

SPEECH-LANGUAGE PATHOLOGISTS' EPISTEMOLOGICAL BELIEFS RELATED TO
AUGMENTATIVE AND ALTERNATIVE COMMUNICATION SERVICE PROVISIONS

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The following faculty members have examined the final copy of this thesis for form and content, and recommend that it be accepted in partial fulfillment of the requirement for the degree of Master of Arts with a major in Communication Sciences and Disorders.

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ABSTRACT

Individuals with complex communication needs have substantial communication disabilities that impact their ability to meet their daily needs. Augmentative and alternative communication (AAC) systems provide one means of communication. Speech-language pathologists (SLPs) are the primary professionals to recommend AAC devices. While there is both anecdotal and scientific evidence which supports the benefits of an AAC device, there remains a gap between this knowledge and the practice patterns of SLPs.

The purpose of this study was to use an epistemological survey to determine whether the SLP's beliefs about knowledge and learning impact whether or not they recommend AAC systems to clients.

Keywords: augmentative and alternative communication, AAC, complex communication needs, speech-language pathologist, epistemological beliefs

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CHAPTER I

Introduction

Complex communication needs

Approximately 3.5 million Americans have such substantial communication disabilities that their natural speech cannot meet their communication needs in their daily lives (Beukelman & Mirenda, 2005). High-technology augmentative and alternative communication (AAC) devices (i.e., devices and/ or computers with software that provide voice-output capabilities) offer individuals with complex communication needs (CCN) a way to communicate beyond what is possible naturally. Although technology is rapidly advancing there remains a gap between the “state of the art knowledge in the field and the actual practices of professionals and families” (Light, Beukelman, & Reichle, 2003, p.30). Although verbal speech production has long remained the “gold standard” for communication it is simply not a realistically attainable goal for many with complex communication needs. “The silence of speechlessness is never golden. We all need to communicate and connect with each other - not just in one way, but in as many ways possible. It is a basic human need, a basic human right. And much more than this, it is a basic human power” (Williams, 2000, p. 248).

AAC interventions can benefit individuals who have complex communication needs (i.e., significant speech and language impairments) by improving their abilities to communicate (e.g., Light, Binger, Agate, & Ramsay, 1999; Miller, Light, & Schlosser, 2006). “The ultimate goal is not to find a technological solution to communication problems but to enable individuals to efficiently and effectively engage in a variety of interactions and participate in activities of their choice” (Beukelman & Mirenda, 2005, p. 8). Speech-language pathologists are usually the

primary professional to recommend AAC interventions, provide assessment for AAC use, provide training and counseling to the client and his or her family, and complete the necessary paperwork for funding approval.

Despite the recognized benefits that AAC can provide an individual with complex communication needs, some speech-language pathologists (SLPs) and family members are concerned that the use of AAC will inhibit development of natural speech production (Beukelman, 1987; Silverman, 1995). In a systematic review of the literature, Millar, Light, and Schlosser (2010), found that AAC intervention did not negatively impact the speech development of individuals with developmental disabilities, but might actually facilitate language skills. While there remains a strong belief among many clinicians that the decision to pursue AAC or develop natural speech is an “either-or” decision (Beukelman, 1987, p. 95), there is empirical evidence that supports the opposing argument that AAC intervention can facilitate natural speech development (Millar, Light, & Schlosser, 2006).

Research within this field has explored what factors speech-language pathologists (SLP) perceive to be that can either facilitate or hinder the use of AAC devices. For example, Iacano and Cameron (2009) interviewed 14 speech-language pathologists in Australia who worked specifically with preschool students and found that there was a perception that parent attitudes and perceptions could be a barrier to successful implementation of AAC. Baxter, Enderby, Evans, and Judge (2012) did a qualitative review of the current literature related to barriers and facilitators to use of high-technology AAC devices. Factors that Baxter and colleagues discovered included: “ease of use of the device; reliability; availability of technical support; voice/language of the device; decision-making process; time taken to generate a message; family

perceptions and support; communication partner responses; service provision; and knowledge and skills of staff” (p. 115).

Though qualitative research has investigated families’ and communication partners’ roles in AAC implementation as well as that of the individual with complex communication needs, there has been a lack of research into the roles and beliefs of the SLP. Johnson, Bloomberg, and Iacono (2008) began to address this when they interviewed SLP undergraduate students to explore the students’ attitudes towards and desires to work with individuals who have complex communication needs. They interviewed 85 undergraduate students who were majoring in speech-language pathology and 10 speech-language pathologists who had graduated from their academic program (Johnson, Bloomberg, & Iacono, 2008). Although there was found to be a small positive attitude shift among the undergraduates toward working with people with disabilities, it was a weak predictor of working with individuals with complex communication needs (Johnson, Bloomberg, & Iacono, 2008). The current literature has yet to investigate how SLPs’ beliefs about knowledge and learning impact their clinical decision making in regards to AAC. Given the choice to implement or not implement AAC, how do clinicians decide which approach to intervention to use with each individual?

The field of epistemology is interested in an individual’s beliefs about knowledge and learning. Personal epistemology is a system of beliefs that are, for the most part, independent of one another (Schommer, 1990). Though primarily applied to the educational setting, some researchers have examined how epistemological beliefs can impact clinical decision making in other contexts.

The purpose of this study was to examine three questions: (1) is the epistemological questionnaire- AAC a valid and reliable tool to analyze epistemological beliefs in regards to augmentative and alternative communication; (2) does a relationship exist between speech-language pathologists' epistemological beliefs and their decisions to recommend augmentative and alternative communication; (3) do clinicians who implement AAC tend to be more accepting of technology than those who do not.

CHAPTER II

Literature Review

Assistive technology and augmentative and alternative communication

This chapter will discuss assistive technology (AT), augmentative and alternative communication (AAC), and how the two overlap. This will be followed by a consideration of the perceived facilitators and barriers to successful implementation of AAC devices with a particular emphasis on the perspective of the Speech-Language Pathologist (SLP).

Subsequently, how clinicians' beliefs and perceptions with regards to learning, knowledge, and AAC, also known as personal epistemology, may influence their decision as to whether or not implement AAC for individuals with complex communication needs will be explored. The conclusion of this chapter will summarize the rationale for this study as well as establish the research questions.

Although spoken speech is the natural and primary mode of communication for most people, individuals with complex communication needs find that their ability to verbalize is not adequate or efficient in meeting their daily needs when interacting with others (King, 1999). An individual may have difficulty producing speech due to a developmental disability (e.g., cerebral palsy) or an acquired disability (e.g., amyotrophic lateral sclerosis, traumatic brain injury, stroke). This causes limitations in all aspects of a person's life, including but not limited to relationships, education, employment, and community participation. Assistive technology supports individuals with developmental or acquired disabilities by modifying aspects of the person's environment.

Assistive technology. Assistive technology (AT) is any type of simple or complex tool, equipment or device, which may be mechanical or electronic, that helps, supports, and/or aids an individual with accomplishing a task or purpose (King, 1999). AT, more specifically, focuses on the needs of individuals of all ages who may have a motor, sensory, cognitive and/or linguistic impairment which prevents them from completing various routine tasks (e.g., writing) in traditional or typical ways. AT and augmentative and alternative communication (AAC) tools may overlap, however they are not the same. Wendt and Lloyd (2011) proposed that the relationship between AT and AAC may be understood by looking at AT as the tools used and AAC as the process or activity an individual engages in to communicate. When there is an AAC device (which would be the AT tool) and the individual is able to communicate with this tool, the overlap is successful.

Augmentative and alternative communication (AAC). The American Speech-Language-Hearing Association (ASHA) Special Interest Division 12 defined augmentative and alternative communication (AAC) as:

AAC refers to an area of research, clinical, and educational practice. AAC involves attempts to study and when necessary compensate for temporary or permanent impairments, activity limitations, and participation restrictions of individuals with severe disorders of speech-language production and/or comprehension, including spoken and written modes of communication. (ASHA, 2004, p. 1)

Individuals of all ages with complex communication needs may benefit from the use of AAC devices to encourage independence, enable the growth and development of relationships, and enrich educational opportunities (Baxter, Enderby, Evans, & Judge, 2012; Johnston, Evans, & Reichle, 2004). Despite rapid growth of technological supports for communication, without the support of professionals like speech-language pathologists (SLPs), many individuals with

complex communication needs do not have access to AAC devices or are unable to use this technology to its fullest potential due to a wide range of both personal and contextual factors which may influence communicating with an AAC device (Light, 2003).

King's ergonomic equation for assistive technology. In order to understand why some individuals with complex communication needs experience success with AAC while others do not, King's (1999) framework for assistive technology (AT) success can be applied to implementation of AAC. In this framework if the user's motivation to pursue and complete a given task exceeds the total physical effort, cognitive effort, linguistic effort, and time load required to do the task, the user will be successful at using assistive technology (King, 1999). If the previously mentioned factors outweigh the user's motivation then adoption of assistive technology will most likely fail. As King (1999) stated,

Across all professional fields of practice that are related to AT [assistive technology], our primary goals for practice in AT diagnosis, prescription, and intervention are to maximize M [the motivation of the AT user], while contributing from our areas of professional expertise to minimize the load and effort factors individually and collectively (p. 71).

Although King applies this model specifically to the AT user, it can also be applied to other stakeholders (e.g., parents, guardians, SLP), as they can influence all of the factors that contribute to the success or failure of AT use. In order to fully understand this model it is important to review each component in relation to AAC devices.

User motivation. King (1999) discussed that the primary reasons new users want to use a device is because they witness others using the device, recognize the benefits of the device, and desire to have those benefits themselves. If an individual perceives AAC to be beneficial they may be more motivated to use a device, however they may also observe others using technology that they themselves cannot access due to an impairment or disability. King (1999) emphasized

that the most important people to perpetuate motivation for AT use are most likely parents, family members, and teachers.

Physical effort. Even if an individual is highly motivated to use a device, if the physical effort it takes to use the device is too great the chance of successful use of the device decreases (King, 1999). Rackensperger, Krezman, McNaughton, Williams, and D’Silva (2005), reported that some users found physical operation of a device to be a challenge, particularly when the device was being used when the individual was not seated in a customized wheelchair. Hodge (2007) interviewed parents of AAC users, as well as adult AAC users. These respondents described the importance of a device being secured to a wheelchair in order to successfully use the device. Additionally, physical impairments “can make operating a communication aid quite slow or inefficient and can be frustrating to the individual user” (Hodge, 2007, p. 463). It may take a team of various professionals, such as a SLP, an occupational therapist, and a physical therapist, working in conjunction with the family and the individual user to decrease the physical effort for the individual user and increase the chance of success. Often it may fall upon the SLP to recognize the need to consult other disciplines, coordinate with other disciplines, and work with the individual and his or her family to problem solve challenges related to the physical effort required to operate an AAC device.

Cognitive effort. A second factor that influences the usage of AAC devices is the cognitive effort required to operate a device (King, 1999). Even if an individual is motivated to use a device, if it requires greater cognitive effort than communicating without the aid of a device, there will be less chance of successful use. “Cognitive effort factors include sensing, remembering, discriminating, analyzing, and sequencing the actions and responses needed to

operate tools and devices” (King, 1999, p. 61). The device should be programmed in a way that key phrases, vocabulary, and pages that are applicable to the person’s daily needs and communicative situations are readily accessible to the individual. Programming an AAC device can require cognitive effort, which is important to remember as those who are most likely to program the device may be family members or professionals. If the cognitive effort is or is perceived to be too great by those who are directly involved with the introduction and maintenance of an AAC device, the less likely successful implementation of the device will be.

Linguistic effort. Linguistic efforts are closely related to cognitive efforts (King, 1999). King (1999) described linguistic effort as “the amount of symbolic interpretation and processing that the user must invest in order to operate a device” (p. 61). Linguistic load increases as the requirement for listening, recognizing, reading, and interpreting becomes greater. One challenge is that the device needs to be customized to meet the user’s linguistic needs. Bailey, Parette, Stoner, Angell, and Carroll (2006), reported that limited vocabularies available on devices are a barrier to their effective usage. Preprogrammed phrases and vocabulary are often intended to decrease the user’s linguistic efforts but as Estrella (2000), an AAC user wrote, “I can think of few things more dehumanizing and even demeaning than selecting canned sentences from a list and seeing the subject matter that you want to talk about is nowhere to be found!” (p. 38). Insufficient vocabulary options not only limits what an individual talks about, but may also contribute to an increased length of time it takes the user to create the message. In a survey by McCord and Soto (2004), family members of AAC users reported that due to the slow response of the AAC device many users may choose to communicate through a different method. Lund

and Light (2007) also discussed the need for faster technology that could keep up with a user's rate of thoughts.

Time. The amount of time it takes for a user to initiate, as well as accomplish, a task using assistive technology is an important factor in successful adoption of AT (King, 1999). The same idea of time can be applied when looking at how an individual uses an AAC device. The longer it takes an individual to generate the message the less likely the user is to use the device in his/her daily life. In a study by Cooper, Balandin, and Trembath (2009), adult AAC users reported that talking to friends was difficult if time was limited. Similarly, Hodge (2007) found that adult users described how the time to create a message was a major challenge in using a device.

The gap between evidence-based knowledge and actual practices of SLPs

Since the 1980's, research has focused on advancement of knowledge and understanding related to AAC. In spite of this, there continues to be a gap between "the state-of-the-art knowledge in the field and the actual practices of professionals and families" (Light, Beukelman, & Reichle, 2003, p. 30). This gap has been attributed to a lack of preservice training programs in AAC and insufficient dissemination of information to professionals and families (Light, Beukelman, & Reichle, 2003). One of the biggest barriers to implementation of AAC by SLPs and families is the perception that AAC will inhibit the development of speech production (Beukelman, 1987; Silverman, 1995). In a metaanalysis of existing literature, Millar, Light, and Schlosser (2006) concluded that "clinicians and parents should not hesitate to introduce AAC interventions to individuals with developmental disabilities whose speech is inadequate to meet their communication needs," (p. 258) as AAC can significantly benefit the development of

communication competence and language skills. Despite the recognized benefit that AAC can have on language development, there is still a gap between the most recent scientific evidence and the knowledge and practices of some SLPs. In the process of working with families, it is the SLP's responsibility to provide not only appropriate, evidence based treatment, but also education and counseling to the family. If the SLP is not knowledgeable in the most up to date evidence based treatment, he or she will not be able to provide families with the most appropriate services. If the most up to date information is not disseminated it could further perpetuate the belief that AAC will inhibit speech development, which in turn could impact future decisions made by the SLP and the family. Keeping up to date on current best practices and scientific literature is time consuming, and as Iacono and Cameron (2009) discovered when interviewing certified SLPs, even if employers encouraged the SLP to keep up with new practices related to AAC this "encouragement was not always accompanied by the time or funding to do so" (p. 242).

Assessment time. Time can be a facilitator or a barrier when discussing the overall process of AAC. The process of assessing how an AAC device can benefit an individual can be time consuming, as the SLP should give each individual an extended period of time using one device, and then similarly assess the individual's use of different devices. Once a device has been selected it takes time to write an assessment report, fill out the required paperwork, and acquire various signatures from the individual, parents, guardians, and physicians; once this is done the paperwork must be submitted to a funding agency for approval. This process can take several months. In a survey by Iacono and Cameron (2009), SLPs expressed concerns related to

a lack of time to research AAC devices, to complete forms to request funds, to complete reports, to obtain support from other SLPs, or to engage in problem solving with others.

The SLP's professional and personal time. In a qualitative study involving interviews of SLPs who worked in an early intervention setting, one of the most prevalent barriers to implementation of AAC was time (Iacono & Cameron, 2009). Iacono and Cameron (2009) reported that clinicians discussed the time that was involved in their many roles and responsibilities, including the time to address the needs of the child and family, the implementation of AAC across contexts, and transitioning children to school by preparing teachers to work with AAC devices. Practicing SLPs reported that customization and maintenance of AAC devices, particularly high tech devices “were so labour intensive that the process required a great deal of their own unpaid time” (p. 244). One SLP expressed concern about the infringement of AAC devices into the private lives of SLPs suggesting that, “We will lose really experienced people because they’ll [the SLPs] just burn out, they just won’t be able to do it again any more...because they decided that they wanted to have some life, which is important” (p. 244). Despite efforts by some clinicians to provide the most appropriate AAC services, even at the expense of their own personal time, there is a perception that many SLPs are not competent to work with AAC devices.

Lack of Confidence

Family's lack of confidence in the SLP. Parette, Huer, and Brotherson (2001) suggested that

Professionals who enter in collaborative arrangements with families must give complete loyalty to the partnership, provide families with relevant, accurate, and up-to-date information, and use effective communication skills so that trusting partnerships can be developed and enhanced (p.78).

This collaboration is ideal in the success of working with an individual with complex communication needs, their family, and the SLP; however this recommendation is not always being applied to clinical practice. Multiple studies of parents and families have found there to be a lack of confidence in the SLPs' abilities in regards to AAC. Lund and Light (2007) discussed how there was a perception of a lack of locally available AAC service delivery, with a particular emphasis on a lack of services for adult users. McNaughton, Rackensperger, Benedek-Wood, Krezman, Williams, and Light (2008) reported that parents and AAC users identified difficulties in having access to an evaluation by a specialist. Lund and Light (2007) found limited expertise of local professionals, lack of collaboration between professionals, and a need for teacher and family training. McNaughton and colleagues (2008) interviewed family members of children who used AAC devices and found that while not all SLPs were expected to be AAC experts they were expected to have a degree of knowledge if they worked with a child who uses AAC. In other words, "professionals need to 'know what they don't know', and be ready to request additional expertise as needed" (McNaughton et al., 2008, p. 53)

Although one should expect an SLP to have at least basic knowledge of AAC, parents have reported that such professionals often lack sufficient experience or knowledge in the area of AAC (Goldbart & Marshall, 2004). Parette, VanBiervliet, and Hourcade (2000), found that families appreciated professionals being honest about their degree of knowledge, and wanted clear, accurate, information. If parents and family members lack confidence in the SLP's abilities and do not feel supported by the SLP then the chance of successful AAC use and carry-over of skills into everyday situations will be less likely to occur.

SLPs' lack of confidence in their own abilities. SLPs have also expressed a lack of confidence in their knowledge and abilities related to AAC. In self reports from 14 SLPs in Australia, Iacono and Cameron (2009) found there to be a wide variety in the knowledge and skills in AAC; one clinician felt unskilled but had support from experienced colleagues; some felt they had gaps in their knowledge base; others felt they had strong skills in the area of AAC. In a survey of 320 SLPs in England, Matthews (2001) found that 31% categorized their skills in high-technology AAC as none, while 37% reported that they had some general knowledge and/or awareness. The need for more advanced training for SLPs to increase knowledge of evidence-based practices related to AAC has been cited in the literature (e.g., Costigan & Light, 2010). This perceived need has ranged from understanding the needs of families (including the demands placed on families) (Goldbart & Marshall, 2004), to understanding what their own role as an SLP was as part of the AAC assessment process (Costigan & Light, 2010). This feeling of uncertainty some SLP's reported feeling about their own knowledge base can carry over to the SLPs view of themselves. Iacono and Cameron (2009) recounted that many SLPs interviewed were hesitant to refer to themselves as AAC experts. The level of confidence in their expertise could impact how they approached and convinced families to implement AAC with their child (Iacono & Cameron, 2009). ASHA's Special Interest Group on AAC (SIG 12) has published skill and knowledge requirements for AAC service delivery (ASHA, 2002) and there are standards for professional certification that include knowledge of AAC. (ASHA, 2004). Though these standards exist, SLPs may have little experience with assessment, implementation, and service delivery related to AAC in graduate school, and may have no experience with AAC once they enter the profession. Iacono and Cameron (2009) pointed out "one aspect of clinical skill is

the extent to which professional practices are based on research evidence. The ability to implement such practices is, in turn, dependent on both the quality of and the clinician's familiarity with the underlying evidence base" (p. 237).

Competencies in AAC. So why do some clinicians lack an underlying evidence base and feel unable to provide AAC services? A position statement about AAC developed by ASHA (2002) stated that

Not all SLPs are expected to engage in all areas of AAC practice. However, all SLPs are expected to recognize situations in which mentoring, consultation, and/or referral to another professional are necessary to provide quality services to individuals who may benefit from AAC (p. 2).

Though not all SLPs may be expected to work in all areas of AAC implementation, there are multiple knowledge and skill areas a SLP must meet in regards to AAC in order to be deemed a competent practitioner. Past surveys of practicing SLP professionals found that 45% of SLPs surveyed provided services to individuals with complex communication needs (ASHA, 2002; Locke & Mirenda, 1992). One could assume that all SLPs should have sufficient knowledge of AAC, access to resources in the area, and the knowledge of other practitioners in the area in order to make referrals, yet SLPs have been found to lack confidence in their AAC abilities and in their knowledge (Baladin & Iacono, 1998; Russell & McAllister, 1995).

Lack of systematic research. The evidence base for AAC has grown extensively over the past twenty years. Research has moved beyond a specific device or one approach to intervention, instead turning attention towards the stakeholders involved in the AAC process, including the individual who uses AAC, the family members, and the SLP, in order to understand how these individuals impact the decision to select the course of intervention and implement an AAC device. Yet there has not been a systematic way to measure the SLP's

beliefs about knowledge and learning; nor has the literature explored how the beliefs and knowledge of the clinician impact the decision to implement AAC. By not exploring the beliefs of SLPs is to ignore human factors that impact successful implementation of AAC. As King (1999) stated:

The best, most complex, most expensive assistive technologies are destined for failure if human factors are ignored in design and intervention... Failure of an intended AT system (the user combined with a device to accomplish an intended purpose) means failure of our learned diagnostic and prescriptive efforts, and of our intended intervention. Failure of our intended, carefully selected AT device to become a true system with our user means we have spent precious client and family time and effort in pursuing an illusion of success; we have spent valuable professional time in pursuit of creating potential assistance from a technology whose full use did not materialize (p. 70).

There continues to be a great divide between those clinicians who work to implement AAC and the clinicians who want nothing to do with AAC.

Personal attitudes and beliefs. Personal attitudes and beliefs are important and cannot be ignored as they are intertwined with the SLP's clinical process and decision making. These factors may account for family perceptions that SLPs skilled in the area of AAC are scarce, and for the SLPs who are perceived to lack knowledge of AAC and resources for AAC in the community. Not only have all practicing SLPs received at least a Master's degree and passed competency examinations, but they also have completed hundreds of clinical contact hours with clients, prior to becoming certified clinicians.

With the stringent guidelines for professional practice created and implemented by ASHA, it is surprising that throughout the literature there is the perception, by clinicians themselves and by clients, that not all SLPs are willing or comfortable recommending and/or working with AAC devices. Why are some clinicians willing to recommend AAC devices for individuals with complex communication needs, while others do not? Evidence-based practice

has documented that AAC is beneficial (e.g., Light, Binger, Agate, & Ramsay, 1999; Miller, Light, Schlosser, 2006) and can have a major impact on an individual's quality of life and level of independence (e.g., Beukelman & Mirenda, 2005). By continuing to ignore these human factors that lead one clinician to work with AAC devices and another to shy away from AAC devices would be a disservice to the field of communication sciences and disorders, AAC, and to individuals with complex communication needs.

Technological Acceptance Model

One human factor that may impact the SLPs willingness to work with AAC is how accepting of technology the SLP is in his or her daily life. Could a clinician who thinks technology is not of great benefit be less willing to work with AAC devices? For the purpose of this study, ideas from Davis' (1989) technological acceptance model will be incorporated. Davis (1989) proposed a technological acceptance model in which two subjective measures are used to determine a user's acceptance of technology (particularly computer use): (1) the "perceived usefulness" (i.e., the degree to which an individual believes the use of a technology will enhance their job performance) and (2) the "perceived ease of use" (i.e., the degree to which the user believes using the system will be free of effort) (p. 320). The perceived ease of use proposes that "effort is a finite resource that a person may allocate to the various activities to which he or she is responsible for" (Davis, 1989, p. 320).

Technological acceptance model as applied to healthcare. Though there have been rapid technological advances since Davis proposed this theory in 1989, it has been applied more recently to healthcare providers' acceptance of communication and information technologies. Gagnon et al., (2012) defined information and communication technologies as something that

enables electronic storage, processing, and transport of information. In a systematic review of the literature, Gagnon et al. (2012) discussed that their findings supported the importance of the factors (usefulness and ease of use) proposed earlier by Davis (1989). Their findings were also consistent with a systematic analysis by Yosuf, Stergioulas, and Zugic (2007), which found that ease of use was the main factor in adopting technology among healthcare professionals. Additionally, both reviews found that time was one of the major barriers to the adoption of technology.

Consequently, the main factors proposed by Davis (1989) are also factors that can facilitate or prohibit successful use of assistive technology as outlined in the framework by King (1999). Though Davis' theory was based on computer technology it could it also be applied to high-technology AAC devices. SLPs who are more likely to accept technology may be more likely to introduce and implement AAC devices with their clients, than SLPs who are less likely to accept technology.

Although acceptance of technology may greatly impact SLPs clinical practices it is only one factor that could impact clinical decision making. Other underlying factors that are deeply ingrained in a person are one's beliefs about knowledge and learning. As Hofer described, "In our most mundane encounters with new information and in our most sophisticated pursuits of knowledge, we are influenced by the beliefs we hold about knowledge and knowing" (p. 3). These beliefs are referred to as personal epistemology.

Personal Epistemology

Perry (1968) began studying school-aged students' beliefs regarding knowledge and their beliefs about learning; these are known as epistemological beliefs. Perry suggested that students

go through stages of development of epistemological beliefs; initially, they view knowledge as either right or wrong and look to authority figures for answers. Over time others have drawn upon Perry's work in order to understand how beliefs about knowledge and learning play a role in educational practices (e.g., Boyes & Chandler, 1992; Kitchener, King, Wood, & Davidson, 1989; Ryan, 1984).

Schommer's view of Personal Epistemology. While Perry and others viewed epistemological beliefs as one entity, Schommer (1990) suggested that personal epistemology is a system of "more-or-less independent beliefs" (p. 500) about how a person learns and acquires knowledge. This notion that personal epistemology is multidimensional, also proposes that these beliefs may not develop at the same rate nor will these beliefs be congruent, as previously theorized by researchers. Additionally, Schommer (1990) proposed five beliefs stemming from previous epistemological research: (1) "the structure of knowledge" (i.e., small parts to integrated ideas); (2) "the stability of knowledge" (i.e., knowledge is on a continuum from rarely ever changing to constantly changing); (3) "the source of knowledge" (i.e., from those passed on by figures of authority to those derived from research and reasoning); (4) "the speed of learning" (i.e., fast or gradual); and (5) "the ability to learn" (i.e., a continuum from a fixed point at birth to changing and improving over time through experiences) (p.499). These personal beliefs can be measured using a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).

Application of personal epistemology in education. While primarily applied to the areas of educational psychology, Hofer (2000) advocated an expansion of the application of personal epistemology to other disciplines. The Schommer Epistemological Questionnaire (EQ1990; 1998) has been found to be a reliable and valid measure of personal epistemology and the

questionnaire has been adapted in order to explore the epistemological beliefs of middle school students (Schommer-Aikins, Mau, Brookhart, & Hutter, 2000), high school students (1993; Schommer, Calvert, Gariglietti, Bajaj, 1997), college students (Schommer, 1990; Schommer, Crouse, & Rhodes, 1992), and adults (Schommer, 1998). Jehng, Johnson, and Anderson (1993) drew on the works of Spiro et al. (1989) and Schommer (1990), to explore epistemological beliefs, including the beliefs of the orderly structure of knowledge, of undergraduate and graduate students across different majors. More recently, Moyer (2012) applied personal epistemology to the field of speech-language pathology by examining SLPs' beliefs related to fluency treatment; Moyer (2012) concluded that the SLP's epistemological beliefs do influence the course of treatment selected.

Application of personal epistemology to healthcare. Though personal epistemology developed and grew in the field of educational psychology some researchers have applied it to the healthcare field. For example, Evans and Trotter (2009) researched how physicians epistemological beliefs impact his or her ability to accept uncertainty in the medical setting; those who practiced a “biopsychosocial” treatment approach believed that uncertainty was an important factor while those who practiced a “biomedical” treatment approach did not tolerate uncertainty.

Spiro and colleagues (1989) found that an oversimplified curriculum in medical schools impacted students' epistemological beliefs; students could believe that learning is always an orderly process. Could this occur in SLP graduate programs as well? Graduate programs in speech-language pathology should be considered to be an accurate representation of advanced knowledge acquisition for those who want to enter the SLP profession, as a master's degree is

the minimum requirement for an SLP. A course in AAC is not always required as part of graduate level coursework; yet many programs offer AAC as a course, or embed information about AAC into other graduate level courses. By teaching AAC in a simplified, systematic way could SLP students develop a rigid belief system that the process is orderly, and that problem solving when working with a client and AAC should have a systematic process? If this is true, then SLPs would have a difficult time connecting prior knowledge (i.e., curriculum materials) with real-world clinical experiences in order to problem solve the many details that occur when implementing an AAC device with a client.

Statement of the problem

In providing services to children with complex communication needs who may benefit from AAC systems, SLPs are often the primary professionals involved. Previous studies have demonstrated that SLPs may feel inadequate in providing those services for a variety of reasons that mirror King's (1999) barriers to the successful adoption of assistive technology, especially the time factors involved in providing AAC services. These perceived barriers may be based in the SLPs epistemological beliefs about persons with CCNs and the services they require as well as their own abilities to provide adequate technological services. Families of clients with CCNs also perceive barriers in adopting AAC systems and frequently lack confidence in the SLPs who are serving their family members.

Additionally, the idea of the SLP being highly skilled with technology or an "expert" is supported by Davis' (1989) technological acceptance model in that the degree to which the SLP accepts technology can either encourage or deter their work with AAC systems/devices. A vast majority of the literature published in regards to the SLP and AAC has been based on first- hand

accounts of clients, families, and SLPs (e.g., Baladin & Iacono, 1998; Costigan & Light, 2010; Goldbart & Marshall, 2004; Iacono & Cameron, 2009; Locke & Mirenda, 1992; Lund & Light, 2007; Matthews, 2001; McNaughton et al., 2008; Parette, Huer, & Brotherson 2001; Russell & McAllister, 1995). Common themes, as previously discussed, are woven throughout the literature making it difficult to accept that the information gained cannot be applicable to larger populations as it is the belief of one or few individuals. Instead, these beliefs may be epistemological beliefs that impact how SLPs think about learning and knowledge, which essentially can shape the practice patterns of SLPs.

Communication is a basic inalienable human right yet it cannot be fully actualized by an individual with complex communication needs if they do not have the means or access to an AAC device. The decision made by speech-language pathologists to implement AAC devices can have a far reaching impact on the lives of those with CCN. One way to understand the SLPs' decision to recommend an AAC is to explore their personal epistemology. Although others have used surveys to explore the beliefs and ideas of stakeholders in AAC, a valid and reliable tool has never been used to measure these beliefs from the SLP's perspective.

Purpose of the study

The purpose of this study is to investigate the relationship between personal epistemology and clinical decision making in regards to augmentative and alternative communication. A secondary purpose is to identify if clinicians who work with AAC are more or less accepting of technology. Lastly, this research will attempt to demonstrate that the Epistemology Questionnaire – AAC is a valid and reliable tool to quantify the personal epistemology of clinicians in regards to augmentative and alternative communication.

This study was designed to answer the following questions:

1. Is the epistemological questionnaire AAC (EQ-AAC) a valid and reliable tool to analyze epistemological beliefs in regards to augmentative and alternative communication?
2. Does a relationship exist between speech-language pathologists' epistemological beliefs and their decision to recommend or not recommend augmentative and alternative communication?
3. Do clinicians who implement AAC tend to be more accepting of technology than those who do not?

CHAPTER III

Methodology

According to Hoffman, Bennett, and Del Mar (2010), healthcare providers may be hesitant to recognize that they lack confidence in implementation or lack knowledge and skills, which is why quantitative measures are useful in assessing an individual's beliefs about knowledge and learning. In order to objectively measure subjective characteristics, the development of a systematic tool to measure the epistemological beliefs of speech-language pathologists was undertaken.

Instrument

Overview of instruments. Several instruments that measure beliefs were investigated for adaptation for this study including The Physician Belief Scale (Ashworth, Williamson, & Montano, 1984), the Psycho-Epistemological Profile (Royce & Mos, 1980), and the Epistemic Beliefs Inventory (Schraw, Bendixen, & Dunkle, 2002). All of these tools aim to measure the level of beliefs of different groups of people. The Schommer Epistemological Questionnaire (EQ 1990; 1998) was selected ultimately for this study as it had been determined to be a valid and reliable way to measure an individual's epistemological beliefs and it has been used with different populations.

Epistemological Questionnaire– Augmentative and Alternative Communication. In its original form, the Schommer Epistemological Questionnaire (1998) has 63 questions which measures a person's self-reported beliefs about the nature of knowledge and learning (See Appendix A). This EQ was adapted for use in this study by modifying the questions in order to pertain more specifically to the speech-language pathologist and augmentative and alternative

communication. Questions that could not be reworded without changing the intent of the original question were replaced with an alternative item designed to target the original intent. The final questionnaire (which will be referred to as the Epistemological Questionnaire-Augmentative and Alternative Communication EQ-AAC) contained 46 items that represented beliefs in (a) structure of knowledge, (b) stability of knowledge, (c) source of knowledge, (d) speech of learning, and (e) ability to learn (See Appendix B). For each subset of beliefs there were at least two questions. Schommer (1990) recommended that there be a balance between asking questions of a positive measure (i.e., questions that a person with unsophisticated beliefs would either strongly agree or disagree with) and asking questions of a negative measure (i.e., questions that a person with sophisticated epistemological beliefs would strongly agree or disagree with). “The sophisticated learner will maintain epistemological beliefs that support flexible thinking, yet underlying that ability to take in new ideas or change old ideas, will be a steadfastness of core concepts” (Schommer-Aikins, 2002, p. 113).

Of the 46 questionnaire items on the EQ-AAC, 25 items were worded so a person with less sophisticated epistemological beliefs would agree (e.g., “I organize my sessions meticulously then stick to the plan”) and 21 items are worded so a person with sophisticated epistemological beliefs would agree or disagree (e.g., “Being a good clinician generally involves being able to solve problems”). Two of the 46 items were taken directly from the Schommer EQ (1990; 1998), while sixteen items were adaptations of items on Schommer’s original scale. The remaining 28 items were created by integrating ideas from Davis’ (1985) technological acceptance questionnaire, current research in the field of AAC, and personal epistemology (Schommer, 1990). The items were presented as statements (e.g., “The main goal of treatment

for individuals with complex communication needs is to develop verbal speech.”). Participants were instructed to respond using a 4-point Likert-type scale (i.e., 1=Strongly Disagree, 2=Disagree, 3=Agree, 4=Strongly Agree) (See Appendix C). The order in which the questions were presented was determined by using a random number generator.

Demographic questionnaire. To examine how epistemological beliefs of the clinician related to the practices of the clinician, a demographic questionnaire was also included in order to gain information on their experience with AAC, work experience, and other background information. This questionnaire consisted of 22 questions, including yes/no response, open-ended questions, and multiple choice options. (Appendix D) The demographic questionnaire was completed after the individual had completed the epistemological questionnaire-AAC, in order to avoid bias in answering the EQ-AAC.

The methodology for this study was derived from survey research. A survey-based research project was determined to be the most cost-effective and efficient way to gather data from a large group of participants.

Participants

A convenience sample of members of the American Speech-Language-Hearing Association (ASHA) were invited to participate. The participants for this study were identified through the member directory of two Special Interest Groups: Special Interest Group 12 (SIG 12): Augmentative and Alternative Communication and Special Interest Group 16 (SIG 16): School-Based Issues. These two SIGs were selected in an effort to compare findings from SLPs who considered themselves to be more specialized in the area of AAC (SIG 12) with those who were more broadly based in providing services to a wide range of clients with communication

disorders (SIG 16), many of whom might not have complex communication needs. The reason for this comparison was to evaluate the assumption that being more “tech savvy” (e.g., those in SIG 12) might influence personal epistemological beliefs.

To be included in the study participants must have had at least one year of experience as a certified SLP. Individuals who had received their Master’s degree, but were in the process of completing their clinical fellowship were excluded from participating. Data collection began in early March 2013 and concluded in April 2013.

Through participant recruitment efforts 109 individuals met the inclusionary criteria and completed the survey. The final sample included SLPs, who worked in a variety of work settings across the United States.

Table 1

Primary work setting for participant pool (N = 82)

Primary work setting	Response Percent	Response Count
Acute care hospital	1.3	1
Home health	1.3	1
Outpatient clinic	6.3	5
Private practice	15	12
Early intervention (Birth-age 3)	0	0
Primary school	61.3	49
Secondary school	7.5	6
University Clinic or program	5	4
Rehabilitation hospital	1.3	1
Skilled nursing facility	1.3	1
Other	35	28

Participants were between 24 and 66 years of age. The sample composed of 3 males, 96 females, and 10 participants who did not report gender. Of those who completed the survey, 58 were

members of SIG 12, 42 were members of SIG 16, and 9 people did not report belonging to either special interest group. Frequency distributions for year of Master's degree completion, special interest group membership, age profile, and caseload profile is listed in Appendix E.

Procedures

Participants were contacted by e-mail (Appendix E) and asked to complete the survey of epistemological beliefs and demographic questionnaire. In the e-mail sent to the participants they were informed of the study and invited to participate by answering the survey. They were informed that the survey would take approximately 20 minutes to complete; the e-mail included a statement of informed consent. The e-mail also included an embedded link that would connect them with SurveyMonkey.com, an internet based survey engine. Participants were informed that their consent was assumed by their completion of the survey.

Three weeks after the initial e-mail, a second e-mail was sent to the entire pool of potential participants thanking them for completing the survey if they had, and asking those who had not yet done so to complete the survey. The survey was available for one week after the second e-mail was sent.

Data analysis

Since a higher score on the EQ-AAC would indicate a more naïve belief, Schommer (1998) recommended recoding some items in order for a higher score to consistently reflect a sophisticated epistemological belief. Next, subset scores were created by adding the total responses in that subset and dividing the sum by the number of questions in that subset. To calculate the mean and standard deviation for each subset, descriptive analysis using IBM® SPSS Statistics (v. 20) was run. A Chi-square test was done to analyze the ordinal data to compare the

obtained frequencies to the expected frequencies. The Chi-square test yielded a p -value in order to indicate the probability of any observed differences between clinicians who recommended AAC and clinicians who did not recommend AAC. A one-way ANOVA for each epistemological factor was conducted in order to determine the difference between the groups in regards to each epistemological belief.

CHAPTER IV

Results

Descriptive analysis

The purpose of this study was to investigate the personal epistemological beliefs of speech-language pathologists (SLPs) and whether those beliefs relate to clinical recommendations regarding augmentative and alternative communication. Three questions were proposed to address this topic: (1) is the epistemological questionnaire- AAC a valid and reliable tool to analyze epistemological beliefs in regards to augmentative and alternative communication?; (2) does a relationship exist between speech-language pathologists' epistemological beliefs and their decisions to recommend augmentative and alternative communication?; and (3) do clinicians who implement AAC tend to be more accepting of technology than those who do not? The EQ-AAC consisted of 42 items across the five factors found in Schommer's Epistemological Questionnaire (Schommer, 1990): (1) structure of knowledge, (2) stability of knowledge; (3) source of knowledge; (4) speed of learning; and (5) ability to learn. Based on the Cronbach's alpha for each of these original factors were not in an acceptable range for this new instrument (e.g., below .40). To determine what factors might be applicable in the EQ-AAC, an exploratory factor analysis was conducted (Appendix G). In this exploratory factor analysis, items with factor loadings of .40 or higher were assumed to contribute to their respective factor. An exploratory factor analysis was conducted with the high loading items (Appendix H). This resulted in three identifiable factors.

Each factor was examined for its psychometric properties. The first factor, labeled MULTIPLE ANSWERS, was composed of 9 items with a Cronbach's alpha of .79. The second

factor was labeled CHANGING KNOWLEDGE was composed of 6 items with a Cronbach's alpha of .68. The third factor was labeled COMPLEX KNOWLEDGE and was composed of 3 items with a Cronbach's alpha of .47. The EQ-AAC factor scores and descriptive statistics for each subset are listed in Table 2.

Table 2

Summary statistics for EQ-AAC factor scores

Factor	Mean	Potential Range	Range of Scores	Standard Deviation	Skewedness	Cronbach's Alpha (α)
Multiple Answers	1.58	1-4	1.00 - 2.33	.32	-.07	.79
Changing Knowledge	3.53	1-4	2.67 - 4.00	.34	-.38	.68
Complex Knowledge	2.18	1-4	1.00 - 3.33	.43	.08	.47

Figure 1. Frequency distribution for the EQ-AAC Factor: Multiple Answers

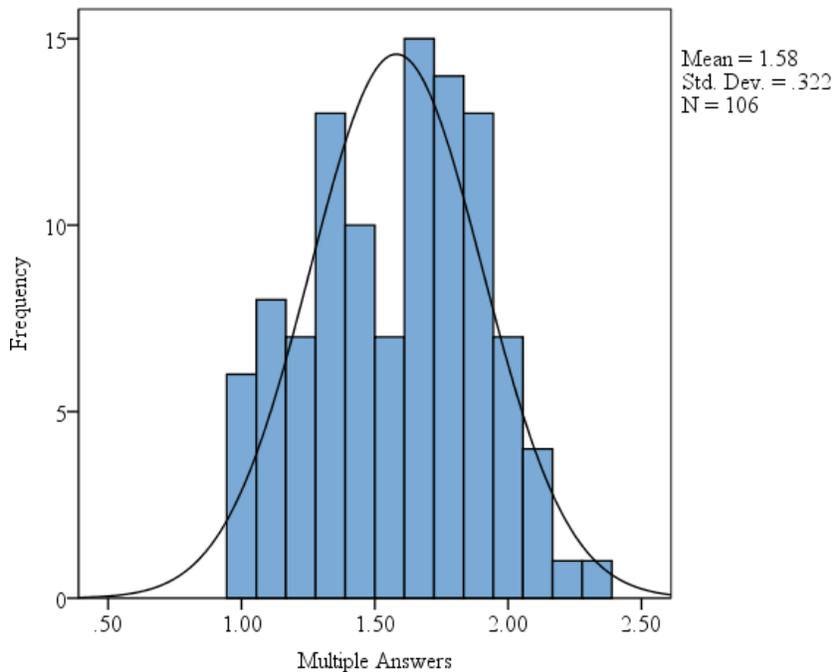


Figure 1. (Above) Frequency distribution for the EQ-AAC factor: multiple answers

Figure 2. Frequency Distribution for the EQ-AAC Factor: Changing Knowledge

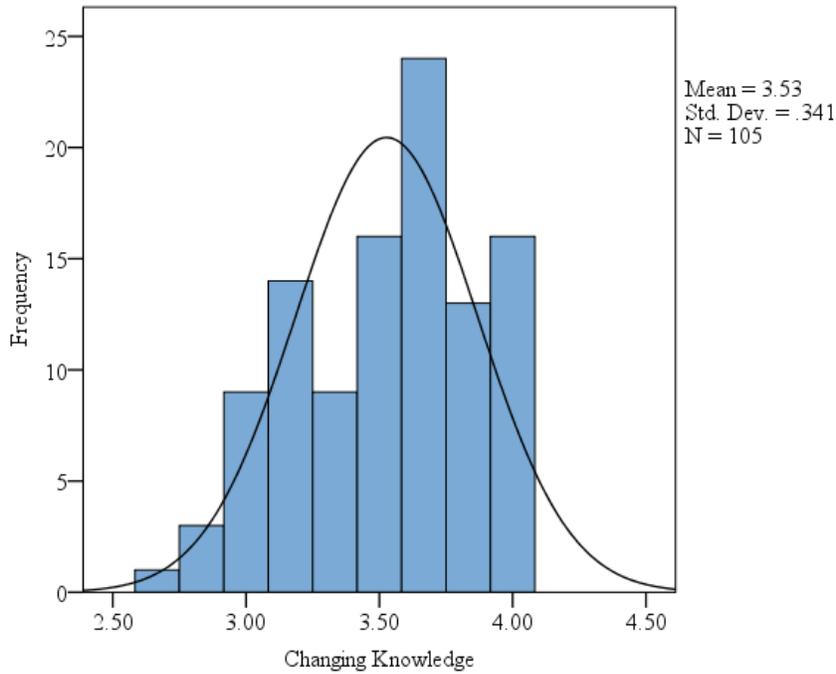


Figure 2. (Above) Frequency distribution for the EQ-AAC factor: changing knowledge

Figure 3. Frequency Distribution for the EQ-AAC Factor: Complex Knowledge

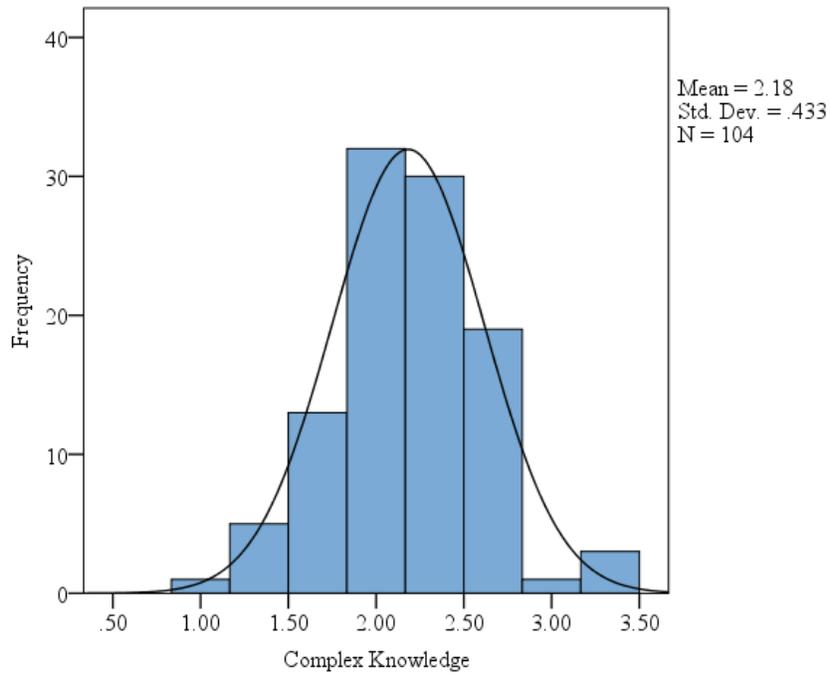


Figure 3. (Above) Frequency distribution for the EQ-AAC factor: complex knowledge

Testing Research Hypotheses

The first research question hypothesized that the EQ-AAC was a reliable tool to analyze epistemological beliefs in regards to augmentative and alternative communication. This was confirmed by identifying three factors that had moderately strong internal consistencies (Cronbach's alphas) through exploratory factor analysis. As seen in Figure 3, three theoretical factors of the EQ-AAC had acceptable Cronbach's alphas of .4 or greater. These values met the acceptable threshold of internal consistency for exploratory factor analysis and were considered to be reliable measures of specific epistemological beliefs of speech-language pathologists at this early stage of investigation.

Figure 4. Internal Consistency Measures Using Cronbach's Alpha (α) for EQ-AAC Factor Scores

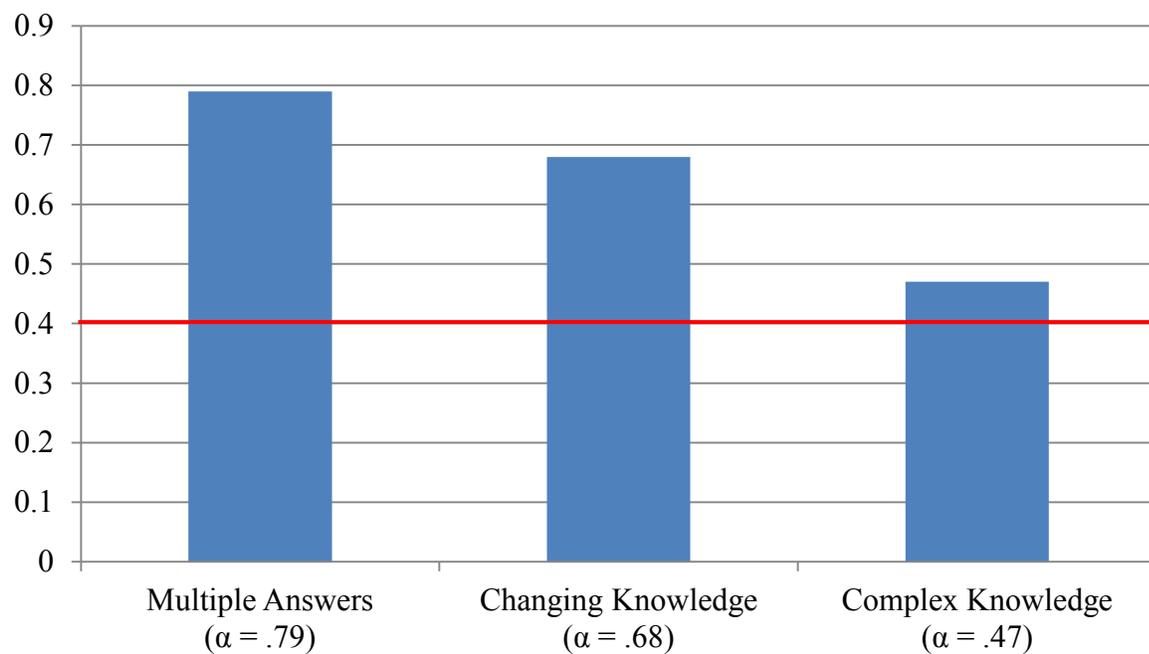


Figure 4. (Above) Internal consistency measures using Cronbach's alpha (α) for EQ-AAC factor scores

The second research question was there a relationship between speech-language pathologists' epistemological beliefs and their decision to recommend AAC. The independent variable was whether the SLP recommended or did not recommend AAC and the dependent variable was the SLP's epistemological belief. Using a one way ANOVA with each epistemological belief factor as a dependent variable, it was determined that those SLPs who recommended AAC had a significantly higher belief in *changing knowledge* ($F(1, 15)=3.85, p < .05, \eta^2 = .04$). The greater the SLP's epistemological belief that *changing knowledge* the more likely he or she was to recommend AAC to clients with complex communication needs; however, the effect size was relatively small. There was no significance between the epistemological belief *multiple answers* ($F(1, 95) = .953, p > .05, \eta^2 = .01$) or *complex knowledge* ($F(1, 95) = .194, p > .05, \eta^2 = .002$) and whether or not the SLP recommended AAC.

The final research question hypothesized that clinicians who implemented AAC would tend to be more accepting of technology than those who did not recommend AAC. Three ANOVAs were conducted and the dependent variable was whether the SLP recommended AAC. Of the three factors, *complex knowledge* was most representative of the complex integration of knowledge necessary to work with technology, yet it was found not to be different between the members in the two groups. Contrary to what might be expected, those who are more specialized in AAC systems/services do not appear to have beliefs about working with technology that are different from their less-specialized colleagues.

Of the three factors identified, SLPs who had more advanced beliefs for the factor, *multiple answers*, were more likely to believe that there was more than one method of treatment for individuals with CCN. This group of SLPs believed that families do not have to accept the

clinician's treatment choice but instead have a right to challenge the decisions made about their family member. In addition, these SLPs may not rely on one specific authority or "expert" to prescribe a treatment plan to use for their clients with CCN but instead, view multiple treatment avenues for each client. These individuals recognize that AAC devices need to be changed and customized to grow and meet the needs of the individual user, but also acknowledge their own need to continually develop the knowledge and skills required to successfully recommend and implement an AAC device with a client. Not only do those who have advanced beliefs in *multiple answers* recognize their own needs in ongoing development but also recognize that individuals with CCN who have been unsuccessful with AAC in the past may still have the potential to become successful AAC users.

As the results indicated, clinicians who had higher scores in the factor, *changing knowledge*, exhibited a higher tendency to recommend AAC to clients with complex communication needs. Those who had higher beliefs in *changing knowledge* were more likely to believe that evolution of knowledge is critical to give their clients maximal control and independence. SLPs with higher beliefs in *changing knowledge* were more likely to view developing AAC knowledge as an ongoing process, where integration of multiple treatment approaches and knowledge was critical in providing the best outcome for the client.

SLPs that scored higher in *complex knowledge* were less likely to believe that an AAC expert was someone who was tech-savvy or had a special gift working with AAC. Complex knowers were also less likely to believe that difficult concepts could be solved by eliminating outside distractions and concentrating on the problem; this suggests a more sophisticated belief

in learning. Instead these SLPs viewed the complex integration of knowledge of technology and clinical skills necessary to address clinical problems.

CHAPTER V

Discussion

This research study examined the personal epistemology of speech-language pathologists and the relationship between epistemological beliefs and clinical decision making in regards to augmentative and alternative communication devices for individuals with complex communication needs. Educational psychology has established valid and reliable tools to measure epistemological beliefs as they relate to education, knowledge, and learning (Schommer, 1990). Studies of other health professions have identified a relationship between personal epistemological beliefs and clinical decision making related to treatment (Evans & Trotter, 2009; Lyddon, 1989; Moyer, 2012 Unpublished). Though epistemological beliefs identified in this study are not the same as those found in other epistemological studies (e.g., the five factors identified by Schommer, 1990), three significant beliefs were identified as they relate to AAC recommendations. Therefore, it was possible to identify a set of epistemological beliefs that appeared to be influencing the clinical recommendations of speech-language pathologists (SLPs) in regards to AAC devices/systems.

Explanation of findings

Three distinct epistemological factors were identified through exploratory factor analysis: *multiple answers*, *changing knowledge*, and *complex knowledge*. The EQ-AAC, the tool developed to identify these epistemological beliefs, was deemed to be a valid and reliable tool to use within the domain of speech-language pathology.

Additionally, acceptance of technology may not discourage SLPs from recommending AAC devices/systems. Through mass production, as well as advances in technology,

electronic/technological devices have become integrated into the daily lives of individuals in this society. Perhaps, the fear of not being “tech-savvy” is not a determining factor in whether or not SLPs recommend an AAC device for a client due to the seamless integration of technology in the educational, vocational, and personal daily environments of the SLP.

The findings of this study are consistent with the findings of Evans and Trotter (2009), Moyer (2012), and Spiro, Coulson, Feltovich, and Anderson (1988), in that epistemological beliefs do impact clinical decision making of the healthcare professional. As in the above mentioned investigations, the findings of this study concluded that epistemological beliefs do influence clinical service provisions related to AAC.

Clinical implications

SLPs tend to approach AAC with their own sets of beliefs. Depending on whether their epistemological beliefs are more advanced in the three factors of epistemological beliefs identified in this study will influence their clinical recommendations when working with clients with CCN, particularly as those recommendations relate to AAC. These findings are significant as they could impact how, or if, SLPs use existing (and often evolving) evidence when providing interventions for individuals with CCN.

Though graduate programs are expanding to prepare future SLPs to work competently with AAC, there continues to be a need for systematic training in AAC (Beukelman & Mirenda, 2010). Students who are studying to become SLPs may benefit from exploring personal epistemologies and how beliefs can impact treatment decisions. This exploration may bring these beliefs to the forefront of thought when selecting and implementing specific evidence-

based treatment in their academic program as well as facilitating integration of evidence-based practice in their future professional ventures.

Members of SIG 12: AAC recommended AAC devices/systems to as many clients as possible at almost double the rate at which members of SIG 16: School-based issues recommended AAC. There is the expectation that those who choose to be members of SIG 12 may have a greater interest in AAC than their school-based counterparts. Perhaps, those SLPs who specialize in the area of AAC have more flexibility in developing and expanding their AAC skill set as their caseload may be less diverse than school based SLPs. SLPs who work in a school environment have less control over the selection of clients on their caseload compared to SLPs who work for specialized clinics or private practices; the diversity of client needs requires school-based SLPs to have more generalized knowledge in multiple areas of speech, language, and communication. School-based SLPs could possibly have more specified knowledge related to AAC; however the school-based caseload may have few to no clients with CCN and other clients may not be appropriate candidates for AAC systems/devices.

Strengths and limitations

This research study was an exploration of epistemological beliefs of speech-language pathologists and the relationship between those beliefs and clinical decision making in regards to AAC devices/systems. Epistemological research has been well established in the field of educational psychology; however only Moyer (2012) has explored epistemological beliefs as they specifically relate to SLPs and treatment approaches. The EQ-AAC was developed based on sound research and has been shown to have the potential to be a valid and reliable measure of epistemological beliefs. However, as a new survey instrument, more refinement of this tool is

needed to become more useful in the field of speech-language pathology and AAC and to eliminate bias in the phrasing of questions that composed this survey. For instance, by providing a clear definition of AAC at the beginning of the survey to include no-technology, low-technology, and high-technology AAC systems/devices more SLPs who work with low-technology AAC devices/systems in the schools may be more likely to respond. Through feedback in the demographic questionnaires, many SLPs reported implementing low-tech AAC systems/devices for clients with CCN yet did not realize or consider themselves to be implementing AAC systems as those systems did not fit that individual clinician's definition of what is or is not considered AAC.

Another limitation of this study was the small sample size. The population of this survey was limited to a convenience sample of two professional special interest groups. SLPs who were not members of either special interest group were not asked to participate in this survey and access to the survey was not provided to those outside of those groups. As the survey was only completed by members of two special interest groups, the results may not be generalized to other speech-language pathologists, particularly those whose special areas of interest lie outside of the areas of AAC or school-based issues.

By wording survey questions to specifically examine epistemological beliefs related to high-technology augmentative and alternative communication, the questions may have been interpreted to exclude those professionals who use low-technology AAC as well as those who implement AAC strategies but not specific devices. By appearing to focus on high-technology AAC only, some questions may have compromised those who recommended and implement low-technology AAC.

Conclusion and future research

In conclusion, epistemological beliefs do appear to impact SLPs clinical decision making in regards to recommendations of high-technology AAC to clients with CCN. Not only do these beliefs drive SLP practice patterns but they also determine if AAC is recommended to clients with CCN. The consequences of having less sophisticated epistemological beliefs include but are not limited to the following: a lack of qualified SLPs available who are willing to work with clients with CCN; failed adoption of AT by the client; wasted time, energy, and resources of all stakeholders; clients with CCN not living up to their full potential in all areas of life. By having limited epistemological beliefs the SLP is not only limiting their clients with CCN but also personally hindering growth as a clinician.

Further research is needed with a larger sample size of SLPs, as well as with AT specialists, in order to gain a greater understanding of these epistemological beliefs and how these factors can enhance or hinder successful treatment outcomes for individuals who CCN. Understanding personal epistemology may empower and instill confidence in SLPs who think that they are lacking in knowledge or the skill level necessary to implement AAC; rather it may be a limiting belief system that holds some clinicians back from recommending AAC for clients with CCN. Further research related to epistemological beliefs could look at the beliefs of graduate students in order to develop a framework for courses in working with individuals with CCN and AAC. Implementation of AAC devices/systems may be hindered by multiple factors, however more needs to be understood of epistemological factors that can facilitate independence for individuals with CCN.

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APPENDICES

APPENDIX A

Schommer Epistemological Questionnaire – Second Edition
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Directions: There are no right or wrong answers for the following questions. We want to know what you really believe. For each statement fill in the circle on the answer sheet for the degree to which you agree or disagree.

Strongly Disagree

Strongly Agree

1

2

3

4

5

1. If you are ever going to be able to understand something, it will make sense to you the first time you hear it.
2. The only thing that is certain is uncertainty itself.
3. For success in school, it's best not to ask too many questions.
4. A course in study skills would probably be valuable.
5. How much a person gets out of school mostly depends on the quality of the teacher.
6. You can believe almost everything you read.
7. I often wonder how much my teachers really know.
8. The ability to learn is innate.
9. It is annoying to listen to a lecturer who cannot seem to make up his mind as to what he really believes.
10. Successful students understand things quickly.
11. A good teacher's job is to keep his students from wandering from the right track.
12. If scientists try hard enough, they can find the truth to almost anything.
13. People who challenge authority are over-confident.

APPENDIX A (Continued)

Strongly Disagree

Strongly Agree

1

2

3

4

5

14. I try my best to combine information across chapters or even across classes.
15. The most successful people have discovered how to improve their ability to learn.
16. Things are simpler than most professors would have you believe.
17. The most important aspect of scientific work is precise measurement and careful work.
18. To me studying means getting the big ideas from the text, rather than details.
19. Educators should know by now which is the best method, lectures or small group discussions.
20. Going over and over a difficult textbook chapter usually won't help you understand it.
21. Scientists can ultimately get to the truth.
22. You never know what a book means unless you know the intent of the author.
23. The most important part of scientific work is original thinking.
24. If I find the time to re-read a textbook chapter, I get a lot more out of it the second time.
25. Students have a lot of control over how much they can get out of a textbook.
26. Genius is 10% ability and 90% hard work.
27. I find it refreshing to think about issues that authorities can't agree on.
28. Everyone needs to learn how to learn.
29. When you first encounter a difficult concept in a textbook, it's best to work it out on your own.
30. A sentence has little meaning unless you know the situation in which it is spoken.

APPENDIX A (Continued)

Strongly Disagree

Strongly Agree

1

2

3

4

5

31. Being a good student generally involves memorizing facts.
32. Wisdom is not knowing the answers, but knowing how to find the answers.
33. Most words have one clear meaning.
34. Truth is unchanging.
35. If a person forgot details, and yet was able to come up with new ideas from a text, I would think they were bright.
36. Whenever I encounter a difficult problem in life, I consult with my parents.
37. Learning definitions word-for-word is often necessary to do well on tests.
38. When I study, I look for the specific facts.
39. If a person can't understand something within a short amount of time, they should keep on trying.
40. Sometimes you just have to accept answers from a teacher even though you don't understand them.
41. If professors would stick more to the facts and do less theorizing, one could get more out of college.
42. I don't like movies that don't have an ending.
43. Getting ahead takes a lot of work.
44. It's a waste of time to work on problems which have no possibility of coming out with a clear-cut and unambiguous answer.

APPENDIX A (Continued)

Strongly Disagree

Strongly Agree

1

2

3

4

5

45. You should evaluate the accuracy of information in a textbook, if you are familiar with the topic.
46. Often, even advice from experts should be questioned.
47. Some people are born good learners, others are just stuck with limited ability.
48. Nothing is certain, but death and taxes.
49. The really smart students don't have to work hard to do well in school.
50. Working hard on a difficult problem for an extended period of time only pays off for really smart students.
51. If a person tries too hard to understand a problem, they will most likely just end up being confused.
52. Almost all the information you can learn from a textbook you will get during the first reading.
53. Usually you can figure out difficult concepts if you eliminate all outside distractions and really concentrate.
54. A really good way to understand a textbook is to re-organize the information according to your own personal scheme.

APPENDIX A (Continued)

Strongly Disagree

Strongly Agree

1

2

3

4

5

55. Students who are "average" in school will remain "average" for the rest of their lives.
56. A tidy mind is an empty mind.
57. An expert is someone who has a special gift in some area.
58. I really appreciate instructors who organize their lectures meticulously and then stick to their plan.
59. The best thing about science courses is that most problems have only one right answer.
60. Learning is a slow process of building up knowledge.
61. Today's facts may be tomorrow's fiction.
62. Self-help books are not much help.
63. You will just get confused if you try to integrate new ideas in a textbook with knowledge you already have about a topic.

APPENDIX B

Epistemological Questionnaire AAC- (EQ-AAC)

© Dean, 2013

1. I organize my sessions meticulously and then stick to the plan.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

2. The best thing about speech-language pathology is that most clinical problems only have one right answer.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

3. The main goal of treatment for individuals with complex communication needs is to develop verbal speech.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

4. Customizing AAC devices requires a lot of my mental effort.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

5. Being a good clinician generally involves memorizing facts.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

6. Using an AAC device gives individuals with complex communication needs greater control over their lives.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

7. Clients and families should accept the treatment choice of the clinician, even if it does not seem to be what they are wanting for themselves or their family members.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

8. Customizing an AAC device to meet the individual client's needs is an appropriate use of my time.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

APPENDIX B (Continued)

9. There is always more than one way to treat individuals with complex communication needs.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

10. Gathering information about AAC devices is an ongoing process.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

11. Successful clinicians learn things quickly.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

12. A required course in AAC in graduate school would probably be valuable for SLPs.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

13. Learning is a slow process of building up knowledge.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

14. It is easy for me to remember how to perform customizations on an AAC device if I have seen someone else show me first.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

15. Parents who challenge the SLP's treatment decisions are overconfident.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

16. AAC devices are what they are; they cannot be changed or customized.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

17. I need to consult the device representative often when using an AAC device with a client.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

18. If you are going to be able to understand something, it will make sense to you the first time you encounter it.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

APPENDIX B (Continued)

19. AAC may be successful for some individuals with complex communication needs.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

20. You will just get confused if you try to integrate new clinical approaches with treatments that you already use.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

21. A really smart SLP would automatically know how to use an AAC device.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

22. It is easy for skilled SLPs to remember how to perform tasks when customizing and troubleshooting an AAC device.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

23. There is only one method to treat individuals with complex communication needs.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

24. Clients who have been unsuccessful with AAC in the past will always be unsuccessful with AAC.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

25. Continuing education classes in AAC are of great value.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

26. Success with AAC takes a lot of work.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

27. Some people are born "tech-savvy," others are just stuck with limited ability.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

APPENDIX B (Continued)

28. Usually you can figure out difficult concepts if you eliminate all outside distractions and really concentrate.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

29. Being a good clinician generally involves being able to solve problems.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

30. If a person tries too hard to understand a problem, they will most likely just end up being confused.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

31. If insurance companies approve funding for AAC it is clear that the device meets the client's needs.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

32. Even if an individual does not demonstrate prerequisite language skills (e.g., communicative intent) they can be successful with an AAC device.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

33. SLPs who challenge authority are overconfident.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

34. An AAC expert is someone who has a special gift in the area of AAC.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

35. All high-technology AAC devices are effective with all clients.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

36. I recommend the use of AAC systems for as many clients on my caseload as I can.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

APPENDIX B (Continued)

37. It's a waste of time to work on problems that have no possibility of coming out with a clear-cut and unambiguous answer.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

38. If a person can't understand how to use an AAC device within a short amount of time, he or she should keep on trying.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

39. I find it easy to recover from errors encountered while customizing an AAC device.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

40. Whenever I encounter a difficult clinical problem related to AAC, I would consult with an expert.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

41. I expect to have to make changes when customizing an AAC device.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

42. I try my best to combine strategies across approaches to treatment for individuals with complex communication needs and other disorders.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

43. When researched-based treatment is not effective it is because the client or family did not follow explicit instructions.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

44. It is a waste of time to try out an AAC device with a person who is not going to do well with that device.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

APPENDIX B (Continued)

45. Augmentative and alternative communication devices are always changing.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

46. Often, even advice from AAC experts should be questioned.

1) Strongly Disagree 2) Disagree 3) Agree 4) Strongly Agree

APPENDIX C

EQ-AAC questions based on Schommer's (1990) Five Epistemological Factors

Assesses Structure of Knowledge

Seek single answers

1. I organize my sessions meticulously and then stick to the plan. +
2. The best thing about speech-language pathology is that most clinical problems only have one right answer. +
3. The main goal of treatment for individuals with complex communication needs is to develop verbal speech. +
9. There is always more than one way to treat individuals with complex communication needs. –
23. There is only one method to treat individuals with complex communication needs. +
32. Even if an individual does not demonstrate prerequisite language skills (e.g., communicative intent) they can be successful with an AAC device. –

Avoid Integration

4. Customizing AAC devices requires a lot of my mental effort. –
5. Being a good clinician generally involves memorizing facts. +
20. You will just get confused if you try to integrate new clinical approaches with treatments that you already use. +
29. Being a good clinician generally involves being able to solve problems. –
36. I recommend the use of AAC systems for as many clients on my caseload as I can. +
42. I try my best to r strategies across approaches to treatment for individuals with complex communication needs and other disorders. –

APPENDIX C (Continued)

Assesses Stability of Knowledge

Avoid Ambiguity

- 19. AAC may be successful for some individuals with complex communication needs. -
- 37. It's a waste of time to work on problems that have no possibility of coming out with a clear-cut and unambiguous answer. +

Knowledge is Certain

- 6. Using an AAC device gives individuals with complex communication needs greater control over their lives. +
- 35. All high-technology AAC devices are effective with all clients. +
- 43. When research-based treatment is not effective it is because the client or family did not follow explicit instructions. -
- 44. It is a waste of time to try out an AAC device with a person who is not going to do well with that device. +
- 45. Augmentative and alternative communication devices are always changing. -

APPENDIX C (Continued)

Assesses Sources of Knowledge

Don't criticize authority

- 15. Parents who challenge the SLP's treatment decisions are overconfident. –
- 33. SLPs who challenge authority are overconfident. -
- 46. Often, even advice from AAC experts should be questioned. -

Depend on Authority

- 7. Clients and families should accept the treatment choice of the clinician, even if it does not seem to be what they are wanting for themselves or their family members. +
- 16. AAC devices are what they are; they cannot be changed or customized. +
- 17. I need to consult the device representative often when using an AAC device with a client. +
- 31. If insurance companies approve funding for AAC it is clear that the device meets the client's needs. +
- 40. Whenever I encounter a difficult clinical problem related to AAC, I would consult with an expert. +

Assesses Speed of Learning

Learning is quick

- 11. Successful clinicians learn things quickly. +
- 13. Learning is a slow process of building up knowledge. –
- 18. If you are going to be able to understand something, it will make sense to you the first time you encounter it. +
- 38. If a person can't understand how to use an AAC device within a short amount of time, he or she should keep on trying. –

APPENDIX C (Continued)

Assesses Speed of Learning (Continued)

39. I find it easy to recover from errors encountered while customizing an AAC device. +

Learn first time

10. Gathering information about AAC devices is an ongoing process. –

14. It is easy for me to remember how to perform customizations on an AAC device if I have seen someone else show me first. +

Concentrated effort is a waste of time

8. Customizing an AAC device to meet the individual client's needs is an appropriate use of my time. –

28. Usually you can figure out difficult concepts if you eliminate all outside distractions and really concentrate. –

30. If a person tries too hard to understand a problem, they will most likely just end up being confused. +

Assesses ability to learn

Can't Learn how to Learn

12. A required course in AAC in graduate school would probably be valuable for SLPs. –

25. Continuing education classes in AAC are of great value. –

Success is unrelated to hard work

26. Success with AAC takes a lot of work. –

Ability to learn is innate

21. A really smart SLP would automatically know how to use an AAC device. +

APPENDIX C (Continued)

Assesses ability to learn (Continued)

- 22. It is easy for skilled SLPs to remember how to perform tasks when customizing and troubleshooting an AAC device. +
- 24. Clients who have been unsuccessful with AAC in the past will always be unsuccessful with AAC. +
- 27. Some people are born "tech-savvy," others are just stuck with limited ability.
- 34. An AAC expert is someone who has a special gift in the area of AAC. +
- 41. I expect to have to make changes when customizing an AAC device.

APPENDIX D

Demographic Questionnaire

1. In what year did you receive a Master's degree in speech-language pathology? (Text box written response)
2. Did your graduate program include a required class on Augmentative and Alternative Communication? (Yes/No)
3. What is the highest academic degree you hold? (choose from Bachelors, Masters, Doctoral)
4. From which Special Interest Group listserv are you answering this survey? (Special Interest Group #12 AAC or Special Interest Group #16 School-Based Issues)
5. What is your gender? (Male/Female)
6. What is your ethnicity? (Text box written response)
7. Are you a native speaker of English? (Yes/No)
8. What is your age? (Text box written response)
9. Are you a parent or family member of someone who uses an AAC device in place of or to supplement spoken speech? (Yes/No)
10. How would you classify your primary work setting? (Multiple choice)
11. What is the total number of clients on your caseload? (Text box written response)
12. Of those how many have complex communication needs? (Range of percentages)
13. What is the age range of those with complex communication needs? (text box written response)
14. In the past year how many of your clients have used an AAC device? (text box written response)
15. What AAC devices have they used? (Please specify) (text box written response)

APPENDIX D (Continued)

16. When working with individuals with complex communication needs do you think they should: (Multiple choice)

Use an AAC device

Use spoken language

Use both AAC and spoken language if possible

None of the above

17. Vocabulary programmed on an AAC device should include: (Check all that apply)

Body functions

Daily routines

Polite language

Dating - flirting, romantic

Sexual activities

Swear words

Spiritual concepts

Contemporary slang

Political terms

18. Do you feel unprepared when a client comes to you with a communication device?

Yes

No

Sometimes

Why? (text box written response)

APPENDIX D (Continued)

19. Where do you find information on best practices for intervention with individuals who have complex communication needs? (Check all that apply)

Conferences

Peers

Textbooks

Consult Specialists

Consult device manufacturers

Internet

Journals

Continuing education

ASHA website

Other (Please specify)

20. How much time during the work week do you spend managing (e.g., customizing, troubleshooting) AAC devices? (text box written response)

21. How much time outside of work (unpaid time) do you spend managing (e.g., customizing, troubleshooting) AAC devices? (text box written response)

APPENDIX D (Continued)

22. What electronics do you use in your day-to-day activities? (Select all that apply)

Computer/laptop

Cell phone

Ipad

GPS/Navigation system

E-mail

Electronic record system

MP3 player

Digital camera

Other (Please specify) (written response)

APPENDIX E

E- mail Invitation for Participants

Dear SURVEY PARTICIPANT:

My name is Amanda Dean and I am a graduate student in the Department of Communication Sciences and Disorders at Wichita State University. In partial fulfillment of the requirements for my Master's Degree, I am conducting a research project under the direction of Dr. Julie Scherz, Associate Professor of Communication Sciences and Disorders. The purpose of this study is to investigate the attitudes and beliefs of speech-language pathologists about AAC and technology and also about how knowledge and the acquisition of knowledge directly affects the SLP's decision-making process.

You have been selected to participate in a web-based survey because you are a member of ASHA Special Interest Group 12 or ASHA Special Interest Group 16. Your participation in this study is completely voluntary. We anticipate that the survey can be completed within twenty minutes. Please be sure to complete both pages of the survey. By beginning this survey, you are consenting to participate in this research with the knowledge that you may discontinue your participation at any time without penalty. All individual responses will be kept confidential. No names are required on the survey. Only group data will be summarized. Your cooperation is greatly appreciated.

If you have any further questions please e-mail me at akdean@wichita.edu or my advisor Dr. Julie Scherz at Julie.Scherz@wichita.edu or call (316) 978-5344. If you have any questions pertaining to your rights as a research subject you can contact the Office of Research

APPENDIX E (Continued)

Administration at Wichita State University, Wichita, KS, 67206-0007, telephone (316) 978-3285.

Thank you for your assistance with this project. We thank you in advance for your time,

Amanda Dean

Graduate Student

Wichita State University

APPENDIX F

EQ-AAC items that contributed to the identification of three epistemological factors

Multiple Answers

7. Clients and families should accept the treatment choice of the clinician, even if it does not seem to be what they are wanting for themselves or their family members.

9. There is always more than one way to treat individuals with complex communication needs.

(Reversed item)

15. Parents who challenge the SLP's treatment decisions are overconfident.

16. AAC devices are what they are; they cannot be changed or customized.

21. A really smart SLP would automatically know how to use an AAC device.

24. Clients who have been unsuccessful with AAC in the past will always be unsuccessful with AAC.

33. SLPs who challenge authority are overconfident.

37. It's a waste of time to work on problems that have no possibility of coming out with a clear-cut and unambiguous answer.

41. I expect to have to make changes when customizing an AAC device. *(Reversed item)*

Changing Knowledge

3. The main goal of treatment for individuals with complex communication needs is to develop verbal speech. *(Reversed item)*

6. Using an AAC device gives individuals with complex communication needs great control over their lives.

10. Gathering information about AAC devices is an ongoing process.

APPENDIX F (Continued)

Changing knowledge (continued)

- 20. You will just get confused if you try to integrate new clinical approaches with treatments that you already use. *(Reversed item)*
- 29. Being a good clinician generally involves being able to solve problems.
- 45. Augmentative and alternative communication devices are always changing.

Complex knowledge

- 27. Some people are born “tech-savvy,” others are just stuck with limited ability.
- 28. Usually you can figure out difficult concepts if you eliminate all outside distractions and really concentrate.
- 34. An AAC expert is someone who has a special gift in the area of AAC.

APPENDIX G

Frequency distribution of EQ-AAC significant factors total scores

Single Answers (N=106)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	6	5.5	5.7	5.7
	1.11	8	7.3	7.5	13.2
	1.22	7	6.4	6.6	19.8
	1.33	13	11.9	12.3	32.1
	1.44	10	9.2	9.4	41.5
	1.56	7	6.4	6.6	48.1
	1.67	15	13.8	14.2	62.3
	1.78	14	12.8	13.2	75.5
	1.89	13	11.9	12.3	87.7
	2.00	7	6.4	6.6	94.3
	2.11	4	3.7	3.8	98.1
	2.22	1	.9	.9	99.1
	2.33	1	.9	.9	100.0
	Total	106	97.2	100.0	
Missing System		3	2.8		
Total		109	100.0		

APPENDIX G (Continued)

Changing knowledge (N =105)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.67	1	.9	1.0	1.0
	2.83	3	2.8	2.9	3.8
	3.00	9	8.3	8.6	12.4
	3.17	14	12.8	13.3	25.7
	3.33	9	8.3	8.6	34.3
	3.50	16	14.7	15.2	49.5
	3.67	24	22.0	22.9	72.4
	3.83	13	11.9	12.4	84.8
	4.00	16	14.7	15.2	100.0
	Total	105	96.3	100.0	
Missing System		4	3.7		
Total		109	100.0		

APPENDIX G (Continued)

Complex Knowledge (N=104)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	.9	1.0	1.0
	1.33	5	4.6	4.8	5.8
	1.67	13	11.9	12.5	18.3
	2.00	32	29.4	30.8	49.0
	2.33	30	27.5	28.8	77.9
	2.67	19	17.4	18.3	96.2
	3.00	1	.9	1.0	97.1
	3.33	3	2.8	2.9	100.0
	Total	104	95.4	100.0	
Missing System		5	4.6		
Total		109	100.0		

APPENDIX H

Factor loadings for each EQ-AAC question

Rotated Factor Matrix^a

	Factor		
	1	2	3
q0001_0001	.177	-.174	.109
q0002_0001	.354	-.415	.111
q0003_0001	.257	-.513	.284
q0004_0001	-.013	.068	.315
q0005_0001	.395	-.151	.113
q0006_0001	-.134	.418	-.014
q0007_0001	.705	.069	-.083
q0009_0001	-.478	.269	-.028
q0010_0001	-.299	.577	-.057
q0011_0001	.085	.264	.039
q0013_0001	.084	.250	-.019
q0015_0001	.718	.152	-.127
q0016_0001	.403	-.321	.082
q0018_0001	.333	-.042	.129
q0020_0001	.609	-.404	.204
q0021_0001	.513	.045	.171
q0024_0001	.532	-.447	.115
q0026_0001	-.176	.218	.172
q0027_0001	.150	-.134	.346
q0028_0001	.030	.061	.425
q0029_0001	-.305	.566	.181
q0030_0001	.410	-.102	.015
q0033_0001	.444	-.251	.263
q0034_0001	.103	-.070	.653
q0037_0001	.535	-.374	.121
q0041_0001	-.504	.227	-.023
q0045_0001	-.208	.408	.125
q0046_0001	-.322	.216	.080

Extraction Method: Principal Axis Factoring.
 Rotation Method: Varimax with Kaiser
 Normalization.

a. Rotation converged in 5 iterations.