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Communication/educational programs for students with Angelman Syndrome in inclusive classrooms: A look at best practices

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COMMUNICATION/EDUCATIONAL PROGRAMS FOR STUDENTS WITH ANGELMAN SYNDROME IN INCLUSIVE CLASSROOMS: A LOOK AT BEST PRACTICES

BY

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I would like to dedicate this thesis to my parents, Philip and Holly Black. They have urged me to reach for the stars and supported me continually in all of my dreams and endeavors while providing me with a solid foundation from which to build upon and establish my educational fortress. I am forever indebted to them for the sacrifices they've made to assist me in accomplishing my goals. I hope that I continue to make you both proud.

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ABSTRACT

COMMUNICATION/EDUCATIONAL PROGRAMS FOR STUDENTS WITH ANGELMAN SYNDROME IN INCLUSIVE CLASSROOMS: A LOOK AT BEST PRACTICES

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This project examined the communication and overall education programs of 36 students with Angelman Syndrome (AS) whom are being educated in both inclusive and segregated classrooms. The purposes of the this study are to: 1) compile a list of best practices regarding the communication and educational instruction of children with Angelman Syndrome and more generally, children with significant disabilities, 2) to validate these practices with an expert panel, and 3) to socially validate these practices with the subjects' parents. An exhaustive review of the current literature in the areas of inclusive education, Angelman Syndrome Augmentative and Alternative Communication (AAC), and instruction of children with significant disabilities was conducted. Best practices for including this population in general education classrooms were pulled from the literature. From this more general information collected from the review, a checklist of best practices was devised more specific to the communication and overall education of children with Angelman Syndrome. The checklist was validated by an expert panel of six members who had significant experience in the areas of AAC and Angelman Syndrome or children with severe disabilities.

Upon the second and final review by the expert panel, an online survey was created including the 107 best practices that were validated. This survey was sent out to the parents of the subjects asking them to rate on a 5-point likert scale, the extent to which they felt these items were important for their child irrespective of what was actually currently happening in their program. All practices were rated in the generally favorable to strongly favorable range. The authors hope from these findings to develop and publish a tool that will provide a framework that individuals working in schools can utilize to assess the degree to which their delivery of services meets these best practices that are supported by the literature and can also provide parents with guidelines of what to look for in selecting a quality inclusive program for their child. It may also serve to prompt educators to consider the changes with respect to the way in which they are providing AAC services to their students with significant needs and incorporate parent priorities.

CHAPTER I

INTRODUCTION

Recently, there has been implementation of certain federal legislation that is changing the face of education. This legislation included revision of the Individuals with Disabilities Education Act (IDEA 1997) which offers children a "free and appropriate education in the least restrictive environment". It also included passage of the No Child Left Behind Act (NCLBA 2001) setting a standard that all children should be held to the same expectations in academic progress in that 100 percent of the students will be meeting the state academic standards in at least math and reading or showing adequate yearly progress towards this goal. With this implementation, there is a current thrust set forth in the direction of inclusive education. In an inclusive environment, students with special needs, including those with the most severe disabilities, are educated alongside their typically developing peers under the same general education curriculum (Alpner, 2003; Beukelman & Mirenda, 2005; Calculator, 2007).

Inclusive education is often confused with educational integration where students with disabilities are merely physically placed in a regular education classroom (Beukelman & Mirenda, 2005). Although physical integration into the general education classroom is one of the key requirements of inclusion it is not entirely what defines it. There are academic and social pieces to inclusion.

Beukelman and Mirenda (2005) discussed academic inclusion according to four levels of participation: competitive educational participation, active educational participation, involved educational participation, and no educational participation. Those students who would be described as 'competitive educational' participants are doing the same work under the general education curriculum and held to the same academic expectations as their typical peers although they may be provided with some extra supports and modifications. Those who 'participate actively' are still learning the same content and doing the same work as their peers, however, their expected learning outcomes differ and progress is determined according to the goals set in their individualized education plans (IEPs). 'Involved educational' participation refers to students who participate in the same educational work as their typical peers, but are more focused on learning content specific to areas defined in their IEPs (e.g., communication, motor skills, and social skills) similar to those whom participate actively. The major difference between this group of students and those participating on the active level is that this group may require more curricular adaptations in order to participate. Finally, those categorized under the 'no educational' participation group are integrated into the general education classrooms but are not involved in general academics. This group also includes those that are physically in the general education classroom but are engaging in activities that are divergent from what the rest of the class is working on. Their instruction is typically delivered by a therapist or paraprofessional as opposed to the general classroom teacher.

Beukelman and Mirenda (2005) also described social inclusion according to similar levels of participation: influential social participation, active social participation,

involved social participation, and no social participation. Those students who would be described as 'influential' have several friends in the classroom, including typical peers, and have influence over group decisions within their social circles, which extend beyond the school grounds into the community. 'Actively' social students also have friends and have a part in group decisions like those at the influential level, although they may not have as much influence over the group and tend to spend less time in their social circles outside of the classroom. 'Socially' involved children have a more difficult time formulating friendships with typical peers. They tend to play more of the role of observer in social situations and do not spend time with their friends outside of school.

Research indicates that despite these new provisions within the legislation such as IDEA and NCLBA, there are many schools in the United States that are struggling to meet the educational needs of students with disabilities in the general education setting (Darling-Hammond, 2007; US Department of Education, 2008). This struggle takes forms such as a lack of training and support for regular educators to meet the children's individual needs in their classrooms, a lack of time and resources to make necessary modifications and adaptations, and resulting negative attitudes towards inclusion of this population (Downing, 2005; Graves & Tracy, 1998; Kent-Walsh & Light 2003). The regrettable consequence of this struggle often leaves the parents of these students with a difficult decision to make. Do they want their child to receive an education in a segregated program that will meet their child's individual needs, or would they opt for an inclusive classroom that meets socio-cultural needs while marginalizing educational standards and demands for academic excellence (Calculator, 2007)? Parents should not have to be put through the agony of debating between such grave ultimatums and should

not have to sacrifice the quality of social and/or educational experiences their children need and deserve.

Inclusion implies more than the placement of a child in a general education classroom. It also ensures that child's individualized educational needs will be met in that setting.

Historically speaking, the debate over the proper educational placements of students with severe disabilities is one that continues to persist even to this day. Though legislation states that "children are entitled to a free and appropriate education in the least restrictive environment" (IDEA 2004), there continues to be much argument over what that least restrictive environment entails.

Current literature has indicated that if implemented according to best practices, inclusive education can yield many benefits for students with disabilities. Recent research has suggested inclusion can offer a greater motivation to communicate, multiple opportunities to communicate and promote greater expectations of students by their parents, educators, and others (Calculator, 2007; Kent-Walsh & Light, 2003; Frederickson, Dunsmuir, Lang, & Monsen, 2004; Soto, Muller, Hunt, & Goetz, 2001). Conversely, negative impacts of inclusive education exist in the literature as well. These include social exclusion apart from the educational environment, failure to meet educational gains, and relationships of unequal status in relation to their peers in the class (Kent-Walsh & Light, 2003). The negative aspects of inclusion can often be indicative of a program where the student may be placed in a mainstream classroom but is not necessarily being engaged in the general education curriculum in which acquisition of new skills is fostered. In other words, inclusion is being defined more so by placement of

the student than engagement with the general education curriculum and the learning of academic skills. (Beukelman & Mirenda, 2005).

A critical key to the successful inclusion of students with significant disabilities may be found in the provision of augmentative or alternative communication (AAC) services that facilitate the students' maximal participation in their academic and social environments (Beukelman & Mirenda, 2005; Calculator, 2007; Mirenda & Calculator, 1993; Kent-Walsh & Light, 2003). These services include systems that can be aided (e.g., objects, pictures, line drawings, and orthography) or unaided (e.g., gestures, sign language, facial expressions and body language). These communication systems are usually used to supplement existing modes of communication, increasing the individual's effectiveness as a communicator with both familiar and unfamiliar listeners in various speaking situations. In some cases the system replaces an existing method altogether. This alternative method of communication is seen most often in the case of replacing challenging behavior (e.g., biting, scratching, hitting, and screaming) with a system that is just as efficient and effective as the behavior but in a more socially acceptable form (Beukelman & Mirenda, 2005, Calculator, 1994, Reichle, Beukelman, & Light, 2002).

Appropriate AAC systems are integral and essential elements to the successful inclusion and participation of children with significant disabilities in general education classrooms. Age and context appropriate AAC systems enable students with complex communication needs to interact with the general education curriculum, their teachers, and peers in a variety of ways. They increase children's access to a larger number of educational and social opportunities and allow them to be a part of the greater school community. Without quality AAC systems and programs children may be set up for

failure in the general education curriculum due to limited ability to express themselves (Beukelman & Mirenda, 2005; Calculator, 2007; Soto, Muller, Hunt, & Goetz, 2001).

There is currently little research that addresses what a quality AAC program looks like in the general education setting and/or best practices in implementing such a program. This leaves parents and professionals with limited guidance and support as to what a program like this should consist of to maximize their child's success in a general education classroom. There is movement of the field towards utilizing evidenced-based practices. It is thus important that research be done to best inform our decisions in creating and fostering such programs for children with significant disabilities to ensure that they truly are receiving the most appropriate education in the least restrictive setting.

A comprehensive review of the literature regarding AAC and inclusive education for students with severe disabilities, including children with Angelman Syndrome was conducted for the purposes of this study. Specific practices that foster inclusion and participation of these populations in the general education classroom were pulled from this body of literature. The authors then validated these collected practices via review by panelists with expertise in the areas of AAC and inclusive education (Calculator & Black, in prep). These efforts have led to the present investigation.

The primary purposes of this investigation were to use the data validated by expert panelists and socially validated by parents of children with Angelman Syndrome to:

1. Create a tool to evaluate the quality of AAC services for students with severe disabilities in inclusive classrooms by assembling a list of

associated evidence-based best practices from the current literature (Calculator & Black, in prep).

2. Propose a set of supplementary practices with the primary investigator that are more specifically related to service delivery for students with Angelman Syndrome.
3. Identify factors that serve to either facilitate or inhibit the use of these best practices in both self-contained and more inclusive placements and identify any qualitative differences between the two settings.

CHAPTER 2

OVERVIEW OF INCLUSIVE EDUCATION AND ANGELMAN SYNDROME

Review of the Literature

The first purpose of this study was to assemble a list of associated evidence-based, best practices from the current literature. To fulfill this purpose, a comprehensive review of the literature was conducted regarding best practices for educating students with severe disabilities. Practices specific to AAC service delivery were also explored. The practices identified in each source were analyzed in terms of their level of corresponding supporting evidence. These levels were established using a hierarchy that has been used with AAC interventions (Schlosser, 2004) as shown in appendix B.

The practices collected from the literature were further examined according to the principles of evidence-based practice. Evidence-based practice can be defined as integrating current research with clinical expertise and family/client values to make treatment decisions (ASHA 2004). It is considered best practice to utilize evidence-based practices in selecting treatments, methods of service delivery, and instructional content. Therefore in order for inclusion to be effective, it is important that teachers as well as related service providers adhere to these principles. Appendix A lists the 107 identified practices pulled from the literature along with the associated level of evidence in the hierarchy supporting each one.

Practices Associated with Successful Inclusive Education

There has been a wealth of literature written addressing the area of inclusive education, providing a useful framework for examining communication and overall general education programs of students with severe disabilities. The investigators of this study assembled these practices into nine separate categories or themes based on a system created by Jackson, Ryndak, and Billingsley (2000). Jackson et. al. proposed a classification system that was intended to reveal useful practices for inclusive education in general; not necessarily directly related or linked to AAC. However, the authors of this investigation felt that these categories achieved at least surface validity with respect to their applicability to AAC best practices compiled for the study. The system is guided by a principle that attempts to capture the broadest range of practices in its utilization of comprehensive, categorical topics. Two reliability studies were conducted to assess the reliability of these categories and the practices that were determined to fall under them. The first reliability study asked an unfamiliar rater to identify the category number that corresponded to a group of practices. The groups were placed in a randomized order by the investigator. This initial reliability study yielded a 100% agreement between the investigators and the unfamiliar rater.

In the second reliability study, two unfamiliar raters were asked to assign the category number (1-9) that they felt best fit each individual practice listed. The practices themselves again were presented in random order. The agreement ratings for this study were 45.6% and 58.4%. Thus, based on these reliability ratings, it is important to note that these categories are not mutually exclusive and several of the practices identified could potentially fall under more than one category. The categories are as follows:

1. Promoting inclusive values
2. Collaboration between general and special educators
3. Collaboration between educators and related service providers
4. Family involvement
5. Choosing and planning what to teach
6. Scheduling, coordinating, and delivering inclusive services within the school
7. Assessing/reporting child progress on an ongoing basis (performance based, authentic, in-context assessments)
8. Instructional strategies
9. Supporting the child with challenging behaviors

The first category revolves around promoting inclusive values within the school community. This may be reflected in an overall mission statement of the school that supports equal education for all students and is embraced by general as well as special educators (Ainscow, Booth, & Dyson, 2004; Avramidis, Bayliss, & Burden, 2002; Carrington & Robinson, 2004; Doyle, 2004;Graves & Tracy, 1998; Jackson, Rydak, & Billingsley, 2000; Kane, Head & Cogan, 2004; Kent-Walsh & Light, 2003; Knowlton, 1998; Meyer & Eichinger, 1994; Nochajski, 2001; Thousand & Villa, 1995; Vlachou, 2004).

Kent-Walsh & Light (2003) discuss the important role that school administrators can play in fostering successful inclusion. They maintained that there needs to be support from these key administrators that takes the form of providing teachers with the necessary resources and time for them to be able to acquire the skills they need to effectively include these students in their classrooms. This also includes allowing them

time to meet with special educators and other related services providers to collaborate on modifying and adapting the curriculum to meet students' individual needs. Investigators have also noted that specific instruction should be provided to the student's peers in relation to their acceptance and attitudes toward the student with disabilities and his/her modes of communication (Jackson, Rydak, & Billingsley, 2000; Kennedy & Itkonen, 2001; Kent-Walsh & Light, 2003). Others note that skills should be taught to foster membership within the community and facilitate friendships with typical peers (Calculator, 2007; Mirenda & Calculator, 1993).

The second category relates to collaboration between general and special educators. This is one of the most highly cited practices in the literature. Calculator & Jorgensen (1994) argue that it is necessary for general and special educators to collaborate in order to determine where and how the child's IEP goals and objectives can best be met in the general education classroom as well as outside of the classroom. Educators also need to collaborate in identifying the crucial classroom and curricular modifications and adaptations that the child will need in order to participate successfully in the general education curriculum (Armstrong, Armstrong, Lynch, & Severin, 2005; Frederickson, Dunsmuir, Lang, & Monsen, 2004; Giangreco, Cloninger, & Iverson, 1998; Kent-Walsh & Light, 2003).

In addition to collaborating with the special educators, general education teachers need to actively engage in collaboration with other related service providers. This need is addressed in the third category. Calculator (2000) stated that the speech-language pathologist needs to collaborate frequently with the classroom teachers and

paraprofessionals to make certain the child's communication goals are being integrated effectively into the special and/or general education curriculum.

Downing (2002) noted that the speech-language pathologist should be collaborating with the general education teacher to prioritize instructional objectives for the child. Speech-language pathologists also need to ensure they are providing teachers with ongoing supports to make sure they have the skills necessary to foster use of the AAC system within their classrooms. The speech-language pathologist also is the one whom is ultimately responsible for the integrity of the AAC program.

The fourth category established by the investigators speaks to family involvement. It is essential that the AAC programs that are designed and implemented are sensitive to and reflect the cultural values and beliefs of the students and their families (ASHA, 2002; Cress, 2004; Downing, 2005). Cress (2004) indicated that the family's goals and priorities for their child should be clearly reflected in their children's AAC programs. She states that the family has a valuable role in the AAC assessment process. The National Joint Committee (1992) also points out that the family should have a significant role in carrying out activities that support their child's effective use of their AAC systems at home as well as at school.

Another important category implicated in inclusive education for students with severe disabilities involves choosing and planning what to teach. Ultimately the goals need to reflect not just the needs of today but also the future needs of the child (Childre & Chambers, 2005; Knowlton, 1998). Calculator & Jorgensen (1994) emphasized the importance of AAC interventions optimizing children's active involvement in classrooms and elsewhere at school.

The goals of AAC should also reflect the communicative demands and opportunities presented in a variety of settings, with a variety of communication partners (Calculator, 1999; 1988; Kent-Walsh & Light, 2003; Knowlton, 1998; Mirenda & Calculator, 1993; National Joint Committee, 1992). In addition to teaching AAC in a broad range of settings with a broad range of partners, Glennen & Calculator (1985) specify AAC instruction should target a broad range of communicative functions such as: requesting, rejecting, social closeness, commenting, requesting information and clarification.

Finally, Calculator (2007) noted that AAC skills should target self-determination and be consistent with the criterion of ultimate functioning (Donnellan, 1984). This principle states that in the event that the child can not complete a skill themselves, someone else will need to perform that skill for them later in life.

Category six is grounded in service delivery within the school. There should be more of a consultative model of service delivery and this should be supported by administrators, teachers, parents and other related service providers (Calculator, 2000; 2007; Dover, 2005).

The National Joint Committee (1992) recognized that it is imperative that children have access to their AAC systems at any time throughout the day and that systems are consistently operational and functional. Others in the child's environment should also be instructed how to respond to the child's communicative attempts (Mirenda & Calculator, 1993; Tetzchner, Brekke, Sjøthun, & Grindheim, 2005). This includes peers (Jorgensen, 2005; Light, Drager, & Nemser, 2004; Mirenda & Calculator, 1993; Tetzchner et. al., 2005). Calculator (2007) also talks about how communication objectives should be

integrated into the general education curriculum. He argues that AAC skills should be targeted throughout the day and not only within discrete, isolated time blocks.

Another important consideration related to category seven involves the idea of ongoing, authentic assessment. Jackson, Ryndak, & Billingsley (2000) suggested that evaluations should be carried out in both structured and natural settings. This is further indicated by Calculator (2007) who asserted data should be collected on a regular basis to determine how effectively AAC supports are assisting the child in acquiring IEP goals and objectives. These data should then be reviewed by those providing direct services to the child to determine if there are needs for modifications to the program to enhance the student's participation and success in the general education curriculum.

The eighth category of best practices relates to instructional strategies. Teachers, peers, and others who interact with the child who uses AAC should be instructed how to modify their language input to communicate more effectively. Their input should be meaningful, understandable, and culturally and linguistically appropriate to the student (National Joint Committee, 1992). Von Tetzchner, Brekke, Sjøthun, & Grindheim (2005) encouraged others to incorporate the use of the child's AAC system in their input. This is further reinforced in a case study done by Sonnenmeier, McSheehan, & Jorgensen (2005). These investigators emphasized the importance of integrating AAC systems into curricular activities and daily routines of the child. Also, teachers and related professionals whom work with the child should engineer the classroom and other environments to promote and foster increased opportunities for the child to communicate with others (Calculator, 1988; 1999; Horn, Lieber, Li, Sandall, & Schwartz, 2000; Kent

Walsh & Light, 2003; Mirenda & Calculator 1993; Wehmeyer, Lance, & Bashinski, 2002).

The final category applied by the investigators involves supporting children with challenging behaviors. Challenging behavior may be characterized by behaviors such as hitting, biting, hair pulling, screaming, and running away. These behaviors may be utilized by the child to serve particular functions such as escape or task avoidance, requests for attention, and/or requests for a certain object or action. Problem behaviors can often be interpreted as a result of the student's feelings of frustration about not being able to communicate their needs, wants, desires, and/or fears (Wilkerson, Northington, & Fisher, 2005). In such situations behavior should be seen as a communicative act and the child should be taught to utilize his or her AAC systems in place of these undesired behaviors. The use of the AAC system is taught to serve a functional equivalent to that of the challenging behavior by eliciting the same consequence but in a manner that is more socially conventional and appropriate (National Joint Committee, 1992).

Currently, there is not a tool for evaluating the quality of communication and educational programs for children with severe disabilities in inclusive classrooms. Even less is known regarding how to support one particular population with severe disabilities, those with Angelman Syndrome (described below). The research concerning Angelman Syndrome is rapidly growing as its diagnosis is becoming more definitive and prominent. With that said, much of this research resides in the arena of genetics and medical concerns (Guerrini, Carrozzo, Rinaldi, & Bonnani, 2003; Wilkerson, Northington, & Fisher, 2005; Williams, 2005). Little is to be found on the subject of communication profiling, assessment, and intervention considerations with this population.

Since the communication research in the area of Angelman Syndrome is sorely lacking, the authors chose to focus on these children specifically. However, it should be noted that the educational practices mentioned for these children are applicable to the more general population of students with severe disabilities as well, as they were pulled from this broader base of literature.

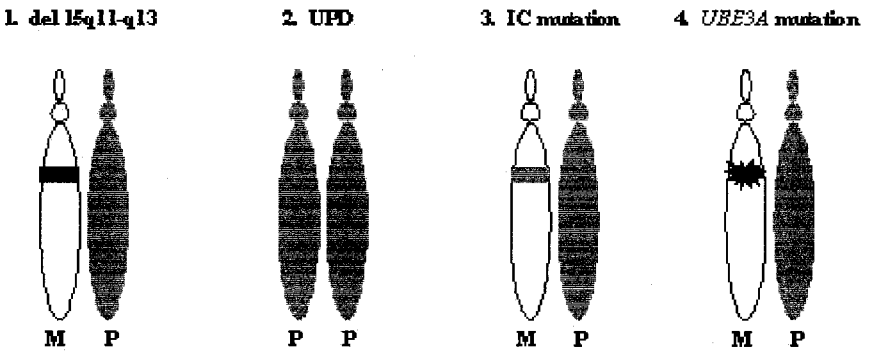
Overview of Angelman Syndrome

Angelman Syndrome (AS) was first identified by Dr. Harry Angelman in 1965. He referred to it as the "Happy Puppet Syndrome". It was later found that this was a genetic disorder usually resulting from a partial deletion or mutation on the 15th chromosome (Williams, 2005). The incidence of AS has been reported to range from 1/10,000 to 1/20,000 children and young adults (Williams, 2005). Recent research findings have linked the syndrome to a specific gene lying on chromosome 15 known as Ubiquitin-protein ligase E3A (UBE3A). It has been found that genetic mutations or deletions of the maternal copy of this gene results in Angelman Syndrome (Guerrini, Carrozzo, Rinaldi, & Bonanni, 2003; Wilkerson, Northington, & Fisher, 2005). Deletion of the paternal copy of this gene has been established as resulting in a diagnosis of Prader-Willi syndrome, which has clinical manifestations that are significantly different from that of Angelman syndrome (Wilkerson, Northington, & Fisher, 2005).

According to Wilkerson, Northington, & Fisher (2005), this UBE3A gene is responsible for regulating a small molecule in the brain known as Ubiquitin. Ubiquitin functions to mark certain proteins that have been mutated or destroyed. Cessation of function within this gene has been reported to account for approximately 80% of the

cases of individuals with AS (Guerrini, Carrozzo, Rinaldi, & Bonanni, 2003). The behaviors and mutations of this gene that yield a consequential diagnosis of Angelman Syndrome are illustrated in Figure 1 and further described in greater detail below.

Figure 1 Genetic Mechanisms leading to Angelman Syndrome (as taken from a presentation by Livija Medne [April 2000])



The majority of these cases (70%) exhibit a deletion on the maternal copy of the 15q11-q13 region of the chromosome implicated in AS. Another 3% exhibit two paternal copies of this 15q11-q13 region instead of a maternal and a paternal copy present. This is referred to as paternal uniparental disomy. 1% of these children demonstrate mutations that are occurring in the imprinting center at 15q12-q13, where regulation involving the switching of the paternal copy of the UBE3A gene takes place. Finally, 6 of the 80% of cases result from intragenic mutations involving the maternal expression of the UBE3A gene.

The remaining 20% of cases of AS are speculated to be the consequence of mutations in other unidentified genes. These diagnoses are based on clinical observations

of AS characteristics in the absence of positive results of genetic testing (Guerrini, Carrozzo, Rinaldi, & Bonanni 2003; Wilkerson, Northington, & Fisher (2005).

Clinical Characteristics Involved in Angelman Syndrome

There are many clinical symptoms implicated in and/or associated with Angelman Syndrome. Consistent with the literature, the majority of the population with AS shows signs of a severe intellectual delay (Alvares & Downing, 1998; Guerrini, Carrozzo, Rinaldi, & Bonanni, 2003; Wilkerson, Northington, & Fisher, 2005; Williams, 2005). Guerrini, Carrozzo, Rinaldi, & Bonanni (2003) suggested that this delay is typically first indicated when the child is approximately six months of age. Investigators have cited additional characteristics that are consistently seen in individuals with AS (Alvares & Downing, 1998; Guerrini, Carrozzo, Rinaldi, & Bonanni, 2003; Wilkerson, Northington, & Fisher, 2005; Williams, 2005). These include:

- a lack of speech or meaningful use of words (typically if they do have words they are limited to only a few)
- ataxic gait and movements accompanied by flexion at the elbows
- severe mental retardation
- frequent laughter and a positive affect
- hand-flapping
- increased excitability
- a reduced span of attention

Other associated features that occur frequently but not as consistently include:

- difficulties in feeding and swallowing during infancy

- strabismus
- hypo-pigmentation of the skin
- seizure disorders
- microencephaly
- prognathia
- sleep disturbances
- a wide mouth with widely-spaced teeth
- a fascination or intense interest in water.

In terms of communication, individuals with AS tend to exhibit significantly greater receptive than expressive skills (Alvares & Downing 1998). A study conducted by Didden, Korzilius, Duker and Curfs (2004) looked at the communicative functioning of individuals with AS in relation to individuals with mixed etiologies. They found that the individuals with AS typically have fairly intact requesting and rejecting skills (i.e., manding). However, they had greater difficulty imitating verbal and nonverbal behaviors, labeling and describing in comparison to other individuals with severe disabilities. Their lack of imitation was further evidenced in studies done by Alvares & Downing (1998) and Calculator (2002) although both identified gestures as a favorable method of communication in this population.

Wilkerson et. al. (2005) attributed some of this difficulty in imitation of gestures (particularly sign language) to children's lack of fine motor skills. Some children are able to produce some simple gestures but have a difficult time doing so without physical contact with the item or referent (Alvares & Downing, 1998). Since the ability to use speech functionally and meaningfully is either severely limited or completely non-

existent in their repertoire of communication, there are powerful rationales to use AAC with these individuals.

Applicability of Best Practices for Students with Severe Disabilities to Students with Angelman Syndrome

Given these clinical manifestations and the strong impetus for the use of augmentative and alternative communication with this population, many of the best practices indicated in the literature for students with severe disabilities in inclusive education apply to students with Angelman Syndrome. AAC programs should be put into place as soon as a diagnosis of Angelman Syndrome is made since very few individuals with this diagnosis are expected to develop meaningful speech (Clayton-Smith, 1993; Jolleff & Ryan, 1993). Putting an effective communication system in place early on decreases the likelihood of the student with AS developing challenging behaviors to communicate their wants and needs (Didden et. al., 2004).

When developing an AAC program, speech-language pathologists should collaborate with the family, educators, and other service providers to ensure that the most useful and practical systems are selected and implemented (Alvares & Downing, 1998; Calculator, 2002). Due to the nature of the clinical manifestations that occur with this syndrome it is important for the program to take on a multidisciplinary approach, accessing input from all stakeholders (Wilkerson et. al., 2005).

There is a particular emphasis on AAC instruction aimed at broadening the range of communicative functions (e.g., commenting, greeting, social closeness, requests for clarification or information, and labeling) (Alvares & Downing 1998). Initiating

conversations should also be addressed in AAC instruction as this is another area where individuals with AS experience particular difficulties (Jolleff & Ryan, 1993; Penner, et. al. 1993).

As mentioned earlier, gestures tend to be a favored, self-selected mode of communication for students with Angelman Syndrome. This is complicated by their lack of fine motor skills, inability to imitate signs, and preference for gestures accompanied by physical contact with referents (Calculator, 2002). Calculator developed a communication program for these individuals referred to as enhanced natural gestures. The premise behind this program is to utilize gestures or intentional behaviors that are already present in the child's repertoire of motor actions or ones that can be readily taught using the child's existing motor abilities (Calculator 2002).

Some children with AS have evidenced an ability to use communication boards to communicate, thus representing an understanding of symbolic communication (Clayton-Smith, 1993). However, intervention should first focus on establishing intentional communication through the individual's preferred method of communication and build from there (Alvares & Downing, 1998).

Given the highly social nature of these children, programs should consider this strength when fostering interactions and social closeness with peers (Alvares & Downing, 1998; Wilkerson et. al., 2005). As with any instructional program, the strategies used should be supported by the best, current, scientific evidence available based on the child's diagnosis and presenting strengths and limitations.

Again, with the lack of research concerning communication and educational strategies for children with a diagnosis of Angelman Syndrome, the findings from this

current study should serve as a guideline for educational teams and parents of this population of children. It should yield greater direction in fostering a successful, educational environment in which they can grow and learn. The following section provides further anticipated outcomes and uses for this research.

Expected Outcomes of this Investigation

From this research study, it is expected that an evidence-based tool will be developed for evaluating the quality of AAC services provided to students with severe disabilities, including those with AS. In addition to creating the tool, the investigators hope to determine any significant differences between the quality indicators for students with severe disabilities being educated in inclusive classrooms versus those who are educated primarily or solely in more segregated placements. The emphasis of this study is on students with Angelman Syndrome, therefore, special considerations in terms of provision of services for this population will be indicated, in addition to the identification of facilitating factors and barriers to employing these best practices with these students. It is hoped that the results from this study will assist families in advocating for optimal programs for their children. In addition, the results may serve to point out to the school communities where they may need to further adjust their supports and services to meet students' individual needs.

CHAPTER III

METHODOLOGY

Design of the Study

Subjects

Participants in this study were selected via an open invitation that was posted on the Angelman Syndrome Foundation (ASF) list-serve. A total of 32 families responded to this call. Every attempt was made to control for geographic location, sex, and age to generate a representative pool of subjects by acquiring a larger sample size. Since random sampling of the participants was not possible, it was hypothesized that by acquiring a larger sample size, the probability for acquiring generalization to the larger population would increase.

Twenty one students with Angelman Syndrome who are involved in inclusive education programs were identified as subjects for this study. These students are either marginally (students may be included in enrichment classes/activities such as art, music, gym, lunch, and recess) or primarily (students are participating in general education classes aside from the previously mentioned enrichment classes and/or activities) included. In addition, eleven students educated solely in segregated placements where they have no engagement with or access to typical peers or the general education curriculum in their educational programming, were also identified as subjects. Of the

total thirty-two students, twelve were females and 20 were males. Ages of the participants ranged from three to 19 years old with a mean age of nine years and six months. These subjects were divided into two groups: 1) mostly included (this group contains those students who participate in the general education curriculum beyond the enrichment courses), and 2) mostly segregated (which consists of the students who do not participate in the general education curriculum at all or may just participate marginally in the enrichment courses). 20 of the participants fell into the second group, while 12 of the students were identified as participating members of inclusive general education classrooms based on the above definitions.

Procedures

The project began with an exhaustive review of the literature regarding inclusion of students with significant disabilities in the general education curriculum. Particular emphasis was placed on the role of augmentative and alternative communication (AAC) systems in fostering inclusion. The majority of the sources were compiled via an internet search of the following databases: EBSCOhost, Academic Search Premier, Cochrane Database of Systematic Reviews, ERIC, MEDLINE, Newspaper Source, PsycARTICLES, PsycINFO, and the respective references listed from the individual sources obtained. Of the 158 references examined there were 102 journal articles, 43 books and book chapters, 7 unpublished manuscripts and papers, and 6 other sources. In order to be considered for the best practices inventory, each practice had to be (1) discussed implicitly or explicitly as a best practice, with clear implications for AAC; (2) measurable quantitatively and/or qualitatively, and (3) supported at a level of evidence of

five or higher on the Schlosser & Raghavendra (2004) hierarchy. From this more generic information collected from the review and clinical expertise, a checklist of 107 best practices was devised with the principal investigator, Stephen Calculator, more specific to the communication and overall education of children with Angelman Syndrome.

Reliability of the Instrument

A Cronbach's alpha analysis was conducted to determine the reliability of the survey instrument created by the authors. The reliability analysis for the instrument yielded a Cronbach's alpha of .970. The Cronbach's alpha was selected because it is used for instruments whose items are scored with multiple answers (e.g., multiple-choice or Likert scale). The results of this analysis can be interpreted as follows: the higher the mean inter-item correlation between the items becomes, the higher the Cronbach alpha will be. This measure ranges from 0-1.0. Therefore a Cronbach alpha of .970 suggests a strong correlation between the items in the instrument. This finding indicates that the survey instrument used is highly statistically reliable for the 107 response items that it contains.

Reliability Studies for the Nine Categories and Levels of Evidence

These practices were assigned to nine categories as indicated in the literature review. Two different reliability studies were conducted with three graduate students unfamiliar with the project. The first reliability study required one of the graduate students to indicate the category number that she felt best corresponded to a group of practices. The reliability for this study yielded a 100% agreement. The second reliability

study asked two other graduate students to assign one of the nine categories to each individual, randomized practice. This study yielded agreement levels of 45.6% and 58.4%. The results of this second reliability indicate that the categories are not mutually exclusive and that any one practice may fall under multiple categories.

Items were also assigned levels of evidence of a five or higher using the Schlosser & Raghavendra (2004) hierarchy. According to its authors, this hierarchy was originally intended to "inform AAC intervention development for children with disabilities". A reliability study was also performed to establish a level of agreement on these levels of evidence ratings that were assigned by the authors. A graduate student assigned her levels of evidence ratings to 39 randomly selected pieces of literature from the total 158 reviewed references. Thirty-nine sources represented 25% of the total number of works reviewed and referenced. The levels of evidence were then compared with those reported by the authors. This comparison yielded a percentage of agreement of 61.5%. There was 100% agreement that all items achieved a level of evidence of at least a five or greater.

Items were then compiled into a survey format using SurveyCat, The University of New Hampshire's web survey application (survey.unh.edu/surveycat/). This survey was then reviewed by an expert panel for purposes of validation.

The panel was composed of eight experts in the areas of communication and inclusive education for students with severe disabilities. Wherever possible, expertise in Angelman Syndrome was also sought. The experts used a seven-point Likert scale to indicate their level of agreement that each item listed on the checklist comprised a best practice. This expert panel was identified by way of contacting Speech-Language Pathologists on the Angelman Syndrome Foundation's List-Serve and also via an open

invitation for participation through the American Speech-Language and Hearing Association's Special Interest Division XII's (AAC) List-Serve. Panelists were selected based upon the following criteria:

- are actively engaged in research in communication disorders
- have publications in the area of Angelman Syndrome and/or severe disabilities
- have sufficient educational/clinical experience providing services to children and youths with severe disabilities, preferably including those with Angelman Syndrome
- have 5 or more years of AAC experience
- have published 3 or more articles in refereed journals and/or book chapters related to communication/educational programs for children with significant disabilities- ideally children with Angelman Syndrome.

Items with mean ratings by the eight panelists of six or greater (Agree to Strongly Agree) on the Likert scale were retained. Additional items noted by two or more panelists were also included. Another review of the second draft of the checklist was completed by the panel, with only the items scoring a mean of a 6.0 rating or greater by at least 6 of the 8 reviewers included in the final checklist tool. 107 of the checklist items were retained in the final edition.

Upon finalization of the checklist, another survey was created using the SurveyCat software. The intent was to socially validate these best practice items by administering them to the parents of the children in the study. The parents were asked to

indicate on a five-point Likert scale (strongly unfavorable to strongly favorable) the extent to which each item was important to them for their child, regardless of what was actually occurring in their child's current educational program. They were also asked to indicate their five greatest priorities with respect to their child's development of communication skills.

The parents of the children who were involved primarily in segregated, or, non-inclusive programs were also asked to respond to a question regarding whether or not they were happy with their child's current placement and, if they wished to see their child included more, to identify the three factors that would enable their child to derive maximum benefit and success in an inclusive classroom. Parents of the children primarily in inclusive programs, (those spending time engaged in the general education curriculum aside from just the enrichment classes and activities), were asked to identify the three greatest factors that have facilitated their child's success in their inclusive program. They also cited the three most important barriers or challenges their child has faced in meeting their communication and educational needs in that setting.

Data were analyzed using SPSS software to examine the parent ratings within and across categories of practices in terms of their level of importance and priority. Facilitating factors and barriers were also looked at and analyzed qualitatively for common themes. Finally, priorities cited by parents of children in inclusive versus segregated educational programs were compared, again noting any emerging themes or significant differences.

CHAPTER IV

RESULTS

Data from the parent survey were run through both parametric and non-parametric statistical analyses using the SPSS computer software. The investigators were seeking to determine if there were significant differences in mean responses between the parents of children in inclusive vs. more segregated placements. They were also looking to assess the reliability of the best practices instrument itself, using a Crohnbach alpha. Finally, themes related to facilitating factors and barriers noted by the children's parents were also examined.

Table 1 shows the results from a parametric analysis looking at the mean ratings across all items within each of the nine categories for the parents of the children in the mostly included group and those with children in the mostly segregated group. The category items were between the favorable to strongly favorable range for each of the categories in both placement groups and no significant differences were found in responses between the groups or between the categories. This indicates that the items in each of the categories, collectively, were just as important to parents of children in the inclusive programs as to the parents of children in the more segregated placements and no one category seemed to hold a higher value or significance.

Table 1 Parametric analysis results; comparison between the two placement groups within each of the nine categories.

Group Statistics

	Placement	N	Mean	Std. Deviation	Std. Error Mean
Category1	Mostly included	12	4.6987	.23982	.06923
	Mostly segregated	20	4.4154	.63452	.14188
Category2	Mostly included	12	4.6500	.46024	.13286
	Mostly segregated	20	4.4200	.56903	.12724
Category3	Mostly included	12	4.7197	.31601	.09122
	Mostly segregated	20	4.6909	.32631	.07297
Category4	Mostly included	12	4.7024	.31333	.09045
	Mostly segregated	20	4.6214	.35077	.07843
Category5	Mostly included	12	4.5149	.33136	.09566
	Mostly segregated	20	4.5250	.42323	.09464
Category6	Mostly included	12	4.6563	.32036	.09248
	Mostly segregated	20	4.5125	.54130	.12104
Category7	Mostly included	12	4.6136	.37408	.10799
	Mostly segregated	20	4.4955	.44289	.09903
Category8	Mostly included	12	4.2440	.61253	.17682
	Mostly segregated	20	4.2786	.54640	.12218
Category9	Mostly included	12	4.8333	.32567	.09401
	Mostly segregated	20	4.9000	.26157	.05849

Table 2 contains the results of a similar analysis only using a non-parametric, Mann-Whitney statistical measure. One reason this measure was utilized in addition to the parametric analysis was the generally small sample size. It was also used because unlike parametric analyses, it does not require normal distribution or homogeneity of variance of the data and the data are based on an ordinal scale. Again, this analysis yielded similar findings to the parametric analysis. There were no significant differences found between groups and across the nine categories in their ratings of importance of each of the nine categories.

Table 2 Mann-Whitney results

Ranks

	Placement	N	Mean Rank	Sum of Ranks
Category1	Mostly included	12	18.75	225.00
	Mostly segregated	20	15.15	303.00
	Total	32		
Category2	Mostly included	12	19.63	235.50
	Mostly segregated	20	14.63	292.50
	Total	32		
Category3	Mostly included	12	16.75	201.00
	Mostly segregated	20	16.35	327.00
	Total	32		
Category4	Mostly included	12	17.42	209.00
	Mostly segregated	20	15.95	319.00
	Total	32		
Category5	Mostly included	12	16.00	192.00
	Mostly segregated	20	16.80	336.00
	Total	32		
Category6	Mostly included	12	17.17	206.00
	Mostly segregated	20	16.10	322.00
	Total	32		
Category7	Mostly included	12	18.08	217.00
	Mostly segregated	20	15.55	311.00
	Total	32		
Category8	Mostly included	12	16.08	193.00
	Mostly segregated	20	16.75	335.00
	Total	32		
Category9	Mostly included	12	15.50	186.00
	Mostly segregated	20	17.10	342.00
	Total	32		

Test Statistics(b)

	Category1	Category2	Category3	Category4	Category5	Category6	Category7	Category8	Category9
Mann-Whitney U	93.000	82.500	117.000	109.000	114.000	112.000	101.000	115.000	108.000
Wilcoxon W	303.000	292.500	327.000	319.000	192.000	322.000	311.000	193.000	186.000
Z	-1.058	-1.490	-.120	-.436	-.234	-.315	-.750	-.195	-.687
Asymp. Sig. (2-tailed)	.290	.136	.904	.663	.815	.752	.453	.845	.492
Exact Sig. [2*(1-tailed Sig.)]	.307(a)	.146(a)	.924(a)	.687(a)	.833(a)	.774(a)	.477(a)	.863(a)	.659(a)

a Not corrected for ties.

b Grouping Variable: Placement

As can be seen from the above tables the Z values and exact significance values on the Mann Whitney do not indicate any significant differences (<.05) between the two groups. Both groups rated items in the generally favorable to strongly favorable range with their respective ratings not differing significantly from one another.

Since the categories were not found to be mutually exclusive, a t-test and independent sample test were also conducted to examine between-group comparison for each of the 107 practice items individually. The results of these tests can be seen in Tables 3 and 4 respectively.

Table 3 T-test results between the two groups for each of the 107 individual practice items.

Group Statistics

	Placement	N	Mean	Std. Deviation	Std. Error Mean
VAR00001	Mostly included	12	4.4167	1.16450	.33616
	Mostly segregated	20	4.6000	.68056	.15218
VAR00002	Mostly included	12	4.8333	.38925	.11237
	Mostly segregated	20	4.5000	.76089	.17014
VAR00003	Mostly included	12	4.6667	.49237	.14213
	Mostly segregated	20	4.5500	.82558	.18460
VAR00004	Mostly included	12	4.9167	.28868	.08333
	Mostly segregated	20	4.7000	.47016	.10513
VAR00005	Mostly included	12	5.0000	.00000	.00000
	Mostly segregated	20	4.3000	.92338	.20647
VAR00006	Mostly included	12	4.4167	.66856	.19300
	Mostly segregated	20	4.4500	.88704	.19835
VAR00007	Mostly included	12	4.7500	.45227	.13056
	Mostly segregated	20	4.3500	.98809	.22094
VAR00008	Mostly included	12	4.7500	.45227	.13056
	Mostly segregated	20	4.5000	.82717	.18496
VAR00009	Mostly included	12	4.7500	.45227	.13056
	Mostly segregated	20	4.1500	1.18210	.26433
VAR00010	Mostly included	12	4.5833	.66856	.19300
	Mostly segregated	20	3.3500	1.18210	.26433
VAR00011	Mostly included	12	4.5833	.51493	.14865
	Mostly segregated	20	4.5500	.82558	.18460

VAR00012	Mostly included	12	4.7500	.45227	.13056
	Mostly segregated	20	4.6500	.58714	.13129
VAR00013	Mostly included	12	4.6667	.65134	.18803
	Mostly segregated	20	4.7500	.55012	.12301
VAR00014	Mostly included	12	4.8333	.57735	.16667
	Mostly segregated	20	4.7500	.44426	.09934
VAR00015	Mostly included	12	4.8333	.57735	.16667
	Mostly segregated	20	4.5000	.82717	.18496
VAR00016	Mostly included	12	4.5833	.66856	.19300
	Mostly segregated	20	4.5500	.82558	.18460
VAR00017	Mostly included	12	4.8333	.38925	.11237
	Mostly segregated	20	4.1000	1.11921	.25026
VAR00018	Mostly included	12	4.1667	1.26730	.36584
	Mostly segregated	20	4.2000	.89443	.20000
VAR00019	Mostly included	12	4.7500	.45227	.13056
	Mostly segregated	20	4.9000	.30779	.06882
VAR00020	Mostly included	12	4.9167	.28868	.08333
	Mostly segregated	20	4.9000	.30779	.06882
VAR00021	Mostly included	12	4.9167	.28868	.08333
	Mostly segregated	20	4.6500	.48936	.10942
VAR00022	Mostly included	12	4.6667	.65134	.18803
	Mostly segregated	20	4.5000	.76089	.17014
VAR00023	Mostly included	12	4.8333	.57735	.16667
	Mostly segregated	20	4.8500	.36635	.08192
VAR00024	Mostly included	12	4.7500	.45227	.13056
	Mostly segregated	20	4.6500	.58714	.13129
VAR00025	Mostly included	12	4.3333	.88763	.25624
	Mostly segregated	20	4.4500	.68633	.15347
VAR00026	Mostly included	12	4.6667	1.15470	.33333
	Mostly segregated	20	4.6000	.75394	.16859
VAR00027	Mostly included	12	4.6667	.49237	.14213
	Mostly segregated	20	4.6500	.58714	.13129
VAR00028	Mostly included	12	4.5833	.79296	.22891
	Mostly segregated	20	4.6500	.58714	.13129
VAR00029	Mostly included	12	4.1667	.71774	.20719
	Mostly segregated	20	4.1000	.91191	.20391
VAR00030	Mostly included	12	5.0000	.00000	.00000
	Mostly segregated	20	4.9000	.30779	.06882
VAR00031	Mostly included	12	4.7500	.62158	.17944
	Mostly segregated	20	4.9000	.30779	.06882
VAR00032	Mostly included	12	4.6667	.88763	.25624
	Mostly segregated	20	4.8500	.36635	.08192
VAR00033	Mostly included	12	4.5833	.66856	.19300
	Mostly segregated	20	4.2500	.85070	.19022
VAR00034	Mostly included	12	4.9167	.28868	.08333
	Mostly segregated	20	4.7000	.47016	.10513
VAR00035	Mostly included	12	4.8333	.38925	.11237

	Mostly segregated	20	4.6500	.58714	.13129
VAR00036	Mostly included	12	4.4167	1.24011	.35799
	Mostly segregated	20	4.6000	.68056	.15218
VAR00037	Mostly included	12	4.9167	.28868	.08333
	Mostly segregated	20	4.8000	.41039	.09177
VAR00038	Mostly included	12	4.7500	.45227	.13056
	Mostly segregated	20	4.6000	.50262	.11239
VAR00039	Mostly included	12	4.6667	.65134	.18803
	Mostly segregated	20	4.3000	.97872	.21885
VAR00040	Mostly included	12	4.4167	.99620	.28758
	Mostly segregated	20	4.5000	.82717	.18496
VAR00041	Mostly included	12	4.5000	.67420	.19462
	Mostly segregated	20	4.3000	.97872	.21885
VAR00042	Mostly included	12	4.2500	1.05529	.30464
	Mostly segregated	20	4.3000	.57124	.12773
VAR00043	Mostly included	12	4.6667	.49237	.14213
	Mostly segregated	20	4.6000	.59824	.13377
VAR00044	Mostly included	12	4.5000	.67420	.19462
	Mostly segregated	20	4.5500	.68633	.15347
VAR00045	Mostly included	12	4.1667	1.33712	.38599
	Mostly segregated	20	4.4000	.82078	.18353
VAR00046	Mostly included	12	4.4167	.66856	.19300
	Mostly segregated	20	4.3500	.67082	.15000
VAR00047	Mostly included	12	4.3333	.98473	.28427
	Mostly segregated	20	4.4000	.68056	.15218
VAR00048	Mostly included	12	4.5833	.51493	.14865
	Mostly segregated	20	4.7500	.44426	.09934
VAR00049	Mostly included	12	4.6667	.49237	.14213
	Mostly segregated	20	4.5500	.51042	.11413
VAR00050	Mostly included	12	4.6667	.65134	.18803
	Mostly segregated	20	4.6500	.74516	.16662
VAR00051	Mostly included	12	4.9167	.28868	.08333
	Mostly segregated	20	4.7000	.47016	.10513
VAR00052	Mostly included	12	4.5833	.90034	.25990
	Mostly segregated	20	4.5500	.82558	.18460
VAR00053	Mostly included	12	4.5000	.67420	.19462
	Mostly segregated	20	4.4500	.82558	.18460
VAR00054	Mostly included	12	4.8333	.38925	.11237
	Mostly segregated	20	4.6500	.74516	.16662
VAR00055	Mostly included	12	4.4167	.79296	.22891
	Mostly segregated	20	4.2000	1.05631	.23620
VAR00056	Mostly included	12	4.3333	.88763	.25624
	Mostly segregated	20	4.5000	.68825	.15390
VAR00057	Mostly included	12	4.7500	.45227	.13056
	Mostly segregated	20	4.6000	.68056	.15218
VAR00058	Mostly included	12	4.2500	1.13818	.32856
	Mostly segregated	20	4.5000	.68825	.15390

VAR00059	Mostly included	12	4.5000	.67420	.19462
	Mostly segregated	20	4.8000	.41039	.09177
VAR00060	Mostly included	12	4.3333	.98473	.28427
	Mostly segregated	20	4.5000	.82717	.18496
VAR00061	Mostly included	12	4.4167	1.24011	.35799
	Mostly segregated	20	4.4500	.75915	.16975
VAR00062	Mostly included	12	4.0000	.95346	.27524
	Mostly segregated	20	4.5000	.82717	.18496
VAR00063	Mostly included	12	4.6667	.49237	.14213
	Mostly segregated	20	4.6500	.58714	.13129
VAR00064	Mostly included	12	4.3333	.77850	.22473
	Mostly segregated	20	4.2000	.83351	.18638
VAR00065	Mostly included	12	4.6667	.65134	.18803
	Mostly segregated	20	4.7500	.44426	.09934
VAR00066	Mostly included	12	4.2500	.62158	.17944
	Mostly segregated	20	4.4000	.99472	.22243
VAR00067	Mostly included	12	4.6667	.65134	.18803
	Mostly segregated	20	4.3500	.93330	.20869
VAR00068	Mostly included	12	4.9167	.28868	.08333
	Mostly segregated	20	4.5500	.82558	.18460
VAR00069	Mostly included	12	5.0000	.00000	.00000
	Mostly segregated	20	4.6000	.82078	.18353
VAR00070	Mostly included	12	5.0000	.00000	.00000
	Mostly segregated	20	4.5500	.82558	.18460
VAR00071	Mostly included	12	4.7500	.45227	.13056
	Mostly segregated	20	4.3000	.97872	.21885
VAR00072	Mostly included	12	4.6667	.65134	.18803
	Mostly segregated	20	4.6000	.75394	.16859
VAR00073	Mostly included	12	4.8333	.38925	.11237
	Mostly segregated	20	4.4000	.88258	.19735
VAR00074	Mostly included	12	4.3333	1.23091	.35533
	Mostly segregated	20	4.5500	.88704	.19835
VAR00075	Mostly included	12	4.2500	.86603	.25000
	Mostly segregated	20	4.3500	.74516	.16662
VAR00076	Mostly included	12	4.4167	.79296	.22891
	Mostly segregated	20	4.7500	.44426	.09934
VAR00077	Mostly included	12	4.6667	.65134	.18803
	Mostly segregated	20	4.7000	.65695	.14690
VAR00078	Mostly included	12	4.4167	.66856	.19300
	Mostly segregated	20	4.6000	.68056	.15218
VAR00079	Mostly included	12	4.6667	.65134	.18803
	Mostly segregated	20	4.4000	.75394	.16859
VAR00080	Mostly included	12	4.7500	.45227	.13056
	Mostly segregated	20	4.6000	.59824	.13377
VAR00081	Mostly included	12	4.5833	.66856	.19300
	Mostly segregated	20	4.6000	.59824	.13377
VAR00082	Mostly included	12	4.5833	.66856	.19300

	Mostly segregated	20	4.7000	.47016	.10513
VAR00083	Mostly included	12	4.3333	.98473	.28427
	Mostly segregated	20	4.5000	.76089	.17014
VAR00084	Mostly included	12	4.8333	.38925	.11237
	Mostly segregated	20	4.6000	.59824	.13377
VAR00085	Mostly included	12	4.5000	.67420	.19462
	Mostly segregated	20	4.3000	.86450	.19331
VAR00086	Mostly included	12	4.5000	.79772	.23028
	Mostly segregated	20	4.3500	.93330	.20869
VAR00087	Mostly included	12	4.8333	.38925	.11237
	Mostly segregated	20	4.6000	.50262	.11239
VAR00088	Mostly included	12	4.1667	.93744	.27061
	Mostly segregated	20	4.3500	.81273	.18173
VAR00089	Mostly included	12	4.1667	1.02986	.29729
	Mostly segregated	20	4.0500	.99868	.22331
VAR00090	Mostly included	12	4.2500	1.05529	.30464
	Mostly segregated	20	3.8500	.93330	.20869
VAR00091	Mostly included	12	4.0000	1.12815	.32567
	Mostly segregated	20	4.2000	.76777	.17168
VAR00092	Mostly included	12	4.4167	.90034	.25990
	Mostly segregated	20	4.6000	.68056	.15218
VAR00093	Mostly included	12	4.0000	.85280	.24618
	Mostly segregated	20	4.1500	.98809	.22094
VAR00094	Mostly included	12	3.5833	.99620	.28758
	Mostly segregated	20	3.8500	.93330	.20869
VAR00095	Mostly included	12	4.2500	1.21543	.35086
	Mostly segregated	20	4.1500	1.30888	.29267
VAR00096	Mostly included	12	4.3333	.98473	.28427
	Mostly segregated	20	4.7000	.57124	.12773
VAR00097	Mostly included	12	4.3333	1.07309	.30977
	Mostly segregated	20	4.3500	1.03999	.23255
VAR00098	Mostly included	12	4.5000	.90453	.26112
	Mostly segregated	20	4.6500	.74516	.16662
VAR00099	Mostly included	12	4.7500	.62158	.17944
	Mostly segregated	20	4.8500	.36635	.08192
VAR00100	Mostly included	12	4.7500	.62158	.17944
	Mostly segregated	20	4.5500	.99868	.22331
VAR00101	Mostly included	12	4.4167	.79296	.22891
	Mostly segregated	20	4.1000	1.02084	.22827
VAR00102	Mostly included	12	4.8333	.57735	.16667
	Mostly segregated	20	4.4500	.68633	.15347
VAR00103	Mostly included	12	4.9167	.28868	.08333
	Mostly segregated	20	4.9500	.22361	.05000
VAR00104	Mostly included	12	4.8333	.38925	.11237
	Mostly segregated	20	4.8000	.41039	.09177
VAR00105	Mostly included	12	4.9167	.28868	.08333
	Mostly segregated	20	4.7000	.47016	.10513

VAR00106	Mostly included	12	4.2500	1.05529	.30464
	Mostly segregated	20	4.3500	.98809	.22094
VAR00107	Mostly included	12	4.7500	.45227	.13056
	Mostly segregated	20	4.2000	.95145	.21275

Table 4 Results from the Independent t-test analysis for significance values

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Upper	Lower
VAR00001	Equal variances assumed	1.048	.314	-.565	30	.576	-.18333	.32467	-.84639	.47972
	Equal variances not assumed			-.497	15.591	.626	-.18333	.36900	-.96725	.60059
VAR00002	Equal variances assumed	9.473	.004	1.405	30	.170	.33333	.23727	-.15123	.81790
	Equal variances not assumed			1.635	29.497	.113	.33333	.20390	-.08338	.75004
VAR00003	Equal variances assumed	1.459	.236	.443	30	.661	.11667	.26345	-.42138	.65471
	Equal variances not assumed			.501	29.996	.620	.11667	.23298	-.35915	.59248
VAR00004	Equal variances assumed	12.278	.001	1.437	30	.161	.21667	.15080	-.09131	.52464
	Equal variances not assumed			1.615	29.952	.117	.21667	.13415	-.05733	.49066
VAR00005	Equal variances assumed	17.227	.000	2.609	30	.014	.70000	.26833	.15200	1.24800
	Equal variances not assumed			3.390	19.000	.003	.70000	.20647	.26784	1.13216
VAR00006	Equal variances assumed	.702	.409	-.112	30	.911	-.03333	.29715	-.64019	.57352
	Equal variances not assumed			-.120	28.258	.905	-.03333	.27675	-.59999	.53333
VAR00007	Equal variances assumed	10.286	.003	1.316	30	.198	.40000	.30405	-.22095	1.02095
	Equal variances not assumed			1.559	28.569	.130	.40000	.25663	-.12522	.92522
VAR00008	Equal variances assumed	3.328	.078	.960	30	.345	.25000	.26034	-.28169	.78169
	Equal			1.104	29.850	.278	.25000	.22640	-.21246	.71246

	variances not assumed									
VAR00009	Equal variances assumed	7.329	.011	1.677	30	.104	.60000	.35777	-.13067	1.33067
	Equal variances not assumed			2.035	26.661	.052	.60000	.29481	-.00526	1.20526
VAR00010	Equal variances assumed	4.964	.034	3.298	30	.003	1.23333	.37397	.46959	1.99708
	Equal variances not assumed			3.768	29.954	.001	1.23333	.32729	.56488	1.90178
VAR00011	Equal variances assumed	.915	.347	.126	30	.901	.03333	.26555	-.50900	.57567
	Equal variances not assumed			.141	29.908	.889	.03333	.23701	-.45077	.51744
VAR00012	Equal variances assumed	1.288	.265	.506	30	.617	.10000	.19777	-.30389	.50389
	Equal variances not assumed			.540	27.949	.593	.10000	.18515	-.27930	.47930
VAR00013	Equal variances assumed	.534	.471	-.387	30	.701	-.08333	.21517	-.52276	.35609
	Equal variances not assumed			-.371	20.280	.715	-.08333	.22469	-.55161	.38494
VAR00014	Equal variances assumed	.311	.581	.459	30	.650	.08333	.18156	-.28746	.45412
	Equal variances not assumed			.429	18.828	.672	.08333	.19403	-.32302	.48969
VAR00015	Equal variances assumed	3.762	.062	1.225	30	.230	.33333	.27217	-.22250	.88917
	Equal variances not assumed			1.339	29.167	.191	.33333	.24897	-.17575	.84242
VAR00016	Equal variances assumed	.200	.658	.118	30	.907	.03333	.28179	-.54217	.60883
	Equal variances not assumed			.125	27.169	.902	.03333	.26707	-.51449	.58116
VAR00017	Equal variances assumed	5.581	.025	2.180	30	.037	.73333	.33643	.04625	1.42042
	Equal variances not assumed			2.673	25.633	.013	.73333	.27433	.16904	1.29762
VAR00018	Equal variances assumed	.765	.389	-.087	30	.931	-.03333	.38220	-.81388	.74722
	Equal variances not assumed			-.080	17.645	.937	-.03333	.41694	-.91055	.84389
VAR00019	Equal variances assumed	4.990	.033	-1.118	30	.272	-.15000	.13416	-.42400	.12400
	Equal variances not assumed			-1.016	17.194	.324	-.15000	.14759	-.46112	.16112
VAR00020	Equal variances	.093	.762	.152	30	.880	.01667	.10988	-.20774	.24108

	assumed									
	Equal variances not assumed			.154	24.520	.879	.01667	.10808	-.20615	.23948
VAR00021	Equal variances assumed	19.646	.000	1.711	30	.097	.26667	.15587	-.05167	.58500
	Equal variances not assumed			1.939	30.000	.062	.26667	.13754	-.01423	.54757
VAR00022	Equal variances assumed	1.201	.282	.632	30	.532	.16667	.26387	-.37224	.70557
	Equal variances not assumed			.657	26.214	.517	.16667	.25358	-.35436	.68769
VAR00023	Equal variances assumed	.152	.700	-.100	30	.921	-.01667	.16622	-.35614	.32280
	Equal variances not assumed			-.090	16.403	.930	-.01667	.18571	-.40957	.37624
VAR00024	Equal variances assumed	1.288	.265	.506	30	.617	.10000	.19777	-.30389	.50389
	Equal variances not assumed			.540	27.949	.593	.10000	.18515	-.27930	.47930
VAR00025	Equal variances assumed	2.212	.147	-.417	30	.680	-.11667	.27981	-.68812	.45479
	Equal variances not assumed			-.391	18.899	.700	-.11667	.29868	-.74203	.50870
VAR00026	Equal variances assumed	.040	.843	.198	30	.844	.06667	.33643	-.62042	.75375
	Equal variances not assumed			.178	16.714	.860	.06667	.37354	-.72246	.85580
VAR00027	Equal variances assumed	.228	.636	.082	30	.935	.01667	.20239	-.39668	.43001
	Equal variances not assumed			.086	26.577	.932	.01667	.19349	-.38064	.41397
VAR00028	Equal variances assumed	1.031	.318	-.273	30	.787	-.06667	.24465	-.56630	.43297
	Equal variances not assumed			-.253	18.282	.803	-.06667	.26389	-.62046	.48713
VAR00029	Equal variances assumed	.823	.372	.216	30	.831	.06667	.30888	-.56415	.69749
	Equal variances not assumed			.229	27.624	.820	.06667	.29070	-.52918	.66251
VAR00030	Equal variances assumed	6.328	.017	1.118	30	.272	.10000	.08944	-.08267	.28267
	Equal variances not assumed			1.453	19.000	.163	.10000	.06882	-.04405	.24405
VAR00031	Equal variances assumed	3.797	.061	-.915	30	.368	-.15000	.16398	-.48489	.18489
	Equal variances			-.781	14.296	.448	-.15000	.19218	-.56139	.26139

	not assumed									
VAR00032	Equal variances assumed	3.272	.081	-.821	30	.418	-.18333	.22328	-.63932	.27266
	Equal variances not assumed			-.682	13.283	.507	-.18333	.26901	-.76324	.39657
VAR00033	Equal variances assumed	.549	.465	1.157	30	.256	.33333	.28803	-.25491	.92158
	Equal variances not assumed			1.230	27.647	.229	.33333	.27098	-.22207	.88874
VAR00034	Equal variances assumed	12.278	.001	1.437	30	.161	.21667	.15080	-.09131	.52464
	Equal variances not assumed			1.615	29.952	.117	.21667	.13415	-.05733	.49066
VAR00035	Equal variances assumed	4.072	.053	.959	30	.345	.18333	.19110	-.20694	.57361
	Equal variances not assumed			1.061	29.598	.297	.18333	.17281	-.16979	.53646
VAR00036	Equal variances assumed	2.177	.151	-.542	30	.592	-.18333	.33808	-.87378	.50711
	Equal variances not assumed			-.471	15.050	.644	-.18333	.38899	-1.01221	.64554
VAR00037	Equal variances assumed	3.518	.070	.863	30	.395	.11667	.13526	-.15958	.39291
	Equal variances not assumed			.941	29.089	.354	.11667	.12396	-.13682	.37015
VAR00038	Equal variances assumed	3.288	.080	.847	30	.403	.15000	.17701	-.21151	.51151
	Equal variances not assumed			.871	25.300	.392	.15000	.17227	-.20458	.50458
VAR00039	Equal variances assumed	2.048	.163	1.150	30	.259	.36667	.31879	-.28440	1.01773
	Equal variances not assumed			1.271	29.571	.214	.36667	.28853	-.22294	.95628
VAR00040	Equal variances assumed	.448	.509	-.256	30	.800	-.08333	.32603	-.74918	.58251
	Equal variances not assumed			-.244	20.001	.810	-.08333	.34192	-.79657	.62991
VAR00041	Equal variances assumed	.329	.571	.623	30	.538	.20000	.32111	-.45579	.85579
	Equal variances not assumed			.683	29.291	.500	.20000	.29287	-.39873	.79873
VAR00042	Equal variances assumed	7.477	.010	-.175	30	.863	-.05000	.28636	-.63482	.53482
	Equal variances not assumed			-.151	14.940	.882	-.05000	.33033	-.75433	.65433
VAR00043	Equal variances	.761	.390	.325	30	.747	.06667	.20512	-.35224	.48558

	assumed									
	Equal variances not assumed			.342	26.899	.735	.06667	.19518	-.33389	.46722
VAR00044	Equal variances assumed	.000	.989	-.201	30	.842	-.05000	.24900	-.55852	.45852
	Equal variances not assumed			-.202	23.641	.842	-.05000	.24785	-.56196	.46196
VAR00045	Equal variances assumed	1.767	.194	-.614	30	.544	-.23333	.37986	-1.00912	.54245
	Equal variances not assumed			-.546	16.061	.593	-.23333	.42740	-1.13911	.67244
VAR00046	Equal variances assumed	.000	.988	.273	30	.787	.06667	.24465	-.43297	.56630
	Equal variances not assumed			.273	23.367	.787	.06667	.24443	-.43854	.57188
VAR00047	Equal variances assumed	1.420	.243	-.227	30	.822	-.06667	.29414	-.66738	.53405
	Equal variances not assumed			-.207	17.382	.839	-.06667	.32244	-.74581	.61248
VAR00048	Equal variances assumed	2.727	.109	-.968	30	.341	-.16667	.17213	-.51821	.18487
	Equal variances not assumed			-.932	20.637	.362	-.16667	.17879	-.53887	.20554
VAR00049	Equal variances assumed	1.663	.207	.634	30	.531	.11667	.18399	-.25909	.49242
	Equal variances not assumed			.640	23.986	.528	.11667	.18229	-.25957	.49290
VAR00050	Equal variances assumed	.021	.886	.064	30	.949	.01667	.26006	-.51444	.54777
	Equal variances not assumed			.066	25.836	.948	.01667	.25123	-.49990	.53324
VAR00051	Equal variances assumed	12.278	.001	1.437	30	.161	.21667	.15080	-.09131	.52464
	Equal variances not assumed			1.615	29.952	.117	.21667	.13415	-.05733	.49066
VAR00052	Equal variances assumed	.001	.980	.107	30	.916	.03333	.31175	-.60334	.67000
	Equal variances not assumed			.105	21.701	.918	.03333	.31879	-.62833	.69500
VAR00053	Equal variances assumed	.257	.616	.177	30	.861	.05000	.28245	-.52684	.62684
	Equal variances not assumed			.186	27.030	.854	.05000	.26825	-.50037	.60037
VAR00054	Equal variances assumed	2.380	.133	.787	30	.438	.18333	.23302	-.29255	.65921
	Equal variances			.912	29.627	.369	.18333	.20097	-.22732	.59399

	not assumed									
VAR00055	Equal variances assumed	1.266	.269	.613	30	.545	.21667	.35350	-.50528	.93861
	Equal variances not assumed			.659	28.312	.515	.21667	.32892	-.45676	.89009
VAR00056	Equal variances assumed	2.217	.147	-.595	30	.556	-.16667	.28021	-.73894	.40560
	Equal variances not assumed			-.558	18.941	.584	-.16667	.29890	-.79240	.45907
VAR00057	Equal variances assumed	2.492	.125	.677	30	.504	.15000	.22161	-.30259	.60259
	Equal variances not assumed			.748	29.582	.460	.15000	.20051	-.25973	.55973
VAR00058	Equal variances assumed	8.889	.006	-.778	30	.443	-.25000	.32146	-.90650	.40650
	Equal variances not assumed			-.689	15.913	.501	-.25000	.36282	-1.01949	.51949
VAR00059	Equal variances assumed	7.542	.010	-1.571	30	.127	-.30000	.19090	-.68988	.08988
	Equal variances not assumed			-1.394	15.977	.182	-.30000	.21517	-.75620	.15620
VAR00060	Equal variances assumed	.462	.502	-.514	30	.611	-.16667	.32432	-.82902	.49569
	Equal variances not assumed			-.491	20.190	.628	-.16667	.33914	-.87368	.54035
VAR00061	Equal variances assumed	1.043	.315	-.095	30	.925	-.03333	.35193	-.75206	.68540
	Equal variances not assumed			-.084	16.033	.934	-.03333	.39620	-.87309	.80643
VAR00062	Equal variances assumed	.007	.935	-1.564	30	.128	-.50000	.31972	-1.15296	.15296
	Equal variances not assumed			-1.508	20.730	.147	-.50000	.33161	-1.19018	.19018
VAR00063	Equal variances assumed	.228	.636	.082	30	.935	.01667	.20239	-.39668	.43001
	Equal variances not assumed			.086	26.577	.932	.01667	.19349	-.38064	.41397
VAR00064	Equal variances assumed	.154	.698	.449	30	.657	.13333	.29715	-.47352	.74019
	Equal variances not assumed			.457	24.598	.652	.13333	.29196	-.46847	.73514
VAR00065	Equal variances assumed	1.350	.254	-.431	30	.670	-.08333	.19341	-.47833	.31166
	Equal variances not assumed			-.392	17.221	.700	-.08333	.21265	-.53156	.36489
VAR00066	Equal variances	2.238	.145	-.469	30	.643	-.15000	.32007	-.80367	.50367

	assumed									
	Equal variances not assumed			-.525	29.902	.604	-.15000	.28578	-.73372	.43372
VAR00067	Equal variances assumed	2.916	.098	1.031	30	.311	.31667	.30708	-.31047	.94380
	Equal variances not assumed			1.127	29.168	.269	.31667	.28090	-.25770	.89103
VAR00068	Equal variances assumed	9.072	.005	1.477	30	.150	.36667	.24825	-.14033	.87367
	Equal variances not assumed			1.810	25.690	.082	.36667	.20254	-.04991	.78324
VAR00069	Equal variances assumed	14.464	.001	1.677	30	.104	.40000	.23851	-.08711	.88711
	Equal variances not assumed			2.179	19.000	.042	.40000	.18353	.01586	.78414
VAR00070	Equal variances assumed	17.818	.000	1.876	30	.070	.45000	.23991	-.03996	.93996
	Equal variances not assumed			2.438	19.000	.025	.45000	.18460	.06362	.83638
VAR00071	Equal variances assumed	5.084	.032	1.493	30	.146	.45000	.30148	-.16570	1.06570
	Equal variances not assumed			1.766	28.660	.088	.45000	.25483	-.07146	.97146
VAR00072	Equal variances assumed	.131	.720	.254	30	.801	.06667	.26218	-.46879	.60212
	Equal variances not assumed			.264	26.049	.794	.06667	.25254	-.45238	.58572
VAR00073	Equal variances assumed	8.506	.007	1.602	30	.120	.43333	.27053	-.11916	.98582
	Equal variances not assumed			1.908	28.197	.067	.43333	.22710	-.03171	.89838
VAR00074	Equal variances assumed	2.262	.143	-.578	30	.568	-.21667	.37486	-.98223	.54890
	Equal variances not assumed			-.532	17.916	.601	-.21667	.40695	-1.07192	.63858
VAR00075	Equal variances assumed	.625	.435	-.346	30	.732	-.10000	.28906	-.69034	.49034
	Equal variances not assumed			-.333	20.591	.743	-.10000	.30044	-.72555	.52555
VAR00076	Equal variances assumed	9.148	.005	-1.531	30	.136	-.33333	.21773	-.77800	.11134
	Equal variances not assumed			-1.336	15.221	.201	-.33333	.24953	-.86453	.19787
VAR00077	Equal variances assumed	.017	.897	-.139	30	.890	-.03333	.23913	-.52171	.45504
	Equal variances			-.140	23.465	.890	-.03333	.23861	-.52639	.45972

	not assumed									
VAR00078	Equal variances assumed	.036	.850	-.743	30	.464	-.18333	.24691	-.68758	.32092
	Equal variances not assumed			-.746	23.640	.463	-.18333	.24578	-.69100	.32433
VAR00079	Equal variances assumed	1.534	.225	1.017	30	.317	.26667	.26218	-.26879	.80212
	Equal variances not assumed			1.056	26.049	.301	.26667	.25254	-.25238	.78572
VAR00080	Equal variances assumed	2.420	.130	.748	30	.460	.15000	.20055	-.25959	.55959
	Equal variances not assumed			.802	28.216	.429	.15000	.18692	-.23276	.53276
VAR00081	Equal variances assumed	.109	.743	-.073	30	.942	-.01667	.22820	-.48271	.44937
	Equal variances not assumed			-.071	21.267	.944	-.01667	.23482	-.50464	.47130
VAR00082	Equal variances assumed	2.193	.149	-.580	30	.567	-.11667	.20129	-.52776	.29443
	Equal variances not assumed			-.531	17.600	.602	-.11667	.21977	-.57915	.34581
VAR00083	Equal variances assumed	.987	.329	-.537	30	.595	-.16667	.31032	-.80042	.46708
	Equal variances not assumed			-.503	18.889	.621	-.16667	.33129	-.86035	.52701
VAR00084	Equal variances assumed	6.190	.019	1.203	30	.238	.23333	.19398	-.16283	.62950
	Equal variances not assumed			1.336	29.717	.192	.23333	.17470	-.12360	.59027
VAR00085	Equal variances assumed	.576	.454	.685	30	.499	.20000	.29212	-.39659	.79659
	Equal variances not assumed			.729	27.765	.472	.20000	.27431	-.36212	.76212
VAR00086	Equal variances assumed	.478	.495	.464	30	.646	.15000	.32352	-.51072	.81072
	Equal variances not assumed			.483	26.241	.633	.15000	.31078	-.48853	.78853
VAR00087	Equal variances assumed	9.865	.004	1.376	30	.179	.23333	.16953	-.11290	.57956
	Equal variances not assumed			1.468	27.870	.153	.23333	.15893	-.09228	.55895
VAR00088	Equal variances assumed	.056	.815	-.583	30	.564	-.18333	.31423	-.82508	.45841
	Equal variances not assumed			-.562	20.719	.580	-.18333	.32597	-.86179	.49513
VAR00089	Equal variances	.014	.907	.316	30	.754	.11667	.36888	-.63669	.87002

	assumed									
	Equal variances not assumed			.314	22.726	.757	.11667	.37182	-.65302	.88635
VAR00090	Equal variances assumed	.273	.605	1.118	30	.272	.40000	.35777	-.33067	1.13067
	Equal variances not assumed			1.083	21.062	.291	.40000	.36926	-.36779	1.16779
VAR00091	Equal variances assumed	6.288	.018	-.598	30	.555	-.20000	.33466	-.88348	.48348
	Equal variances not assumed			-.543	17.194	.594	-.20000	.36815	-.97606	.57606
VAR00092	Equal variances assumed	.555	.462	-.653	30	.519	-.18333	.28061	-.75641	.38974
	Equal variances not assumed			-.609	18.571	.550	-.18333	.30118	-.81469	.44803
VAR00093	Equal variances assumed	1.118	.299	-.437	30	.665	-.15000	.34351	-.85154	.55154
	Equal variances not assumed			-.453	26.066	.654	-.15000	.33079	-.82986	.52986
VAR00094	Equal variances assumed	.000	.984	-.763	30	.451	-.26667	.34939	-.98022	.44688
	Equal variances not assumed			-.750	22.090	.461	-.26667	.35532	-1.00339	.47006
VAR00095	Equal variances assumed	.200	.658	.215	30	.831	.10000	.46571	-.85111	1.05111
	Equal variances not assumed			.219	24.708	.829	.10000	.45691	-.84158	1.04158
VAR00096	Equal variances assumed	4.350	.046	-1.339	30	.191	-.36667	.27379	-.92583	.19249
	Equal variances not assumed			-1.177	15.524	.257	-.36667	.31165	-1.02898	.29565
VAR00097	Equal variances assumed	.046	.832	-.043	30	.966	-.01667	.38423	-.80136	.76803
	Equal variances not assumed			-.043	22.715	.966	-.01667	.38735	-.81851	.78518
VAR00098	Equal variances assumed	.519	.477	-.509	30	.615	-.15000	.29477	-.75200	.45200
	Equal variances not assumed			-.484	19.874	.633	-.15000	.30975	-.79639	.49639
VAR00099	Equal variances assumed	1.721	.199	-.575	30	.569	-.10000	.17385	-.45504	.25504
	Equal variances not assumed			-.507	15.669	.619	-.10000	.19725	-.51887	.31887
VAR00100	Equal variances assumed	1.251	.272	.623	30	.538	.20000	.32111	-.45579	.85579
	Equal variances			.698	29.915	.490	.20000	.28647	-.38512	.78512

	not assumed									
VAR00101	Equal variances assumed	.469	.499	.919	30	.365	.31667	.34459	-.38708	1.02041
	Equal variances not assumed			.980	27.825	.336	.31667	.32327	-.34571	.97905
VAR00102	Equal variances assumed	4.831	.036	1.619	30	.116	.38333	.23680	-.10028	.86694
	Equal variances not assumed			1.692	26.523	.102	.38333	.22656	-.08193	.84859
VAR00103	Equal variances assumed	.534	.471	-.366	30	.717	-.03333	.09108	-.21935	.15269
	Equal variances not assumed			-.343	18.926	.735	-.03333	.09718	-.23679	.17013
VAR00104	Equal variances assumed	.212	.649	.227	30	.822	.03333	.14707	-.26702	.33369
	Equal variances not assumed			.230	24.306	.820	.03333	.14508	-.26589	.33256
VAR00105	Equal variances assumed	12.278	.001	1.437	30	.161	.21667	.15080	-.09131	.52464
	Equal variances not assumed			1.615	29.952	.117	.21667	.13415	-.05733	.49066
VAR00106	Equal variances assumed	.215	.646	-.270	30	.789	-.10000	.36998	-.85561	.65561
	Equal variances not assumed			-.266	22.079	.793	-.10000	.37632	-.88028	.68028
VAR00107	Equal variances assumed	8.190	.008	1.871	30	.071	.55000	.29401	-.05046	1.15046
	Equal variances not assumed			2.203	28.921	.036	.55000	.24962	.03942	1.06058

From the above results in looking at the F and significance values, several of the variables were found to be significant when the variances were not assumed to be equal. Although significance was found, these results must be interpreted with caution because we were not assuming a homogenous sample or equal distribution. Table 5 shows the variables that were found to be significant for differences between the two groups. Further detailed interpretation of these differences can be found in the discussion section of this paper.

Table 5 Survey items yielding significant differences in responses between the two groups.

Variable	t-statistic	Mean	p-value
There is general support for inclusion from the principal and other key administrators. (1)	3.39	Group 1 = 5.0000 Group 2 = 4.3000	.003
If there is a broadly recognized school mission it guides the education of all children, with or without disabilities, and is embraced by general as well as special educators. (1)	2.04	Group 1 = 4.7500 Group 2 = 4.1500	.05
My child is included in age-appropriate general education classes for 80% or more of the day. (1)	3.77	Group 1 = 4.5833 Group 2 = 3.3500	.001
My child's placement in the general education classroom provides opportunities to address not only general education goals but also IEP goals and objectives. (6)	2.67	Group 1 = 4.8333 Group 2 = 4.1000	.01
Teachers support my child's access to effective AAC methods in order to be successful in their classrooms. (3)	2.18	Group 1 = 5.0000 Group 2 = 4.6000	.04
Our child has ready access to his or her AAC system throughout the day. (6)	2.44	Group 1 = 5.0000 Group 2 = 4.5500	.03
There is little evidence of our child abandoning or rejecting the AAC system, indicating a good fit between the system and his/her needs and capabilities. (7)	2.20	Group 1 = 4.7500 Group 2 = 4.2000	.04

Group 1 indicates the parents from the inclusive grouping and Group 2 is representative of those in the mostly segregated grouping. The category represented by each of the practices listed in this table is indicated in ( ).

All of the parents of the children involved in the study were also asked to identify five of their greatest priorities with respect to their child's development of communication skills. In other words, what would make the greatest positive impact on their child's life in the short and long term? Some of the common themes and responses that arose from this question included but were not limited to:

- Their child being able to make their wants and needs known/ being able to make choices (25 parents) ("One of my biggest goals in life for [daughter] is for her to be able to make choices on her own and let us know what she wants, if she doesn't feel good, if she is sad or hurt. We can pick up on some of those cues now but we are still guessing.")
- Their child being able to share feelings and experiences with others (10 parents) ("I want my child to be able to share how their day at school was")
- Their child being able to communicate with a wider range of conversational partners, including new acquaintances (13 parents) ("I want my child to be able to be understood by total strangers, not just everyday people.")
- Their child being able to acquire life skills/ functional skills (8 parents) ("[I want my son] to be able to protect himself and recognize danger."

"[to] acquire life skills that are useful now and can be built upon to improve his quality of life as an adult.")

- Their child being able to initiate and maintain conversations (7 parents) ("to sustain a social interaction beyond the initial greeting.")

The parents of children in inclusive placements were also asked to identify factors that they felt fostered the implementation of best practices for children in inclusive settings. Some of the themes arising from this question were, however not limited to:

- Having a competent SLP with a vested interest in their child (3 parents) ("[My daughter] has an amazing SLP who has done wonderful things with [her] AAC program and her curriculum. She is great at programming the device to allow [her] to have successful interactions with her family and peers.")
- Having a shared philosophy of inclusion (3 parents)

> "If a teacher does not understand the benefits of inclusion, it would be hard to have a successful experience. We are lucky in that [our daughter's] general education teacher knows not only how great inclusion is for [her] but also for the typical peers as well."

- Parent involvement or parents being the "squeaky wheel that gets the grease" (4 parents) ("At the end of the day, we are the ones that are carrying over the transition of the device from home to school and back.")
- Caring educators (6 parents) ("I feel like you really have to have a team that is willing to work for and in behalf of our children.") ("A staff that wants to see my child succeed.")

- The necessity for collaboration between the classroom teachers, therapists, and parents (7 parents) ("By communicating all around, we can give more quality educational time to the child and less trial and error. This also lends itself to a more economical use of teacher resources.")
- Classroom modifications (7 parents) ("IEP goals should be driven behind what to modify and how to modify. If putting symbols/words in order is part of their IEP goal, then this is writing assignments and worksheets are to be completed.")
- Administrative support (7 parents) ("I have learned that the teacher/paraprofessional can have as much enthusiasm for inclusion as possible, but without the support of the principal/administration, they do not have the power to implement any program.")
- Strong Paraprofessional Support (8 parents) ("Most importantly, her one-on-one aide who had good knowledge in use of signs and AAC.")
- Modifications that involve classmates; exposure to typical peers (11 parents) ("the kids are great- most of them want to interact with her on some level")("[My son] would benefit from having peer models to model appropriate behavior in the classroom.")

In addition to identifying factors that they felt fostered the implementation of best practices, parents of the inclusion group were asked to also identify factors that they felt impeded the implementation of best practices for children in inclusive settings. The following themes arose:

- Teacher's lack of knowledge about AAC (2 parents) ("No one is encouraged to seek additional training unless I bring it up or encourage it.")
- Lack of understanding that "special education is a service, not a place" (2 parents)
- No money (2 parents) ("So many other kids would benefit from inclusion and [our daughter] is one of the only ones who gets to do it because she already has a 1:1 aide so it's not costing the district anything extra to provide that.")
- How much is the child actually learning? (2 parents) ("Inclusion is more than just a placement")

> "I'm very pleased with the peer acceptance but I'm skeptical how much he is he is really learning as far as the regular education curriculum is concerned. If he's not really learning what the other kids are, or at least not getting the chance, then he needs a more intensive program to enable him to have the tools to learn."

- Low expectations (2 parents)

> "While I know it may not be possible for my child to do everything, most of his IEP goals seem to be made on 'it would be nice if he could do such and such' as opposed to deciding where [at minimum] he needs to be at graduation and 'working our way backwards' to make sure he's where he needs to be years from now. [My son] is very smart. He's a locked treasure chest. If we set his goals too low, we cheat him out of his education."

- Lack of having a quality 1:1 paraprofessional (3 parents) ("they are in the trenches with my child, and I believe you could have a great educational program but if you have struggles with paras, you're sunk.")
- Educator's lack of awareness and knowledge about Angelman Syndrome (example- how they learn best, limitations and strengths, etc.) (3 parents)

("People don't understand how much these kids can learn and experience.")

- Limited time for meetings – obstacle to collaboration (6 parents) ("Our team meetings are limited to one, thirty minute session, four times a year rather than one hour sessions, six times per year. This will make for more difficult collaboration.")
- Lack of a clear vision (6 parents) (e.g. all students should be included- no exceptions) ("Kids with severe challenges are seen as 'kids in the back of the room'; not really part of the mix")
- Lack of general education teachers with Special Education training (7 parents) ("Teachers/support people are not trained or are not motivated to obtain the proper training.")
- Lack of administrative support (9 parents) (time for meetings, support for professional development, etc.) ("The paraprofessional seems professional and dedicated although overwhelmed and under-supported in implementing her program") ("The biggest issue in the non-success is the lack of support for [our child] and his teacher. You know some just don't have a clue; some just don't want to change 'their' way.")

CHAPTER IV

DISCUSSION

Based on the results of the statistical analyses discussed in the previous section of this paper, it can be concluded that parents of children who are placed in primarily segregated programs want the same things for their children as parents of children who are involved in primarily inclusive programs. However, when looking at the comparison in mean responses between groups for each practice there were some statistically significant differences that were found in conducting the independent t-test. Again these results should be interpreted with some caution as the variances were assumed to be not equal.

The first item that demonstrated a significant difference between groups was "there is general support for inclusion from the principal and other key administrators". This practice was unanimously given a rating of 5.0 or strongly favorable by all of the 12 parents with children in the mostly included group. For the 20 parents in the mostly segregated group, the mean rating for this item was a 4.3; closer to the general favorable range. This difference is not surprising since all seven of the parents who indicated that administrative support is a facilitating factor to inclusion were parents of children currently involved in mostly inclusive classrooms.

The second item that demonstrated a significant difference was "if there is a broadly recognized mission statement it guides the education of all students, with or

without disabilities, and is embraced by general as well as special educators". There was less of a significant difference between the groups on this item with the mostly included group having a mean rating of 4.75 and the mostly segregated group with a mean of 4.15. Again the parents that brought this up in the qualitative comments were parents of children who were involved in inclusion.

The next practice indicating a significant difference in responses between the two groups was a practice involving level of inclusion. The practice reads "my child is included in age-appropriate, general education classes for 80% of the day or more". The mostly included group responded generally favorable-strongly favorable with a mean of 4.58. The mostly segregated group responded in the neutral range with an average response of 3.35. This practice item denoted the greatest discrepancy between groups albeit not surprising. Even if the parents of both groups were not responding in regards to what is currently occurring in their child's program, 10 out of the 11 parents whose children were solely in segregated placements indicated a general satisfaction with their child's current educational setting. This indicates that they seem to feel that this is an appropriate setting for their child at this time.

"My child's placement in the general education classroom provides opportunities to address not only general education goals, but also IEP goals and objectives" was another practice that delineated differences. With this practice, the mostly included group rated this item with a mean of 4.83 closer to the strongly favorable range. On the other hand, this practice was generally favorable for parents in the mostly segregated placements with a mean of 4.10. This discrepancy could also reflect the current placements of their children. It could also reflect the views and attitudes of some of the

parents of children in the mostly segregated programs regarding the type of education their children should be getting. A few of the parents of the children in the segregated programs also indicated that they felt that general education goals were not appropriate for their children. For example, one mother states "I have never understood why my child needs the typical knowledge of say science, biology, geography, government, etc. In reality what is he going to do with this knowledge? In his contained setting- all the teaching and lessons pertain to him and helping him learn skills to help him get through the day."

Another practice item that denoted significant differences in responses was "teachers support my child's access to effective AAC methods in order to be successful in their classrooms". This difference was not as significant as the prior two items, however. It was unanimously a strongly favorable practice for the mostly included group and rated within the generally favorable to strongly favorable region for those considered in the mostly segregated placement grouping. This small difference did not stand out in terms of parents comments as parents from both groups indicated its importance in their child's successful communication.

Two more practices were indicated from the results analysis although again, the significant values were relatively small. The first was related to the previously mentioned practice item. This practice states "My child has ready access to his or her AAC system throughout the day". The ratings were also similar to those in the previous item for both groupings. Again, both groups really stressed the importance for their children to develop their communication abilities using multiple modalities.

Finally, the last practice highlighting differences that were significant was the practice "there is little evidence of our child abandoning or rejecting his or her AAC system, indicating a good fit between the system and his/her needs and capabilities". Both groups rated this item in the generally favorable range; however, the mostly included group rated this item closer to the strongly favorable range. It is questioned by the author whether or not this difference, again albeit small, might be a function of a reduced number of opportunities and reasons to utilize these systems in a more self-contained setting. Thus with a decreased motivation to communicate, there is a greater likelihood of devices being abandoned or rejected in these settings. Once again the author cautions readers in these interpretations as the variances were not assumed to be equal. There were no significant differences found between the two groups in terms of their responses to the practices when looking at the practices in relation to their categories. It is important to keep in mind with this finding that the parents were asked to indicate favorability regardless of what is actually occurring in their child's program.

Parent priorities indicated qualitatively in the survey also corresponded highly with some of the practices that were ranked in the strongly favorable range, illuminating their importance. For example, one of the most frequently cited priorities that parents noted was that they wanted their child to be able to communicate their wants and needs, share feelings, and interact with others. One of the practices that fell in the strongly favorable category was awareness that their child's behavior may be a result of them trying to express their wants and needs and the frustration of not being able to do so effectively. Also honoring multiple modes of communication and teaching the use of AAC systems to replace challenging behaviors were practices that were also deemed

highly favorable and relate to parent priorities. This information is critical to consider when putting together an educational program for these children as parent priorities and parental involvement should be integral in this process.

What was most surprising was that 10 out of the 11 parents whose children were in segregated placements were generally satisfied with their child's placement based upon their responses to the question regarding their happiness with their child's current educational setting. Some of these parents felt that the general education environment is "too distracting" for their child and the rest of the children in the classroom. One parent stated, "I feel if [my son] were in an inclusive classroom, other "typically developing" students will be distracted as well as [him]. My strongest belief is that [my son] needs one- on-one training." Another parent concurred with this notion of one-on-one training. "Yes, I am happy with his current placement in a self-contained classroom. I believe he benefits greatly with the small class size and one-on-one assistance."

This idea that children with significant disabilities will serve as a distraction in the general education environment and take away from learning is actually contra-indicative of what the literature suggests. Current literature is suggesting that having children with disabilities in inclusive placements benefits them as well as their typical peers, given the necessary supports and modifications (Kent-Walsh & Light, 2003; Soto, Muller, Hunt, & Goetz, 2001). Nine of these parents of the children in mostly segregated placements were able to identify some of the supports that would need to be in place for their child to be in a successful, inclusive program such as: peer modeling (3 out of 9 parents), collaboration among team members (5 parents), shorter periods of things to do (2 parents), and a full-time one on one aide (3 parents) to name a few of the more popular suggestions. What

was also striking was a few of the comments from parents of children in inclusive settings that were not happy with their child's placement in the regular education setting. One parent stated, "I don't consider my child's inclusion to be successful, in fact I'd like to see my child placed in a more specialized school to see if he has greater success there." The same set of parent go on to say, "I would like to see more highly trained personnel at the school and more help shifting communication home. (Things are improving but it practically took an act of God). I am very pleased with the peer acceptance, but I'm skeptical as to how much he is actually learning as far as the regular education curriculum is concerned." Another parent listed themselves as a barrier to their child's inclusion claiming "I will not put my child in a situation that is automatically set up for him to fail. That is what I felt was offered in the regular education so I put him in an environment that he would be accepted in and make some great strides in as well." These findings suggest there is much work to be done in applying the principles of universal design to create an environment where all different types of learners can learn and have access to the general education curriculum.

All of the practices contained in the parent survey were rated within the generally favorable to strongly favorable range indicating that they were all socially valid practices according to the parents. As noted earlier, the instrument itself was found to be a highly reliable tool. The investigators hope to use these data to ultimately develop an instrument from which parents and school personnel can evaluate the quality of their program in terms of its adherence to these validated best practices. Further validation is currently being conducted with the school personnel of the subjects involved in the study. Special and General Educators in addition to Speech-Language Pathologists are being asked to

indicate to what extent they feel the items on the survey represent best practices and also to what extent they are utilizing these practices in their program. This information may provide further validation of the practices in creating a usable program evaluation tool while also identifying possible disconnects between home and school priorities. It may thus help school teams in preparing and developing children's Individualized Education Plans (IEPs). The findings from the school validation survey and parent survey will also be triangulated with the children's current IEPs to assess consistency. They will also be used to assist in identifying disconnects between home and school and areas where parent priorities could be incorporated into their child's programming. Another possible direction for this type of research would be to look at the comparison of responses by age group of the children involved in the study. Are the priorities still similar across age groups? In addition, it would be interesting to examine parent level of expectations for their child and whether or not they feel this same level of expectation is maintained in their child's educational setting.

Possible limitations to this study include a limited subject pool (as Angelman Syndrome is a relatively rare genetic syndrome) and therefore it was difficult to adequately control for demographics. Another limitation was the online survey. A major difficulty with the SurveyCat program is that one cannot save their work once they start the survey so they would need to complete the entire survey in one sitting. This is a difficult task given the length of this survey especially for parents of children with disabilities to have the time to adequately complete it. As such, the quality of our results may have been affected by this inconvenience. The length of the survey and inability to complete it in multiple sittings may have also had an impact on the quality of the parents'

responses and qualitative comments. Finally, the lack of evidence-based research poses a limitation in adhering to the principles of evidence-based practices hence amplifying the significant need and implications for this research study and other studies like it.

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APPENDICES

APPENDIX A

BEST PRACTICES FOR PROVIDING AAC SERVICES TO CHILDREN WITH SEVERE DISABILITIES [1, 2]

[1] Please note, while ALL proposed practices pertain to the general population of individuals with severe disabilities, including those with Angelman Syndrome (AS), those indicators delineated with the superscript [AS] are proposed to be particularly pertinent to this population.

[2] The term 'severe disabilities' refers to children with severe to profound intellectual disabilities and associated challenges with adaptive behaviors, which include communication, whom require relatively high levels of support from family, educators, related service providers classmates, and others in order to meet the demands of daily living and enjoy the best possible quality of life.

The authors have also assigned the highest level of evidence (L#) support each practice according to Schlosser & Raghavendra's (2004) hierarchy (1-5) with 1 exemplifying the highest level source.

1. Promoting inclusive values

- AAC skills taught foster membership in the school community; this includes facilitating the development of friendships with typical peers. (Calculator, 2007, L5; Mirenda & Calculator, 1993, L5). *(Item #1 on the survey)*

- AAC use enhances classmates' overall awareness and acceptance, viewing the child as more capable and 'normal' (Calculator, 2007, L5; Kent-Walsh & Light, 2003, L4; Soto, Muller, Hunt & Goetz, 2001, L4). *(Item #3 on the survey)*

- AAC services foster networking with friends and acquaintances, as well as others who are presently unfamiliar with the child (Blackstone & Berg, 2003, L5; Calculator, 2007, L5; Mirenda & Calculator, 1993, L5). *(Item #2 on the survey)*

- There is general support for inclusion from the principal and other key administrators. (Avramidis, Bayliss, & Burden, 2002, L4; Flem, Moen, & Gudmundsdottir, 2004, L4; Jorgensen, McSheehan, & Sonnenmeier, 2002, L5; Kent-Walsh & Light, 2003, L4; Nochajski, 2001, L4; Odom et. al. 1999, L3; Salisbury, Palombaro, & Hollowood, 1993, L4; Thousand & Villa, 1995, L5). *(Item #5 on the survey)*

- The school principal provides teachers with the time and resources necessary for them to acquire skills they will need to effectively include the child in their classes (Kent-Walsh & Light, 2003, L4; Nochajski, 2001, L4; Odom, et. al., 1999, L3; Salisbury, Palombaro, & Hollowood, 1993, L4; Thousand & Villa, 1995, L5). *(Item #7 on the survey)*

- The school principal provides time for special educators, including SLPs and other related service providers, to collaborate on program planning and evaluation

of outcomes. (Kent-Walsh & Light, 2003, L4; Salisbury, Palombaro, & Hollowood, 1993, L4) *(Item #8 on the survey)*

- There is a broadly recognized mission that guides the education of all children, disabled or not, and that mission is embraced by general educators as well as special educators (Ainscow, Booth, & Dyson, 2004, L5; Avramidis, Bayliss, & Burden, 2002, L4; Carrington & Robinson, 2004, L4; Doyle, 2004, L5; Frederickson et. al., 2004, L4; Graves & Tracy, 1998, L5; Jackson, Rydak, & Billingsley, 2000, L5; Kane, Head, & Cogan, 2004, L4; Kent-Walsh & Light, 2003, L4; Knowlton, 1998, L5; Lieber et. al. 2000, L4; Meyer & Eichinger, 1994, L4; Nochajski, 2001, L4; Vlachou, 2004, L5) *(Item #9 on the survey)*

- The student is included in age-appropriate classrooms whenever possible (Avramidiz, Bayliss, & Burden, 2002, L4; Cushing, Clark, Carter & Kennedy, 2005, L5; Doyle, 2004, L5; Horn, Lieber, Li, Sandall, & Schwartz, 2000, L4; Kent-Walsh & Light, 2003, L4; Meyer & Eichinger, 1994, L4; Wehmeyer, Lance, & Bashinski, 2002, L5; *Wilkerson, et al. 2005, L5*) *(Item #10 on the survey)*

- Specific instruction targets others' acceptance and attitudes toward the child and his or her methods of communication. (Jackson, Rydak, & Billingsley, 2000, L5; Kennedy & Itkonen, 2001, L2; Kent-Walsh & Light, 2003, L4) *(Item #11 on the survey)*

- The child is accepted and treated respectfully by classmates. (Jackson, Rydak, & Billingsley, 2000, L5; Kent-Walsh & Light, 2003, L4) *(Item #12 on the survey)*

- Educational and AAC programs for the student with Angelman Syndrome build upon the student's relatively strong social skills with peers *(Alvares & Downing, 1998, L4; Wilkerson, et al., 2005, L5)* [AS] *(Item #13 on the survey)*

2. Collaboration between general and special educators

- General educators understand why the child with severe disabilities is in their classroom and how he/she is expected to benefit from instruction in their classroom and other settings (Calculator & Jorgensen, 1994, L5). *(Item #14 on the survey)*
- Time is set aside on a regular basis for collaboration between general education and special education teachers (Ainscow, Booth, & Dyson, 2004, L5; Armstrong et. al., 2005, L4; Avramidis, Bayliss, & Burden, 2002, L4; Carrington & Robinson, 2004, L4; Calculator, 1988, L5, 2007, L5; Cleary & McFadden, 2001, L4; Cushing et. al., 2005, L5; Dover, 2005, L5; Downing, 2005, L5; Flem, Moen, & Gudmundsdottir, 2004, L4; Hunt-Berg, 2005, L3; Jackson, Rydak, & Billingsley, 2000, L5; Kane, Head, & Cogan, 2004, L4; Kent-Walsh & Light, 2003, L4; Lieber, et. al., 2000, L4; Mirenda & Calculator, 1993, L5; Nochajski,

2001, L4; Rheams & Barn, 2005, L4; Salisbury, Palombaro, & Hollowood, 1993, L4; Vlachou, 2004, L5; Wolfe & Hall, 2003, L5; Sonnenmeier, McSheehan, & Jorgensen, 2005, L4; Soto, Müller, Hunt, & Goetz, 2001, L4; Wehmeyer et. al., 2004, L1) *(Item #16 on the survey)*

- There is an active, systematic, and collaborative process by which general and special education teachers identify classroom and curriculum modifications that will be necessary to foster the child's participation in the general education curriculum (Armstrong et. al., 2005, L4; Calculator, 1999, L5; Frederickson et. al., 2004, L4; Kent-Walsh & Light, 2003, L4). *(Item #15 on the survey)*

- General and special educators collaborate as necessary to identify how the child's IEP goals and objectives can be addressed in the general education classroom and elsewhere (Calculator & Jorgensen, 1994, L5).

- The child's placement in the general education classroom is not only intended to provide opportunities for social interaction with typical peers but also to be used as a context in which specific IEP goals and objectives may be addressed (Doyle, 2004, L5; Meyer & Eichinger, 1994, L4; Mirenda & Calculator, 1993, L5). *(Item #17 on the survey)*

- Given the multiple conditions associated with AS, a multidisciplinary approach is provided *(Wilkerson, et al., 2005, L5)* [AS] *(Item #18 on the survey)*

3. Collaboration between educators and related service providers.

- The SLP collaborates with the teacher in prioritizing instructional objectives for the child, for example how the child's use of AAC might assist him or her in meeting IEP objectives (Downing, 2002, L5) *(Item #19 on the survey)*

- The speech-language pathologist collaborates with classroom teachers and paraprofessionals frequently enough to ensure communication goals are fully integrated within the special education and/or general education curriculum (Calculator, 2007, L5; Kent-Walsh & Light, 2003, L4; Soto, Muller, Hunt & Goetz, 2001, L4). *(Item #20 on the survey)*

- Teachers recognize the fact that the child needs access to effective AAC methods in order to be successful in their classrooms (Calculator, 2007, L5; Calculator & Jorgensen, 1994, L5; Downing, 2005, L5; Kent-Walsh & Light, 2003, L4; Soto, Muller, Hunt, & Goetz, 2001, L4). *(Item #69 on the survey)*

- There is a general understanding that the child will exhibit limited educational and social gains in the classroom unless teachers receive sufficient preparation and ongoing supports regarding how to foster the child's effective use of AAC (Hunt-

Berg, 2005, L3; Kent-Walsh & Light, 2003, L4; Soto, Müller, Hunt & Goetz, 2001, L4). *(Item #104 on the survey)*

- The SLP, in collaboration with other team members, has the knowledge and skills necessary to foster effective implementation of the AAC program. (Kent-Walsh & Light, 2003, L4; Sonnenmeier, McSheehan, & Jorgensen, 2005, L4). *(Item #21 on the survey)*

- While the responsibility for implementing the AAC program is shared by multiple persons, there is sufficient oversight and monitoring by the SLP, who is ultimately responsible for the integrity of the AAC program (Calculator, 2007, L5) *(Item #22 on the survey)*

- The delivery of communication services involves active and systematic collaboration between the speech-language pathologist and additional team members (e.g. parents, physical therapist, occupational therapist, general education teacher, special education teacher, and psychologist) (Ainscow, Booth, & Dyson, 2004, L5; Avramidis, Bayliss, & Burden, 2002, L4; Calculator, 1988, L5, 2007, L5; Carrington & Robinson, 2004, L4; Cleary & McFadden, 2001, L4; Downing, 2005, L5; Flem, Moen, & Gumundsdottir, 2004, L4; Frederickson et. al., 2004, L4; Jackson, Rydak, & Billingsley, 2000, L5; Jorgensen, McSheehan, & Sonnenmeier, 2006, L5; Jorgensen, McSheehan, & Sonnenmeier, 2002, L5; Kent-Walsh & Light, 2003, L4; Mirenda & Calculator, 1993, L5; Nochajski, 2001, L4; Rheams & Barn, 2005, L4; Sonnenmeier, McSheehan, & Jorgensen, 2005, L4; Soto, Müller, Hunt, & Goetz, 2001, L4; Vlachou, 2004, L5; Wren & Parkhouse,1998, L5) *(Item #23 on the survey)*

- The SLP provides sufficient preparation and ongoing supports to enable teachers to acquire the knowledge and skills they need to foster the child's functional use of the AAC system in their classrooms. (Calculator, 2007, L5; Kent-Walsh & Light, 2003, L4; Sonnenmeier, McSheehan, & Jorgensen, 2005, L4). *(Item #24 on the survey)*
- The educational and related programs consider students' concurrent needs for medical interventions designed to address common problems seen in students with AS, including seizures, orthopedic, vision, behavior, and sleep disorders *(Wilkerson, et al. 2005, L5)*[AS] *(Item #25 on the survey)*

- There is an understanding that services from speech-language pathologists, occupational therapists, behavior therapists, and others are likely to be needed across the individual's lifespan *(Wilkerson, et al. 2005, L5)*[AS]. *(Item #26 on the survey)*

- The child with Angleman Syndrome may exhibit unusual movement patterns, including an ataxic, wide-based gait and some balance difficulties (Williams, 2005, L5). These are taken into consideration when selecting AAC systems. This

often requires collaboration between the SLP and Physical Therapist. [AS] *(Item #27 on the survey)*

- The child with Angelman Syndrome may exhibit difficulties pointing while also experiencing tremors and jerky movements in their limbs (Williams, 2005, L5). The speech-language pathologist collaborates with the Occupational Therapist and/or other professionals to identify how to maximize the child's access to AAC. [AS] *(Item #28 on the survey)*

4. Family involvement

- AAC programs are sensitive to and reflect the family's cultural values and beliefs. (Cress, 2004, L5; Downing, 2005, L5). *(Item #29 on the survey)*

- The family has an active role in determining the child's needs for AAC. Their involvement is integral to the assessment process (Avramidis, Bayliss, & Burden, 2002, L4; Childre & Chambers, 2005, L4; Cress, 2004, L5; Flem, Moen, & Gudmundsdottir, 2004, L4; Jorgensen, McSheehan, & Sonnenmeier, 2002, L5; Frederickson, et. al. 2004, L4; Murray & Mandell, 2004, L4; Jackson, Rydak, & Billingsley, 2000, L5; Jorgensen, McSheehan, & Sonnenmeier, 2006, L5; Lieber et. al., 2000, L4; Meyer & Eichinger, 1994, L4; Renzaglia, Karvonen, Drasgow, & Stoxen, 2003, L5; Robinson & Sadao, 2005, L4) *(Item #30 on the survey)*

- The family has a clear and significant role in carrying out activities that support their child's effective use of AAC at home and school. (NJC, 1992, L5; ASHA, 2004, L5) *(Item #31 on the survey)*

- Family priorities and input are considered strongly in selecting the AAC system (Cress, 2004, L5) *(Item #32 on the survey)*

- There is a formal procedure in place to coordinate AAC instruction and use between school and home (NJC, 1992, L5) *(Item #33 on the survey)*
- The family receives direct coaching from the SLP and/or other team members on how they may incorporate AAC use at home. (Cress, 2004, L5) *(Item #34 on the survey)*

- The SLP and other team members consider both the child and his or her family as their primary clients when designing and implementing the AAC program (Cress, 2004, L5) *(Item #35 on the survey)*

- The speech-language pathologist collaborates with the student's family to identify and implement AAC systems that are both useful and practical *(Alvares & Downing, 1998, L4; Calculator, 2002, L2).* [AS] *(Item #36 on the survey)*

5. Choosing and planning what to teach

- The IEP team uses a collaborative decision-making process in selecting AAC systems for the child; the decision is not made by the SLP alone. (QIAT, 2004, L5) *(Item #36 on the survey)*

- Communication programs target multiple modes of communication, aided (e.g. voice output communication aid) as well as unaided (e.g. gestures), rather than limiting instruction to a single mode. (Calculator, 1988, L5, 1999, L5; Kent-Walsh & Light, 2003, L4; NJC, 1992, L5) *(Item #37 on the survey)*

- AAC goals correspond to communication demands, opportunities and reasons for communication across various settings at school. (Calculator, 1999, L5; Horn et al., 2000, L4, Mirenda & Calculator, 1993, L4; NJC, 1992, L5). *(Item #38 on the survey)*

- AAC programs are specifically designed to foster the child's participation in the general education or special education curriculum (ASHA, 2002, L5; Calculator, 2007, L5; Sonnenmeier, McSheehan, & Jorgensen, 2005, L4; Von Tetzchner et. al., 2005, L5) *(Item #39 on the survey)*

- Communication instruction targets fostering 'social closeness' as one of its primary objectives, teaching the child and others how communication can be used to initiate, establish, and maintain social relationships, including friendships, with others. (Doyle, 2004, L5; Jackson, Rydak, & Billingsley, 2000, L5; Jorgensen, McSheehan, & Sonnenmeier, 2002, L5; Kent-Walsh & Light, 2003, L4; Light, Beukelman & Reichle, 2003, L5; Meyer & Eichinger, 1994, L4; Mirenda & Calculator, 1993, L5; NJC, 1992, L5) *(Item #40 on the survey)*

- The AAC program is designed to enhance the child's ability to interact effectively with a broad range of conversational partners. (Calculator, 1988, L5, 2007, L5; Jorgensen, McSheehan, & Sonnenmeier, 2002, L5; Knowlton, 1998, L5; Mirenda & Calculator, 1993, L5) *(Item #41 on the survey)*

- Communication interventions emphasize AAC as a means of optimizing the child's active participation in the classroom and elsewhere at school. (Calculator & Jorgensen, 1994, L5; NJC, 1992, L5) *(Item #42 on the survey)*

- AAC systems are selected based in part on functional assessments in the child's customary environments which may include the classroom, lunchroom, playground, and home (QIAT, 2004, L5) *(Item #43 on the survey)*
- The child's preferences, whether conveyed overtly or more subtly, are a primary consideration in selecting the AAC system. (Cress, 2004, L5; Downing, 2005, L5) *(Item #44 on the survey)*

- Communication skills are selected based on their perceived value to the child. (Cushing et. al, 2005, L5; Horn et. al., 2000, L4; Jackson, Rydak, & Billingsley, 2000, L5; Wehmeyer, Lance, & Bashinski, 2002, L5) *(Item #45 on the survey)*

- The AAC program reinforces the concept of self-determination by targeting skills that will enable the child increased responsibility for making choices and decisions that affect him or her. (Calculator, 2007, L5; Jorgensen, McSheehan, & Sonnenmeier, 2006, L5; Palmer, Wehmeyer, Gipson, & Agran, 2004, L2; Wehmeyer, et. al., 2003, L2) *(Item #51 on the survey)*

- AAC goals are designed, in part, to erase the discrepancy between communication skills needed to participate in an activity, and the skills actually exhibited by the child (Calculator, 2007, L5). *(Item #46 on the survey)*

- The communication skills taught are ones we can expect the child to acquire in a reasonable amount of time, with a reasonable level of effort, suggesting ease of acquisition (Calculator, 1999, L5) *(Item #47 on the survey)*

- The determination of an appropriate AAC system includes a process of feature matching in which the child's capabilities (e.g. language, cognition, sensory, motor, social, behavioral, and emotional) are matched to the characteristics of an array of possible AAC systems. (ASHA, 2002, L5; Glennen, 1997, L5) *(Item #48 on the survey)*

- The AAC program is designed to address the child's present as well as future communication needs. (ASHA, 2002, L5; Childre & Chambers, 2005, L4; Jorgensen, McSheehan, & Sonnenmeier, 2006, L5; Knowlton, 1998, L5) *(Item #49 on the survey)*

- AAC skills target life-goals; in other words the skills taught are ones the child might be expected to continue to benefit from using as he or she progresses toward adulthood. (Calculator, 2007, L5; Knowlton, 1998, L5; Mirenda & Calculator, 1993, L5) *(Item #50 on the survey)*

- AAC skills taught are consistent with the criterion of ultimate functioning in that the child's ultimate failure to acquire them will require someone else to perform the skill for him or her later in life (Calculator, 2007, L5).

- The selection and use of AAC systems is based on the child's IEP goals and objectives, not only communication but across all domains, along with associated demands of the general curriculum. (QIAT, 2004, L5; Calculator, 2007, L5)

- The AAC program maximizes opportunities for the child to express personal choices and attain maximum control over events in their environment, consistent with cultural norms and the principle of self-determination. (Calculator, 2007, L5; Doyle, 2004, L5; Jorgensen, McSheehan, & Sonnenmeier, 2006, L5; Knowlton,

1998, L5; Palmer, Wehmeyer, Gipson, & Agran, 2004, L2; Renzaglia et. al., 2003, L5; Wehmeyer, Lattin, Lapp-Rinchker, & Agran, 2003, L2) *(Item #51 on the survey)*

- Communication behaviors that are taught are readily understandable to others. These include people who are and are not familiar with the child and his/her methods of communication. (Calculator, 1988, L5, 2007, L5; Jorgensen, McSheehan, & Sonnenmeier, , 2002, L5; Knowlton, 1998, L5; Mirenda & Calculator, 1993, L5) *(Item #52 on the survey)*

- AAC systems are selected in part based on their usefulness with conversational partners who are as well as those who are not familiar with the child and the particular system (Calculator, 1999, L5)

- Symbols for AAC systems are selected following an assessment of the child's cognitive and representational skills. Symbols may vary from actual objects to relatively abstract line drawings and words (Glennen & Decoste, 1997, L5; Beukelman & Mirenda, 2005, L5; Lloyd, Fuller & Arvidson, 1997, L5). *(Item #53 on the survey)*

- The communication program fosters functional communication skills that can be used to meet real-life needs, demands, and opportunities for communication. (Cushing et al., 2005, L5; Horn et. al., 2000, L4; Jackson, Rydak, & Billingsley, 2000, L5; NJC, 1992, L5)

- The child is taught to use AAC to express a broad range of communication functions which may include requesting objects and actions, regulating the behavior of others, requesting attention, rejecting unwanted objects and activities, establishing/maintaining social relationships, etc. (Downing, 2005, L5; Jorgensen, McSheehan, & Sonnenmeier, 2002, L5). *(Item #54 on the survey)*

- AAC goals foster the likelihood the child will become a productive and contributing member of society (Dover, 2005, L5; Downing, 2002, L5) *(Item #55 on the survey)*

- AAC programs foster the child's safety and overall health. (Giangreco, et al. 1998, L5)

- The AAC program includes the identification of supports as well as barriers to successful implementation. (Kent-Walsh & Light, 2003, L4; QIAT, 2004, L5) *(Item #56 on the survey)*

- AAC skills targeted for instruction are ones the child will have multiple opportunities to use functionally throughout the day. (Calculator, 1988, L5, 1999, L5; Knowlton, 1998, L5; Mirenda & Calculator, 1993, L5) *(Item #57 on the survey)*

- Interventions address today's needs as well as tomorrow's (Childre & Chambers, 2005, L4; Jorgensen, McSheehan, & Sonnenmeier, 2006, L5; Knowlton,1998, L5.)

- The AAC program builds upon communicative behaviors the student is already using (Calculator, 1988, L5, 1999, L5; Kent-Walsh & Light, 2003, L4; NJC, 1992, L5). For children with Angelman Syndrome this often includes physically manipulating others, acting on objects, shifting eye gaze, and reaching (Calculator, 2002, L2) [AS]. *(Item #58 on the survey)*

- AAC instruction targets not only expressive but also receptive skills recognizing the fact that students with AS typically demonstrate stronger receptive skills *(Alvares & Downing, 1998, L4; Andersen, et al. 2001, L2; Jolleff & Ryan, 1993, L4).* [AS] *(Item #59 on the survey)*

- Since children with AS have been found to experience difficulties initiating communication, initiations comprise an important element of the student's AAC program *(Jolleff & Ryan, 1993, L4; Penner, et al. 1993, L4).*[AS] *(Item #60 on the survey)*

- Given their motor difficulties, rather than teaching conventional ASL signs, simple or modified signs, personal signs and relatively primitive gestures are selected as methods of communication for the student with Angelman Syndrome *(Clayton-Smith, 1993, L2; Penner, et al. 1993, L4; Wilkerson, et al. 2005, L5).* [AS]

- For children over the age of three who have failed to develop more than one or two functional words, speech is not an area of emphasis in the AAC program. This reflects a defining characteristic of AS involving children's typical failure to acquire more than a few words and absence of functional speech *(Williams, 2005, L5; Clayton-Smith, 1993, L2; Wilkerson, 2005, L5)* [AS]
- Since students with AS have been found to be most successful using communication for manding (i.e. issuing requests and rejections), this function comprises a significant portion of the AAC program *(Duker et al., 2002, L2; Jolleff & Ryan, 1993, L4).* [AS]

- Additional AAC instruction is provided to teach the student with AS to use the AAC system to convey a broad range of communicative intents that include greetings, social closeness, requests for information and clarification, commenting and labeling *(Alvares & Downing, 1998, L4).* [AS]

- The student is taught to use the AAC system for spontaneous communication as this is something he/she may not otherwise accomplish *(Alvares & Downing, 1998, L4).* [AS] *(Item #62 on the survey)*
- Since hyperactivity and an associated lack of ability to sustain attention are common (Williams, 2005, L5), activities in which AAC skills are targeted are

those proven to be most reinforcing for the child, thus maximizing the student's motivation to succeed.[AS] *(Item #63/106 on the survey)*

6. Scheduling, coordinating and delivering inclusive services within the school

- Administrators, teachers, parents, and others recognize and support consultative models of service delivery (Calculator, 2007, L5) *(Item #64 on the survey)*

- The SLP collaborates with teachers to identify ways of modifying the curriculum in order to maximize the child's participation in classrooms and other settings. (Calculator, 2007, L5; Nochajski, 2001, L4; Robinson & Sadao, 2005, L4).

- Significant others, which typically include teachers, classmates, and peers, are encouraged and taught how to respond to the student's communicative attempts. (Mirenda & Calculator, 1993, L5; NJC,1992, L5; Sonnenmeier, McSheehan, & Jorgensen, 2005, L4; Von Tetzchner et. al., 2005, L5) *(Item #65 on the survey)*

- Peers are instructed how to use the AAC system with the child (Mirenda & Calculator, 1993, L5; Sonnenmeier, McSheehan, & Jorgensen, 2005, L4; Von Tetzchner et. al., 2005, L5). *(Item #66 on the survey)*

- The IEP specifies how the AAC system will support the child's achievement of goals in the general curriculum (QIAT, 2004, L5) *(Item #67 on the survey)*

- Communication objectives are integrated into the general education curriculum. In other words, rather than working on communication in isolation the SLP, teachers, paraprofessionals and others target communication in contexts (e.g., academics, lunch, playground, and music) in which these skills are both necessary and useful to ensure participation (Calculator, 2007, L5; Cushing, Clark, Carter, & Kennedy, 2005, L5; Doyle, 2004, L5; Downing, 2005, L5; Giangreco, Cloninger & Iverson, 1998, L5; Horn et. al., 2000, L4; Jackson, Rydak, & Billingsley, 2000, L5; Jorgensen, McSheehan, & Sonnenmeier, 2002, L5; Meyer & Eichinger, 1994, L4; Mirenda & Calculator, 1993, L5; Nochajski, 2001, L4; Sonnenmeier, McSheehan, & Jorgensen, 2005, L4; Wolfe & Hall, 2003, L5) *(Item #68 on the survey)*

- The child has ready access to any necessary AAC systems at all times throughout the day. (NJC, 1992, L5) *(Item #70 on the survey)*

- There are a reasonable number of people in the environment who are more competent than the child in understanding and using the AAC system (Von Tetzchner et al., 2005, L5) *(Item #71 on the survey)*

- Communication programs are carried out in classrooms and other real world settings around the school and are designed to maximize the child's

communicative effectiveness in these respective settings. (Calculator, 1998, L5, 1999, L5; Jorgensen, McSheehan, & Sonnenmeier, 2002, L5; Knowlton, 1998, L5; Mirenda & Calculator, 1993, L5; NJC. 1992, L5)

- Skills, including those related to AAC, are taught systematically throughout the day, rather than in isolated blocks of time. (Calculator, 1988, L5, 2007, L5; Doyle, 2004, L5; Downing, 2005, L5; Horn et. al., 2000, L4; Jackson, Rydak, & Billingsley, 2000, L5; Jorgensen, McSheehan, & Sonnenmeier, 2002, L5; Meyer & Eichinger, 1994, L4; Mirenda & Calculator, 1993, L5; Nochajski, 2001, L4; Sonnenmeier, McSheehan, & Jorgensen, 2005, L4; Wehmeyer et. al., 2003, L2; Wolfe & Hall, 2003, L5)

- Paraprofessionals receive consistent and systematic instruction (i.e. role release) from the speech-language pathologist pertaining to the implementation of communication goals that enhance the child's participation in the classroom and other natural settings. (ASHA, 2002, L5) *(Item #72 on the survey)*

- Instruction emphasizes the student's communicative effectiveness with a broad range of conversational partners, including those who are not paid to interact with him or her. (Calculator, 1988, L5, Jorgensen, McSheehan, & Sonnenmeier, 2002, L5; Knowlton, 1998, L5; Mirenda & Calculator, 1993, L5; NJC, 1992, L5)

- There are specific procedures in place to ensure the AAC system is operational most or all of the time. This includes efficient set-up, repair, and replacement of AAC systems when the needs arise. (NJC, 1992, L5; QIAT, 2004, L5) *(Item #73/102 on the survey)*

- Few students with Angelman Syndrome are expected to develop any functional speech. AAC services are thus initiated prior to or soon after the diagnosis of AS is made. *(Clayton-Smith, 1993, L2; Jolleff & Ryan, 1993, L4).* [AS] *(Item #74 on the survey)*
- Aided communication is carried out following a formal assessment of the child's vision (Glennen, 1997, L5). This is particularly true for the student with AS given the high incidence of vision problems in these students (Williams, 2005, L5). [AS] *(Item #75 on the survey)*

- AAC programs are mindful that the student is likely to lack a sense of danger and thus provide the supports necessary to ensure the student's safety at all times. *(Wilkerson, et al. 2005, L5).* [AS] *(Item #76 on the survey)*

- Teachers and others use simplified (e.g. shorter utterances) and more redundant (i.e. repetitive) language when interacting with the student, recognizing children with Angelman Syndrome may understand no more than two key words in each sentence *(Jolleff & Ryan, 1993, L4).* [AS] *(Item #77 on the survey)*

- Given the communicative attempts of students with AS may be ambiguous and difficult to interpret (Alvares & Downing, 1998, L4), other adults and peers are taught how to recognize and respond to these messages (*Calculator, 2002, L2*) [AS]

7. Assessing/reporting child progress on an ongoing basis (performance based, authentic, in-context assessments)

- Evaluations of the effectiveness of the AAC program include assessments of its impact on the child's ability to control events affecting his or her daily life (i.e. self-determination). (ASHA, 2004, L5) *(Item #78 on the survey)*

- Evaluations are carried out in a combination of natural and structured settings (Jackson, Rydak, & Billingsley, 2000, L5; Jorgensen, McSheehan, & Sonnenmeier, 2002, L5; Jorgensen, McSheehan, & Sonnenmeier, 2006, L5; Knowlton, 1998, L5; QIAT, 2004, L5; Vlachou, 2004, L5) *(Item #79 on the survey)*

- Evaluations of the effectiveness of the AAC program consider its impact on the child's overall quality of life. (ASHA, 2004, L5) *(Item #80 on the survey)*

- There is an ongoing process for systematically assessing the child's and others' (teachers, classmates, and family's) satisfaction with the child's methods of communication. (ASHA, 2002, L5) *(Item #81 on the survey)*

- A process is in place to monitor the effectiveness with which the child uses the AAC system over time and across different settings. (ASHA, 2002, L5) *(Item #82 on the survey)*

- Efficacy of AAC is examined in relation to the achievement of IEP and curricular goals, as well as participation in extracurricular activities at school and elsewhere. (QIAT, 2004, L5) *(Item #83 on the survey)*

- AAC needs are reassessed any time changes in the child, environments, and/or tasks result in the child's needs not being met with current devices and/or services. (QIAT, 2004, L5) *(Item #84 on the survey)*

- There is little evidence of the child abandoning or rejecting the AAC system (Johnston, Reichle, & Evans, 2004, L5). *(Item #107 on the survey)*

- Data are collected on a daily basis to determine the extent to which AAC supports are fostering the student's acquisition of IEP objectives (Calculator, 2007, L5; Cushing, et al. 2005, L5). *(Item #85 on the survey)*
- The SLP consults with paraprofessionals and others who are providing direct services to students, reviewing AAC data they have collected. This serves as a

basis for discussing possible needs for program modification to enhance the student's successful use of AAC to access and participate in the curriculum, in and out of the classroom. (Calculator, 2007, L5). *(Item #87 on the survey)*

8. Instructional strategies

- Teachers, classmates, and other peers are systematically taught how to modify their language input to maximize the efficiency and effectiveness of their conversational exchanges with the child. Their input is meaningful, understandable, and culturally and linguistically appropriate. (NJC, 1992, L5) *(Item #88 on the survey)*

- Others, including teachers and classmates, incorporate the child's system of communication as a method of input when interacting with him or her (Sonnenmeier, McSheehan, & Jorgensen, 2005, L4; Von Tetzchner, Brekke, Sjothun, & Grindheim, 2005, L5). *(Item #89 on the survey)*

- The child learns how to use the AAC system to influence people and actions in various natural settings. (NJC, 1992, L5).

- Any pull-out instruction is accompanied by systematic efforts to evaluate and, when necessary, foster the generalization of skills from the instructional setting to the many natural settings in which the communicative behavior is required to participate in the curriculum. (NJC, 1992, L5) *(Item #90 on the survey)*

- Teachers, classmates, and others are responsive to the child's communication attempts, even those that are occasionally ambiguous, understanding that doing so will foster the child's intentional uses of communication (Calculator, 1988, L5, 2007, L5; Downing, 2005, L5).

- AAC instruction is embedded in meaningful activities that are valued by the child and society. (Calculator, 1988, L5, 2007, L5; Downing, 2005, L5; Doyle, 2004, L5; Horn et. al., 2000, L4; Jackson, Rydak, & Billingsley, 2000, L5; Jorgensen, McSheehan, & Sonnenmeier, 2002, L5; Meyer & Eichinger, 1994, L4; Mirenda & Calculator, 1993, L5; Nochajski, 2001, L4; Sonnenmeier, McSheehan, & Jorgensen, 2005, L4; Wehmeyer et. al., 2003, L2; Wolfe & Hall, 2003, L5; Wren & Parkhouse, 1998, L5;)

- AAC technology is integrated into the curriculum and daily activities of the child. (QIAT, 2004, L5; Sonnenmeier, McSheehan, & Jorgensen, 2005, L4; Von Tetzchner et. al., 2005, L5)

- There are opportunities for the child to see his or her AAC mode used by more competent peers and adults who rely on the same system (Von Tetchner, et al. 2005, L5) *(Item #91 on the survey)*

- SLPs, teachers, paraprofessionals and others engineer/modify classrooms and other settings to maximize the number of opportunities the child has to communicate with others. (Avramidis, Bayliss, & Burden, 2002, L4; Calculator, 1988, L5; 1999, L5; 2002, L2; Horn et. al., 2000, L4; Kent-Walsh & Light, 2003, L4; Mirenda & Calculator, 1993, L5; Wehmeyer, Lance, & Bashinski, 2002, L5). *(Item #92 on the survey)*

- Since students with AS typically have significant difficulties with imitation *(Didden, et al. 2004, L2; Jolleff & Ryan, 1993, L4; Penner, et al. 1993, L4)*, especially with respect to gestures *(Calculator, 2002, L2)*, imitation is not a primary means of teaching AAC skills to the student [AS]

- The program accommodates to the child with Angelman Syndrome's short attention span *(Williams et al., 2005, L5)* by presenting instruction in a series of brief intervals, varying the nature and modalities of stimuli and expected responses, to maintain the child's interest and active participation. [AS]

- The student's AAC program includes strategies for interacting with unfamiliar people *(Alvares & Downing, 1998, L4; Calculator, 2002, L2)* [AS] *(Item #93 on the survey)*

- The student's AAC program includes strategies for interacting in unfamiliar settings *(Alvares & Downing, 1998, L4; Calculator, 2002, L2)* [AS]

- For children with Angelman Syndrome, AAC interventions include the use of naturalistic, milieu-based, or, incidental teaching procedures such as mand-modeling, environmental sabotage (i.e., environmental engineering), and expectant delays *(Calculator, 2002, L2)* [AS] *(Item #94 on the survey)*

- Formal signing programs are avoided for the child who experiences limitations producing the various hand shapes and movements necessary to sign. Instead, unaided programs emphasize natural gestures and simplified signs that are easily interpreted by listeners, including those unfamiliar with the child and his/her method of communication. *(Calculator, 2002, L2)* [AS] *(Item #95 on the survey)*

- As is the case with other students, AAC instructional strategies for the child with Angelman Syndrome are supported by current scientific evidence (i.e. evidence based practices) related to the child's diagnosis. [AS] (ASHA. 2004, L5) *(Item #96 on the survey)*

- Social stories (Gray, 1995, L5; Quill, 1995, L5) are used to prepare the child for upcoming events and to reinforce or reflect on these events after the fact. *(Item #98 on the survey)*

- A partial participation model (Calculator, 2007, L5) is used, where the child is encouraged to complete those parts of a task they are able to perform while receiving the least possible level of support with aspects with which they need assistance.[AS] *(Item #97 on the survey)*

- Backward chaining (Snell & Zirpolli, 1987, L5) is employed as a means of teaching sequential tasks. Here, the child is assisted with all steps leading to the final one, which he/she performs. The instructor gradually backs up assistance, requiring the child to perform an increasingly greater number of components of the task.[AS]

- Visual schedules, or, calendar systems (Beukelman & Mirenda, 2005, L5; Bopp, Brown & Mirenda, 2004, L3) and/or other cues are available to orient the child to completed as well as upcoming activities. This is especially important for children with AS, many of whom experience difficulties dealing with transitions. [AS]

9. Supporting the child with challenging behaviors (contextual modifications, involve peers, focus on function rather than form of behavior).

- If necessary, the child is taught to use his or her AAC system in place of challenging behaviors. The more conventional communication behavior is designed to elicit the same consequence (functional equivalent) as the challenging behavior (e.g. escape or avoidance; requesting attention, objects and actions) but in a more socially appropriate, conventional, and acceptable manner. (ASHA 2004, L5, NJC, 1992, L5). This is particularly relevant for children with AS, many of whom exhibit behaviors such as hair pulling, hitting, and pushing). *(Item #99 on the survey)*

- Behavior problems are interpreted as outcomes of the student's feelings of frustration being unable to communicate needs, desires, and/or fears *(Wilkerson, et al. 2005, L5).*[AS] *(Item #103 on the survey)*

APPENDIX B

SCHLOSSER'S (2004) LEVELS OF EVIDENCE HIERARCHY FOR AAC INTERVENTION FOR PARTICIPANTS WITH DISABILITIES

TABLE 1 Hierarchy of evidence to inform intervention development and selection: participants with disabilities

Rank	Design		
1	Meta-analyses		
	Meta-analysis of (a) single-subject experimental designs (Schlosser & Lee, 2000), (b) quasi-experimental group designs		
2	Non-randomized control trials (Non-RCTs) and single-subject experimental designs (SSED)		
2a–c	One non RCT	One SSED – one intervention	One SSED – multiple interventions
2ai–2ci	Multi-group pretest-posttest design without control group (Layton, 1988; Yoder & Layton, 1988)	Multiple baseline design (Reid & Hurlbut, 1977; Sigafoos, Laurie & Pennell, 1996)	Parallel treatments design (Bennett, Gast, Wolery & Schuster, 1986; Schlosser, Belfiore, Nigam, Blischak & Hetzroni, 1995)
2aii–2cii	Basic within-group design, crossover design, complex counter-balanced design	Multiple probe design (Schlosser et al., 2000)	Adapted alternating treatments design (Schlosser et al., 1998)
2aiii–2ciii	Multi-group time series designs	ABAB design (Vaughn & Horner, 1995)	Alternating treatments design (Remington & Clarke, 1993)
2aiv–2civ	Factorial designs	ABA design (Schweigert & Rowland, 1992)	ABACA/ACAB design (Koul et al., 1997)
2av–2cv	Latin square designs (Hupp & Mervis, 1981)	Non-concurrent multiple baseline design	A-B-BC-B-BC/A-BC-B-BC design (Parsons & La Sorte, 1993)
2avi, 2cvi	Posttest-only control group design, multi-group posttest-only design		ABAB design (Rotholz, Berkowitz & Berry, 1989)
2avii	Single-group time series design		
2aviii	Separate sample pretest-posttest design		
3	Non-meta-analytic reviews		
3a	Quantitative reviews that are non meta-analytic (Mirenda, 1997)		
3b	Narrative reviews (Doherty, 1985; Schlosser & Sigafoos, 2002)		
4	Pre-experimental designs		
	Pre-experimental group designs (e.g., one-shot case study, one-group pretest-posttest design, and the static group comparison) and single-case studies (e.g., AB designs, case studies) (Blischak, 1995; Dowden, Beukelman & Lossing, 1986; Glennen & Calculator, 1985)		
5	Non-experimental designs		
	Respectable opinion (Augmentative Communication News, Perspectives Newsletter, ISAAC Bulletin, Opinions of expert presenters, textbook authors)		

APPENDIX C

IRB APPROVAL LETTER

University *of* New Hampshire

Research Conduct and Compliance Services, Office of Sponsored Research
Service Building, 51 College Road, Durham, NH 03824-3585
Fax: 603-862-3564

13-Nov-2006

Calculator, Stephen N
Communications Disorders
Hewitt Hall
Durham, NH 03824

IRB #: 3832
Study: Communication/Educational Programs for Students with Angelman Syndrome in Inclusive Classrooms: A Look at Best Practices
Approval Date: 09-Nov-2006

The Institutional Review Board for the Protection of Human Subjects in Research (IRB) has reviewed and approved the protocol for your study as Exempt as described in Title 45, Code of Federal Regulations (CFR), Part 46, Subsection 101(b). Approval is granted to conduct your study as described in your protocol.

Researchers who conduct studies involving human subjects have responsibilities as outlined in the attached document, *Responsibilities of Directors of Research Studies Involving Human Subjects.* (This document is also available at http://www.unh.edu/osr/compliance/irb.html.) Please read this document carefully before commencing your work involving human subjects.

Upon completion of your study, please complete the enclosed pink Exempt Study Final Report form and return it to this office along with a report of your findings.

If you have questions or concerns about your study or this approval, please feel free to contact me at 603-862-2003 or Julie.simpson@unh.edu. Please refer to the IRB # above in all correspondence related to this study. The IRB wishes you success with your research.

For the IRB,

Julie F. Simpson
Manager

cc: File