

LEBANESE AMERICAN UNIVERSITY

Examining the Effectiveness of the Visualizing and Verbalizing Program for
Language Comprehension and Thinking© on Two Bilingual students with
Asperger Syndrome.

By

Siham A. Fakhreddine

A Thesis
Submitted in partial fulfillment of the requirements
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- highlight the bilingual context and the equal poor Arabic skills

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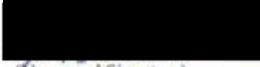
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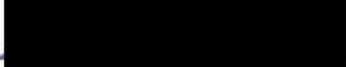
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Examining the Effectiveness of the Visualizing and Verbalizing Program for Language Comprehension and Thinking© on Two Bilingual students with Asperger Syndrome.

Siham A. Fakhreddine

Abstract

The purpose of this case study was to determine the effectiveness of the Visualizing and Verbalizing for Language Comprehension and Thinking© by Nancibell on two upper elementary students diagnosed with Asperger Syndrome, one of the autism spectrum disorders (ASDs). Another aim was to identify the changes in the students' attitude and motivation throughout the intervention. Progress in reading comprehension skills was monitored using the curriculum-based measurement (CBM) before, during, and after the intervention. The intervention took place over a period of four weeks at the rate of ten sessions per week. The researcher compared the results of two students in the experimental group who were exposed to the program with two ASD peers in the control group who were not exposed to any intervention. The results showed that the program significantly improved the reading comprehension skills of the students who were exposed to the intervention, and they developed a more positive attitude and increased motivation towards tasks that require reading comprehension. Based on the results, implications and recommendations for future research were drawn.

Keywords: Autism Spectrum Disorders (ASDs), Asperger Syndrome, Visualizing and verbalizing, Curriculum-Based Measurement, Reading comprehension, Bilingual.

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CHAPTER1

Introduction

1.1 Overview

“Letters and words are the parts of the reading universe, but they are not the universe itself. Reading comprehension; recall, reasoning, critical thinking, and interpretation is the universe of reading” (Bell, 2007, p.394)

Reading comprehension is described as a concern that students deal with all through their education. It is considered the goal of reading. Even adults need to continue to adjust their reading strategies in different tasks. Unfortunately, little instruction in reading comprehension skills is provided in the elementary classrooms (McLaughlin, 2012). For instance, a study performed by Durkin in 1979 (McLaughlin, 2012) shows that among 17,997 minutes of classroom observation, less than 50 minutes were devoted to teaching reading comprehension skills. Since reading comprehension is the essence of the reading process and the most important aim of reading, the improvement of teaching reading comprehension skills should be considered a significant priority. Learners can be taught strategies which good readers utilize spontaneously and when students are taught these strategies, their reading comprehension would automatically improve (Pressley, 2002). Many research-based strategies were developed to enhance reading comprehension skills especially for students with learning disabilities, specifically reading disabilities. However, some students, even with the implementation of many of these strategies, they can read words, sentences, and text accurately and fluently. They may also have well-developed oral vocabulary, yet are unable to reason, think critically, and

interpret. These students do not get the big picture or the imaged gestalt of what they read. These characteristics are often common in hyperlexic children like those diagnosed with Asperger syndrome, a disorder from Autistic Spectrum Disorders (ASDs) (Bell, 2007). Students with Asperger syndrome have average to advanced literal ability in language skills (Clikeman, 2007), but they show severe problems in reading comprehension. These students display problems in social reciprocity, verbal comprehension, eye contact, and communication. These individuals find it hard to comprehend jokes, metaphors, and thoughts; they are also unable to understand the feelings of others. However, students with Asperger Syndrome have an advanced ability in word recognition and reading fluency but display a severe deficit in reading comprehension. (Asberg, Kopp, Berg-kelly & Gilberg, 2010).

1.2 Significance of the Study

In the school where I work, a number of research-based corrective strategies and programs are available to promote reading comprehension skills for students with deficits in this skill. These strategies and programs were tried with students with Asperger syndrome but unfortunately, they were not effective. These strategies were not designed for students with this disorder. Thus, students with Asperger Syndrome are not getting any opportunity to improve their reading comprehension. Since all the students have the right for instruction, a program is highly needed to help students with AS improve their reading comprehension skills. A number of researchers discussed the importance of visualization and concept imagery in helping students with Asperger Syndrome in reading comprehension skills. The “Visualizing and Verbalizing for Language Comprehension and Thinking” program successfully stimulates concept imagery and improves reading comprehension skills (Bell, 2007).

A study performed in California shows that the number of students diagnosed with AS has dramatically increased during the last years in the elementary classrooms (Myles, 2005; Sansosti & Powell-Smith, 2006). Most studies have been conducted on the improvement of social skills and social interaction for students with AS. Little importance has been given to reading comprehension skills for these students since they read and speak fluently and their vocabulary skills are often advanced. Since reading comprehension is the universe of reading (Bell, 2007), it is very important for the teachers at all levels, both special education and regular teachers to be well trained in implementing a corrective program that helps students with this disorder improve their comprehension skills.

Visualization and concept imagery are helpful skills that help students with Asperger Syndrome improve their reading comprehension skills. According to Rader (2010), using language for visualization of words is considered an important tool to help students with AS who usually have difficulties in reading comprehension. Information resulting from clinical studies have hypothesized that the process of visualization significantly enhances reading comprehension skills especially for students with Asperger syndrome (Bell, 2007). The Visualizing and Verbalizing program is grounded in the evidence that reading requires two codes and not only one. Most comprehension programs only give credence to the verbal or linguistic code. However, according to Paivio (2007), imagery is a silent partner in cognition. Visualization makes it easier for them to process information, organize and store them. In addition, by turning those mental images back into words, the process of verbalization helps in retrieving the stored information and showing understanding. So as hypothesized by Onofrey & Thurer (2007), visualization and

verbalization are skills that help in making sense of any data shared either orally or in a text.

1.3 Purpose of the Study

The purpose of this study was to measure to what extent the Visualizing and verbalizing program improves reading comprehension skills of upper elementary students diagnosed with Asperger syndrome and who are enrolled in an inclusive program in a mainstream school in Beirut.

1.4 Research Questions

The following questions were explored:

1. What are the effects of the implementation of the V/V program on the reading comprehension skills of two hyperlexic students with AS who have advanced decoding skills and reading comprehension deficits?
2. What are the differences in reading comprehension performance between two AS students who will be exposed to the V/V program and other two AS students in the control group who will be exposed only to the regular teaching strategies in the classroom?
3. What are the observable changes in the students' attitude towards reading comprehension tasks?

1.5 Hypothesis

It was hypothesized that implementing the V/V program will enhance the reading comprehension skills in the particular two upper elementary graders in the

experimental group and who have AS compared to the results of the AS students in the control group who were not exposed to any intervention.

1.6 Operational Definitions

Autism spectrum disorder (ASD) is a group of disorders that include childhood disintegrative disorder (CDD), Rett disorder, autistic disorder, Asperger syndrome (AS), and pervasive developmental disorder not otherwise specified (PDD-NOS) (Ben- Arieh & Miller, 2009). A common characteristic of all individuals in the spectrum is that they display problems and difficulties in social communication, social interaction, and imaginative thinking (Pittman, 2007). For instance, according to DSM IV definitions, students with Asperger syndrome (AS) have difficulties in their language comprehension. These students have impairment in their social skills, they often display repetitive or stereotyped behaviors, but they don't have a significant delay in their cognitive and language development (Adams, Gouvousis, Vanlue, & Waldron, 2004).

The term **Hyperlexia** was first used in 1967 to describe children who began reading early before the age of five, without explicit instruction. In the early literature, cases of hyperlexia were reported among children with Asperger Syndrome and other pervasive developmental disorder. Hyperlexia is defined as a weakness in reading comprehension that is in contrast to remarkable word recognition skills. For hyperlexic students, comprehension of oral and written texts is very difficult. The discrepancy between word reading skills and comprehension is a major characteristic of hyperlexia (O'Conner & Klein, 2004).

Visualizing is the formation of associations and mental images based on previous knowledge (Zwiers, 2004). For instance, visualizing helps students in

forming mind pictures about what they read or heard, storing information, and retrieving them by turning the pictures into words.

Concept imagery is defined by Bell (2007) as the sensory base of thought and language, connecting individuals to language and linking them to prior knowledge, establishing vocabulary, accessing the background experiences, and creating and storing new information in short-term as well as long-term memory.

Progress monitoring is a scientifically based practice that teachers can use to evaluate the effectiveness of their instruction for individual student or their entire class (Hosp, Hosp, & Howell, 2007).

Curriculum-Based Measurement (CBM) is a set of methods for assessing academic competence in reading, comprehension, spelling, and mathematics. Unlike the traditional assessment that measures the mastery of a certain skills, CBM is criterion-referenced and its scores reflect changes in accuracy as well as in the ease of response. CBM Maze passages are timed measures of reading comprehension.

1.7 Ethics

An informed consent form was sent to each of the four students' parents describing the objective of the study and the procedure that will be followed (see Appendix I).

Another informed consent form was given to the director of the elementary division in the school where the students are enrolled to take permission to work with the students (see Appendix II).

1.8 Methodology

Design

A pretesting, posttesting case study was used in my research. This design was used to observe the changes in reading comprehension skills of two hyperlexic students with Asperger Syndrome after their exposure to the Visualization and Verbalization Program for Language Comprehension and Thinking and also the changes in reading comprehension abilities of two other hyperlexic students with Asperger Syndrome who were not exposed to the V/V program or to any other intervention. The results of both groups were compared in this study using different tools.

Participants' Background

Four bilingual students participated in my research. The four students were divided into two groups; the experimental group which consisted of Rami and Jad, and the control group which consisted of Jawad and Rayan. The four students were diagnosed with Asperger syndrome and they read fluently but have very limited reading comprehension abilities in English and in Arabic languages. The four students are enrolled in the special education program, inclusive setting in a school in Beirut.

Instrumentation

A pretest was administered to each of the four participants prior to the intervention period. A posttest of the same tests was used two days after the termination of that period. The tests used are from The Woodcock-Johnson III Tests of

Achievement which are the following: Reading Fluency and Passage Comprehension. Second, Curriculum-Based measurement (CBM) Maze passages used from standardized measures of the Dynamic Indicators of Early Basic Literacy Skills (DIBELS) was used every five sessions of instruction to present ongoing information concerning each of the students' progress throughout the period of intervention.

Third, an interview with the special educators who work with the participants was done before the intervention and after the completion of the program to discuss any significant changes in the reading comprehension skills of these students.

Each of the students was asked separately to fill out a checklist that describes their attitude towards reading comprehension skills. This checklist was filled out every time after implementing the CBM.

The questions of the interview were piloted prior to their administration.

Intervention

The intervention period was done intensively over a period of 4 weeks, for 10 sessions per week. Each session consisted of 50 minutes of intervention. The instructor who was the researcher implemented the program to both Rami and Jad together since the program is designed to be implemented either individually or in a small or even large group. The other two students in the control group continued their regular studies in the classroom without any intervention in reading comprehension.

Data Analysis

A table was used to compare the results of the scores on the standardized tests that are administered by Woodcock Johnson III. Also, the results of the CBM Maze passages were plotted on a graph. A comparison between the scores of the students was also noted.

An interview with the special educator to describe any change in the students' performance concerning reading comprehension was also done.

The students' attitude and motivation towards reading comprehension tasks was noted and a comparison of results of the two groups was described.

Assumptions

It was expected that the scores of the students in the experimental group in the standardized tests improve significantly after the completion of the program. Moreover, the scores of the students in the experimental group on the graph used in the CBM Maze passages were ascending. In addition, teachers' comments were positive towards the students' performance in the classroom. Moreover, the students' attitude towards reading comprehension was very positive hoping that both Rami and Jad will become good readers who enjoy reading since they will understand the content of they read that is appropriate to their age level. However, it was expected that little or no improvement will be noted in the scores of the standardized tests and in the scores of the CBM of the students in the control group. Also, it was expected for these students that their special educators' comments and their own attitude and motivation towards reading comprehension will not change after the termination of the intervention period.

This chapter provided an overview of the research. It included a brief introduction, the purpose of the study, the questions explored, some operational definitions and the division of the thesis. The next chapter includes a presentation of a review of literature discussing issues related to Asperger Syndrome and reading comprehension.

CHAPTER TWO

REVIEW OF LITERATURE

Researchers agree that deficits in reading comprehension skills of students diagnosed with Asperger Syndrome is dramatically increasing (Hale & Tager Flusberg, 2005; Nation, Clark, Wright & Williams, 2006). This chapter provides an overview of autism spectrum disorder (ASD), definition and prevalence. It also provides a brief description of the characteristics of (ASD) focusing on Asperger syndrome. Moreover, a brief overview is presented about research on reading comprehension for students with AS and what makes this task hard for them. The last part of this chapter includes interventions that remediate reading comprehension of students with AS.

2.1 Autistic Spectrum disorders

Autistic spectrum disorders (ASD) include childhood disintegrative disorder (CDD), Rett disorder, Autistic disorder, Asperger Syndrome, and Pervasive Developmental Disorder- Not Otherwise Specified (PDD_NOS) (Ben-Arieh & Miller, 2009). All these conditions have almost similar symptoms, but they are different in the severity, onset, and in some specific characteristics. ASD is considered a term that describes enduring developmental disorders identified by impairments of three major areas which are qualitative impairments of social interaction, communication, and occurrence of special interests and repetitive behaviors (Moss & Howlin, 2009). The cognitive ability of individuals with ASD

ranges from advanced to very limited. Moreover, some of them are very talkative while others are non-verbal. Some are independent while others need constant one-to-one assistance to function properly.

2.1.1 History and Prevalence

In 1940s, Hans Asperger, a Viennese pediatrician and Leo Kanner, a psychiatrist from Austria who first identified autism as a separate neurological state, were the pioneers in the autism research (Sicile-Kira, 2004). In 1944, Hans Asperger performed his first study about four boys who displayed severe difficulties in their social, behavior, physical and communication skills (Clikeman, 2007). These two pioneers in the field of autism described individuals with severe impairments in social skills and communication with the development of unusual interests. Kanner discussed cases of children with severe autistic traits, while Hans Asperger discussed cases of more functioning children with better capabilities (Sicile-Kira, 2004). These cases were referred to as having Asperger syndrome named after the pediatrician Hans Asperger. People with Asperger syndrome display difficulties in communication and social interaction but do not show a significant delay neither in cognitive development nor in their language abilities.

About 1% of the general populations have ASDs (Ricketts, 2011). Research confirms that more people are currently affected by ASDs than before. This increase in the prevalence of ASDs may be due to a better and more specific diagnosis or to the awareness among people which are more accepting the label (Ben-Arieh & Miller, 2009).

2.1.2 Prognosis

Determining the prognosis of the impairments in ASDs is hard for the specialists. This difficulty is caused by the severity and variability of the symptoms. However, it is agreed that cognitive ability, early language skills, severity of the disability, response to the therapy provided, and early intervention, are indicators for the prognosis (Ben-Arieh et al. 2009).

2.1.3 Causes

Autism might be due to environmental, genetic, and immunological factors (Kidd, 2002). Autistic individuals display severely elevated metals like copper and zinc in their bodies which suggest a disorder in the metal-metabolism leading to malfunctioning metallothionein which plays a role in the immune response, and neuronal development. Deficiencies of some minerals like iron, manganese, chromium, fluoride, and molybdenum lead to significant variations in neuronal functioning associated with different effects on learning and behavior. There is undeniable proof that autism has a genetic component. For instance, according to De Francesco (2001), with monozygotic twins, if one of them has autism, the probability that the second one will have autism is 90%. Moreover, relatives of individuals with autism might also display some of the symptoms of the disorder but might not meet all its criteria. Research reported that the gene Fragile X and also the Reelin gene are both linked to autism. Other studies also reveal that viral infection during the first trimester of a pregnant woman or bacterial infection during her second trimester are associated with the offspring's autism (Atladdottir, Thorsen, Ostegaard, Schendel, Lemcke, & Parner, 2010). In addition, recent studies show that some medications used during pregnancy might lead to autism in the offspring (Landrigan, 2010).

Inflammation of the brain, premature birth, and a toxic environment might all lead to autism (Ratajczak, 2011).

2.2 Asperger Syndrome: Cognitive, Behavioral, Social, and Academic Skills.

Asperger Syndrome (AS) is considered a developmental disorder known by severe difficulties in emotional skills, social interaction, unusual narrow interests, and stereotyped behaviors. However, these individuals have an average to advanced literal ability in language skills (Clikeman, 2007), although it is proven that they have considerable problems in pragmatic language (i.e., turn taking, conversations, social interaction, understanding jokes, etc.) (Church, Alisanski, & Amanullah, 2000). There is no typical cognitive profile for students with AS (Barnhill, Hagiwara, Myles, Simson, 2000). When administering the Wechsler Intelligence Scale for Children, students with AS usually have high scores in the Block Design section which designates visual-motor integration. They also score high in Information, Vocabulary, and Similarities or verbal conceptualizations. These students have low scores on Coding which indicates high level of distractibility and excessive concern to details (Barnhill et al., 2000).

Other characteristics of AS include major impairment in the nonverbal behaviors like eye contact, body postures, social gestures, and facial expressions. Moreover, AS individuals lack the ability to share interests or to seek enjoyment (APA, 2000). In addition, stereotypical and repetitive behaviors, restricted activities, strange preoccupation with themes of interests (history or science), inflexibility in routines, repeated mannerism (i.e., finger or hand flapping, twisting etc.), are also characteristics of AS (APA, 2000).

Impairments in reading comprehension skills in autistic children and specifically in students with Asperger syndrome are becoming more highlighted in today's literature (Hale & Tager-Flusberg, 2005). Traditionally, teaching reading comprehension for students with AS has received little importance in research since social and behavioral needs were considered more important (O'Conner & Klein, 2004). However, studies demonstrate a discrepancy between good word identification skills and poor reading comprehension ability in the profile of students with AS. In this extreme case, the word "hyperlexia" is commonly used to describe advanced decoding and word recognition skills combined with very limited reading comprehension. However, not all students who are hyperlexic have autism, but unfortunately, most individuals with AS are hyperlexic (O'Conner et al., 2004). According to Styslinger (2013), students with AS have an advanced ability in reading sight words and this might be due to their powerful rote-memory proficiency. But as mentioned before, the most important goal of reading is to understand what is read not to recite phrases or words. Students with AS show rapid decoding by using linguistic rules. However, they do not construct meaning of a given text. In addition, it is challenging for students with AS to interpret metaphors although they are able to define the word and give several examples of it (Styslinger, 2013). Such students read and understand questions that are literal and they answer these questions correctly. However, they struggle in understanding and responding to questions that require higher order of thinking such as applying, comparing, synthesizing, evaluation, etc. (Falk-Ross, Iverson& Gilbert, 2004). They find it hard to share topics and appear annoyed while asked to listen carefully to others. This difficulty may be due to their inability to understand well nonverbal cues. As a result, appreciating others' opinions and point of view might be very challenging. Language integration,

social understanding, and emotional intention of messages are a real challenge for AS individuals to understand well their own social world (Gately, 2008). AS people find it hard to well understand others' thoughts, jokes, metaphors, they often display language deficits and problems in labeling and interpreting emotions and integrating and incorporation these feature of communication to get meaning in social settings. Similar to the social situations, the importance of interpreting different cues is extremely needed for effective reading comprehension of texts (Gately, 2008).

To understand well a text, the reader should go way beyond the sentences, integrating them with his or her background knowledge in order to synthesize a mental representation and a global understanding of the gist (O'Conner et al., 2004). AS students have difficulty in integrating acquired information to comprehend the gist of a text. This causes a severe delay in their reading comprehension skills. According to Gately (2008), students with AS focus on the details while they read and they analyze data in a fragmented way. They misperceive the goals and intentions of the author.

For instance, a study performed by Jones, Happe, Golden, Marsden, Tregay, Siminoff, Pickles, & Charman (2009) describes the results of standardized tests to 100 students diagnosed with ASD. The results illustrated discrepancies between word recognition and reading comprehension. The scores on word recognition were very high as opposed to the below average reading comprehension scores. The same discrepancy between these two skills is found in different studies about reading skills in ASD (Lingren, Folstein, Tomblin, & Tager-Flusberg, 2009). For example, Nation, Clarke, Wright, & Williams (2006) conducted a study on 41 individuals aged 6-16 years with ASD and most of them had AS. The results showed that 32 readers had

the ability to read fluently and accurately while they scored very low on reading comprehension and nine were not able to read.

2.2.1 Diagnosis

Asperger Syndrome is a chronic neurobiological condition affecting the person's social, behavior and adaptive functioning. Although it is identified as a disorder, there is very little clinical agreement on both, the criteria for the diagnosis for AS, and the criteria that differ AS from HFA (High functioning autism) and NLD (Non-verbal learning disability) (Clikeman, 2007).

No specialized tools are found to test for ASDs. All the diagnoses are based on the observational characteristics that a specialist exhibits. These observations may be sometimes subjective which make the pioneers skeptical concerning the diagnosis (Sicile-Kira, 2004). Moreover, people should be very cautious in reading and interpreting the results mentioned in the assessment reports. One should keep in mind the extent to which the instruments used are valid and reliable (Ben-Arieh et.al, 2009). In addition, knowing that children with ASDs have language impairments, standardized instruments used to measure the IQ may not be reliable and may fail in giving the accurate measure (Ben-Arieh et al., 2009).

Individuals with ASDs should take psychotherapy both family and individual, psychopharmacology, occupational therapy, special education, speech and language therapy (Ben-Arieh et al., 2009). The research presented in this literature review focused on recommended interventions used by special educators to help in remediating reading comprehension deficits of students with AS.

Proficient readers are able to use various "fix- up" strategies to understand what they read such as inferring, summarizing, predicting, making connections,

visualizing, and accessing prior knowledge (Styslinger, 2013, p.41). Non-proficient readers like those diagnosed with AS who read accurately but superficially, focus on words and are not able to monitor their comprehension. Fortunately, research has shown that students with AS are able to outgrow their reading comprehension problems with an effective early interventions that target this particular skill at the level of words and sentences (Randi, Newman, & Grigorenko, 2010). According to Styslinger (2013), individuals with AS are visual learners, they display strength in the visual cue system by seeing and recalling easily some patterns in words and sentences. An fMRI study conducted by Kana, Cherkassky, Minshew, & Just (2006), showed that the occipital and parietal parts of the brain of individuals with AS was more activated than in regular students. This study proved that AS individuals think in pictures and rely on the visual imagery to comprehend at the sentence level. When they read long texts, students with AS fail to understand them even when they implement strategies that are proven to be effective. This is due to their memory impairment caused by the lack of organizational skills needed to enhance memory. AS individuals have “weak central coherence” that focuses on details instead of seeing the “big picture” (Randi et al., 2010, p.894). So it is possible to help students with AS become proficient readers by capitalizing on their strengths in visualizing and thinking in pictures.

2.2.2 Reading Comprehension Strategies for Students with Asperger Syndrome

For many years educators believed that when students have an average or above average cognitive ability and are able to decode accurately and fluently, good reading comprehension would naturally follow (Allington, 2001). Researchers maintain that problems in reading skills are the most common reasons for enrolling

students in a special education program designed to meet the individual's interests and needs (Hagaman, Luschen, & Reid, 2010). As a result, the early intervention program in reading skills mainly focuses on the basic skills needed for reading such as letter-sound correspondence, decoding, and encoding (Fuchs, Fuchs, Hosp, & Jenkins, 2001). These foundational skills permit the student to read accurately and fluently. However, with this focus on the basic skills of reading, comprehension instruction may be ignored. It is very true that reading fluency affects reading comprehension. Students who read fluently and who are able to recognize the words effortlessly have the ability to better allocate their cognitive resources to reading comprehension. This correlation between reading fluency and reading comprehension may direct teachers to presume that when students are able to read fluently they are able to understand what they read (Meisinger, Bradley, Schwanenflugel, Kuhn & Morris, 2009).

Although very few would deny the importance of fluent decoding as a prerequisite for strong reading comprehension, there has been a growing awareness of other factors that promote successful development of that skill. According to Gately (2008), a combination of many competencies underlies reading comprehension success. Thus, for students to be successful readers, not only the ability to decode fluently and accurately is needed, but also understanding the writing style of the author, story structure, story setting, characters' emotions and social experiences (Gately, 2008). For instance, to gain reading comprehension, students should understand and interpret the vocabulary used by the author, his/her writing style, story structure, social experiences of the characters and their contribution and effects on the goals, motivations, and action within the setting of the story. These mentioned skills require good reading comprehension which is hard for students with

AS (Gately, 2008). Various studies on the prevalence of ASDs report that the number of individuals diagnosed may be increasing. And since ASDs students are supposed to be integrated in regular schools and in the mainstream classrooms (NCLB, 2001), it is extremely essential for instruction in reading comprehension to be a crucial component in the curriculum. Teaching AS students to read for meaning is a difficult task since reading comprehension requires complex processes and skills and even different approaches are needed with different individuals (Randi et al. 2010). A strategy that improves reading comprehension skills is a technique applied by students to gather information from the text whether to answer related questions or to compose an effective essay or report about the text (Dymock & Nicholson, 2010). Harris and Hodges (1995) described a strategy for reading comprehension like “a systematic sequence of steps for understanding text” (p.39). Good readers apply different strategies to understand a given text (Pressley, 2006). Strategies must be taught explicitly and guided practice should be done under the supervision of the teacher. Thus, students get numerous opportunities to apply a strategy until they are able to implement it effectively and independently. Pressley (2006) hypothesized that students should have “a small repertoire of strategies” so they can use them in “a self-regulated fashion” (p.17) to improve comprehension. Below is a description of various strategies that are proven to be effective with individuals with AS:

Priming background knowledge

Priming background knowledge is an essential strategy that considers reading as being a thinking activity. This strategy requires students to connect what they already know to new presented skills and information. The more the reader knows about the content discussed in a text, the easier it is understood (Harvey & Goodvis,

2000). Studies confirm that enhancing background knowledge is very important to students with AS, however, if this knowledge lacks accuracy, the comprehension process will be disrupted (Gately, 2008). Thus, teachers should anchor the information needed correctly and accurately.

Picture walks

Picture walks is a strategy that is proven to be effective in enhancing reading comprehension skills of students with AS (Gately, 2008). This strategy helps students in developing adequate expectations concerning the events of a story. Before reading the story, students are asked to observe the pictures with the teacher, and try to come up together with an overview of the story. Teachers should ensure that wrong assumptions by AS students are fixed instead of being reinforced by maintaining a well planned picture walk. This strategy requires AS students to focus on pictures which is satisfying for them since as mentioned before, AS individuals are visual learners (Serafini, 2004).

Think-Aloud and Reciprocal teaching

Think aloud is a strategy that helps students model their thinking about a text. Four skills are learnt in this strategy when used in reciprocal teaching (Palinscar & Brown, 1985, cited in Gately, 2008). Predicting is the first skill, questioning is the second, clarifying is the third, and summarizing is the fourth skill. This strategy is highly recommended to be implemented with students who find difficulties in meta-cognitive facets of reading. Explicitly teach AS students the four skills by modeling how to think throughout the story. While reading aloud, teacher stops often to share his thoughts. These thoughts should be explicit. For instance, teacher points out to

the word that triggered such thoughts. Eventually, students will be able to share their thoughts, answer questions, and also generate their own questions. This mediated scaffolding is very essential in helping AS students becoming proficient readers who are able to understand a text independently. Also, teachers can use color coding for the four strategies to help AS students better remember them.

Emotional Thermometers

When students understand emotions and feelings of the characters, appreciation of characters' choices, and understanding of the story are enhanced (Gately, 2008). Emotional thermometers are used with colors and different vocabularies to help students differentiate between different feelings with their intensities. In 1994, this strategy was suggested by Gray to help children with AS understand and better describe their emotions and the characters' emotions in a story (Gately, 2008). For example, blue connotes happy feelings while red connotes angry feelings. Shades of these colors used help AS children see the intensity of feelings and it also shows how the feelings of the characters might change in the story affecting their choices. Gray (1994) also suggests the use of colors in comic strip also to differentiate the thoughts from the actions by drawing cartoon bubbles.

Visualization

Visualization is the creation of mental images making associations using previous knowledge (Zweirs, 2004). Visualization is a skill that allows students to make mind pictures representing what they read or heard, organizing, storing, and retrieving information, forming ideas, drawing conclusions, and finally translating the pictures they formed by turning them into words. Clinical studies concerning

visualization confirm that this strategy improves reading comprehension. The strategy presented here was developed by Bell (1991). Nine questions are explored in the strategy. These questions teach students how to visualize and verbalize their mind pictures to improve reading comprehension. The questions are very systematic and used gradually by the students. Each student is well trained and had enough time practicing each question separately before using all of them together in a connected text. For instance, a pilot study was conducted over two years on 69 students diagnosed with AS. Thirty six received instruction using visualization while the other 33 did not. Scores on the tests of reading comprehension are represented by pretests and posttests. Results show that students who followed the visualization process with its nine questions made the biggest gains in reading comprehension and they also met the state benchmarks. Finally, visualization is a powerful strategy that helps AS students improve their reading comprehension skills (Onofrey & Thurer, 2007).

After reading the few strategies that can be implemented with AS students, one can notice that all these strategies are based on visual imagery, visual symbols or using pictures or drawing. According to Bell (2007), AS students respond very well to materials that are visually-based by making language concrete. In this case, auditory tasks are supplemented with visuals. Thus, the Visualizing and Verbalizing Program for language Comprehension and Critical Thinking which is based on visual imagery, will be implemented to remediate reading comprehension skills in the following case study. In the next chapter, the methodology used in this study will be discussed in details.

CHAPTER 3

METHODOLOGY

This chapter includes a detailed description of the methodology followed in the study. The methodology includes design, participants, settings, materials used, resources, procedure and finally data analysis.

3.1 Design

A case study, A-B-A design was used to determine the effectiveness of the *Visualizing and Verbalizing for Language Comprehension and Thinking Program* © (Bell, 2007), in improving reading comprehension skills in students with ASD. To answer the research questions of this study, a case study was used. As defined by Thomas (2003), “a case study typically consists of a description of an entity and the entity’s actions. Frequently, case studies also offer explanations of why the entity acts as it does. Entities that are the focus of case studies can be of various sorts, such as individuals, groups... (p.61).

A qualitative case study is defined by Merriam (1998) as an “intensive, holistic description and analysis of a single entity, phenomenon, or social unit” (p.27). In addition, Merriam claimed that “descriptive case studies are useful in presenting basic information about areas of education where little research has been conducted. Innovative programs and practices are often the focus of descriptive case studies in education” (p.38).

This design has been used in this research since it is often selected to study any changes in one's behavior after being exposed to a treatment or an intervention (Fraenkel, Wallen, & Hyun, 2012). The most important advantage of using the A-B-A design is that the statement of change is strengthened with the return to baseline" (Tillman & Burns, 2009, p.40). Thus, the selected behavior is continued after finishing the intervention period. When A-B and A-B-A designs are compared, it is found that A-B-A design is often more appropriate since with the A-B design, the conclusions are made only during the intervention time. A modification in the observed behavior could be noted or not. Nevertheless, adding a third phase that is considered as a verification stage, allows a new record of a change in the behavior as predicted. A sustained behavior after finishing the intervention stage, assures that the alteration of the aimed behavior was not by coincidence. However, the researcher should consider other factors that led to the variation in the target behavior. To better validate the research study, a replication of the same study needs to be conducted (Tillman & Burns, 2009).

In this case study, an A-B-A design was followed to study Rami's, Jad's, Jawad's, and Rayan's reading comprehension skills and attitudes towards reading comprehension after implementing and stopping the intervention. An initial baseline stage was followed to gather data about each of the students' Reading Fluency and Passage Comprehension skills. In addition, a baseline of their reading comprehension ability was plotted. Furthermore, the students' attitude towards reading tasks was also recorded through a checklist. During this stage, an informal interview was also conducted with each of the special ed teachers who work with these students. The Reading Fluency test was conducted before the intervention to make sure that the selected students read fluently and can understand fragmented sentences. The

students were randomly divided into two groups; the experimental group, which consisted of Jad and Rami, and the control group which consisted of Rayan and Jawad. During this second phase, the researcher implemented the V/V program for the experimental group over a period of four weeks, ten sessions per week for 50 minutes each. These students did not attend the classroom sessions when reading comprehension tasks were performed. The students in the control group were not exposed to any intervention program. During this intervention period, the instructor administered the CBM assessment after every five sessions of instruction for the four students. Two days after the completion of the intervention period, a follow-up phase was conducted to measure the alteration of the students' reading comprehension skills. Similar tools as the baseline phase were used in this third phase. These instruments are the Woodcock Johnson subtests (only the Passage Comprehension test was performed as a posttest), the progress accomplished through the CBM records, the checklist done by the students, and the interview done with the special educators.

3.2 Participants

Rami, Jad, Jawad, and Rayan (pseudonyms), are the four participants in this case study. These students are enrolled in the special education program in an inclusive, private school in Beirut. Different special educators assist them in the classroom during English, Arabic, Math, and Science sessions. The main role of the special educators is to monitor the students' comprehension by simplifying the instructions, modifying their class work, and explaining what is being read. During classes of arts, advisory, music, and physical education, the students do not have any support. In addition, they are all exempted from French and history sessions where

instead, they have one-on-one sessions to reinforce the skills taken in the classroom in addition to the therapy sessions with the counselor. These sessions are tailored to improve the students' social and communication skills through social stories and role playing. Jawad has one occupational session per week to help him improve his handwriting skills. Jad takes individual Arabic sessions with a special educator on one-to-one basis since he was enrolled in an International school in Qatar which, according to Jad's parents, gave little importance to Arabic and led to a delay in his Arabic language skills and specifically reading and writing.

The four students were chosen to be the participants in this study based on the following criteria of eligibility: (a) their profiles are consistent with Asperger syndrome, a form of autism; (b) they read fluently but display severe problems in reading comprehension skills.

During the early years of school, Rami had difficulty understanding and following directions, he had short attention span, no eye contact, repetitive use of language and difficulty engaging in symbolic and imaginative play. At that time, Rami performed a formal evaluation by a psycho-educational therapist. The report of this assessment shows that Rami was expressionless throughout the examination and was repeating everything the examiner was saying. The Autism behavior Checklist (ABC) was used by the examiner to test for Rami's social relations, body use, object use, language, social skills, and self help. The (ABC) checklist is performed in case autism is suspected. It was reported during the assessment that Rami does not react visually at the presence of new individuals. He avoids eye contact and stares in the room with no reason. It was also noted that Rami does not like to be held or even touched, and it's hard for him to make friends. As for his body use and relation, Rami spins his finger a lot and he enjoys a lot playing with Legos by arranging all of

them into a straight line. As for language, Rami often echoes questions or instructions, and repeats words. On the other hand, it was mentioned that mental retardation is ruled out since Rami has advanced ability in decoding and encoding. Three teachers completed the checklist and it can be deduced that Rami is at high risk of having an ASD disorder.

In 2009, Rami was assessed by a speech therapist who mentioned in her report that Rami reads fluently when compared to others at the same age level but he has a major problem in understanding directions and following instructions. For instance, he has “very limited verbal comprehension, and expression capacities”. Moreover, it was mentioned in the report that Rami has difficulties keeping eye contact and staying on topic during conversations. In addition, it was noted that it was hard for Rami to comprehend metaphors and other figures of speech. It was recommended at the end of the report that Rami receives two speech therapy sessions per week to help him overcome his weaknesses.

In April 2010, Rami performed a psycho educational assessment. The report showed that Rami has advanced skills in the following tests: Letter-Word Identification, Word Attack, Reading Fluency, Basic reading Skills, Sound Blending while he scored very low on Passage Comprehension test. Moreover, it was noted in the report that Rami has Asperger Syndrome.

Jad is the second participant in this study. Jad has joined the school where he is currently studying two years ago. When his parents first met the director of the special education program, they were depressed and tired of moving Jad from one school to another in Qatar. After meeting the child and after listening to the parents’ concerns, the director of the special education program suspected that Jad displays symptoms of Asperger Syndrome and she referred him to a specialist for a better

diagnosis. The results of the assessment performed with Jad shows that Jad has Asperger Syndrome with an advanced reading fluency and severe reading comprehension deficits. Jad's parents reported that Jad had normal developmental milestones except for his language skills. In the early years, Jad used to echo words and sentences and had difficulty following instructions. He took many speech therapy sessions but he did not show a significant improvement although according to his mother, he learned to read at an early age and he had a very rich vocabulary repertoire.

Jawad is the third participant in this study. Jawad has been diagnosed of having Asperger Syndrome four years ago when he was referred by his school for a formal assessment. Rayan, is the fourth participant in my study. Rayan's profile as shown by an educational psychologist is consistent with Asperger Syndrome. Jawad decodes and reads properly, but he has severe deficits in his reading comprehension skills.

3.3 Materials and Instruments

3.3.1 Visualizing and Verbalizing for Language Comprehension and Thinking (V/V) program

The Visualizing and Verbalizing for Language Comprehension and Thinking is a program used to stimulate concept imagery which is the skill used in visualizing the gestalt or whole. This skill is developed in this program by developing the sensory association required in the development of language comprehension, expression, and thinking (Bell, 2007). This program has emerged from the experiential rather than the theoretical bases. Many years of teaching experience in helping students improve their oral and written language led to the

initiation of this program. The principles of this program align with Dual Coding theory which is considered as one of the major theories in cognitive psychology. The role of imagery in cognition has been highlighted by many cognitive psychologists like Allan Paivio. Paivio (2007) has extensively written about the important role imagery plays in cognition. He explains that as its name suggests, the theory is based on the assumption that thinking involves the activity of two distinct cognitive subsystems, a verbal system specialized for dealing directly with language and nonverbal system specialized for dealing with nonlinguistic objects and events (Bell, 2007).

The *Visualizing and Verbalizing* program is grounded in the evidence that cognition, including reading, and it requires two codes, not one. Most programs designed to improve reading comprehension give credence to the linguistic code. However, imagery is an essential partner in cognition (Paivio, 2007). The program is designed to be administered either individually or for a small or even large group of students. The kit of this program is composed of a teacher's guide, big picture to picture book, folder of pictures, 12 structure words big and small cards, Easel book for word imaging, two big Sentence by Sentence Easel book, V/V story books, a progress chart, colored felts, and a bag of magic stones. The stones are used as reinforcers or as behavior management tool to motivate students and help them focus more. The review of a number of research shows that students with Asperger Syndrome learn best in pictures, visualization, and visual imagery. For this reason, the V/V program was used since it is based on all these skills to improve comprehension. The lesson plans are prepared according to the objectives of the program and following specific criteria (see Appendix III).

The V/V program is divided into 10 sequential steps which are described below.

1- The Climate

This first step is designed to explain briefly what the instructor is going to do and the reason of doing it. This explanation is done by talking and drawing at the same time since the illustrations of language will definitely help students' comprehension. Here, the instructor draws a head with a bubble of thought saying that we will say the word house and then she draws a house. The point here is to show students that words turn into pictures and pictures turn into words.

2- Picture to Picture

This second step is the beginning of development of the imagery-language connection. The primary aim of this step is to develop the learner's ability to verbalize starting with a simple picture and by using 12 structure words that help learners elicit details and to make the students' expressive language longer and more complex. Thus, this step does not require the students to visualize; they are required to verbalize only. By looking alone at a very simple picture, the students describe the details and the whole of what they see. This verbalization helps the instructor create the same picture in his mind and summarizes the imagery created by the learner's verbalization.

3- Word Imaging

The major goal of this step is to develop the ability to create mental representations of a single word laying the foundation of for mental representations

of a phrase, a simple sentence, or a paragraph. In this step, the learners are asked to turn a word into a picture and to describe their visualization of a single word following a format very similar to the second step. Here, the language of the instructor is very structured focusing on the development of the learners' imagery. In short, the learners form a mental representation of a single word (visualizes) and then they describe their imagery to the instructor (verbalizes). For instance, the instructor says a word and then gives a picture of this word. The learners look at the picture for few seconds and then they are required to verbalize their imagery recall. Both the instructor's questions and the structure words help in the process. The learners and the instructor can look at the picture when needed to recall specific details

4- Single Sentence Imaging

The goal of this step is to develop visualization and verbalization of a sentence. The procedures here are very similar to the Word imaging step which make it familiar to learners and to instructors. In this step, the instructor builds a sentence with a known word used in the previous step as a subject. The learners visualize the words of the sentence and construct a sentence gestalt. Many students are able to move easily to the fifth step.

5- Sentence by Sentence Imaging

In this step, the learners create mental representations of parts and then of a whole. But this time, the part is a sentence. Thus, the goal of this Sentence by Sentence Imaging step is to enhance the learners' ability to create an imaged gestalt from oral and written language. In this step, the instructor reads out loud the first sentence and the learners visualize and verbalize it by placing a colored squared felt

representing imagery. The students here also check for details using the 12 structure words which can be used only for the first sentence. Then the instructor reads the next sentences and asks some questions that help learners connect their imagery in good sequence. The learners keep on putting a colored squared felt for each imaged sentence. When the sentences are completed, the learners are required to give a picture summary and a word summary of the paragraph. During the picture summary, the learners touch each colored felt as a reference and reverbalize their imagery. While during the word summary, the felts are taken away and the learners are asked to summarize the whole using his images as a reference. The lesson here becomes shorter when the learners visualize and verbalize with minimal prompts.

6- Sentence by Sentence Imaging with higher Order Thinking

This step helps learners apply certain comprehension skills to facilitate the application of the gestalt imagery with critical thinking and problem solving. In this step, the learners have to get the main idea and details, draw conclusions, make an inference, predict, and evaluate. In this step, the learners read each sentence separately and place a colored felt like in the previous step for each sentence. The felts are used as a reference for what is visualized and verbalized each sentence. The instructor asks by providing choices keeping in mind the importance of asking for details and for the gestalt. The learner is required to give a picture summary as well as a word summary. In addition, the instructor uses questions of higher order thinking based on the learners' imagery.

7- Multiple Sentence Imaging with Higher order Thinking

This part of the program is easily grasped by both the instructor and the learners. After starting imagery, verbalizing a picture and a word summary, and answering questions of high level of thinking are more comfortable and familiar. In this step, the part is no more one sentence, but it is extended to two or more sentences. The lessons here continued to include the colored felts in order to anchor the imaged sentences. Questions for details are very minimal and structure words are no longer used. In this step, more vivid imagery from the learners is expected with less questioning from the instructor. With practice, the learners will start to apply independently the imagery to reasoning, problem solving, and critical thinking.

8- Whole Paragraph Imaging With Higher Order Thinking

This step is very similar to the previous parts of the program but with only two differences: no picture summary is required and thus no colored felts are used. However, the learners process the paragraph and immediately provide a word summary. It is important to make sure that the learners are forming images in their mind and this is by asking them appropriate questions for specific details. In this step, the instructor spends less time in questioning and more time refining the learners' expressive language skills. The instructor encourages the students to be more explicit in the summary and this is done by highlighting redundant phrases, poor use of adjectives, missing images...the instructor also asks high level thinking questions from the gestalt image.

9- Paragraph by Paragraph Imaging With High Order Thinking

The goal of this step is to develop the ability in learners to visualize and verbalize more than one paragraph toward the gestalt image. In this step, colored

felts and picture summary are also used again. The summary here is different than the previous ones since it only consists of few sentences describing the general imagery and the content of the paragraph. The instruction is paired with factual questions and a page summary. The learners read a whole paragraph and represent it by a colored felt and then provide a word summary of this paragraph. The instructor asks questions to refine the word summary provided. Next, the learners read the rest of the paragraphs, visualize and verbalize each of them. At the end, the learners give a quick and short picture summary to retrieve the general content of each paragraph. Then a summary of all the paragraphs is given by the learner followed by questions from the instructor. The questions are factual and of high order thinking level.

10- Page Imaging with Higher Order Thinking

This is the last step of the explicit instruction of the program. The learners visualize and verbalize a whole page. The colored felts are not used since there are no imaged parts. On the contrary, the learners read the whole and give a word summary. The instructor can ask the learners for some imagery throughout the page.

All the steps of the V/V program can be done in either small or large groups of students. The instructor has to visualize the group as a collective student. All students participate and each of them is asked to visualize and verbalize separately.

3.3.2 Curriculum-Based Measurement-CBM

CBM is a tool used for assessment known by different attributes. CBM is made up of a set of standard directions, some materials (i.e., sheets, passages, and lists), a timing device, record charts, and standards for evaluating the performance. The directions given to students are very direct and similar to the tasks that are

usually performed during class (reading from a book, writing a paragraph, or some computation problems (Hosp, Hosp, & Howell, 2007). During the performance of these timed tasks, the scores are recorded in terms of the number of correct and incorrect responses per minute.

CBM evolved out between 1970's and 1980's by Stan Deno and Phyllis Mirkin at the Minnesota Institute for Research on Learning Disabilities. They were working on a process of intervention called Data-Based program Modification (DBPM). DBPM was composed of different procedures for setting goals, interventions, and monitoring. Deno and Mirkin realized that an assessment system based on common principles and standardized procedures is highly needed. This system already existed for social behaviors but not for academic content. Thus, CBM was created to fulfill this need.

The main reason why CBM was used in this study is that it is characterized by different attributes. The first attribute is alignment. Students are tested with CBM on the curriculum being taken. Reliability and validity of the measures is the second attribute of CBM. In the last 25 years, there have been hundreds of research studies supporting the application of CBM. In CBM, criterion-referenced measures are used as opposed to norm-referenced measures. Also, repeated measurement over time is emphasized by CBM. They can be also used for progress monitoring to illustrate the rate of learning as it is happening. This allows an immediate adjustment in the students' educational programs whenever it is needed.

3.3.3 Woodcock-Johnson Tests of Achievement Third Edition (WJ-III).

The battery consists of 22 tests of achievement that target areas of oral language, reading, written language, mathematics, and general knowledge

(Woodcock, McGrew, & Mather, 2001). The scores were compared to standardized sample of students of similar chronological age. The tests were administered with about 4,000 students ranging from kindergarten through Grade twelve from more than 100 communities. The Woodcock Johnson tests norm referenced and used by the most professionals in field of special education in Lebanon to diagnose students' cognitive ability and their achievement. The two subtests used are: Reading Fluency and Passage Comprehension. Reading Fluency was used a screening test, while Passage Comprehension test was used as a pretest.

Reading Fluency: it is a test that measures the speed of reading and the comprehension of simple sentences. This test requires general information so that the student has the ability to confirm whether a statement that is read is true or false during a timed period.

Passage Comprehension: it is a complex task that tests the ability of the student to form mental representations given by the text throughout the reading process. The student is required to determine the appropriate missing word, make connections of concepts, and draw a conclusion from the text.

An interview designed for the special education teachers who deal with each of the participants was also used in the study. The special educators were informed about the purpose of the study but they were not informed about the distribution of the students in experimental and control group. The questions were piloted on a number of English teachers (special education and regular teachers). The questionnaire consists of five questions about the performance of the student in tasks requiring reading comprehension skills (See Appendix IV).

3.3.4 Checklist

A checklist was done by each of the participants before the intervention period and it was repeated every five sessions and also at the end of the intervention. This checklist reflects the students' attitude towards reading comprehension skills before, during, and after the intervention period

3.3.5 Questionnaire

A pilot questionnaire was administered with the special educators who work with the participants. This questionnaire was done before and at the end of the intervention period to check whether any change in the students' performance was noted.

3.4 Procedures

Baseline

Before initiating this study, a meeting was conducted with each of the students' parents, special educators, and regular English teacher. The purpose of the meetings was to inform them about the purpose and the procedure of the study. The parents were notified that at any time, they have the authority to ask for the withdrawal of their children from the study. Both parents and the director of elementary division in the school where the children are enrolled were given consent forms to sign. Pseudo names were used in the study so they stay unrecognizable.

The researcher interviewed each of the special educators who deal with the participants. The purpose of this pilot questionnaire was to know more about the students' performance in tasks requiring reading comprehension skills. Moreover, each of the participants was asked to complete a checklist which reflects their

attitude towards reading comprehension. On the other hand, the researcher conducted the CBM assessment to measure the baseline that reflects the number of correct responses the student has in a minute. Maze passages from the DIBELS were used. (See Appendix V) After identifying the baseline, a formula was used to find the aimline that each student should reach by the end of the intervention period.

Two tests from Woodcock Johnson III test of Achievement were conducted by a specialist to measure both the reading fluency and the reading comprehension skills of these students.

Intervention

The participants were randomly divided into two groups, the experimental group and the control group. The two students in the control group were not given any corrective strategy concerning reading comprehension skills. They were only exposed to the regular curriculum in their classrooms. The other two students in the experimental group were exposed to the V/V program. The program was implemented after school by the researcher over a period of four weeks for 10 sessions (50 minutes per session) per week. After every five sessions of intervention, the participants were asked to fill in the same checklist that they had prior to the intervention (See Appendix VI). The purpose of giving this checklist during the intervention was to notice the improvement of the participants' attitude towards reading comprehension. CBM was also conducted using similar Maze Passages used in the baseline period after every five sessions to measure the reading comprehension abilities of these students. Both, the CBM and the questionnaire were done with the four participants in both groups.

Follow Up

Two days after the completion of the intervention period, posttests were conducted to measure the improvement of reading comprehension skills of the participants. Moreover, the same questions given to the special educators who deal with the participants were asked by the researcher to those teachers to see the changes in the students' performance in reading comprehension tasks.

3.5 Data Analysis

A pretest was administered to make sure that the participants read fluently and have severe difficulties in reading comprehension skills. An interview was conducted with each of the students' special educator, in addition to a self checklist that was filled by the participants before, during, and at the end of the intervention. Curriculum-based measurement was also used before the intervention, during and after its end to monitor the progress achieved by the students. The intervention was then implemented for a period of four weeks. After the termination of the intervention, a posttest was administered in addition to the interview with the teachers. The researcher compared the results of the posttests between the experimental and control group. Moreover, a visual illustration through graphs was presented to compare the progress of students in reading comprehension. A summary of the interview and the checklists was also provided.

This chapter has shown the design used, participants, settings, materials and instruments used, procedure, and data analysis methods. The data and the results deduced in this study will be discussed in the following chapter.

CHAPTER 4

RESULTS

The current study aimed to study the effectiveness of “*the Visualizing and Verbalizing for Language Comprehension and Thinking*©” program in improving the reading comprehension skills in students with Asperger syndrome. This study also intended to check the improvement of the students’ attitude towards tasks that require reading comprehension. Moreover, the changes in performance in reading comprehension were also monitored throughout the intervention period using Curriculum Based Measurement. The data during both baseline and follow up were gathered using the Woodcock Johnson III Test of Achievement, Curriculum-Based measurement, informal interview with the special education teachers, and monitoring checklists done by the participants. A comparison between the results of the students in the experimental and control group will be established. The results will be discussed in detail in this chapter.

4.1 Students’ Attitude Studied By the Checklist

The checklist consists of five items. The students were required to check for each item one of the following: “extremely happy”, “happy”, “neutral”, “upset”, or “very upset”. The students were asked to fill out the checklist before starting the intervention and after every five sessions of instruction. Both groups, the experimental and the control, were asked to fill out the checklist at the same time. The first checklist filled by the students before initiating the program showed how

students do not enjoy at all tasks that require comprehension. For instance, all of the four students answered with “Extremely Upset” when asked the questions of the checklist concerning their feeling about reading for fun, asking questions about a reading material in class, their feeling towards reading time, and taking a reading comprehension test. However, it was obvious that both Jad’s and Rami’s attitude was improving during the intervention. Their responses were more positive every time they filled out the checklist. At the end of the intervention period, their answers varied almost between “happy” and “extremely happy”. Both students answered them “Upset” only on the question concerning their feeling about taking a reading comprehension test. However, both Rayan’s and Jawad’s answers did not reveal any significant change in their attitude towards reading comprehension neither during the intervention period nor at the end. These results show that students who were exposed to the V/V program were more positive and they started enjoying reading comprehension tasks. However, these students still feel “upset” when they have a reading comprehension test. When comparing the results of the checklist of these students to the other two in the control group, one can gauge the effectiveness of the V/V program on the students’ attitude especially that the participants in the control group held almost the same negative answers before, during, and at the end of the intervention period.

4.2 Curriculum-Based Measurement-Maze Passages

The progress of the students was monitored throughout the intervention by the Curriculum-Based Measurement using Maze passages from DIBELS.

Curriculum-Based Measurement is a progress monitoring tool used in measuring the students’ performance and growth in specific areas (Coyne & Harn, 2006). The

Dynamic Indicators of Basic Literacy Skills (DIBELS) is made up of a set of subtests to measure the students' early literacy from preschool through sixth grade. Maze passages from DIBELS were used in this study to measure the students' progress in reading comprehension. Both the baseline and the aimline of each student were identified before the initiation of the program. CBM was also administered individually to each of the four participants after every five sessions of instruction till the end of instruction. The test consists of maze passages that students read and the instructor counts the correct responses per minute and plots the score on a graph. Figure 1 illustrated the results of each of the four participants.

Figure1

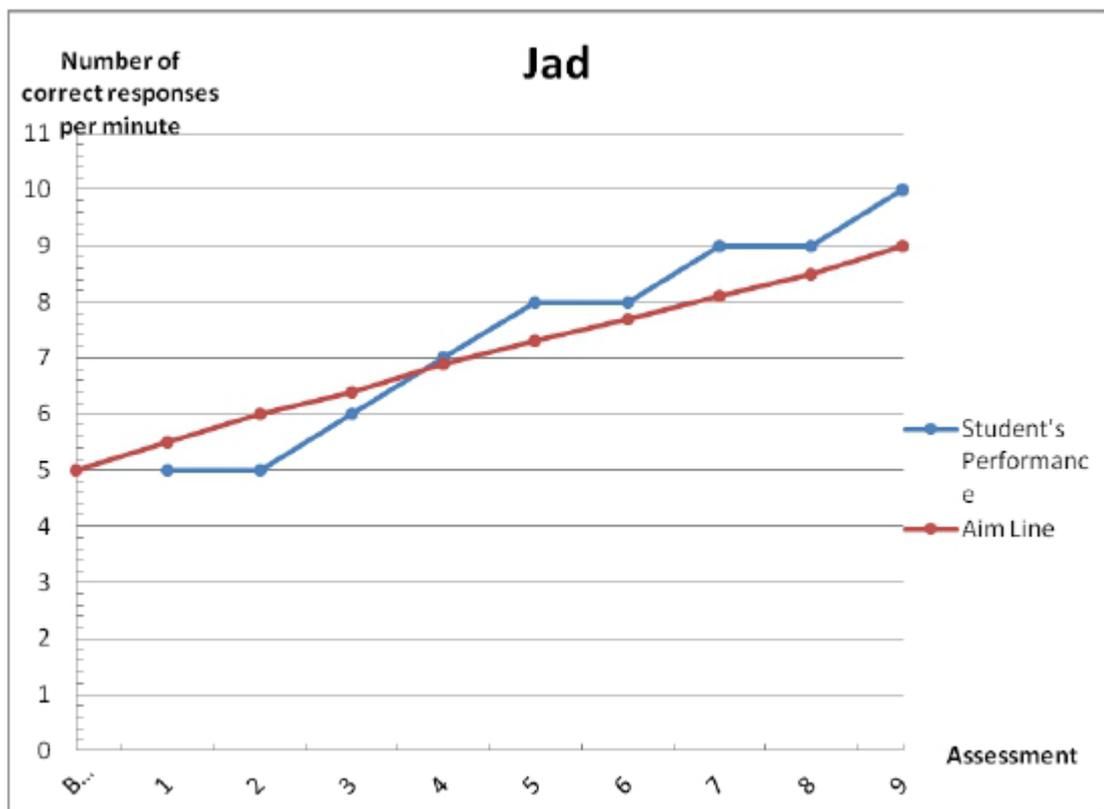


Figure 1: Jad's performance In CBM

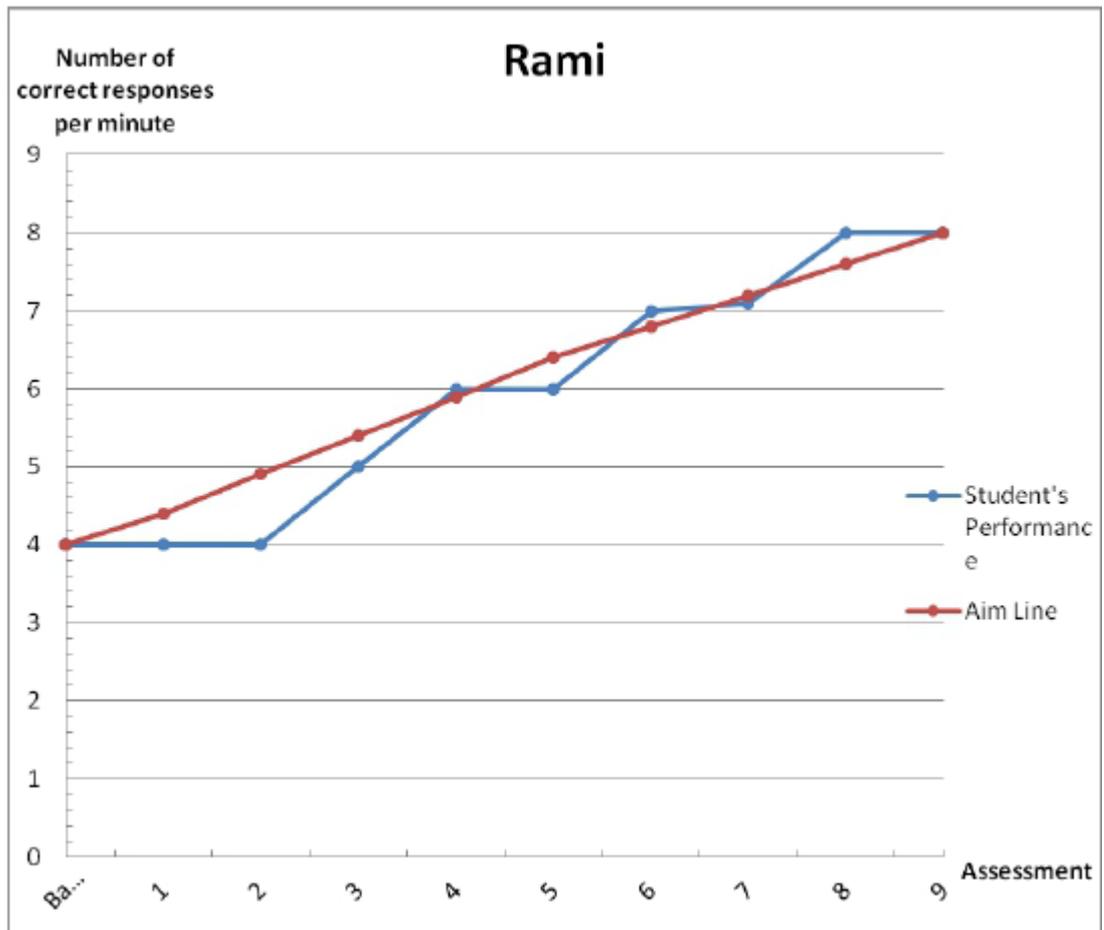


Figure 2: Rami's performance in CBM

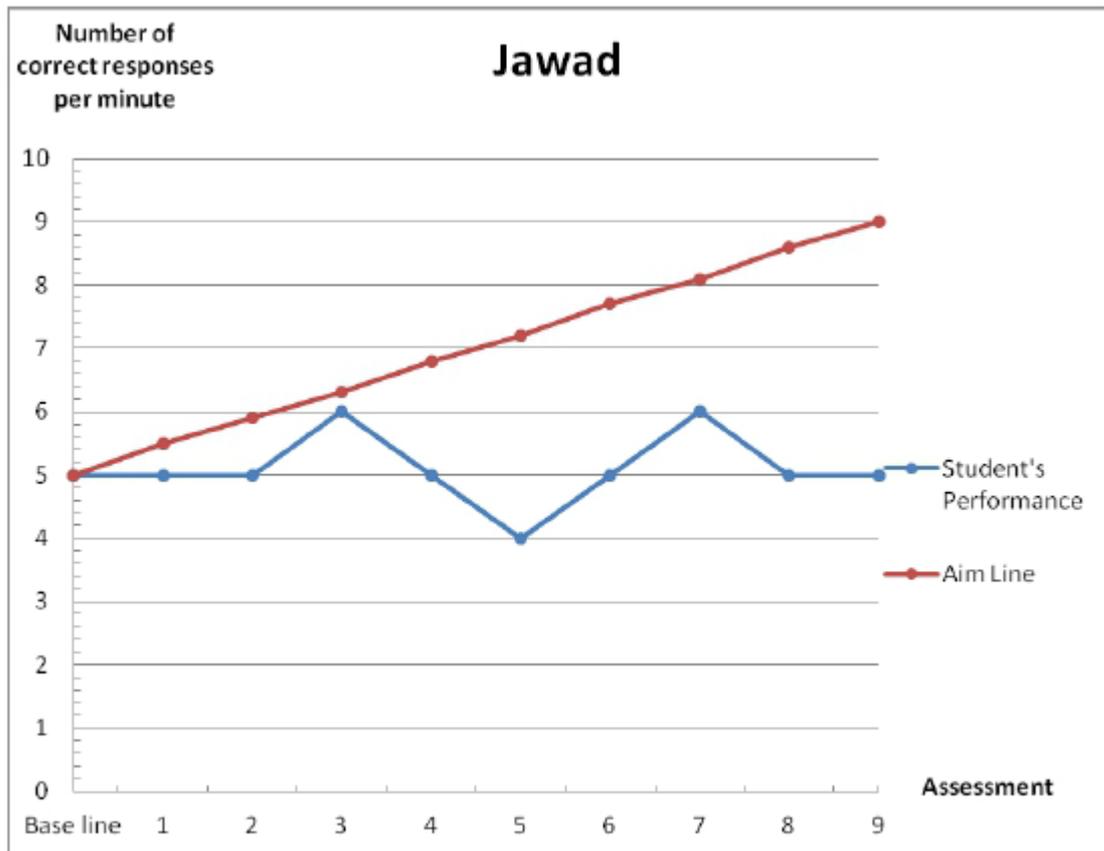


Figure 3: Jawad's performance in CBM

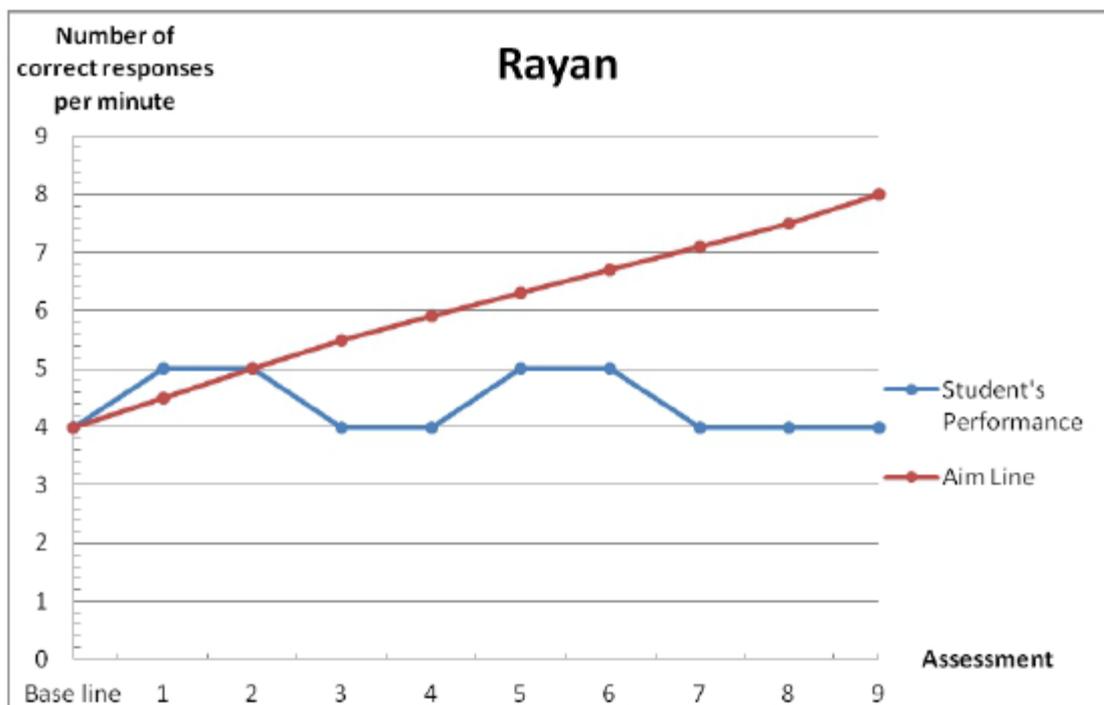


Figure 4: Rayan's performance in CBM

A visual analysis of the graphed data of the four students from the Maze passages indicated variability between the students. Jad and Rami showed increasing

scores which demonstrated a progress in their performance on reading comprehension. For instance, after the third assessment, Jad's scores showed an increase every time he was assessed until he exceeded the aimline by one item. Jad started the program by being able to read a maze passage with only five correct responses, and he ended the intervention period by reading a maze passage of same level with nine correct responses. As for Rami, he was also being able to reach the aimline by the end of the intervention period by being able to read a maze passage with eight correct responses per minute. On the other hand, the other two students, Jawad and Rayan who were in the control group, were not able to reach the aimline. They did not show any significant improvement. They showed stability in their scores in the baseline, intervention, and follow-up phase. For instance, Jawad started the CBM with a baseline of 5 which means that he was able to read a maze passage with only five correct responses. Jawad scored also five in his last CBM assessment. Rayan started the CBM with a baseline of four and he ended it with a similar score of four.

4.3 Interview with the Special Education Teachers

The interview consisted of four questions which require each of the special education teacher to describe the student's attitude and performance in reading comprehension activities. Also, the teacher is asked to explain some of the challenges the student is facing and to list some of the interventions that have been tried with the student to improve his reading comprehension skills. Teachers were asked the same questions prior to initiating the intervention period and at its completion. The teachers had almost similar answers when first asked the questions of the interview. For instance, according to the teachers, none of the four participants

enjoy tasks that require reading comprehension. One of the teachers reported that reading comprehension is “a hell”. On the other hand, the teachers describe some of the challenges that the students are facing. For instance, the four students read texts fluently but they are not able to answer related questions. During class discussion about a selection that was read in class or at home, these students did not participate at all and they also tried to avoid looking at the teacher so she does not call on them to answer any question or to give their feedback. One of the special education teachers also mentioned that, although all the questions during tests are modified and simplified, those students are not being able to achieve good results. Many practices have been done with these students but “unfortunately nothing has been effective”. By the end of the intervention, the special education teachers were asked by the researcher almost the same questions as in the baseline phase. Both Rami’s and Jad’s teachers had much more positive feedback than Jawad’s and Rayan’s teachers. For instance, Rami’s and Jad’s teachers reported that the students started to enjoy reading comprehension tasks. Moreover, the interview showed that Jad is participating well when discussing the events of a story, and both Rami and Jad are performing well and they are getting much better grades in quizzes and comprehension tests. On the other hand, Rayan’s and Jawad’s teachers reported that there are no changes to note in the students’ performance. Their attitude and their performance did not change.

4.4 Woodcock Johnson III Test of Achievement

Two subtests from the WJ-III were administered in this study. Prior to the intervention period, Reading Fluency and Passage Comprehension tests were used. The Reading Fluency test was administered in this study only before starting the intervention to make sure that the participants can read fluently. The Passage

Comprehension test was used to make sure that the participants display a serious problem in reading comprehension. By the end of the intervention, the passage Comprehension test was also administered individually to each student as a posttest to measure any change in the students' performance in reading comprehension. The Passage Comprehension test requires the students to read a short paragraph and identify the missing word that gives meaning to the context of the paragraph. Each student's score was compared to a standardized group of students having similar chronological age. The statistical student T- test was used in this study. All analyses were two tailed and a p-value <0.05 was considered significant. The statistical package for the social sciences was used for the computations. Table 1 illustrates the results of the pretest and posttest and Table 2 illustrates the interpretation of the results using the statistical test.

Table 1: Pretests results.

Students	Standard Score SS	Grade equivalence GE
Rami	67(62-72)	2.3
Jad	64(56-72)	1.9
Jawad	57(52-62)	1.7
Rayan	72(67-76)	2.1

Table 2: Posttests results

Students	Standard Score SS	Grade equivalence GE
Rami	90(87-92)	5.1
Jad	89(85-93)	4.8
Jawad	58(52-62)	1.8
Rayan	78(74-82)	2.6

Table 3: The Results of the Pretest and Posttest

Standard Score: SS		Grade Equivalence: GE	
Experimental Students	Control Students	Experimental Students	Control Students
Pretest			
1.90	65.50 [®]	64.50	2.10 ^{***}
±0.28	±2.12	±14.61	±0.28
Posttest			
2.20 ^{**}	89.50 ^{®®}	68.00	4.95 [*]
±0.57	±0.71	±14.14	±0.21

^{*}, ^{**} values with different superscripts are significantly different at $p < 0.05$.

^{*}, ^{***} values are significantly different at $p < 0.05$.

[®], ^{®®} values are significantly different at $p < 0.05$.

The results show a significant difference between the scores of students in the experimental group and those in the control group when their performance in reading comprehension was measured and valued according to grade equivalence. Students who were exposed to the V/V program made a significant improvement in reading comprehension, whereas the students in the control group, who were not exposed to any intervention, did not made any significant improvement and their scores still reveal a very limited reading comprehension abilities.

This chapter presented the results of all the assessment tools used in the study. This coming chapter includes a discussion of all the results obtained from this research and also it relates the results to previous conducted research and findings.

CHAPTER 5

DISCUSSION

The main purpose of this study was to examine the effectiveness of the Visualizing and Verbalizing for Language Comprehension and Thinking © program on the reading comprehension skills of students with AS. This study was intended to see whether this intervention would improve the students' reading comprehension skills compared to the results of AS students in the control group. The second aim was to see whether the students' attitude and motivation towards reading comprehension tasks will improve. The researcher of this study hypothesized that there would be a significant improvement in the reading comprehension skills of the students in the experimental group after the termination of the intervention period. It was also hypothesized that the students' attitude and motivation towards tasks requiring reading comprehension will also improve. This section discusses the results and the findings of the study and also relates them to some previous research.

5.1 Discussion of Results

5.1.1 The Interview Results

The information gathered from the special education teachers prior to and at the end of the intervention period showed positive results. The special education teachers who work with Jad and Rami, the students who were exposed to the V/V program, mentioned that by the end of the program, these students started to enjoy reading comprehension tasks and they started to get much better grades on their

reading comprehension tests and quizzes. Similar results are shown in a case study conducted by Bell (2007) which aimed at improving the reading comprehension skills of a girl in sixth grade with AS. Visualization was the strategy used during the intervention period which consisted of 50 hours of instruction. The results of this study showed that the girl started to perform better in class and her homeroom teacher reported that she has shown an improvement of three grade levels in reading comprehension after the termination of the intervention. Jad's special educator explained how Jad is no more facing the same challenges as before. For instance, he is now able to make connections between ideas, to understand the characters' emotions, and to summarize the events of a short story in sequence. However, the data gathered from the interview with the special education teachers who work with Rayan and Jawad who were not exposed to any intervention, showed that no changes in their students' performance and attitude have been noted. A study conducted by Gately (2008) describes the challenges students on the spectrum face when reading comprehension tasks are required. Almost the same challenges were mentioned by the special education teachers when they were asked about the challenges the participants face in reading comprehension. As mentioned before, the participants in the control group were not able to overcome these challenges like the other experimental students did. Gately (2008) explains in his study how these students with AS struggle with understanding what they read, thereby making reading frustrating to them. It was noted in his article that students will find it hard to integrate language, understand social situations, and make connections between ideas. These difficulties make it hard for them to understand and to see the whole picture of what they read if they are not exposed to a remediation program like the V/V program.

5.1.2 The Checklist Results

The checklist aimed at checking the improvement in the students' attitude and motivation towards reading comprehension. After being very frustrated when reading comprehension was required, the students in the experimental group, Jad and Rami, have shown a great improvement in their attitude towards reading comprehension. After the termination of the program, they began enjoying reading sessions and felt happy about being asked questions in class. However, it was noted that both students did not show a change in their attitude towards taking a reading comprehension test. So although their skills in comprehension had improved, these students still needed encouragement to be able to reduce their negative attitude when having a reading comprehension test. For instance, the checklist shows that both of the students still feel "upset" when they have a reading comprehension test. As for the other two students in the control group, Rayan and Jawad, no changes have been noted in their attitude and motivation towards reading comprehension. Since they were not exposed to the V/V program, they did not have the opportunity to overcome their challenges and to start enjoying reading comprehension tasks like those in the experimental group.

5.1.3 The Curriculum-Based Measurement Results

Curriculum-Based measurement (CBM) is a way that instructors implement to measure how their students are improving and to monitor their progress in the basic areas such as reading, writing, math, and spelling (Hosp. et al, 2007). The CBM was used in this study to measure the progress of the four participants in reading comprehension skills. The maze passages used for testing were taken from the

Dynamic Indicators of basic Early Literacy Skills (DIBELS). The participants got almost similar results in CBM as in the Woodcock Johnson Passage Comprehension Test since as mentioned before, both Jad and Rami showed progress in their scores in the post tests administered. For instance, Jad and Rami were able to reach the aimline before the end of the intervention period. They both showed a progress in their scores every time the CBM was performed. This proves the effectiveness of the V/V program on the students' reading comprehension skills. Almost from the second week of intervention, the students who were exposed to the program started to show a progress in their performance. However, Jawad and Rayan, since they were not exposed to the intervention provided, they did not show any progress in their scores. As in this study, the results of CBM using DIBELS support the results of the Woodcock Johnson standardized tests, an evaluation performed by the Education department in the State of Alabama in 2004, examined the relationships present between the score of third grade students on the reading fluency test and their reading scores on "the Stanford Achievement Test-tenth Edition (SAT-10)". The results show a correlation between the two scores. Students got almost similar results on both the DIBELS and the SAT 10. Moreover, similar tests from DIBELS were used in 2007 during a school year. For instance, the tests were implemented in 13,869 schools in the States to elementary students. The results show that the DIBELS are considered very strong predictors of the children's performance on a variety of standardized tests in reading (Paleologos & Braham, 2011).

5.1.4 The Pretest and Posttest Results

The results of the pretest and posttest show that both Jad and Rami who were exposed to the intervention program, made a significant progress in their scores.

Jad's reading comprehension grade equivalence level was 1.9 before the intervention period. After the termination of the program, Jad made an improvement of about three grade levels which is very significant. Rami also made almost the same progress in his reading comprehension skill. However, the students in the control group who were not exposed to any intervention did not make any significant improvement. The results of their posttests show that these students are still facing severe difficulty in reading comprehension. The comparison made using the T-test between the results of the experimental and control students shows a significant difference between their results. The results show the importance of the V/V program in improving reading comprehension skills of students with Asperger Syndrome. The results also show the importance of visualizing and creating mental images, two important skills addressed in the program. Rader (2010) developed a two-year pilot program to find out whether the increase in visualization leads to effective reading comprehension in students with Asperger Syndrome and language delay. Sixty-nine students in lower elementary classes took part in this study; 33 were exposed to the intervention, while 36 were not. The results of the study show that the development of the visualization skill is very effective in improving reading comprehension. It was obvious that students had more detailed and well structured summary of the paragraph after receiving the program (Rader, 2010). Since students with Asperger syndrome display a deficit in their reading comprehension skills (Nation et al., 2006), a corrective program like the V/V program would be very effective in remediating this skill.

CHAPTER 6

Conclusion

The results of this study may lead to several conclusions. First, after being exposed to the V/V program, Jad and Rami showed a significant progress in their reading comprehension scores using pre and post tests of Woodcock Johnson III Test of Achievement. However, the same tests show that Rayan and Jawad did not show any significant improvement in the same skill since they were not exposed to the intervention program. Second, the V/V program have not only improved the students' reading comprehension skills, but also their attitude and motivation towards tasks that require reading comprehension have improved as shown in the results of the checklist. Moreover, positive changes were documented by the teachers' questionnaires. The results show how the students in the experimental group have shown improvement in their performance in class when reading comprehension is required. CBM also showed the progress Jad and Rami were doing during the intervention period as opposed to Rayan and Jawad. One can visually notice the progress the students in the experimental group have made especially when they both reached the aimline and one of them exceeded it.

6.1 Limitations

Although this current study was effective with Jad's and Rami's reading comprehension skills, potential drawbacks cannot be ignored. First, the study was implemented on four students among which two were in the experimental group and

two in the control group. Thus, the generalization will be very limited. Second, the researcher was the instructor was the one who implemented the program to one of the two groups involved which might have created some internal bias. Third, the results of both, the teachers' questionnaire and the checklist cannot be very reliable since the researcher cannot make sure that what was reported is really true and reflects the total reality. The last limitation may be the participants' age. The program was very effective with students between 11 and 12 years old, however this same program might not be as effective as with either younger or older students.

6.2 Implications

Although different studies have discussed the effectiveness of concept imagery and visualization (Rader, 2010), this study adds some evidence to the effectiveness of both visualization and verbalization on the reading comprehension skills of students diagnosed with Asperger Syndrome. The V/V is easy to implement not only in small group setting but also in an inclusive setting. The program is highly effective and it is also very simple and enjoyable.

Based on the findings of the current study, both regular teachers and special education teachers will benefit from familiarizing themselves with the V/V program. By helping their students visualize, verbalize and think in pictures, they will be help them become better readers.

6.3 Recommendations for Future Research

Most studies have been designed to measure the improvement of social skills and interaction for individuals with AS. Little or no importance has been given to skills needed in reading comprehension since AS individuals read and speak fluently

and they have advanced vocabulary skills. Since reading comprehension creates severe difficulties for students with AS, it is very important for researchers to find some ways that remediate this skill. This study proved that the V/V program is very effective in improving the reading comprehension skills of students diagnosed with Asperger Syndrome. Future studies need to find whether the V/V program is effective with all AS students regardless of their age and gender. For instance, this study was conducted on four boys whose ages vary between 11 and 12 years. It would be beneficial to find out whether other students, girls and boys, with AS and who are older or younger than this age group would benefit from the implementation of this program in improving their reading comprehension skills. On the other hand, future studies may be conducted to study the effectiveness of the implementation of the V/V program in an inclusive setting in the mainstream classroom. These studies will show whether AS students included in these classrooms will benefit from the implementation of the program and thus their reading comprehension skills would improve. Finally, more research needs to be done to address the maintenance issue and to better generalize. The post test, checklist, and questionnaire were done two days after the termination of the intervention. Maybe the future research might have the post tests being conducted after a longer period of time after finishing the intervention period to check the long term effects of this program.

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Appendix I

Dear parent:

I am Siham Fakhreddine. I am pursuing my M.A. in special education at the Lebanese American University. I would like to work with your child to improve his reading comprehension skills. I will be using a research-Based program called the *Visualizing and verbalizing for Language Comprehension and Critical Thinking*. The program used to stimulate concept imagery which is the skill used in visualizing the gestalt or whole. This skill is developed in this program by developing the sensory association required in the development of language comprehension, expression, and thinking. The skills used in this program are proven to be highly effective in improving the reading comprehension skills of students with Asperger Syndrome.

If you approve, your child will participate in the study five days a week for two sessions every time. Your child's participation is completely voluntary. Your decision will not affect your child's grades at school. Moreover, the data obtained from this research project will be very confidential. Pseudonyms will be also used to substitute your child's name. In the space below, please choose whether you accept or you refuse that your child participate in this study. If you have any questions please do not hesitate to contact me.

Sincerely,

Siham Fakhreddine

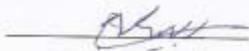
Email: siham_00@hotmail.com

Mobile: 03512545

Yes I agree to allow my child to participate in this project

No I do not allow my child to participate in this project

Parent's signature:



APPENDIX II

Dear director,

I am Siham Fakhreddine. I am pursuing my M.A. in special education at the Lebanese American University. I would like to work with four students from your school to try to improve their reading comprehension skills. I will be using a research-Based program called the *Visualizing and verbalizing for Language Comprehension and Critical Thinking*. The program is used to stimulate concept imagery which is the skill used in visualizing the gestalt or whole. This skill is developed in this program by developing the sensory association required in the development of language comprehension, expression, and thinking. The skills used in this program are proven to be highly effective in improving the reading comprehension skills of students with Asperger Syndrome. If you approve, two students will participate in the study over a period of four weeks for five days a week. The sessions will be given immediately after school. The other two students will be in the control group where no intervention will be provided. However, these students will not attend the class sessions where reading comprehension strategies. Moreover, the data obtained from this research project will be very confidential. Pseudonyms will be also used to substitute your child's name. In the space below, please choose whether you accept or you refuse that your child participate in this study. If you have any questions please do not hesitate to contact me.

Sincerely,

Siham Fakhreddine

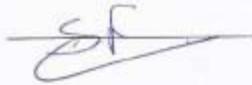
Email: siham_00@hotmail.com

Mobile: 03512545

Yes I agree to allow my child to participate in this project

No I do not allow my child to participate in this project

Parent's signature:



APPENDIX III

Sample lesson plan

Program: Visualizing and Verbalizing for Language Comprehension and Thinking
by Nancy Bell

Duration: 50 minutes

Objectives

By the end of the session, the students will be able to:

- Verbalize by describing a given picture

Materials

- Pictures from Picture to Picture.
- The 12 structure words: what, size, color, number. Shape, where, movement, mood, background, perspective, when, and sound.

Procedure

- The researcher shows the students a picture. The researcher says the following: " here is a picture that I did not see. You are going to tell me about it. Your words will help me create a picture in my mind".
- The researcher reminds the students to start from the top to the bottom
- Students start to describe the picture.
- The researcher questions with choices and contrast.
- The students are asked to check through the structure words.
- The researcher rephrases and summarizes the students' responses by saying: " your words made me picture..."
- The researcher and the students compare the summary to the picture.

Closure

The researcher will ask the students to visualize the picture that they already verbalized.

APPENDIX V

Curriculum-based Measurement: Maze Passage Copy

#Correct: _____ #Errors: _____

Student: _____ Classroom: _____ Date: _____

When you think about deserts, you probably think of hot, dry places with sand stretching for miles. While it is true that some (playgrounds, deserts, pleasure) are hot, sandy areas, most deserts (lain, are, believe) different. For example, some deserts have (angry, mountains, eyes), and others have bare plains covered (after, big, with) stones and gravel. Some deserts are (big, even, though). The one thing that (all, beautiful, more) deserts have in common is that (old, they, hot) are dry. In fact, some deserts (re, receive, colorful) no rain at all for years (at, throughout, frowning) a time. In one South American (business, street, desert), no rain has fallen in over (summer, forty, nail) years! The average amount of desert (about, summer, rainfall) is less than ten inches a (moment, year, desert).

The plants and animals that live (far, in, behind) deserts have special features that help (wine, roll, them) survive in the desert's dry climate. For example, some desert (plants, dry, animals) have very long roots that grow deep into the (desert, ground, tree) to reach water. Other plants have (robust, subtract, very) shallow roots that extend outward in (shiny, night, a) large area around the plant. These (roots, deserts, hot) are close to the surface so (they, strong, wooden) can take in water from even a small amount of rain.

Appendix VI

Attitude towards reading comprehension: Self Checklist.

Name: _____

Date: _____

Questions	Extremely happy	Happy	Neutral	Upset	Extremely upset
1. How do you feel about reading for fun at home?					
2. How do you feel when the teacher asks you questions about what you read?					
3. How do you feel when it's time for reading class?					
4. How do you feel about reading out loud in class?					
5. How do you feel about taking a reading comprehension test?					