners (Guiberson & Atkin, 2012). This is echoed by Kimble (2013) who found that SLPs

reported low confidence in assessment and intervention of ELLs. Despite these reported areas of

need, speech-language pathology graduate program directors felt their programs adequately

prepared SLPs to assess and treat culturally and linguistically diverse children and adults

(Hammond, Mitchell, & Johnson, 2009). Diversity research and practice trends are most limited

for the lesbian, gay, bisexual, transgender, and queer (LGBTQ) population. However, Hancock

and Haskin (2015) found a lack of knowledge amongst SLPs regarding the needs of the LGBTQ

community and best practices for intervention. ASHA mandates that SLPs be competent in

working with individuals from diverse cultural and linguistic backgrounds. There are five ASHA

competences which include specific mention of cultural and linguistic diversity; in contrast, only

one competency recognizes the need for knowledge of augmentative and alternative

communication (Council for Clinical Certification in Audiology and Speech-Language

Pathology of the American Speech-Language-Hearing Association, 2013). Keller-Bell, Scott,

Jackson, Miller, Gillespie, & Bridges-Bond (2017) recommended that graduate training

programs provide AAC content and training opportunities that are intentionally infused with

information regarding cultural and linguistic diversity. A more robust curriculum may help to

mitigate disparities in SLPs' confidence working with diverse users of AAC and help to improve

outcomes for learners across various backgrounds.

Professional Demographics

It is important to note that there is a marked mismatch between the representation of

SLPs and the learners they serve. As Fannin (2016) lamented, "The demographic profile of

certified Audiologists and SLPs is not reflective of the rapidly changing population" (p. 64). In

2017, ASHA reported that only 8% of professionals identified as members of a non-dominant

racial or ethnic group compared to nearly 28% of the general U.S. population (ASHA, 2017b).

Similar trends are evident in Missouri's SLP workforce: 96% of SLPs are white while 28% of

students receiving special education are not (ASHA, 2017a; U.S. Department of Education,

2017b, 2017e). Representation is an often-overlooked factor in education but is one that plays a

critical role in student achievement—especially for Students of Color. Role models who share

aspects of a child's identity increases their self-concept and achievement (Nadal, Wong, Griffin,

Davidoff, & Sriken, 2014). For learners who use AAC, this could extend to fostering

communication competence and increased use of self-advocacy skills.

Conclusion

Demographic information does not paint the whole picture of a learner; while these

factors certainly influence service delivery to and outcomes of children ages birth-21, they are

not defining features which innately limit progress, communication competence, or quality of

life. As such, demographics—especially of learners who use AAC—should help advise SLPs

when practicing in order to provide apt and fair services. Based on existing research, it is critical

that SLPs be mindful, equitable, and culturally competent to service pediatric AAC users and

their families (Fannin, 2016; Forbes, 2018). Prevalence and demographics of AAC users will

better advise equitable service provision and allow professionals to identify areas of unmet needs

(Creer, Enderby, Judge, & John, 2016). By collecting demographic information, professionals

will have a better understanding of learners' contextual factors, which will lend to differentiated

instruction and individualized service delivery to children with complex communication needs

and their families.

Methods

Participants

Following IRB approval, an online survey was disseminated to 1,195 Missouri Speech-

Language-Hearing Association (MSHA) members using MSHA's email listserv. MSHA

members include practicing speech-language pathologists, audiologists, and graduate students.

597 MSHA members opened the email containing the survey and 64 individuals followed the

survey link. Data was collected between September 20, 2018 and November 14, 2018.

Procedures

Survey Design

The survey included two sections. The first section was comprised of questions related to SLPs' caseloads: total number of children on caseload, number of AAC users, demographic characteristics of these learners who use AAC, models of service delivery, and multimodal communication system characteristics. The second section asked questions to glean information about professionals working with learners who use AAC. These included questions regarding respondent characteristics, levels of professional preparation and continuing education for work with AAC, comfort level serving learners who use AAC, and needs in working with the population. Caseload demographic information was collected through numeric values and responses to multiple choice questions. Participant characteristics were collected via responses to multiple choice questions and open-ended questions. Levels of professional preparation and continuing education were obtained through responses to multiple choice questions. Comfort levels and needs surrounding AAC were identified using a Likert-type scale (i.e. strongly agree, agree, neither agree nor disagree, disagree, strongly disagree), a checklist of areas in need of further exploration, and open-ended questions. The IRB-approved survey invitation and survey are available in paper format in Appendices A and B, respectively.

The survey aimed to address the need for data on state-level prevalence of learners who use AAC and their characteristics. Survey questions were adapted from Binger and Light's 2006 investigation of the demographics of AAC users ages 3-5 in Pennsylvania. Language in the demographics section was consistent with race and ethnicity terminology that was to be used in the 2020 United States Census (Mathews et al., 2017) and gender terminology was informed by the Human Rights Campaign (2016).

Data Collection and Analysis

Respondents received an email inviting them to participate in the Fontbonne University

IRB-approved survey at SurveyMonkey.com. Informed consent was obtained through an

agreement statement in the cover letter, and an additional statement at the beginning of the online

survey. Participants were assured that their responses would remain anonymous. Data was

collected between September 20, 2018 and November 14, 2018. To be included in the survey,

participants had to be speech-language pathologists licensed in the state of Missouri.

Additionally, SLPs could participate if they were certified through ASHA or completing or if

they were completing their Clinical Fellowship Year. Responses were excluded if not all the

pertinent questions within a section were not completed, or if the responses were illogical (e.g.

total counts of AAC users did not add up with disability category counts).

Survey data was analyzed quantitatively and qualitatively. In the first section of the

survey (Questions 1-11), caseload demographic data were exported into Microsoft Excel in order

to calculate total reported AAC users, total reported caseload sizes, and point prevalence of AAC

users in Missouri. Sums, averages, and percentages were obtained for the various demographic

subgroups, service delivery models, and AAC systems. Percentages are rounded to the nearest

whole percent. These caseload characteristics were also described due to the heterogeneity of

responses and limited survey response rate. In the second section of the survey (Questions 12-

32), answers were exported into Excel for descriptive analysis. Questions 12-29 were analyzed

using inferential statistics through IBM SPSS Software. T-tests and Pearson correlation tests

were conducted to determine significance of the responses and the impact of professional

preparation.

Results

The results addressed the following research questions: (1) What is the prevalence of AAC use among learners ages birth-21 in Missouri? (2) How does the demographic profile of this specific population (e.g. race/ethnicity, (SES), gender identity) compare to those of the general national and state populations? (3) How prepared are Missouri SLPs to provide services to learners who use AAC? (4) What are the needs of current SLPs working with learners who use AAC?

Respondents

Forty-six SLPs responded to the caseload information portion of the survey and 38 of those SLPs also completed the professional background portion of the survey. Response rate was 4% (46/1,195) and survey completion rate was 83% (38/46). This response rate is considerably low compared to other surveys distributed to SLPs (McNeill & Light, 2007). The respondents were master's (97%) or doctorate-level clinicians (3%), ranging in level of experience from clinical fellows to certified SLPs with 16+ years of experience. They worked in a variety of settings, including hospitals, public schools, preschools, EI agencies conducting home visits, and private schools. Table 1 illustrates the characteristics of the 38 SLPs who answered questions pertaining to their professional background.

Table 1. Complete Survey Participants' Demographic Information

Participant Information	N = 38
Highest Degree Held	
Master's Degree	37
Doctorate Degree	1
Years of Practice	
<1 year	1
1-5 years	13
6-10 years	7
11-15 years	3
16+ years	14
Setting	
EI agency – home visits	1
Hospital	2
Preschool	6
Public elementary school	18
Public middle school	1
Public high school	7
Other	3

Prevalence

Forty-six SLPs responded to the caseload characteristics portion of the survey. Six SLPs'

answers were removed due to discrepancies in data (i.e. reporting 38 learners on caseload but 72

learners who used AAC; not reporting disability categories). Data reflected the responses of 40

Missouri SLPs. Of the 40 SLPs, 35 had AAC users on their caseloads. The total number of

learners birth-21 on the caseloads of surveyed SLPs was 1,491. A total of 147 learners birth-21

on the caseloads of surveyed SLPs used AAC. Given these sums, the point prevalence of

Missouri AAC users birth-21 on 40 surveyed SLPs' caseloads was approximately 10%

(147/1,491). In their demographic study, Binger and Light (2006) found 24% of Pennsylvania

preschoolers on SLPs' caseloads required AAC (p. 203). An average of 4 learners per caseload

used AAC. It can be inferred that these learners had complex communication needs which

warranted the use of AAC.

Demographic Characteristics

Age

Less than 1% of learners using AAC were eligible to receive or received services under

Part C (birth-2;11) of the Individuals with Disabilities Education Act (IDEA). 30% of all

reported AAC users were eligible for or received services under Part B (ages 3-4;11) and 68% of

reported AAC users received or were eligible for services under Part B (ages 5;0-17;11). 1% of

reported AAC users qualified for or received services under Part B (ages 18;0-21;11). Results are

reported visually in Figure 1.

Figure 1. Ages of AAC users birth-21 in Missouri, by IDEA service provision

Percentage of AAC USers in Missouri Qualified Under IDEA (n = 147)
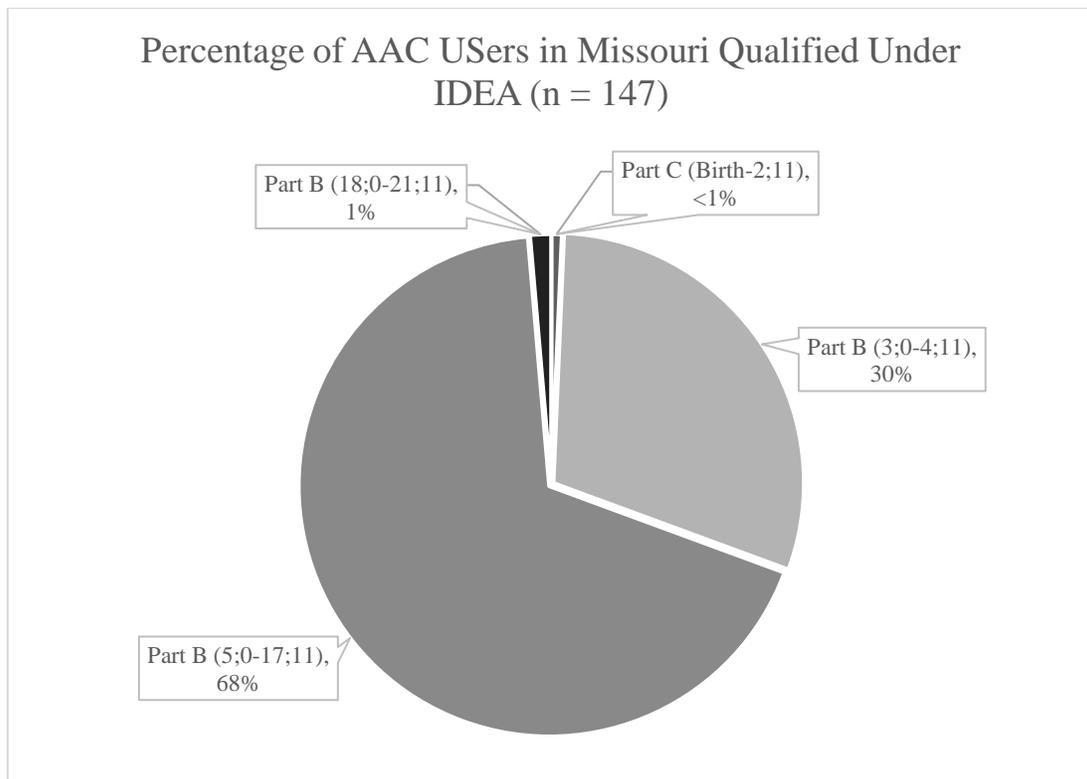
Gender Identity

Of the reported users of AAC ages birth-21 in Missouri (147), 63% of the users were male and 37% were female. No reported AAC users identified as transgender or non-binary individuals.

Racial and Ethnic Identity

Approximately 31% of the reported AAC users were Children or Young Adults of Color. More than half of AAC users (69%) were White. 15% were Black or African American. 7% identified as Hispanic, Latinx, or of Spanish Origin. 5% of AAC users were Asian. 2% identified as Middle Eastern or North African. 1% of reported AAC users identified as Native Hawaiian, Other Pacific Islander, or a mixed race. Racial and ethnic information is summarized in Table 2. Racial and ethnic identities of AAC Users in the current study are compared to statistics from reported 2016-2017 U.S. Department of Education data for the state of Missouri (U.S. Department of Education, 2017b; 2017e; 2017f). The fourth column of Table 2 includes percentages children birth-21 who received special education services under IDEA in 2016-2017, by race/ethnicity.

Table 2. Racial and ethnic identities of reported AAC users birth-21 in Missouri

AAC Users' Racial and Ethnic Identity n = 147			
Race/Ethnicity	Number	Percentage[1]	Percentage2
Asian	7	5	1
Black or African American	22	15	17
Hispanic, Latinx, or Spanish origin	11	7	5
Middle Eastern or North African	3	2	n/a
Native Hawaiian or Other Pacific Islander	1	<1	<1
White	102	69	72
Mixed Race	1	<1	3

[1]Percentage of AAC users in the current study

[2]Percentage of children receiving special education services under IDEA in 2016-2017 (U.S. Department of Education, 2017b; 2017e; 2017f)

English Language Learners

Table 3 contains a summary of primary languages spoken in the homes of the reported AAC users. Approximately 7% of reported AAC users birth-21 in Missouri were English Language Learners (10/147). 3% of these users (50% of ELLs who use AAC) spoke Spanish. 1% of total reported AAC users (20% of ELLs who use AAC) spoke Arabic as their primary language. 1 student each (less than 1% of total AAC users) spoke Korean, Amharic, and Oromo. Amharic is a language related to Arabic that is an official language of Ethiopia and Oromo is a Cushitic language that is the 3rd most dominant language in Africa (Záhořík, 2013). 5-year estimates from 2012 to 2016 made by the U.S. Census Bureau (2016) found that approximately 21% of US citizens spoke a language other than English and 8.5% "spoke English less than 'very well.'"

Table 3. Languages other than English spoken by reported AAC users birth-21 in Missouri

AAC Users' Primary Languages n = 147			
Language	Number	% of Total AAC Users	% of ELLs Who Use AAC (n = 10)
English	137	93	n/a
Spanish	5	3	50
Arabic	2	1	20
Chinese	0	0	0
Amharic	1	<1	10
Oromo	1	<1	10
Korean	1	<1	10

Geographic Areas

Geographic area of AAC users was based on the location of SLPs' place of employment. This data reflects the responses of 38 SLPs because location was included in the Professional Background section of the survey. Of the 38 SLP who completed this portion of the survey, approximately 39% worked in a rural area, 18% in an urban area, and 42% in a suburban area. Figure 2 provides a visual representation of the distribution of Missouri SLPs across geographic areas.

Figure 2. Percentage of SLPs practicing by geographic area (n = 38)

Location of SLPs' Workplaces by Geographic Area (n = 38)

Suburban: 42%

Rural: 40%

Urban: 18%
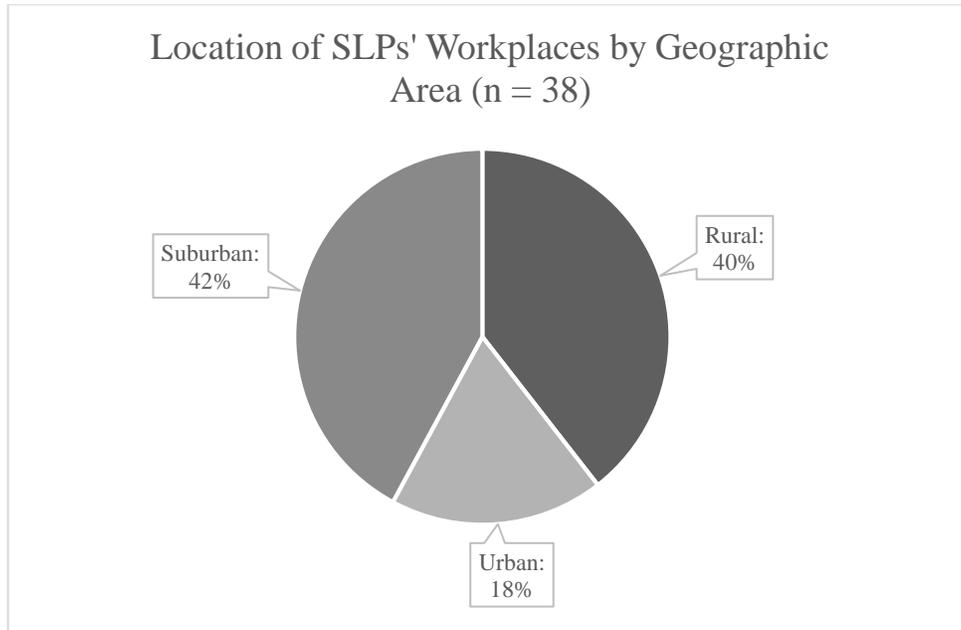
Socioeconomic Status

SES of AAC users was difficult to determine through a survey of the SLPs who work with them. However, this is an important demographic factor as SES is often tied to development and inequity of service provision. Since many AAC users receive services in schools, SLPs were asked if any children on their caseload qualify for Free and Reduced lunch. 32% of AAC users qualified for Free and Reduced lunch.

Diagnosis (Diagnoses)

The educational diagnoses of AAC Users Birth-21 based on the 13 IDEA categories are reported in Table 4. Young Child with Developmental Delay was included to account for the diagnoses of children receiving early childhood special education in some regions of Missouri. 4 SLPs reported more than one diagnosis for AAC users on their caseloads; as such, this demographic category title has been changed from "Primary Diagnosis" to "Diagnosis

(Diagnoses)." More than a quarter (37%) of reported AAC users birth-21 had a diagnosis of

Autism Spectrum Disorder (ASD). The next largest disability category was Intellectual

Disability for 23% of reported users, then Young Child with Developmental Delay (16%). 11%

of users had Multiple disabilities. 8% of users presented with Speech or Language Impairment

and 6% with Other Health Impairment. 1 reported user (less than 1% of AAC users) had an

Orthopedic Impairment. No reported users had a diagnosis of Deafblindness, Deafness,

Emotional Disturbance, Hearing Impairment, Specific Learning Disability, Traumatic Brain

Injury, or Visual Impairment.

Table 4. Diagnoses of Missouri AAC users ages birth-21

AAC Users' Diagnoses n = 147		
Disability Category	Number	Percentage
Autism Spectrum Disorder	59	37
Intellectual Disability	36	23
Young Child with Dev. Delay	25	16
Multiple Disabilities	17	11
Speech or Language Impairment	13	8
Other Health Impairment	9	6
Orthopedic Impairment	1	1
Deaf-Blindness	0	0
Deafness	0	0
Emotional Disturbance	0	0
Hearing Impairment	0	0
Specific Learning Disability	0	0
Traumatic Brain Injury	0	0
Visual Impairment	0	0

Service Delivery

Service delivery models for AAC users and the number of minutes these children were seen by SLPs were obtained from 40 respondents. Findings are summarized in Table 5. Most learners with CCN who use AAC were seen through a combination of push-in, individual, or group therapy (67%). A majority of learners (48%) were seen by their SLP in these settings for 46-60 minutes. 40% of AAC users attended therapy sessions for more than 60 minutes. Of the SLPs who specified the amount of time over 60 minutes they spent with AAC users, the mode was 90 minutes.

Table 5. Number and percentage of Missouri AAC users who were seen by an SLP through various models of service delivery

Service Delivery Models for Missouri AAC Users Birth-21 n = 147		
Models of Service Delivery	Number	Percentage
Push-In	27	18
Individual	17	12
Group	7	5
Combination	99	67
Minutes of Service Delivery	Number	Percentage
0-15	0	0
16-31	6	4
31-45	11	7
46-60	71	48
60+	59	40

Multimodal AAC System

Respondents were asked to indicate the AAC systems used by learners with complex communication needs. SLPs were given the option to select more than one AAC type (no tech low tech, high tech) for learners on their caseloads. The following examples of AAC types were

included in the survey question. No tech AAC included signs, gestures, and vocalizations. Low

tech AAC included Picture Exchange Communication System (PECS), letter boards, or

communication books. Examples of high tech included both dedicated and non-dedicated

speech-generating devices. 33 learners birth-21 used no-tech AAC, 36 learners used low-tech

options, and 122 used high-tech AAC within their multimodal communication system. Given

that 160 different system types were selected, some of the 147 AAC users in Missouri utilize a

multimodal communication system. AAC system types by number and percentage of users are

compiled in Table 6.

Table 6. AAC Systems Used by Missouri AAC Users Ages Birth-21

AAC Users' System Information n = 147		
System Type	Number	Percentage
No Tech	33	22
Low Tech	36	24
High Tech	122	83

Professional Preparation

Inferential Statistics

Influence of Dedicated AAC Courses on Comfort Level

A Pearson Correlation coefficient was computed to determine the correlation between the

number of dedicated AAC courses an SLP took during their professional preparation (Question

21) and the level of comfort providing services to learners who use AAC (Question 29). One or

more courses were considered "some" and zero courses as "none" for sake of dichotomous

comparison. Results did not meet statistical significance between dedicated AAC courses and

SLPs' comfort level (p= 0.279, r = 0.180, n = 38).

Influence of Off-Campus Assessment Experience on Comfort Level

A Pearson correlation test was performed to determine the correlation between the amount of off-campus assessment of learners who use AAC an SLP had during their graduate training (Question 25) and the level of comfort providing services to learners who use AAC. No correlation was revealed between assessment experience and SLPs' comfort level because results did not reach statistical significance (p =0.992, r = 0.002, n = 38).

Influence of Off-Campus Intervention Experience on Comfort Level

A Pearson correlation test was performed to determine the correlation between the amount of off-campus intervention of learners who use AAC an SLP had during their graduate training (Question 26) and the level of comfort providing services to learners who use AAC. There was not a statistically significant correlation between intervention experience and SLPs' comfort level (p = 0.739, r = 0.056, n = 38).

Influence of Years of Professional Experience on Comfort Level

A Pearson correlation coefficient was calculated to determine the correlation between the SLPs' years of professional experience (Question 14) and their level of comfort providing services to learners who use AAC. No statistically significant correlation was revealed between years of professional experience and SLPs' comfort level (p = 0.493, r = -0.115, n = 38).

Needs Assessment

Survey respondents were asked several questions to glean information about their needs regarding AAC (Questions 22, 27, 28, 30, 31, and 32). In survey Question 22, SLPs were asked to agree or disagree with the statement *I feel that I could have benefitted from additional clinical*

experience in conducting assessments of learners who use AAC, using a Likert-type scale. A

majority of SLPs agreed or strongly agreed that they could have had more AAC-focused

coursework during their graduate training (79%, n=38). When asked if they feel they could have

benefitted from more clinical experience providing AAC assessment and intervention (Questions

27, 28), 87% of respondents strongly agreed or agreed. 13% of respondents neither agreed nor

disagreed that they could have benefitted from additional assessment or intervention experience.

Question 31 delineated 10 AAC topics in which SLPs desire more information or training.

Answers are available in Figure 3. The five most-needed areas of information were assessment

(61% of respondents wished they knew more), school-age population (50%), transition services

(42%), evidence-based practices (39%), and literacy (37%). SLPs, once they are licensed and

practicing, may obtain this information through a variety of formats. When asked their preferred

format for acquiring knowledge in the areas of AAC (Question 32), 50% reported a face-to-face

presentation, 37% preferred an online format, and 13% would attend a standalone workshop or

utilize another type of format. Responses are summarized in Figure 4.

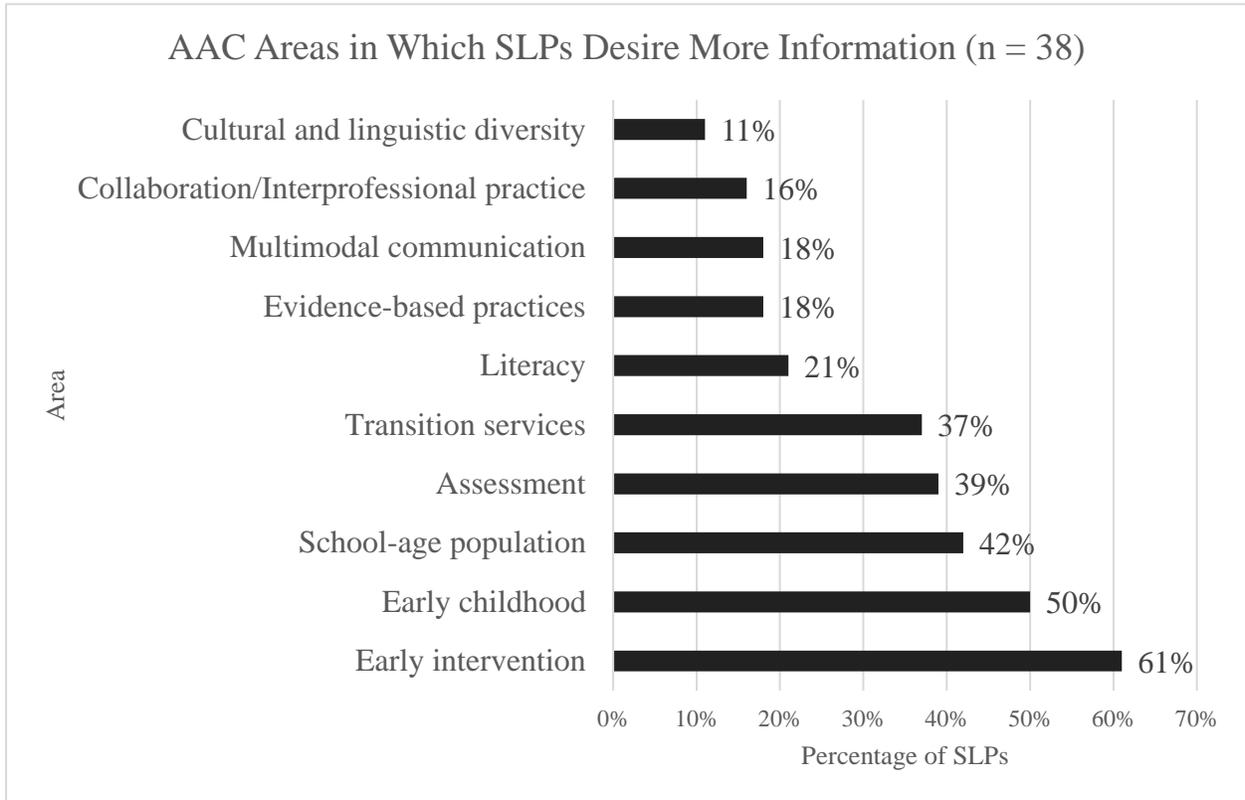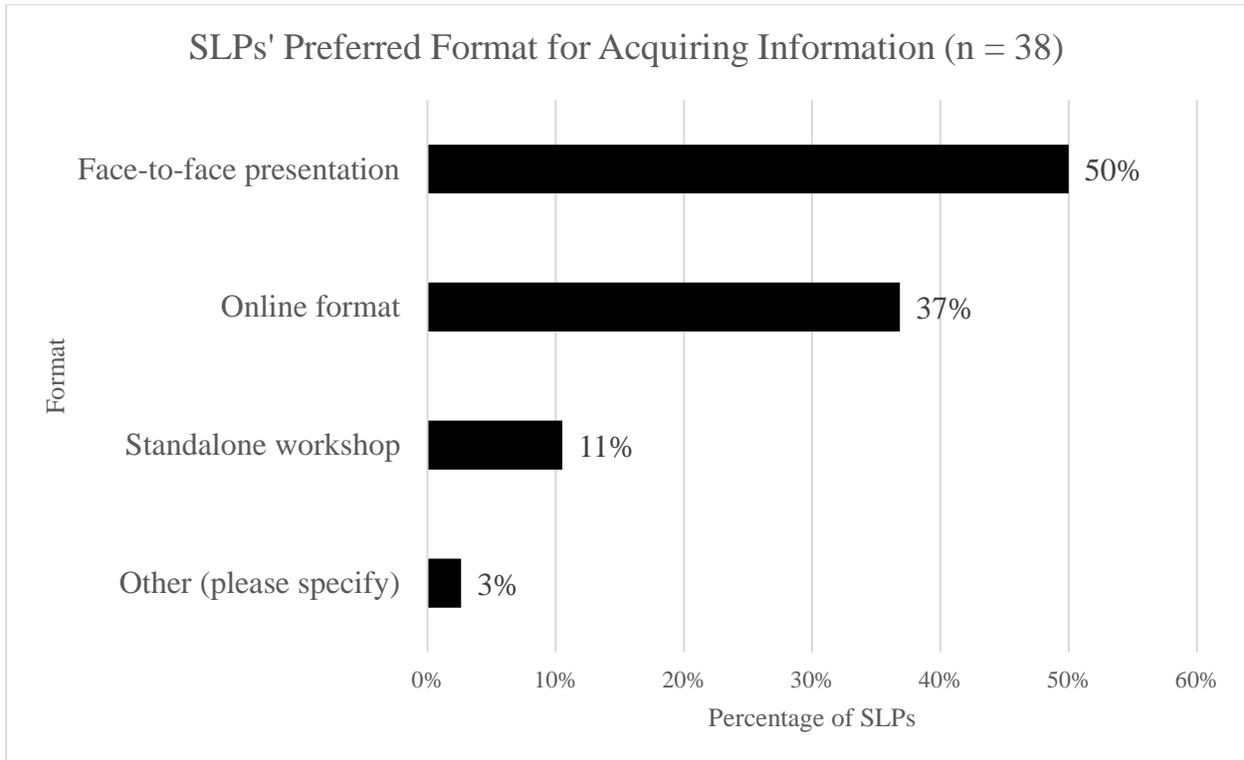Figure 3. Percentage of SLPs Who Wish to Know More About AAC, by Category

AAC Areas in Which SLPs Desire More Information (n = 38)

Figure 4. Preferred Format for Acquiring Knowledge in the Areas of AAC

SLPs' Preferred Format for Acquiring Information (n = 38)

Discussion of Results

The purposes of this study were 1. to describe and analyze the population of pediatric AAC users (birth-21) in Missouri and 2. to evaluate the preparation speech-language pathologists (SLPs) have had to serve these learners.

Prevalence

This study found that 10% of children birth-21 in Missouri who received services from a speech-language pathologist used AAC. While prevalence in the current study is lower than reports by other researchers in other states (Binger & Light, 2006), this statistic may not reflect the true landscape of SLPs' caseloads. This study yielded a low survey response rate (4%). The aforementioned prevalence is representative of only a fraction of the total number of children on

caseloads of Missouri SLPs' who are members of their state association, MSHA. The information from missing respondents, and those who are not MSHA members, would increase both the total number of children receiving services from an SLP and, theoretically, the number of AAC users. More representative information is necessary to better determine prevalence. Of the 40 surveys used to analyze caseload characteristics, 35 included children who used AAC. This begs the question of whether or not SLPs who had children with CCN on their caseloads were more likely to participate in the survey. If so, the reported prevalence of AAC users may be positively skewed. In either case, the data is reflective of children who currently use AAC. There may exist children in Missouri with CCN who may be candidates for AAC but are not currently using AAC. Children who have previously used AAC but have since abandoned their systems may not have been included in SLPs' counts as well.

Most of the reported AAC users (69%) were between 5-21 years old and qualified for or received services under Part B of IDEA. This is commensurate with data from the United States Department of Education (2017b; 2017e; 2017f) that reported 82% of students receiving special education services received under IDEA were in primary or secondary educational settings. It is interesting to note that less than 1% of reported AAC users were currently qualified under Part C. This result is commensurate with Bruce and Bashinski (2017) who cited a lack of AAC in early intervention. Although it has been well-established that AAC facilitates verbal communication (Light & McNaughton, 2012), this finding indicates an area of pressing need for advocacy, evaluation, and early intervention in the state of Missouri. SLPs can educate early intervention case managers and providers about the benefits of AAC systems—low tech and high tech—and provide in-services to help eliminate the myth that AAC is a last-resort. Early intervention was an area of interest amongst 18% of SLPs as indicated by the Needs Assessment

(see Figure 3). Another surprising finding from the current study was that rural areas in Missouri

yielded 40% of the survey respondents. This is interesting considering the perception that rural

areas have unmet personnel and staffing needs.

Diversity of AAC Users Birth-21 in Missouri

One hypothesis that was tested in the current study was that AAC users in Missouri will

be more racially and ethnically diverse compared to state averages. It should be noted that

comparisons of children who use AAC are made with children birth-21 who received special

education services in Missouri in 2016-2017. Results from the study supported the hypothesis,

but not by a great margin. In Missouri, 31% of reported AAC users birth-21 were non-white

compared to 28% of children who received special education who were non-white (U.S.

Department of Education, 2017b; 2017e; 2017f) and an estimated 27% of the total U.S.

population who identified as non-white (U.S. Census Bureau, 2016). Based on the high

percentage of Children of Color who use AAC—almost one-third of users in Missouri—it is

imperative that SLPs understand the specific needs of children with CCN and their families

whose backgrounds differ from their own (Soto & Yu, 2014). Reported AAC users in Missouri,

in addition to being racially and ethnically diverse, were linguistically diverse. Descriptions of

languages spoken amongst children birth-21 in Missouri are not readily available, and linguistic

comparisons of reported users in the current study were made to total United States population

estimates from the U.S. Census Bureau (2016). 7% of reported pediatric AAC users in Missouri

were English Language Learners. Primary languages of these learners included Spanish, Arabic,

Korean, Amharic, and Oromo. There may exist other languages spoken or understood by AAC

users in Missouri. Home language is vital to consider when developing an AAC system, but

many high-tech voice output systems do not support a diverse range of languages and dialects

(Soto & Yu, 2014). This warrants the need for legislative efforts to aid or sources to fund the enhancement of current AAC software; as a result, AAC systems will support a wider range of languages in order for more children to effectively communicate or code-switch across environments.

Previous studies of AAC users have varied widely in diagnosis or disability category of participants. In the current study, AAC users exhibited a range of disabilities. Diagnoses of these users represented 6 of the 13 disability categories recognized by IDEA, and Young Child with Developmental Delay. In the current study, the four most common diagnoses—in descending order or frequency—were ASD, ID, Multiple Disabilities, and YCDD. Beukelman and Mirenda (2013) cited ID, Cerebral Palsy (CP), ASD, and Childhood Apraxia of Speech (CAS) as the most common diagnoses which necessitate AAC use. It is interesting to note that in the current study, no reported learners had a hearing loss, visual impairment, or traumatic brain injury. Few SLPs from medical settings responded to the survey, but children in acute medical care who have sustained traumatic brain injuries may benefit from temporary or long-term AAC (Fager & Spellman, 2010) and collaboration between SLPs and nursing staff (Downey & Happ, 2013). Binger & Light (2006) found that few children who use AAC have visual impairments as a primary diagnosis, but these learners require specific strategies and system modifications to enhance their learning. AAC use amongst children who are deaf or hard of hearing is sparse; however, new research that suggests benefits of using AAC to teach specific language structures to children with hearing loss (Meinzen-Derr et al., 2016).

AAC Systems and Service Delivery

Results from the question of systems used by AAC users birth-21 revealed that a portion—but not all—of the population used a multimodal system of communication (using

more than one AAC form). This could reflect lack of understanding the benefits of a flexible

communication system, one that provides communicators a range of modalities to express their

thoughts, feelings, needs, desires, and ideas. Most reported AAC users in Missouri used high-

tech, speech-generating devices. No-tech AAC was scarce amongst reported users and could

signal a shift towards desire for more advanced technology, or could be due to SLPs not

considering unaided communication (e.g. gestures, signs, vocalizations) a separate AAC form.

Individualized communication systems should best meet the needs of learners with CCN and

allow them to participate in a variety of communication interactions effectively and efficiently

(Brady et al., 2015). Most pediatric AAC users were seen through a combination of either push-

in, individual, or group therapy. 18% were seen through push-in services alone. If AAC users

receive services in their classroom setting, SLPs must be prepared to collaborate with general

education teachers, special education teachers, and other professionals. It is important that SLPs

approach assessment and intervention of learners with CCN as a collaborative process, building

rapport with team members in order to increase communication and academic outcomes for

children who use AAC (Beukelman & Mirenda, 2013). The nature of collaboration between

SLPs and team members in the settings described in the current study would be worth exploring

further. Understanding more about the state of AAC systems and how they are used by learners

across environments would be critical to SLPs' reflection of their assessment and intervention;

moreover, it would inform SLPs' interactions with other members of the learners' teams—

especially families.

Professional Preparation and Needs

The second hypothesis of the current study focused on professional preparation, based on

the wealth of research which calls for better representation of AAC in graduate training programs

(Costigan & Light, 2010; Keller-Bell et al., 2017). The researcher hypothesized that SLPs level of preparation to serve learners who use AAC and their current comfort level providing services will correlate strongly. Overall, there was no significant correlation between SLPs level of preparation and comfort level providing services to learners who use AAC. While there was no statistically significant correlative relation between dedicated AAC courses taken and level of SLPs' comfort, there was a weak positive relationship between completion of one or more dedicated AAC courses and comfort providing AAC services. There was no relationship between graduate clinical experience (e.g. assessment experience, intervention experience) and comfort level. While not significant, there was a weak inverse relationship between years of SLPs' professional experience and comfort level. This could suggest that more graduate training programs are including more AAC throughout the curriculum, increasing the exposure newer SLPs in the field have to the needs of learners with CCN. Courses dedicated to AAC, however, not a required for graduation from every SLP professional preparation program. Out of the 9 accredited speech-language pathology master's programs in Missouri, 8 offer and require a dedicated AAC course, while one institution requires a course related to assistive technology that includes AAC. Of the 38 SLPs who completed the survey, 67% seek annual continuing education units (CEUs) related to AAC. A majority of Missouri SLPs in the current study wished to know more about assessment, school-age children, and transition services. This aligns with the current state of SLPs' caseloads and needs. There currently exists a discrepancy between the diversity of SLPs' caseloads and the number of SLPs who desire information and training related to cultural and linguistic diversity. Only 11% of survey respondents wanted to know more about this topic, potentially reflecting white professionals' trepidation towards self-criticism and cultural humility (Matias & Mackey, 2015). Respondents mostly prefer face-to-face formats for

acquiring this information. Continuing education (CE) serves as an excellent avenue for SLPs to acquire a greater breadth and depth of knowledge pertaining to AAC once they are practicing, as well as to mitigate gaps in knowledge that may not have been covered during an SLP's professional preparation.

Limitations

There were several limitations with the current study. First, the total number of survey respondents represented a small sample size, and this decreased further once surveys were rejected based on discrepancies or inaccuracies in question responses as well as failure to complete the survey. Convenience sampling was used by sending the survey through a listserv to Missouri SLPs who members of their state association, MSHA. Furthermore, responses were limited by the single time potential participants were contacted to respond to the survey. A stratified sampling methodology or increased contacts with participants could improve response rate and representativeness of the sample (McNeill & Light, 2007). A sampling bias also existed as SLPs who had learners with CCN who use AAC on their caseloads (35/40 SLPs) may have been more likely to respond to the survey. Including a clear and concise statement in the survey invite encouraging all SLPs, even those with no AAC users on their caseloads, to participate in the survey may increase response rate. This may have also impacted measurements of comfort level providing assessment and intervention to children who use AAC, as a majority of respondents were currently providing services to learners with CCN.

A common methodological limitation McNeill & Light (2007) note in AAC research is that of coverage error. When questions are vague or confusing, this increases the likelihood that respondents will answer questions incorrectly. In the current study, some of the questions included in the survey—especially those used to acquire specific demographic information about

caseloads—were lengthy in their directions and the response field may not have been conducive to collecting the proper information (e.g. Question 2). Additionally, there were many questions for SLPs to answer that may have led to fatigue—hence the 17% of respondents who failed to complete the entire survey. It is possible that rephrasing questions or limiting the information obtained from the survey could help to improve response rate, completion rate, and accuracy of data.

Future Directions

Future survey research should employ a stratified, systematic sampling technique with multiple participant contacts. Due to the small number of AAC users in Missouri who received services under Part C of IDEA, future research should look into this subset of the population. Moreover, it would be worthwhile to investigate barriers to early AAC intervention in Missouri. Most importantly, family perspectives would be crucial to acquire in order to assess parent perceptions of AAC as well as their readiness to facilitate its implementation in the home. Due to the heterogeneity of the population, and large percentage of Children of Color who use AAC, best practices should be refined and supported through public health initiatives. Most of the SLPs and team members working with children who are culturally and linguistically diverse are white (Fannin, 2016), but this may impact learner outcomes as professionals who share aspects of cultural identity can help to advance children's self-concepts (Nadal et al., 2014). Systematic change is necessary to increase racial and ethnic representation amongst speech-language pathologists. Graduate training program recruitment may be the impetus to this change: If more programs intentionally recruit qualified Candidates of Color, and support them in the process, the pipeline from pre-service training to practice will be more representative and enriched.

Graduate programs preparing speech-language pathologists should include or continue to include dedicated AAC courses in their curriculum. SLPs serving learners with CCN must be equipped with the skills and dispositions necessary to engage in interprofessional collaborative practice. Children with CCN often receive services from many providers and SLPs can help to increase other team members' knowledge of AAC while furthering their own learning from the knowledge of other disciplines. Information sharing and team building combine to increase the success of interprofessional teams and lead to improved outcomes in communication, academics, daily functioning, and quality of life for the learners ages birth-21 with CCN with whom they work.

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Hello, SLPs!

Below is a request for your voluntary participation in a Fontbonne University IRB-approved survey on prevalence and demographics of augmentative and alternative communication (AAC) users ages birth-21 in Missouri.

I am a second-year graduate student in Speech-Language Pathology completing a master's thesis under the guidance of Gale Rice, Ph.D., CCC-SLP at Fontbonne University. I am requesting your participation in a survey of Missouri SLPs to determine the prevalence of AAC use in therapeutic settings. This survey is one component of the completion of a master's thesis. The purpose of this study is 1. To identify the prevalence of AAC users (birth-21) in Missouri, as this data does not currently exist 2. To analyze the demographics of these children and young adults and compare them to state and national averages, and 3. To describe the preparation SLPs practicing in Missouri have had to serve learners with complex communication needs who use AAC. The results of this survey will add to our field's understanding of the likelihood of serving a learner who uses AAC, aid in professional preparation of Missouri SLPs to serve children and young adults who use AAC, and provide data that helps future funding, research, and legislative efforts.

The online survey will take approximately 15 minutes to complete. Participation in this research study is voluntary, and all of your responses will be completely anonymous. The Fontbonne University Institutional Review Board has approved this survey. Survey results will be made available if you wish to receive them.

Should you have any questions regarding this survey, please email me at phelpsa@fontbonne.edu or Dr. Gale Rice, faculty advisor, at grice@fontbonne.edu.

If you choose to participate in this study, indicate that you agree to do so by clicking on the following link:

https://www.surveymonkey.com/r/moaacprev

Thank you very much for your time.

Allison Phelps, B.S.
phelpsa@fontbonne.edu
(314) 610-4951

IRB #FBUIRB051619-AP

Prevalence and Demographics of Augmentative and Alternative Communication (AAC) Users Ages Birth-21 in Missouri: A Survey of Speech-Language Pathologists Serving Learners with Complex Communication Needs (CCN)

Instructions

The online survey will take approximately 15 minutes to complete. Participation in this research study is voluntary, and all of your responses will be completely anonymous. The Fontbonne University Institutional Review Board has approved this study. Study results will be made available if you wish to receive them. By clicking on **Begin Survey**, you agree to participate in this study.

Should you have any questions regarding this survey, please email me at phelpsa@fontbonne.edu or Dr. Gale Rice, faculty advisor, at grice@fontbonne.edu.

Part I: Learner Information

1) **How many children (birth-21) are on your caseload/workload?**

   o   Open answer

2) **Of these children, how many, in the following age ranges based on the Individuals with Disabilities Education Act services, <u>currently use AAC</u>? * The children on your caseload (birth—21) who use AAC will henceforth be referred to as <u>"learners"</u> ***

   o   Part C (Birth—2;11)   ___

   o   Part B (3;0—4;9)   ___

   o   Part B (5;0—17;11)   ___

   o   Part B (18;0—21;11)   ___

3) **Of these learners, how many are:**

   o   Female

   o   Male

   o   Transgender

   o   Non-binary (non-conforming to either male or female)

4) **How many of the children who use AAC are English Language Learners?**

   o   Open answer

5) If applicable, designate the learners' primary languages (if other than English):

o   Arabic

o   Chinese (Mandarin or Cantonese)

o   Spanish

o   Other (please specify)

6) How many learners with CCN in each category use AAC? (If a child identifies with more than one race/ethnicity/origin, you may indicate more than one group per child.)

a.   American Indian or Alaska Native

b.   Asian

c.   Black or African American

d.   Hispanic, Latino, or Spanish origin

e.   Middle Eastern or North African

f.   Native Hawaiian or Other Pacific Islander

g.   White

h.   Some other race, ethnicity, or origin

7) How many of the learners who use AAC qualify for Free/Reduced Lunch?

o   Open answer

8) Of the learners on your caseload who use AAC, how many have the following primary disabilities? (Count)

a.   Autism Spectrum Disorder

b.   Deaf-blindness

c.   Deafness

d.   Emotional disturbance

e.   Hearing impairment

     f.   Intellectual disability

     g.   Multiple disabilities

     h.   Orthopedic impairment

     i.   Other health impairment

     j.   Specific learning disability

     k.   Speech or Language Impairment

     l.   Traumatic brain injury

     m.   Visual impairment

     n.   Young Child with a Developmental Delay

9) For how many minutes per week do you see the learners who use AAC? (Count)

o   0-15 minutes

o   16-30 minutes

o   31-45 minutes

o   46-60 minutes

o   Other (please specify)

10) What model of service delivery is used for each learner? (Count)

o   Push-in

o   Individual pull-out

o   Group therapy

o   Combination

The Multimodal Communication System

11) Of the children on your caseload who use AAC, how many use the following: (Count)

     a.   No Tech (including gestures, signs, vocalizations)

b. Low Tech (e.g. Picture Exchange Communication System [PECS], letter boards, communication books)

c. High Tech (e.g. dedicated speech-generating devices, non-dedicated speech-generating devices like iPads with AAC software)

Part II: Professional Information

12) **Highest degree received:**

a. Bachelor's degree

b. Master's degree

c. Doctorate degree

13) **Date highest degree received:**

a. Prior to 1985

b. 1985-1994

c. 1995-2004

d. 2005-2014

e. 2015-present

14) **Years of professional experience, beginning with your Clinical Fellowship Year**

a. <1 year

b. 1-5 years

c. 6-10 years

d. 11-15 years

e. 16+ years

15) **Are you currently licensed and practicing in Missouri?**

a. Yes

b. No

16) Place of employment - Type

    a.   EI agency – home visits

    b.   EI agency – center

    c.   Hospital

    d.   Preschool

    e.   Public elementary school

    f.   Public middle school

    g.   Public high school

    h.   Private elementary school

    i.   Private middle school

    j.   Private high school

    k.   Other (please specify)

17) Place of employment – Name

    a.   Open answer (optional)

18) Place of Employment - Location

    a.   Rural

    b.   Urban

    c.   Suburban

19) Have you obtained continuing education credits in the area of AAC since receiving your degree?

    a.   Yes

    b.   No

20) Do you seek continuing education credits in the area of AAC annually?

    a.   Yes

    b.   No

21) **How many courses in your graduate studies (professional preparation) were dedicated to the needs of learners who use AAC?**

    a.   0

    b.   1

    c.   2

    d.   3+

22) **I feel I could have benefitted from additional coursework in my professional preparation program regarding learners who use AAC.**

    a.   Strongly agree

    b.   Agree

    c.   Neither agree nor disagree

    d.   Disagree

    e.   Strongly disagree

23) **During my professional preparation program, I had the opportunity to provide assessments for ___ learners who use AAC in the university clinic.**

    a.   0

    b.   1-2

    c.   3-4

    d.   5+

    e.   I did not have a graduate clinical practicum in a university clinic

24) **During my professional preparation program, I had the opportunity to provide intervention for ___ learners who use AAC in the university clinic.**

    a.   0

    b.   1-2

    c. 3-4

    d. 5+

    e. I did not have a graduate clinical practicum in a university clinic

25) **During my professional preparation program, I had the opportunity to conduct assessments of ___ learners who use AAC in an off-campus clinical placement.**

    a. 0

    b. 1-2

    c. 3-4

    d. 5+

    e. I did not have an off-campus graduate clinical practicum

26) **During my professional preparation program, I had the opportunity to provide intervention for ___ learners who use AAC in an off-campus clinical placement.**

    a. 0

    b. 1-2

    c. 3-4

    d. 5+

    e. I did not have an off-campus graduate clinical practicum

27) **I feel that I could have benefitted from additional clinical experience in conducting assessments of learners who use AAC.**

    a. Strongly agree

    b. Agree

    c. Neither agree nor disagree

    d. Disagree

    e. Strongly disagree

28) I feel that I could have benefitted from additional clinical experience in providing intervention to learners who use AAC.

    a. Strongly agree

    b. Agree

    c. Neither agree nor disagree

    d. Disagree

    e. Strongly disagree

29) I currently feel comfortable providing assessment/intervention for learners who use AAC.

    a. Strongly agree

    b. Agree

    c. Neither agree nor disagree

    d. Disagree

    e. Strongly disagree

30) I wish to know more about AAC in the areas of: (Select all that apply)

    a. Early intervention

    b. Early childhood

    c. School-age populations

    d. Transition services

    e. Literacy

    f. Evidence-based practices

    g. Multimodal communication

    h. Collaboration

31) My preferred format for acquiring knowledge in the areas of AAC is:

    a. Online format

    b.   Face-to-face presentation

    c.   Standalone workshop

    d.   Other (please specify)

32) If you would like to provide additional information regarding your professional preparation to serve role as a school-based SLP providing prevention services, please use the box below.