The enhancement of verbalization skills of teenagers with moderate mental retardation through augmentative communication intervention

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The Enhancement of Verbalization Skills of Teenagers with Moderate Mental Retardation through Augmentative Communication Intervention

by
Marydee Gaidis

A Thesis
Submitted in partial fulfillment of the requirements of the Masters of Arts Degree in the Graduate Division of Rowan University
May 1997

Approved by
Professor

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The purpose of this study was to determine if persons with moderate mental retardation, who have poor verbal skills, can improve the length of verbalizations through the use of a simple augmentative communication device.

Through a three-part study using an experimenter made Pretest and Post-test, the effectiveness of treatment could be determined. The study included two fifteen-year-old males with Down's Syndrome from a private school for the handicapped. Both subjects had significant difficulty with speech production and showed great weakness in the area of independently requesting services during community-based instruction. Baseline data was collected in the classroom setting. Each subject used a portable augmentative communication device with two preprogrammed messages during CBI outings. After simulated classroom instruction, the students were placed in the field and were to approach the worker, press the desired icon, listen to the message, then repeat the simple phrase. Data was collected over a ten-week period, where each word verbalized was recorded, the mean length of utterances was established and percentage of improvement was determined after removal of AAC device using post-test.

The results suggest that by using a simple AAC device as a tool to lengthen verbalizations showed an increased improvement between 66%-70%.
Can verbalization skills of two teenagers with moderate mental retardation be enhanced through augmentative communication intervention to increase independence during community-based instruction?

The results support the theory that the mean length of utterances of the subjects can be enhanced between 66%-70% through the use of an AAC device.
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## CHAPTER

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To my parents, John and Dolores Gaidis, who bestowed on me great strength to continue working, when the work seemed endless. They gave me the opportunity to reach new heights through their love and comforting words. I hope I have made them proud by finally "working to my potential."

To my future husband, David Epstein, who has exemplified the meaning of what it is to be a loving, patient and supportive partner during the last two years. I am thankful that he has held me up during my most challenging moments.
Chapter One

Introduction

Augmentative communication refers to the aides or techniques that supplement existing vocal or verbal abilities (Reichle, York & Sigafos, 1991). Augmentative communication is an internationally recognized area of clinical and educational practice that attempts to compensate, temporarily or permanently, for significant speech, language, and writing disabilities (Nat. Inst. On Disability and Rehab. Research, 1992). It emerged in the 1970's and has made significant advances in research and education. Augmentative communication is generally used with students or adults who have loss of or limited speech due to injury, trauma, or severe developmental delays.

The need for augmentative communication may result from a variety of conditions affecting cognitive, neurological, structural, emotional, or sensory abilities. Developmental disabilities are often incorporated with speech delays or disorders. In students with mental retardation, great speech impairments may give reason to use an augmentative system.

The ability to communicate effectively improves overall quality of life by increasing the access to the student's community and services available in the locale.
Those who interact with augmentative or alternative communication (AAC) users benefit as well, allowing them to know the thoughts or desires, and being more comfortable to communicate. The student now becomes an active participant on community-based outings rather than a passive member of the group. Students with both mental retardation and severe language impairments are likely to remain segregated from their environs, and dependent upon their families and school members to interpret their needs and desires.

How can educators and families use a simple electronic augmentative communication device to improve the poor communication skills and to increase independence with a student with moderate mental retardation during community-based instruction or outings?

To ensure success in training a student to use augmentative communication, educators and families must provide enough time for practice, both simulated and in the community. As appropriate speech modeling occurs, they may expect a reduction of anxiety, therefore an increase of oral communication. Educators need further investigation to prove that students can increase verbalization skills with the use of an electronic communication device.

**Research Question**

Can verbalization be increased by using an augmentative device?

The purpose of this study is to explore the use of a simple electronic augmentative communication device with two moderately mentally retarded fifteen-year-old boys, to improve their verbalization skills, when accessing goods and services in the community.
Each student has a specific Speech Therapy goal emphasizing verbal skills. By using the AAC as an appropriate communication model, the students will increase their verbal utterances, from either a monosyllable or one word, to three to five word utterances. The classroom will serve as a training facility to prepare students for community outings, where the subjects will need verbal skills. The study will compare their vocalizations before and after treatment. Ultimately, the teenagers could probably attain greater independence due to the improvement of their conversation abilities.

Hypothesis

Will mentally retarded teenagers with poor communication skills enhance their verbal abilities to access services during community-based instruction after frequent training with a simple electronic communication device and simulated classroom instruction?

Teenage students with poor communication skills and classified as moderately mentally retarded, will enhance their verbalization skills to more effectively access services in the community, after frequent training with a simple electronic augmentative communication device and simulated classroom instruction.
Definition of Terms

- **Augmentative Communication:** The aids or techniques used to supplement existing vocal or verbal communication. Aids may be electronic or simplified picture/word boards depicting likes/dislikes, needs or actions.

- **Alternative Communication:** Communication methods used by persons without any vocal ability.

- **AAC:** Abbreviated term for Augmentative or Alternative Communication. It refers to an internationally recognized practice that attempts to compensate temporarily or permanently, for significant speech, language and writing disabilities.

- **Moderately Mentally Retarded:** Students with an I.Q. range of approximately 30-50 who have significant impairments in auditory and visual memory, conceptual and perceptual ability, and imaginary and creative abilities. These disabilities may be the result of neurological impairments, genetic abnormalities, traumatic brain injury or illness.

- **Community-Based Instruction:** An intervention program used to supplement classroom instruction for students with moderate to severe handicaps. The goal of this instruction is to reinforce and teach life-skills, to promote independence, and become a self-reliant and productive participant in the community.

Assumptions

An underlying assumption in this study is that all instructors working with the subjects are familiar with the electronic augmentative device (Pocket Talker).

Secondly, it is assumed that all instructors are familiar with the underlying principles of community-based instruction as a method to enforce independence with this population.

Lastly, it must be assumed that the information being reported concerning the productivity of the students is valid and accurate.
Limitations

One limitation of this study is that the program only involves two middle school boys with Down's Syndrome in a self-contained class. The second limitation is that a small population is being tested. Therefore, the question of validity arises.

Purpose

Augmentative communication has served as a gateway for those with severe speech impairments to "speak" with others around them, for the last twenty-five years. Conventional speech is often a difficulty for persons with moderate mental retardation and creates a reliance on others to communicate for them. In an era when mainstreaming is being pushed to the forefront, these students may encounter great intimidation due to their lack of communication skills. Many are already aware of the differences between them and their peers. An increase in verbalization may offer these teenagers a hope relate to others around them in a more typical manner, and to become a dynamic member of the group.

A teenage student with the capability of expressing needs and wants, who participates as an active consumer, and depends more on self than others, becomes a productive community member. The goal of augmentative intervention is to empower persons with significant communication disadvantages and their communication partners as well (E.g., store clerks, students, clergy, etc.).
The results will possibly be used to support the theory that communication devices can help other students besides the nonverbal students. The speech department has expressed an interest in this topic of study and currently uses forms of augmentative communication with many of verbal students in our program. The data will hopefully encourage other staff to use this simple form of technology as a tool and not fear the possibility of becoming an impediment.

Overview

To understand the full extent for the urgency of communication intervention for those with acute language impairments, a brief history of augmentative communication will be discussed in Chapter 2. An examination of the current research will follow this discussion on the variety and benefits of augmentative communication systems. I will also review research on the application of community-based instruction and its value for persons with mental retardation.
Communication is the essence of life. It is language that distinguishes humans from any other living creature. All human can and do communicate; however, approximately two million Americans with significant communication disabilities are unable to do so effectively. The use of AAC affords greater independence and allows students to participate more independently in school and the community.

Laws including Individuals with Disabilities Education Act, Public Law 99-457 and Rehabilitation Act of 1973, exist for the provision of AAC services. The spirit of these laws must be carried out consistently so that all people can communicate effectively. The history of augmentative communication is brief, approximately twenty-five years old. It has included the use of sign language, symbol/picture recognition, gesture systems and most recently, computers. The goal for AAC use has remained the same; to enable individuals who cannot use natural speech or writing to communicate effectively and participates fully in society.
Augmentative communication is no longer about technology; it is about language and communication. Today, thousands of people are living better lives through AAC technology, but the most successful users did not become so with technology alone. Technology combined with powerful language representation method, an appropriate application program, and support from family and school members.

People at any age whose gestures, speech, or written communications are temporarily or permanently inadequate to meet all of their communication needs can benefit from an augmentative device to enhance their communication abilities.

A relationship exists between augmentative communication and the increase of speech production, although there have been limited attempts made to study its impact.

Available research and clinical reports suggest that AAC does facilitate speech production. The AAC intervention may cause improved natural speech performance itself. Alternative explanations include maturation, improvement in the structure and function of the speaking mechanism, a time post onset of injury, a Hawthorne effect, an interaction effect between AAC intervention and speech-language therapy and improved listener performance (Nat Inst. On Disability and Rehab. Research, 1992).

According to the Consensus Validation Conference on Augmentative and Alternative Communication Intervention(1992), eight essential components are necessary for augmentative intervention.
The eight items are:

1. Assessment of communication needs across all environments;
2. Setting priorities for intervention;
3. Assessment of variety of cognitive, functional, language and motor skills;
4. Selections, procurement, customization, integration and maintenance of ACC systems and related technologies;
5. Instruction and skill development for the user;
6. Instruction for communication partners;
7. Ongoing evaluation of the intervention program to insure effectiveness and satisfaction, and
8. Follow-up supports and reassessment as required.

Interventions are driven by the individual’s needs. Present and future needs are considered in formulating short and long term intervention planning. Simply providing an augmentative communication system as tools for communication is not sufficient to assure effective communication (Romich, 1996). Intervention must also focus on development of the skills necessary to support the functional use of these systems to communicate effectively. The skills required to support effective communication are complex and include language, literacy, social motor, strategic and systems operation skills. Intervention is time and labor intensive and should occur as early as possible. Early awareness of the AAC option is also encouraged for people who are losing speech function resulting from a progressive neurological condition. Intervention is a dynamic
process. Evaluation occurs regularly to assure effectiveness and satisfaction with intervention. Goals are revised as skills develop and as needs change. When needs and skills change, modifications to the student’s device may be required.

To date, little attention has been focused toward the understanding the role of AAC has on spoken communication. Many persons who already use an augmentative device comprehend a speaker and rely on the system primarily for expressions. Children who are trained to use a device may still be in the process of acquiring comprehension skills. Studies conducted and published by National Institute on Disability and Research (1992), cited that children who produce little speech early in language development may be processing the speech and language that they hear and advancing their own linguistic competence. Furthermore, the institute suggests that speech and language comprehension of spoken language may be developing even when a child is not talking. They continue to suggest that their research show that artificial speech technology plays a specific role in developing expressive language skills for those with difficulties processing natural speech.

Traditionally, AAC systems have been used for expressive communication to augment or replace natural speech. There have been limited attempts to study the impact of AAC on speech production. The National Institute on Disabilities and Research has expressed in their Consensus Statement (1992) that improved speech production has been observed following augmentative intervention. The limited, yet available research and clinical reports are not unanimous and suggest a need to understand better how AAC affects speech. The explanation of the results of the studies may include normal
Facilitated communication is a method of augmentative and alternative communication that involves a facilitator providing varying degrees of support, and emotional and communicative support, to the communication aid (Janzen-Wilde, Duchan, Higginbotham, p 658). Although facilitated communication (FC) is not the method of augmenting language in my study, the nature of the study reflected some methods I will use in Chapter Three. This particular study revealed that through FC, the child's language in length of utterance, and syntactic complexity. The subjects parents of this particular 6-year-old subject, were interested in pursuing facilitated communication with him, but expressed a concern that his oral language might decrease as a result of using this augmentative method. The results of the study suggest the potential for using this method with children who have some functional oral skills but cannot express themselves fully. The authors also cited that not dismissing a child from using the augmentative system is important if they have some functional oral skills and can be used in a total communication program, just as gesturing and sign language is used.

Reichle, York and Sigafoos(1991) suggest that teaching a learner to produce spoken communicative behavior is in many respects more challenging than establishing a graphic or gestural repertoire. The authors state that the most efficient response prompt in teaching an initial repertoire involves the provision of imitative models (p.143). Problems with this method may arise since many learners with severe disabilities never
Reichle, et al., cites Piaget's (1929) findings in which he provided an exacting description of the emergence of vocal and verbal imitation. His theory of vocal contagion was a phenomenon which noted that the probability of vocalization was influenced on early environmental factors. The child would be more apt to vocalize if others around him used verbal communication. This evidence may support the previous findings and the expected outcome of this current study.

Learner-initiated vocalization occurs when the learner produces a sound, the interventionist imitates the vocalization, then in turn the learner repeats the sound, reinforcing the utterance. They increase delays of sound repetition on the partner's part, eventually making it seem as if the child is imitating the partner and not self. If this method is chosen, the interventionist is committed to teaching the learner to vocalize at the right time despite the form of the learner's vocal behavior (Reichle, p 144-145).

Very limited self-initiated communication contributes to a lack of opportunity (Lanigan, 1994). Lanigan cited Burkhart (1987) stating that lack of active participation on the learner hindered on what was being taught. A compiled list of reasons disabled children were not participating in active communication. (P.23)

1. Physical limitations
2. Cognitive limitations
3. Emotional impairments
4. Lack of opportunity
5. Frustration from past failures
6. Delayed response
In a related article aimed at augmentative communication and language acquisition, Sutton and Gallagher (1993) studied the limitations of ACC language-encoding. The study used one male and one female subject aged 26 years and 25 years, with congenital Cerebral Palsy and completed a non-academic special education program. Although these subjects are dissimilar to those used in this current thesis study, the importance of an artificial language device and the use of Mayer-Johnson's (1985) AAC symbol/picture system, which contains elements for indicating semantic past and future time, is shared.

Sloan (1993) stated in her dissertation that no study has compared the efficiency or effectiveness of anyone picture type with regard to ability. Her study addressed this issue and the results indicated that there was no difference in trials to criterion, percentage of errors, generalization, or maintenance across the four picture types. The Mayer-Johnson picture symbols will be used since they are commonly used presently with both teachers and therapists as the school's universal symbol system.

The influence of AAC language-encoding limitations on the development of grammar has not been determined. Some research suggests that ACC has reduced comprehension and production, while other studies and discussions suggest that the language-encoding restrictions of the augmentative or alternative communication systems do not affect the underlying language skills of individuals with severe physical impairments (p.1216).

Sutton and Gallagher (1993) propose that although most current language acquisition theories make no specific predictions concerning the effects of limited language-encoding options might have on the development of grammar, several theories
hypothesize that language production plays a role in development. It has been assumed
that one means by which children learn about language forms is through the act of
reproducing them. The authors continue by commenting on the hypothesis that children’s
use of language to express communicative functions and to engage in social experiences,
which in turn, motivates language acquisition. One might conclude that the implication of
these views of language acquisition, for children using an augmentative device, is that
limitations on language production would restrict language development.

Since 1981, non-speech or augmentative communication has been formally
recognized as an area of clinical and scientific interest within the speech-language
pathology field. A significant body of research concerning augmentative communication
has focused on the interaction patterns of augmentative system users and normal
speakers(Gorenflo & Gorenflo, 1991). Many variables influence the perceptions of
nonusers toward the augmentative device user. Bedrosian, Hoag, Calculator and
Molineux (1992) noted that few studies have examined observers’ perceptions of the
ACC user’s communicative competence or the behaviors that influence these perceptions.
The authors found that questions designed to access their perceptions of the
communicative competence of the AAC user in naturally occurring interactions with a
speaking partner were warranted, to conduct their research.

Their results of the four scripted video taped sessions indicated a significant interaction
effect involving subject group and aided message length.

A second study by Hoag and Bedrosian (1992) indicated that synthesized speech is
generally less intelligible than recorded natural speech. However, for adult listeners a few synthetic voices have compared favorably in intelligibility to recorded natural speech under a sentence as opposed to single-word stimulus conditions. The use of a Pocket Talker, a simple five responses, a natural speech recording device will be used in this thesis experiment. The main factors in using this device are its small, portable size, ease of programming, the limitation of five messages, sound quality and availability within the school.

Electronic communication devices with synthesized speech currently offer advantages to the consumer, including price and storage capacity as compared with a model with digitized speech. Some synthesized models are comparable to natural speech production and quality of intelligibility. Although utterance intelligibility undoubtedly contributes to a favorable assessment of communicative competence, the two are not equivalent and are not necessarily evaluated in the same way (p. 1366).

In a similar study, Gorenflo's and Gorenflo's (1991) review of literature on the attitudes toward persons with disabilities concluded that attitudes toward the disabled varied and were often negative and society's rejecting attitudes restricted their social and vocational opportunities. The authors cited Beukelman's (1986) report which suggested the need for development of a tool to assess the handicap, especially as we integrate more augmentative users into secondary and post secondary school settings. It was found that those who had been exposed or educated on augmentative communication were more accepting to communicate than the naive group.

Romski, Seveik and Wilkinson (1994) studied thirteen males with mental
retardation and little or no functional speech, ranging in age from six to twenty years old. They developed a communication device created with lexigrams and a communication device using a notebook computer and Vortrax Personal Speech System called System for Augmenting Language (SAL), and used the tool for the two-year study. The purpose of the study is to examine the success and effectiveness of communications SAL users directed to their peer during natural, albeit limited, opportunities, while studying the success of SAL as it is directed to adults.

At the onset of the study, each subject exhibits a severe expressive language impairment characterized by a spoken word vocabulary of 10 word approximations or less. They introduced the subjects to the SAL, which they designed to supplement the natural language abilities with a lexigram-embossed computerized keyboard that produced synthesized speech. The SAL consisted of a communication device and a symbol vocabulary and also teaching procedures that encourage communication attempts. Teaching to use the device was done in an unstructured fashion. The goal was to enhance social interactions with a peer communicative partners who did not have mental retardation. Verbal partners, with the subjects shared using the system while communicating. The subject group of thirteen was an isolated group, and they could not compare results with a control group. The subjects directed a minority of their communication to peers. Subjects had a difficult time generalizing their SAL skills from adults to peers. When attempting to communicate with peers, a combination of both SAL responses and natural, yet unintelligible, language was used. The system permitted the students to express messages with informational context that may have been difficult to
convey using non conventional language. The longitudinal study was not specifically to evaluate peer interaction. It was not always clear whether or not all partners were always receptive to interaction or haphazardly present. It is likely that older youth with mental retardation continued to encounter difficulties in social interaction, especially as these situations become more verbally based. Their research concluded that the program was successful with adults but they advise caution in generalizing the findings in this study. Future researchers should focus on the factors influencing interactions, such as attitudes toward SAL users, specific roles that communication plays in peer initiation and the development of more ways to encourage peer interactions.

Without augmentative communication, a person is unable to make the most rudimentary human contacts.

Effective use of AAC enables people to share thoughts, feelings, and humor with others. Just as daily communication poses a challenge for those with augmentative communication devices, as it may pose a challenge for communication partners. The reviewed literature suggests that intervention may be required for others to develop the knowledge and skills required to support daily interactions with others who use AAC systems. Timely intervention will help avoid frustration and hopefully, for this experiment, maximize the potential to increase output of verbalization.
Chapter Three

This study examined the effects of a simple augmentative device on the verbalizations of two verbal teenage students with Down’s Syndrome during community instructional outings. The young men typically speak in monosyllables or one to two word phrases (e.g. “Hamburger” rather than “I want a hamburger.”). The boys have displayed anxiety due to their inability to always be understood by those in the community. The subjects are less verbal than their peers during class lessons, but can often be heard during recreation or sports activities. There are no physical reasons for why the students probably could not improve their vocalizations. The two subjects have been specifically selected from my Pre-Vocational classroom at St. John of God Community Services. The boys were chosen due to their need to enhance the number of utterances produced during speech. Both have current speech goals targeting the increase of mean length of utterances using three-word phrases during conversation for requests. Although both boys have capability to form speech, the desire of this experiment is to conclude that augmentative communication can aid persons with speech and not hinder the production of natural language output.
Profiles of Subjects

- **Subject 1- Nathan**

Nathan is a fifteen-year-old male with Down's Syndrome. He has a mild bilateral hearing loss due to middle ear effusions which has required ongoing speech and language therapy services. Formally instructed with sign language, his verbal expression has developed to a point that he no longer relies on signing. Nathan wears an assistive listening device, the Phonic Ear, which is cued into his teacher's speech to amplify his hearing and drown out distracting noises. On his latest three-year evaluation, conducted 2/1/95, his relative weaknesses on the Stanford-Binet were on tests measuring memory and concentration, and verbal fluency. His verbal reticence makes formal assessment with a verbal component difficult and may underestimate his intelligence. He continues therefore to be classified as trainable mentally retarded.

- **Subject 2- Bobby**

Bobby is a fifteen-year-old boy with Down's Syndrome-Trisomy 21. He has attended St. John of God since infancy. His most current psychological evaluation was conducted on 1/96. Bobby continues to be classified as trainable mentally retarded. His verbal responses to the evaluator's questions were either monosyllabic or one word answers. The student does have the capability of multi-word responses, but he may have developed a habit of underestimating his own abilities and relies on others. Bobby currently receives speech and language services in a direct setting plus integrated, focusing on conversational speech. The Vineland Adaptive Behavior Scales completed by myself, and analyzed by the team psychologist, expressed that Bobby's communication skills are at the four year, four month level. It is perhaps that the subject's functional language in the school setting does not appear to reflect his actual abilities in this area, and he may need some support and encouragement to improve his verbal communication skills on a daily basis.
I have created a program for the subjects which will use a Pocket Talker to help improve their ability to communicate their wants to others in the natural environment.

The basic design of the experiment follows three steps:

- Pre-test/Baseline
- Treatment/Intervention
- Post-test

I determined their success by using pre and post-tests, and collecting data each week when the students go on their community-based instruction. A teacher-made test of common phrases needed for the community will also be administered. The experimenter designed the teacher-made test so that the adult administering the test will show the student ten pictures of familiar community sites, then ask for a phrase that would be expressed to an employee of the establishment, implicating a need for a service or desired object (e.g. pictured: Men's room. Desired phrase: "Where is the bathroom/Men's room/restroom?"). I conducted both pre- and post-tests in the school-based setting.

The students were required to produce only one phrase for each scenario portrayed in the photos, totaling ten for each of these measurements. The length of the students' utterances were recorded, then later compared with the post-test responses to verify an increase of verbal responses. The results have compared the average length of the words produced during the baseline and after treatment, once the use of augmentative communication ceased.

The augmentative device used natural voice recordings and was used as a model, in lieu of depending on an adult to elicit the response. Subjects were exposed to a simulated community scenario, twice a week, as part of class lessons. I conducted the
lessons, preparing them for their upcoming outings. The lessons lasted approximately 15
20 minutes long. Throughout the treatment, the subjects performed the expected tasks
in various community settings. St. John of God Community Services' school program
includes weekly functional instruction in neighborhood establishments where students
practice skills taught during class instruction. Community Based Instruction, or CBI,
provides all students with the transference of skills to natural settings. Before the
community trips, I reviewed the two programmed responses on the Pocket Talker with
the subjects. Small Mayer-Johnson icons were placed on the buttons to indicate which
button will illicit which response. The messages contained three to five words each.

It was the students' responsibility to:
1. approach the employee
2. press the device
3. listen to the desired phrase
4. repeat the message

Steps two through four were repeated if they had not properly conveyed the message.
The subjects were to verbally repeat the message using the appropriate rate, clarity and
volume. The student used the augmentative device as a model, then repeated the request
to the worker, hopefully using clear and audible verbalizations. The students' responses
were recorded, then the average length of each of the total twenty utterances were then
tabulated. My assistant from the class helped occasionally by supporting the teaching
process and collecting data. She was trained in collecting data onto an experimenter
designed recording sheets, writing the utterances verbatim and any difficulties encountered
on the outing. It was utterly important that the data collector did not interfere or prompt

3.21
the students once the subjects had approached the employee. Evidence may have be
confounded by the helpfulness of the experimenter or additional staff. I collected the
majority of the data, to avoid any additional potential confounds. An ancillary staff
member was always present during CBI and allowed the experimenter to certify her data
was precise. The experimenters was very familiar with the Pocket-Talker, had been
previously trained by speech pathologist on its operation, and currently the nonverbal
students in our classroom benefit from this augmentative device.

Subjects were likely to perform well for the experimenter due to the affectionate
nature of their relationship. Both subjects enjoy using the computer for various tasks and
the Pocket-Talker hopefully provided the students with the same motivation, and with the
reward of accomplishing the act of independently attaining goods and services.
Chapter Four

Communication difficulties have created even greater challenges for individuals with Down’s Syndrome. This experiment was generated as an additional method to improve the language quality of these young men.

The original hypothesis stated:

Teenagers with poor communication skills and classified trainable mentally retarded, will enhance their verbalization skills to more effectively access services in the community, after frequent training with a simple electronic augmentative device and simulated classroom instruction.

The results of the treatment were gathered in two settings and were collected over a ten-week period. The pre and post tests were administered in the school setting, individually to each subject and lasted approximately fifteen minutes each. Each boy was pretested in the classroom scenario on ten community-based locations. This yielded each boy responded with a mean score of two words for each scenario. The longest utterance produced by both subjects related to what they would order at McDonald’s. Both boys vocalized a four word, not containing a subject, verb or direct object. The boys requested the items in a list. Therefore, thirteen of twenty responses elicited for the experiment
contained four word phrases. The maximum response for a single narrative was four words, and did not contain a subject or verb. The subjects showed great frustration by repeatedly seeking assistance or making grunting noises. On one occasion, Subject 1 stated "I can't do this!" although they were responding only to a possible event that may occur during the experimentation. Throughout the research period, neither of the subjects showed a dislike of using the Pocket-Talker. The boys were disappointed when using the AAC was no longer necessary. They asked to use it again during community based instruction, once treatment was completed. The practice of using an augmentative device, to assist mentally retarded students to increase their verbal abilities, for this research, may suggest that AAC devices should not only be limited to those with physiological limitations. Rather, technology has a place for many people with speech difficulties.

The results of the classroom based Post test show a combined average of 2.7 words per utterance after the treatment and following the cessation of the use of the Pocket-Talker. The data collected during the community-based study suggested that Subject-1 produced an average of 2.55 words for each twenty preprogrammed phrases used for the treatment. His counterpart achieved a norm of 2.65 words per visit to the community to access goods and services. Their baseline scores showed that both only had a 10% success rate at self-initiating a four-word utterance in the community while using an AAC device. Even then, the phrases were not tied together by a subject, verb or prepositional phrase. The subjects have grown to rely on adults for their communication needs. They are aware that it is much easier to have someone else make their requests.
rather than struggling themselves to be understood by community workers. Anxiety increased when the subjects became aware that they were not going to receive assistance. Occasions arose, during treatment, when the subjects hung their heads down and expressed their frustration through facial expressions or clenching of fists. Incorporating the usage of a game-like tool into the experiment, fortunately heightened the teenagers' interest in communicating. The students did enjoy using the Pocket-Talker and did not mind approaching the workers in the community and pressing the correct message for output. By using highly motivating reinforcers such as goods and services rendered for articulating needs clearly, the subjects became aware of the benefits for the increase in speech production. Although they clearly did not enjoy their unexpected independence, they performed at all community locations. The two students who used the augmentative device increased their expressive abilities after treatment by approximately 66% to 70%, as anticipated in the hypothesis (Table 1).

Throughout the treatment using the AAC device, Bobby and Nathan both showed improvement in their ability to imitate the model given by the Touch-Talker. The data collected could be based on the knowledge that staff observers were monitoring the subjects’ performances. Bobby achieved a mastery rate of 73.6% in repeating the four word utterances provided on the Pocket-Talker during community outings. He achieved 86.4% for each of the five 3-word responses programmed into the AAC device. Nathan achieved a score of 62.76% regarding the repetition of a four-word phrase (Table 2.). Subject two could produce 100% of all three word phrases in the treatment portion of the program. During the regular day, Nathan is often echolike, repeating short, whimsical
phrases made by staff or another student. The boys' average ability to repeat a five-word
preprogrammed utterance during community instruction was only 45% and often the task
became too overwhelming.
Table 1. Pretest and Post-test Data

<table>
<thead>
<tr>
<th>Subj</th>
<th>S1</th>
<th>S2</th>
<th>Subject 1</th>
<th>Subject 2</th>
<th>Subject 1</th>
<th>Subject 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laundry</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>McDonalds</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Video Stb</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post office</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Friendly's</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Supermarket</td>
<td>-</td>
<td>1</td>
<td>3</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Music store</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walgreens</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Movie theater</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td></td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Mean adj</td>
<td>1.7</td>
<td>2</td>
<td>2.4</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Results of Treatment

<table>
<thead>
<tr>
<th>CBI sites</th>
<th>Subject 1</th>
<th>% correct</th>
<th>Subject 2</th>
<th>% correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laundry</td>
<td>2/3</td>
<td>66%</td>
<td>2/3</td>
<td>58%</td>
</tr>
<tr>
<td>post office</td>
<td>2/4</td>
<td>50%</td>
<td>1/4</td>
<td>25%</td>
</tr>
<tr>
<td>Card store</td>
<td>3/3</td>
<td>100%</td>
<td>2/3</td>
<td>100%</td>
</tr>
<tr>
<td>Burger King</td>
<td>3/5</td>
<td>75%</td>
<td>3/4</td>
<td>75%</td>
</tr>
<tr>
<td>Dunkin Donuts</td>
<td>3/4</td>
<td>75%</td>
<td>3/4</td>
<td>75%</td>
</tr>
<tr>
<td>Rx Place</td>
<td>3/5</td>
<td>100%</td>
<td>3/3</td>
<td>100%</td>
</tr>
<tr>
<td>Dollar store</td>
<td>3/5</td>
<td>75%</td>
<td>3/4</td>
<td>75%</td>
</tr>
<tr>
<td>Video store</td>
<td>3/3</td>
<td>100%</td>
<td>2/3</td>
<td>65%</td>
</tr>
<tr>
<td>Shop Rite</td>
<td>3/4</td>
<td>75%</td>
<td>3/4</td>
<td>75%</td>
</tr>
<tr>
<td>Pizzeria</td>
<td>2/4</td>
<td>50%</td>
<td>3/4</td>
<td>75%</td>
</tr>
<tr>
<td>mean len</td>
<td>2.66/3.8</td>
<td></td>
<td>2.65/3.9</td>
<td></td>
</tr>
</tbody>
</table>
Chapter Five

The results of this study suggest that using an augmentative device with students with moderate mental retardation does increase the length of verbal language production. Increasing the frequency of usage of the AAC device may have proven to show even greater results.

The findings of this study support Kumin's (1994) research that states imitation with expansion helps the child learn how to combine words and provides the stimulation right at the level from which the child can learn. It is a technique that takes him from where he is into the next stage. Repetition is essential and one should provide many opportunities to use it. The notion of the Pygmalion theory, which refers to the notion that one will behave in accordance to the experimenters' expectations, may relate to the improvement of the students' verbalization skills; these two particular boys thrive on positive reinforcement and often attempt to please the adults around them. The improvements can also be based on the fact that both students are able to form oral speech, but the lack of motivation prior to this treatment counteracted their productivity.

The information gathered during this research relates to the Consensus Statement 5.28.
of the National Institute on Disabilities and Research that supported the theory that speech may be improved following augmentative intervention by fostering conversation, written communication and telecommunications across all of an individual's environments. Additional research by Reichle, York and Sigfoos (1991) suggests that the most efficient response prompt in teaching an initial repertoire involves the provision of imitative models (p.143). The drawback to this method is when students cannot imitate sounds. This experiment provided the opportunity for imitation and high reinforcement in the natural setting. Total communication, combining words and sign language, has been used frequently with this population of students, including Bobby and Nathan. This project has gone one step beyond, using an augmentative device to assist in language modeling and development. The testing upheld students' need for communicative support. Their demand for assistance was available without the requirement of depending on staff to express their needs. Although Bobby is more outgoing and communicates more frequently, Nathan made a greater growth socially and verbally.

Limited literature, based on the theory that an augmentative device may enhance a person's ability to communicate verbally, is available and this is a new territory in the field of speech therapy. Its usage and popularity only seems to be growing as we enter a more technologically advanced era. The possibility to continue this study on a long term basis may assist in answering the hypothesis more concisely. Ongoing use of the AAC device may prove to have lasting effects on treating students with poor verbalization skills. Augmented communication will hopefully provide an increase in independence and allow for these students to become more involved in an inclusion setting. Lack of language
persuades many to underestimate the cognitive abilities of persons with communication disorders. Automatically, these students are at a disadvantage and not given the same challenges as their verbal peers. This is proof that many educators are often guilty of segregation and ignorance to the abilities of this population of handicapped students.

This study dealt with only two very particular subjects and did not contain a control group. Although it is only a small case study, the data collected should be significant enough to continue with further research on the topic. The study was based only with a population of two males with Down's Syndrome (Trisomy 21) and may not work with all students with limited expressive language, and labeled trainable mentally retarded. Since this study was only a minor case study of two students, I am hopeful, that the treatment could be duplicated and used for a larger study group in further research. The natural-environmental settings associated with this experiment allows for greater generalizability of the data. The concept of this experiment was developed with the good intentions that a new method of improving expressive language would be developed. Before each outing when another staff member would be responsible for collecting data, the experimenter repeated instructions not to assist the student in the usage of the device, so as not to confound the results. Due to scheduling in the school's program, the participants were only afforded one community outing a week, therefore collection of data occurred only once a week as well.

The responses to the scenarios in the baseline testing reinforced the Child Study Teams' evaluations on both boys, suggesting that their abilities may be underestimated due to their limited speech. The data collected still supports the ongoing need for therapeutic
speech and language intervention. The results of this research may be supported by Lanigan (1994) who concluded that limited self-initiated communication contributes to a lack of opportunity to communicate. Lack of active participation in communication models hinders the acquisition of new language for the participants. These subjects in Lanigan’s study infrequently initiate conversation or contribute to conversation. Rather, they verbalize only when elated, offended or in need of attention. Fortunately, in my study, the AAC device opened the lines of communication and verbal initiation for the subjects.

I believe that this study had an impact on the community, and also my students. Community workers, school personnel or family may have previously viewed these subjects as not having the capability or cognitive skills to form short phrases, when in reality, these are the same persons who may not consistently provide language models. During the second phase of the study, the community workers directed their responses to the subjects, rather than their adult companions. In each site, the workers were courteous and showed a willingness to assist the subjects by taking the time to listen carefully, and often repeated the subjects’ requests for confirmation.

The lack of formal assessments specifically related to the mean length of utterances was the basis for the experimenter to develop Pre and Post tests. The tests specifically target the subjects’ use of expressive language and the length of phrases used. The situations given in both Pre and Post tests are relatively similar to the community and were used as a simulation of likely interactions the student would have on ten particular excursions. Baselines fundamentally should have occurred in the community, but due to a
high level of student frustration to communicate without assistance and limited responses that we could elicit in a single trip, I opted to do the testing in a simulated setting. The study was conducted in a variety of settings and allowed for natural growth of language rather than acquiring phrases by rote. Varied settings would assure the observer that the subjects were developing their own language abilities with the assistance of the AAC device. Further research may formally prove that technology and appropriate language models do influence language acquisition. The participants both are able to produce speech and their intelligence may be miscalculated due to monosyllabic or one to two word answers they frequently provide, unless prompted.

This particular study could be expanded into further research in the field of improving verbalization skills. The study could incorporate the gradual extinction of the prompting devices. It also affords the opportunity to introduce a non-mechanical picture or symbol device that correlates the number of symbols with the length of phrases anticipated. The topic of this study alone gives great opportunity to explore the use of an augmentative device with verbal students in the future production of language.

Language is an aptitude taken for granted by most who possess articulate verbalization skills. Historically, those without language were labeled 'dumb'. Tragically, society often views these persons as less competent and does not engage them in social events. Although the subjects' utterances may have improved only by one word in this study, it was an opportunity for them to prove that they would not allow society to further stigmatize them. The art of communication is a profound source of empowerment.
REFERENCES


