

Effectiveness of applied behavior analysis on behavior modification of children with autism



Submitted by

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Certification

I have perused the thesis paper entitled **‘Effectiveness of applied behavior analysis on behavior modification of children with autism’** by the student Khadiza Binta Habib, Educational Psychologist in Training (Epi-6), Session:2014-2015 in a fulfillment of the requirements for the degree of **Master of Philosophy (MPhil) in Educational Psychology, Department of Educational and Counselling Psychology**, University of Dhaka and that is a record of bona fide research carried out by her under my supervision and guidance.

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Declaration

I, Khadiza Binta Habib, Student of MPhil in Educational Psychology, Department of Educational and Counseling Psychology, session 2014-2015, declare that this thesis paper titled on **‘Effectiveness of applied behavior analysis on behavior modification of children with autism’** has been under taken under the supervision of Dr. Mahjabeen Haque, Department of Educational and Counseling Psychology, University of Dhaka.

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Dedicated
to
My Respectable Parent
and
My Late Sister

Acknowledgement

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Acronym

- ASD –Autism Spectrum Disorder.
- PDD-Pervasive Developmental Disorder.
- DSM-Diagnostic and Statistical Manual of Mental Disorders.
- ICD-International Classification of Diseases.
- WHO-World Health Organization.
- IDEIA-Individual with Disabilities Education Improvement Act.
- ADCL-Autism Diagnostic Check List.
- ABA-Applied Behavior Analysis.
- ABC-Antecedent Behavior Consequences.
- ECAS-Eye Contact Avoiding Scale.
- DTT-Discrete Trial Training.
- NET-Natural Environment Training.
- BCBA-Board Certified Analyst.
- DIR- Developmental, Individual Difference, Relationship-Based Model.
- IPNA-Institute of Pediatric Neurodisorder and Autism.
- BSMMU-Bangabandhu Sheikh Mujib Medical University.
- IEP-Individual Educational Plan.
- NIDCD-The National Institute on Deafness and other Communication Disorder.
- NIH-National Institutes of Health

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Abstract

There are many different ways to teach children with Autism Spectrum Disorder. Applied Behavior Analysis (ABA) is one educational tool that has shown to be effective in showing progress with children of Autism Spectrum. The present study investigated to see whether there is any effect of ABA therapy on behavior modification of children with autism. A total of forty ASD children and their mothers were included in the study. Twenty were assigned in experimental group and the rest were assigned to the control group. Antecedent Behavior Consequences (ABC) has been used for assessing target Behavior (Eye Contact). Eye Contact Avoidance Scale (ECAS) has been used to measure eye contact avoiding behavior before and after intervention. Applied Behavior Analysis (ABA) therapy has been used for intervention program. Data has been analyzed by independent sample t-test. Result indicated that there is an effect of ABA therapy on behavior modification of children with autism. Children of experimental (intervention group) showed significant improvement in making eye contact than the children of control group (no intervention).

1. Introduction

All over the world, gradually the number of children with Autism is increasing. Autism spectrum disorders are lifelong neuro developmental disorder that affects an individual's ability to Behavior effectively. So, ABA Therapy is important because the Autism Children face difficulty with problem behavior. Worldwide in large number of countries there are continuing huge numbers of ABA therapy in different settings (Rehabilitation Centre, Autism school etc) for Behavior modification of autistic child. There are also many Autism school, Autism Welfare Foundation etc are working for Behavior modification with Autism children in their overall activities.

Autism Spectrum Disorders (ASD) is also known as Pervasive Developmental Disorders (PDDs). Its main characteristics are impaired communication and social interaction as well as restricted and repetitive interests and behavior (Lincoln, Searcy, Jones and Lord 2007).

Autism a pervasive developmental disorder is marked by profound deficits in social, language, and cognitive abilities. There are some characteristics associated with autism including severe, complex, and permanent behavioral and cognitive disabilities and affects all areas of performance. Autism Spectrum Disorders (ASD) is a complex, lifelong condition that affects individuals from all walks of life, as well as their families, friends and caregivers. The word autism derives from the Greek word autos, which means self. Autism is a common neurological pediatric condition. In 1943, Leo Kenner first identified this disorder as Autism. (Case-Smith, Allen and Pratt 1996).

1.1 History of autism

Children displaying behaviors characteristic of current conceptions of autism have been recognized since the 1700's. The term 'autism' was first used by the Swiss psychiatrist Eughen Bleuler in 1911 to designate loss of contact with reality, which can cause difficulty with or incapacity of communication (Gadia, Tuchman, & Rotta, 2004, p 8). Bleuler used the term autism to describe schizophrenics who had difficulty relating to people and who appeared to be turned inward or towards themselves (Mansour, Dovi, Lane, Loveland, Pearson, 2017)

In 1943, Leo Kanner studied eleven children who demonstrated extreme aloneness and labeled this condition as early infantile autism (Gadia, Tuchman & Rotta, 2004). The typical difficulties that Kanner observed in these children were language abnormalities, social skill deficits and unusual behavior patterns that showed a tendency to preserve the environment (Matson & Minshawi, 2006). These behaviors were often compared with childhood schizophrenia, but the age of onset, family history, and intelligence level were thought to distinguish between the two disorders. Kanner believed that children with autism were born without an innate ability to develop normal affective contact with other people. He suggested that the parents of these children were very much career-oriented and intelligent but were socially awkward, and displayed little affection toward their children (Matson & Minshawi, 2006; Gadia, Tuchman & Rotta, 2004). Kanner suggested that the parents' child-rearing practices directly correlated with their children's developing autism. These beliefs became causal explanations of autism in the 1960's (Gadia, Tuchman, & Rotta, 2004, Linder, 1993). Further etiological factors, including stimulus deprivation, parental personality disorder, and some interaction between the biology and the experiences of the child were also considered (Linder, 1993).

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In 1961, Ferster theorized how the role of parents as mediators of reinforcement could be a potential cause of autistic behavior. These speculations by Ferster were not found to be valid, but his beliefs did contribute to the initiation of behavioral analytic research leading to data-based interventions for autism. Behavioral analytic principles attempted to address the learning needs of children through the use of social reinforcers (i.e., tokens provided to elicit a behavior response) (Gadia, Tuchman, & Rotta, 2004). This research was very much influential in the development of therapeutic interventions, such as Ivar Lovaas' work with applied behavior analysis (Volkmar & Cohen, 1997). .

The 1970's brought increased efforts to educate the public about autism. Parents became more highly involved and formed the National Society for Autistic Children. By the 1980's, autism was recognized as a distinct disorder in the Diagnostic and Statistical Manual of Mental Disorders (DSM) (Matson & Minshawi, 2006).

1.1.1 Classification of Autism and Pervasive Developmental Disorders

The two accepted classification systems used for diagnosing autism are the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) (American Psychiatric Association, 2000) and the International Classification of Diseases (ICD- (World Health Organization (WHO), 2007). In addition, the Individuals with Disabilities Education Improvement Act (IDEIA, U.S. Congress, 2005), also referred to as The Individual with Disabilities Education Act (IDEA) is used for purposes of educational classification of individuals with autism.

According to the DSM-IV-TR (APA, 2000), autism is manifested by delays or abnormal functioning in at least one of the following areas prior to age 3 years: reciprocal social interaction; language as used in social communication; and symbolic or imaginative play. It is

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estimated that 650 to 1,000 of every 100,000 children are born with autism spectrum disorder and that it affects boys four to five times as often as it affects. There is a higher risk of autism among siblings of individuals with the disorder. Autism is more prevalent than Down's syndrome, pediatric AIDs and diabetes combined (Center for Disease Control, 2001). The DSM- IV diagnostic criteria for autism include the following: qualitative impairment in social interaction, as manifested by at least two of the following: marked impairment in the use of multiple nonverbal behaviors such as eye to eye gaze, facial expression, body postures, and gestures to regulate social interaction. Failure to develop peer relationships appropriate to developmental level. a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people. lack of social or emotional reciprocity qualitative impairments in communication as manifested by at least one of the following: delay in, or total lack of the development of spoken language in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others

Stereotyped and repetitive use of language or idiosyncratic language lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level restricted repetitive and stereotyped patterns of behavior , interests and activities, as manifested by at least one of the following:

encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus apparently inflexible adherence to specific, nonfunctional routines or rituals stereotyped and repetitive motor mannerisms persistent preoccupation with parts of objects Delays or abnormal functioning (with onset prior to age 3 years) in at least one of the following areas; social interaction, language as used in social communication, or symbolic or imaginative play. The disturbance is not better accounted for by Rett's disorder or Childhood Disintegrative Disorder. In IDEA regulations autism is

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defined as “a developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age three that adversely affects a child’s educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences” (US Congress, 2005) This definition differs from the DSM-IV definition and is used primarily for educational purposes to implement effective interventions in the school setting (Pearson, Pobbe, Defenson, Oasay, Boivar, Banchard & Blanchard, 2011).

According to the Center for Disease Control and Prevention (2009), Autism is one of five disorders in the category of Pervasive Developmental Disorders, the term, “Pervasive” referring to a problem that cuts across multiple types of communication (Marshall, Sheller, Wiliams, Mancl & Cowan, 2007). The other disorders in this category include Asperger’s Syndrome, Pervasive Developmental Disorder-Non Otherwise Specified (PDD-NOS), Rett’s Disorder, and Childhood Disintegrative Disorder. As reported by Muller (2006), many states have adopted the term Autism Spectrum Disorders (ASDs) to refer to these various conditions as a related group. Asperger’s Syndrome is exhibited in individuals with relatively good verbal language but mild non-verbal language problems, a limited range of interests and decreased ability to relate with others (Muller, 2006; APA, 2000).

PDD-NOS is displayed in individuals who show non-verbal language problems and do not meet criteria for any other PDD disorder (Muller, 2006; APA, 2000). Rett’s Disorder is a rare neurodegenerative disorder that affects only girls (Cowan et al, 2007). Childhood Disintegrative Disorder is used to characterize individuals who demonstrate normal development during the first two year after birth, but soon thereafter exhibit a loss of acquired

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language, social, motor and adaptive skills, poor bladder control, and a reduced ability to play (Cowan et al, 2007).

1.1.2 Characteristics of ASD:

ASD is characterized by four main categories: impairment in social interaction, impairment in verbal and nonverbal communication, restricted repetitive and stereotyped behaviors, interests and activities, and developmental delay of The Medical/Psychiatric Diagnosis of Autism: The DSM-IV Criteria (2004) provided in autism watch (2004) explain the following criteria:

I. Impaired in social interaction:

- Marked impaired in nonverbal behaviors such as eye contact and gestures
- Failure to develop peer relationships Impaired expression of pleasure when others are happy

II. Impaired communication:

- Delay or lack of development of spoken language
- Impaired in ability to sustain conversation
- Repetitive or stereotyped use of language
- Lack of pretend or social imitative play

III. Restrictive repetitive and stereotyped behaviors

- Preoccupation with one or more patterns that is abnormal in intensity or focus
- Repetitive motor mannerisms

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- Preoccupation with parts of objects

IV. Delays in functional in at least one of the following (Social interaction, Social communication with language, Symbolic or imaginative play)

There are many intervention strategies for managing Autism child like Sensory integration, social skill group Therapy, Daily Living Skills Training etc. And one of the most important interventions for ABA is behavior Therapy.

1.2 What is ABA?

Applied behavior analysis is the science in which procedures derived from the principles of behavior are systematically applied to improve socially significant behavior to a meaningful degree and to demonstrate experimentally that the procedures employed were responsible for the improvement in behavior (Cooper, Heren & Heward, 1987)

Applied behavior analysis may be defined as the process of applying behavioral principles to improve behaviors while simultaneously evaluating whether noted changes may be attributed to the application of those principles (Alberto & Troutman, 2007).

Applied Behavior Analysis (ABA) involves the application of basic behavioral practices based on the principles of behavior (such as positive reinforcement, repetition and prompting that are applied systematically to bring about meaningful behavior change) ABA can also facilitate the development of language, positive skills and social behavior as well as reduce everyday social problems and serious behavior disorders.

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ABA Basics

Applied

- Application of behavior principles to everyday situations to increase or decrease a specific behavior.

Behavior

- A behavior in need of improvement is identified
- Behavior must be specific, observable and measurable

Analysis

- Data are collected that drive decision-making about an individual's response to intervention

If progress is not being made or is minimal using a particular intervention, the intervention is re-evaluated and modified so that the individual begins to make progress (Functional relationship between behavior and intervention) * National Autism Center, 2010

1.2.1 Historical Background of ABA

In 1938 American behaviorist B.F Skinner's Operant Conditioning theory was published in his first book, *The Behavior of Organisms: An Experimental Analysis*. He examined the basic mechanism of behavior change (learning)- the consequences of the behavior influence the likelihood that the behavior will occur again Skinner's laboratory research demonstrated that a behavior would increase when it is followed by a reward such as a highly desired item and that behavior will decrease in frequency when followed by punishment (Social disapproval, loss of privileges) In the 1960's, behaviorists began applying Skinner's theory

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to the development of teaching methods. Some, like Ivar Lovaas at UCLA, designed programs specifically for children with autism. Children with autism were making treatment gains within behavior modification programs and these findings were making their way into professional journals *Courtesy of CT FEAT, 2010

Skinner published *Verbal Behavior* in 1957 to describe his functional analysis of language. In 1968, the *Journal of Applied Behavior Analysis* was published. It wasn't until the mid-1990s, however, that intensive behavioral treatment for children with autism began receiving serious attention among families and others outside the scientific community. In 1993, Catherine Maurice published an autobiographical account of her family's successful experience with intensive ABA. This book, *Let Me Hear Your Voice*, gave families hope and direction that was supported by scientific research. By the end of the decade, ABA had received several major endorsements in the United States, including a 1999 report from the U.S. Surgeon General *Courtesy of CT FEAT, 2010

1.2.2 Safety and Effectiveness of ABA

Applied Behavior Analysis (ABA) is widely recognized as a safe and effective treatment for autism. Research has shown significant improvement across all areas of development, such as language and communication, cognitive skills, and adaptive skills in children who received intensive ABA services.

In the United States, ABA has been endorsed by some state and federal agencies, including the U.S. Surgeon General, the National Institutes of Health (NIH), and the Association for Science in Autism Research * National Autism Center, 2010.

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In 2007, a clinical report at the American Academy of Pediatrics concluded that the benefit of ABA-based interventions in autism spectrum disorders (ASDs) “has been well documented” and that “children who receive early intensive early intensive behavioral treatment have been shown to make substantial, sustained gains in IQ, language, academic performance, and adaptive behavior as well as some measures of social behavior.” (Myers & Johnson, 2007)

The field of Applied behavior Analysis maintains professional standards set by the Behavior Analysis Certification Board (BACB ~ [www. bacb.com](http://www.bacb.com)) which serves as a credentialing board for behavior analysis. Other professional groups promoting “best practices” in the field of ABA include the Association of Professional Behavior Analysts (APBA) and the Association for Behavior Analysis International, Association (ABAI). A number of studies have demonstrated that techniques can produce improvements in communication, social relationships, play, self care, school and employment. Many of these have been documented in peer-reviewed journals such as the Journal of Applied Behavior Analysis, The Behavior Analyst and The Analysis of Verbal Behavior. The results of the National Autism Center’s National Standards Project, the most comprehensive analysis of the autism treatment literature completed to date, showed that the over whelming majority of treatments that have solid research support come directly out of the field of ABA

1.2.3 Type of Problems ABA can address

ABA has been effective in decreasing challenging (inappropriate) behavior as well as increasing improving positive behaviors

- Challenging behaviors
- Noncompliance
- Tantrums
- Aggression

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- Self-injury
- Feeding problems
- Transition problems
- Self-stimulatory behaviors
- Skill areas / Positive behaviors
- Language & communication
- Focus
- Functional daily living skills
- Toileting
- Academic/ cognitive skills
- Play skills
- Social skills

1.2.4 Who can benefit from ABA?

ABA is effective in working with individuals of all ages. Research shows that intervention at a young age fosters better outcomes and can often reduce the likelihood of more severe or dangerous behaviors later in life. A number of recent studies confirm that ABA techniques are effective for building important life skills in teens and adults with autism (Autism Speaks, 2016). Many comprehensive autism support programs for adults employ and combine ABA techniques to help individuals transition successfully into independent living and employment (Autism Speaks, 2016). ABA has also been demonstrated as effective for treating the symptoms of a variety of conditions, including severe destructive behavior, substance abuse, dementia, pediatric feeding disorders, traumatic brain injury, among others (BACB, 2014).

1.2.5 ABA Approaches

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The behavioral approach involves:

- Observing and predicting
- Facilitating behavior change
- Recording and verifying challenging behaviors

ABA approaches are conducted in structured and unstructured settings and include both planned and naturally-occurring situations

Some of these approaches include:

- Discrete Trial Training (DTT)
- Natural Environment Training (NET)
- Verbal Behavior
- Challenging behavior

A very structured method of teaching that involves breaking down a skill or behavior into smaller parts and teaching each part until mastery, one building upon the next employed by many early ABA programs exclusively Consists of a 3-term contingency (Antecedent-Behavior-Consequence) .

Table: 1.1 Consists of a 3 term contingency

Instruction-	Response-	Reward/Correction
Teacher: “What does a cow say?”	Student “moo”	Teacher: “Great job” and gives student a piece of cookie.
Teacher: “What does a cow say?”	Student: “meow”	“A cow says moo”

Natural Environment Teaching (NET)

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Natural Environment Teaching (NET) occurs in more natural setting including in the community using intrinsically motivating items or activities- the child is motivated to perform a specific skill in order to access an item in the environment

Key elements of NET:

- Teach in the natural environment
- Set up situations where the child will be motivated
- Wait for child to initiate (requesting/perform an action)
- Prompt the correct behavior
- Reinforce it

Verbal Behavior

The principles of behavior are applied to teach verbal behavior B.F Skinner published his book, Verbal Behavior, in 1957 to describe his functional analysis of language Skinner broke language down into different categories

- Echoics ~ vocal imitation
- Mands ~ requests
- Tacts ~ labeling
- Intraverbals ~ verbal responses to another's verbal behavior

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Challenging Behavior

When addressing challenging behavior, you have to determine the function of the behavior ~ basically why they are behaving that way This is done through a functional behavioral assessment (FBA)

Possible functions of challenging behavior include:

- Attention
- Escape/Task avoidance
- Access to tangibles (items- toys, food, etc.)
- Sensory stimulation (automatic reinforcement)

Once the function of the behavior is identified, function-based strategies can be applied to decrease the behavior.

Analyzes of behavior through a 3-term contingency

Table: 1.2 Antecedent Behavior Consequences (ABC)

Antecedent	Behavior	Consequence
Teacher: “What dose a cow say.”	Student: “moo”	Teacher: “Great job” and gives student a piece of cookie.
Teacher: “Do your work quietly”	Student: continues to talk to classmate	Teacher: sends student out of the room.

1.2.6 Principles of Behavior

➤ Positive Reinforcement

When a stimulus is presented immediately following a behavior (or response) that results in an increase in the behavior

Reinforcers (SR+)

Primary reinforcers (unlearned) ~ have biological importance

- Food/drink
- Sleep
- Warmth

Conditioned reinforcers (learned) ~ have acquired reinforcing properties from being paired with primary reinforcers

- Verbal praise
- Games/toys
- Play activities/hobbies

➤ Negative Reinforcement

When a stimulus is removed following a behavior (or response) that results in an increase in the behavior

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Table: 1.3 Consists of a 3 term contingency

Antecedent	Behavior	(Response) Consequence
Akhil's mother adds some carrots to his dinner plate	Akhil begins to scream and push his plate away	His mother removes the carrots from this plate

A Quality ABA Program

A Qualified and trained behavior analyst designs and directly oversees the intervention.

The analyst's development of treatment goals stems from a detailed assessment of each individual's skills and preferences and may also include family goals.

Treatment goals and instruction are developmentally appropriate and target a broad range of skill areas such as communication, sociability, self-care, play and leisure, motor development and academic skills.

Goals emphasize skills that will enable the child to become independent and successful in both the short term and long term.

The instruction plan breaks down desired skills into manageable steps to taught from the simplest (e.g. imitating single sounds) to the more complex (e.g having a conversation).

The intervention involves ongoing objective measure of the individual's progress.

The behavior analyst frequently reviews the data and information on the child's progress and uses this to adjust procedures and goals as needed.

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The analyst meets regularly with family members and program staff to plan ahead, review progress and make adjustments as needed.

A defining characteristic of ASD is a difficulty in making or maintaining eye contact, a behavior that only makes Social interactions harder, but can lead to miscommunication among cultures where eye contact is taken as a sign of trust and respect (Lapidot & Barak)

1.3 Why eye contact is important in child with autism

Eye contact occurs very early in development and serves many functions for the young child. It has been implicated in the development of social, cognitive, and language skills. A substantial number of children with autism fail to develop this important skill and therefore experimenters with both developmental and behavior analytic perspectives have researched methods to teach eye contact. However, only a few researchers have recently attempted to condition the response of the communication partner as a reinforcer for social behavior and thereby arrange the conditions under which typical children develop social responses. The analysis of typical development of social skills to the teaching of eye contact as a language pragmatic skill to a child with autism. Data from a single case study of a child with autism are provided (Kerwin & Albert, 2013). It has been suggested that eye contact, sometimes referred to as (eye) gaze behavior or eye-to-face gaze (Mirenda, Donnellan, & Yoder, 1983) serves an important social function for young children even before vocal responding begins to develop. In early development, eye contact serves to regulate face-to-face social interactions (Lee, Eskritt, Symons, & Muir, 1998) and contribute communicatively to social interactions. Later, eye contact responses coordinate the visual attention between another individual and an object of interest and have been found to be an influencing variable in language acquisition (Podrouzek & Furrow, 1988).

1.3.1 Eye contact avoidance

Eye contact avoidance has become synonymous with autism spectrum disorder (ASD) and social impairment (Ninci, Lang, Davenport, Lee, Garner, Moore, & Lancioni 2013.), making it a common goal of interventions for children with ASD (Carbone, O'Brien, Sweeney-Kerwin, & Albert, 2013; Foxx, 1977; Weiss & Zane, 2010). Sustained eye contact may increase the probability of attending to necessary instructional stimuli (e.g., observing modeled behavior of the instructor or instructional materials), thus increasing the probability of compliance with instructions and potentially increasing the rate of acquisition of such skills as manding and simple motor imitation (Carbone et al., 2013; Cook et al., 2017; Kraus, Hanley, Cesana, Eisenberg, & Jarvie, 2012; Tiegerman & Primavera, 1984).

In spite of its social validity and prominence as a target for early intervention, there are few empirical demonstrations of and little agreement on appropriate procedures to effectively teach eye contact to young children with ASD. In some studies, "eye contact" has been described as looking at a person spontaneously while it has been defined in others as looking at a person in response to a name or an instruction (e.g., "look at me") (Ninci, et al 2013). Beyond this distinction, eye contact has been targeted both directly and indirectly (Ninci et al., 2013). Few studies have utilized the same prompting strategies, varying from none, to physical, to visual/modeling (Carbone et al., 2013). Only a few studies have considered and programmed for long-term maintenance and generalization in their investigations (Cook, 2017; Ninci et al., 2013).

Levin, Lee, Korneder, Bauer, and Evans (2009) used shaping and differential reinforcement to teach eye contact during pauses in instruction. The instructor removed a preferred item until the child made eye contact and used differential reinforcement to decrease latency to eye

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contact. If the child made eye contact within 5 s, they received a reinforcer for 40–60 s. If eye contact occurred after 5 s, the instructor delivered the item for only 10–30 s. Once the children made eye contacts within 5 s following the removal of the reinforcer, the instructor no longer immediately gave the reinforcer and instead would require a previously mastered response (e.g., a high-five) and a second eye contact before giving the reinforcer.

Based on procedures recommended by Levin et al. (2009) and O'Reilly and Leslie (1999) and later adopted for our classroom by Shane, Lichtenberger, Michelin, Mrljak, and Malott (2016), the present study used shaping without prompting to increase eye contact during pauses in instruction. A duration of 3 s was selected because it is approximately the length of time required to observe any necessary instructional components of a discrete trial (e.g., the modeled behavior of the instructor during a discrete trial of imitation training). Given the present skill level of the participants, who engaged in few listener responses and who did not make spontaneous eye contact, a shaping-only approach was selected to increase eye contact as a prerequisite for discrete trial training.

1.4 Literature review

Donaldson & Stahmer (2014) conducted a study. The results showed that the number of people being diagnosed with Autism was continuously growing. Right now one in sixty eight kids was diagnosed with Autism. In those one in sixty eight children at least forty-two of them were boys. There were many techniques that were used to help educate and treat children on the Autism Spectrum. One technique that was used in schools, home settings, and clinics was a technique called Applied Behavior Analysis also known as ABA.

Hayward, Eikeseth, Gale, Morgan, (2009) did a study on Autism is a pervasive developmental disorder characterized by severe impairment in social interaction and

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communication along with high rates of ritualistic and stereotyped behavior. He wanted to know that children that were on the Autism Spectrum greatly vary with their symptoms. The severity, presence of intellectual disability, and language deficits. There were also significant changes in behavioral features within individuals over times as well in addition the pervasive nature of the disorder across all areas of development (communication, social, cognitive, play, motor, adaptive skills) means that multiple disciplines are necessarily involved in effective intervention .

A study was conducted by Smith(2001) where typically developing students continually learn from their environment throughout their waking hours through play, modeling, conversation, etc. Children on the Autism Spectrum tend to had little to no skill or inclination to learn this way, which will lead to them to fail to understand communicative efforts made by adults attempting to help them learn. Since these children did not learned like typically developing children they were more likely to experience frustration in teaching situations and understand what they were learning. Their frustration ranges anywhere from tantrums to finding other ways to escape so they did not seek failure again.

Ekikseth et. al (2007) conducted a research where study being able to diagnosed children on the Autism Spectrum was being done at a very young age. He wanted to know that however, many children that had gotten a diagnosis weren't able to receive services until they were at the age of four or older. Since getting services for your children when being diagnosed was so important, investigators had conducted hundreds of studies on how to accomplish getting services in a wide range of effective approaches. Smith states out of all of the studies they have found the most effective one is an approach called Applied Behavior Analysis also known as ABA .

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Donaldson et al (2014) conducted a research which gave the explanation that Applied Behavior Analysis, more commonly known as ABA is a scientific approach for discovering environmental variables that reliably influence socially significant behaviors. ABA interventions were also called the operant model. Learning was the result of consequences that follow a behavior, and these consequences determine the likelihood of a behavior to happen again (Donaldson, 2014). The operant model involves three main parts an antecedent, which was an event of experience that happens before a behavior occurs. Then there was the behavior from the individual and lastly there was the consequence, which was what happened after the behavior occurred. This was also known as the three part contingency which is the ABC's of ABA (Donaldson, 2014). Within the intervention context the antecedent is most often the stimulus presented by the clinician with the intent to elicit the target behavior.

Ryan, Hughes, Antonis, Katsiyannis, McDaniel, Sprinkle, (2014) conducted a research which gave the **explanation that rewarding positive behaviors to verbal behaviors. This means that behavior was under** the control of consequences mediated by other people .this research made the way other educators look at behavior. The research was what made ABA used in an educational way (Ryan et al 2014). The principles of this theory had been used to create a behavior modification program sharing the same name designed to help children on the autism spectrum (Ryan et el 2014).

A study was conducted by Dillenburger, Keenan,(2009), where ABA based interventions range from highly structured programs that were conducted in a one to one treatment setting to more naturalistic inclusion programs that include typically developing children as models. ABA brings improvements and change in socially relevant behaviors within the context of the individual's social environment . ABA also is conducted within the scientific framework and focuses on functional relationships and replicable procedures. Because ABA was very

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data driven, it was able to achieve measurable changes in relevant target behaviors that last across time and environments (Dillenburger et al. 2009).

Zaman, (2011) did a study on there were three different types of ABA that professionals used on a daily basis. He wanted to know that one type of the approach that was used was most popular and most commonly used was called Discrete Trial Training. Discrete Trial training was a type of teaching style that used a series of trials to teach each step of a desired behavior or response. Lessons were broken into their simplest parts and positive reinforcement was used to reward correct answers and behaviors. When a child gives an incorrect answer it was most likely ignored. Each discrete trial had at least five parts. The five parts were a cue, prompt, response, consequence, and inter trial interval. Depending on the treatment program in which the child was enrolled in they may receive a few minutes to several hours of discrete trail training per day (Smith, 2001).

In 2001,smith conducted a research which most children that were receiving ABA treatments get at least an hour of treatment a day to be able to see the progress that was being tracked. Since children on the Autism Spectrum vary in ability, some programs that were implemented were longer or shorter. Children that need more therapy usually spend two to five minutes on a trial and then get a one to two minute break in between. They also usually get a fifteen to twenty minute break at the end of every hour

There are three aspects of Discrete Trial Training that may increase children's learning and motivation to learn. The first one is that each discrete trial is short. Children have many learning opportunities. The second advantage to Discrete Trial Training is teachers work one on one with the child, so this allows the teacher to tailor instruction to meet his or her needs. The third reason is it has a very precise format. Discrete Trial Training clarifies the teaching

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situation for the child. It specifically has a definite starting and stopping point and its components are kept simple (Smith, 2001). Discrete Trial Training is very useful to children on the Autism Spectrum because it allows the teacher to add new forms of behavior to their repertoires and make new discriminations between events (Smith, 2001).

Smith,(2002) conducted a study which gave the explanation that ABA was almost always implemented one on one, you could almost always gear the lessons to the children you were working with in many unique ways. Since all children learn in different ways you could teach different skills different ways such as imitation, receptive language, expressive language, conversation, and grammar (Smith, 2002). Most children at a young age learn from modeling or imitation. Imitation in ABA form is defined as giving a response that is identical to a cue. For example, you say to the child “do this” as you are clapping, the child will then have to follow (Smith, 2002). Most children with Autism struggle with this aspect. ABA allows this child to learn imitation through intensive therapy. ABA had also been the only teaching method that had been clearly shown to enable children with Autism to imitate actions such as clapping, playing activities such as rolling a car, or even imitating speech sounds.

Another skill that ABA uses to help teach is a program called Receptive Language. Receptive Language involves performing an action in response to a verbal cue. For example, picking up a doll when a teacher says “doll” or picking up a car with the teacher says “car.” Almost every child with autism lacks receptive language or is delayed in their development of receptive language. Along with receptive language there is expressive language, which is another, tool, used in ABA to teach (Smith, 2002). Expressive language consists of giving a verbal response to a visual cue. For example, when a teacher holds up an object the child would respond with the correct object. Since most children with autism do not have the

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ability to talk, expressive language is a very important lesson to try and teach children with autism (Smith, 2002). These are all forms of Discrete Trial Teaching.

Donaldson (2014) conducted a research where another popular teaching technique in ABA is called Pivotal Response Training. Pivotal response training was a variety of naturalistic behavioral interventions grounded in the principles of ABA. Specific elements of pivotal response training included gaining the child's attention, presenting clear and appropriate instructions, interspersing easier tasks with more difficult tasks, sharing control, requiring the child to respond to multiple aspects of the learning environment, providing contingent consequences, ensuring a direct relationship between the child's response and the reinforcer, and reinforcing attempts at correct responding. To teach pivotal response training you teach it in context of something. For example, if you are teaching a child the word cat you may play with a set of cat animals.

While teaching the word at the same time (Donaldson, 2014). You are bringing the word into the natural environment. Just like Discrete Trial Training after a correct response from the child, they would get a positive reinforcer such as food, or a preferred activity or toy.

Rosenwasser, Axelrod, (2002) conducted a study which gave the explanation that there had been a lot of research completed by many people to find out what was the best educational tool to teach children on the Autism Spectrum. Even though there were a lot of other successful resources to teach children with Autism, ABA had the best- documented outcome data supporting this approach compared to other methods .Since ABA emphasizes the teaching of children with disabilities in different environments, you were able to see the data more clearly how effective ABA is (Resenwasser et el. 2002) .

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In 2007, Hilton, Seal conducted a research where there were a lot of case studies that had been done to show the statistics of how effective ABA is in the Autism field. A lot of the case studies that had been done had been conducted between two different children using two different techniques. There was one case study that had been done between twin boys. One of the twin boys did extensive ABA therapy while the other twin did another autism technique called DIR. DIR is geared towards play and social interaction. The boys were two years old and both exhibited severe speech-language delays and were diagnosed with autism. Both of the boys were assigned a speech language pathologist and underwent supervision for two hours a day for 18 sessions. The first session and the last session were devoted to testing to get a baseline data. Once the testing was completed the twins began their intervention programs. During the ABA session the activities were presented as a discrete trial. This consisted of one simple step while signing a noun. For example, the therapists would say, “point to cow” while signing the noun cow (Hilton, 2007). During each session primary reinforcers were offered and then later replaced with a token reinforcement schedule that included preferred activities such as blowing bubbles or playing with toys (Hilton et. al 2007).

During the DIR sessions the material was presented the same but the child was allowed to choose activities. For example, if the child chooses to play with the cow the therapist will say “Lets play with the cow!” while signing the word cow (Hilton et. al 2007). With this type of intervention rewards include high fives, clapping, and praise. Each activity includes 15-20 circles of communication (Hilton et al. 2007).

After the weeks of therapy were done results showed that the child that received ABA went from a standard score of 7 to 8, and the child that received DIR dropped from a score of 12 to 10. The twin that received ABA showed three areas of improvement. He improved in gestural

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and vocal communicative means and social affect signaling (Hilton et. el 2007). The twin that received DIR only showed improvement in one area that was symbolic behaviors. Overall, the twin that participated in ABA therapy showed a higher increase in behaviors and educational purposes than the twin that received DIR interventions.

Aslan (2011),conducted a study which gave the explanation that, there were many other case studies that show that starting intervention at a younger age will help the recovery rate of children with autism. There was a case study completed with a boy who was 28 months and at a high risk of having autism. The child started ABA therapy for two hours a week and then transitioned into four hours a week). After therapy was conducted it showed that the child showed improvement in targeted skills he needed more help with. He showed improvement in non When the child continued with the therapy his IEP showed that he was showing positive amounts of improvement (Aslan 2011). By the end of the year of his therapy his scores in matching, imitation, receptive language, and expressive language went up tremendously. The child was scoring a 100 percent in all areas by the end (Aslan 2011).

Eikeseth et al (2014) conducted a study which gave the explanation that, ABA is effective at a young age is a study that was conducted by children around the age of 4 and then once the study was finished the children were around the age of 7. The study was conducted over 3 years to make sure that the results were accurate and consistent. The study took place in public elementary schools for typically developing children (Eikeseth et el 2014). Each child that was participating in this study received a minimum of two therapists. During the time of the treatments, the child worked alone with the therapist in a private room. Once the first year was up the therapists were asked to report the number of hours a week that the child was receiving ABA therapy and also had to report the treatment goals they had for each child (Eikeseth et el, 2014). Results showed that after getting ABA treatments social behaviors and

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aggressive behaviors decreased. It also showed that the children's IQ score went up 34 points. Since these children started at a younger age and were able to continue with extensive ABA therapy, it allowed them to improve on all skills, including adaptive, social, maladaptive, and behavioral skills. The study also shows that children who range from 4- 7 and have autism may benefit considerably from intensive ABA therapy.

Mcphilemy, Dillenburger,(2013) conducted a study where there were many people that were skeptical of ABA and were not sure if it was effective for their kids. Fifteen families volunteered to participate in a study where their children were involved in ABA therapy. Half of the families used one agency while the other families used another agency. All of the families were given a questionnaire, which they had to provide information about themselves, what they were expecting to get out of ABA and why they decided to go the ABA route.

Once intervention had started all of the parents stated that ABA interventions had a positive impact on their child. They all emphasized that it reduced frustration and problem behaviors due to improved communication between the parents and the child (Mcphilemy, 2013). For example, one parent stated that since starting ABA services their son has improved eye contact and is now able to communicate through picture exchange communication systems. Another parent stated that their son could now ask questions where before they started intervention he was non-verbal (Mcphilemy et el 2014).

Communication is not the only area that improved. Parents stated that they are now seeing changes in behaviors as well. One parent said that their child has a longer attention span where another parent said their child is now more aware of consequences of their actions. Other parents stated that their children are becoming more independent. They are saying that their children can now ride a bike, or went from special education to mainstream after

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receiving ABA services. Other are stating simple goals geared to independence such as being able to cope with daily life skills and being able to interact with siblings.

Most importantly families are now seeing improvement with their family life after receiving ABA services. One parent stated “we can now do things outside the home such as going to shopping centers, restaurants, or on vacation, whereas before uncontrollable behaviors made these outings very stressful” (McPhilemy, 2013). Overall, stress levels have been lowered and their families reported a better quality of life. Families also stated that ABA services have brought their family closer together. Families also have a different perspective on autism after receiving services. They learned that behaviors they thought that couldn’t be change can be changed and good behaviors are able to get strengthened.

The parents that were involved in the study considered ABA based interventions as very effective or effective. They said that their child has improved in fine motor skills and gross motor skills. One family also said that since finishing ABA services their child has a increase in social skills (McPhilemy, 2013). Overall, parents stated that ABA therapy had a significant positive impact on not only the lives of the child but also the family as a whole. They are now able to communicate and deal with challenging behaviors more efficiently (McPhilemy, 2013).

In 2014 Ryan et al conducted a study which gave the explanation that in order to promote success in ABA programs there needs to be consistent, intense, and sometimes constant feedback and correction of a child’s behavior. This requires intense one on one instruction at the beginning of the intervention, which also means that parent participation, was crucial. As new behaviors replace old behaviors it will become more automatic for the child (Ryan et al 2014). According to studies done by Lovaas nearly half of the children in the ABA program

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achieved higher functioning in comparison to only 2% of the control group not receiving treatment. Children that received ABA services had an increased level of cognitive skills, language skills, adaptive skills, and even compliance skills. Some children who received ABA therapy were eventually able to attend classes with their non-disabled peers (Ryan et al 2014). This suggests that ABA interventions implemented early on in a child's life can result in long-term positive goals.

Rosenwasser et al (2002) conducted a study. The results showed that Researchers demonstrated that early and intensive language focused behavioral education led to a profound difference in IQ and degree with children that are just being mainstreamed into educational settings .ABA has the best- documented outcome data supporting their approach as compared to other research methods. ABA emphasizes the placement and teaching of children with disabilities in integrated environments. The field of ABA had begun to systematize training and certification of people giving out therapy. In order to implement ABA you need to go through extensive training and are now required to get a board certification in order to supervise cases.

Smith, (2011) conducted a study where ABA is a scientific tool to teach specific skills and then reinforce them, it can be used in many different settings. ABA is an individual approach that focuses on increasing and teaching appropriate behaviors or responses while decreasing the inappropriate behaviors (Smith, 2010). ABA also creates an environment of growth and learning that can be applied to all areas of teaching. Behaviors are modified by consequences that follow it and is strengthened and maintained by reinforcement. This can be done at home but as well as in a school setting. For example, if you do a chore at home you get allowance but if you raise your in class you get attention by the teacher (Smith, 2011). Since there are so many people involved in a child's daily life it is important to strive to use behavioral teaching

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to bring out the best in each child. Behavioral teaching follows a curriculum that is designed to meet the individual's needs. In environments that are successful, each skill is broken down into the smallest part and introduced one at a time. Then slowly the next sub skill will be introduced

In order to have effective ABA teaching strategies in the classroom you should follow a set of recommended strategies. They include minimizing self stimulatory behaviors and gain attention, use routines but do not allow obsession, use visual schedules, use lots of visual supports, use repetition, use warnings and countdowns, minimize overuse of language during instruction, use many prompts, get a response, and lastly use effective reinforcers. Some examples of reinforcers used in the classroom are stickers, bubbles, snacks, and use of technology (Smith, 2011).

Bloh, Axelrod (2008) conducted study where a lot of the time ABA was used outside of the classroom in a one on one setting in a private room in a house or in a center based program. This was not to say that that was the only place that ABA can be implemented. ABA was an effective strategy that can be used in the classroom as well for a teaching tool. The most commonly used ABA instructions used in a classroom are direct instruction, positive behavioral support, curriculum based measurement, and curriculum matching. Recent federal legislation now requires that schools use behavioral methods. Some of the guidelines that need to be completed in school before implementing ABA services were making sure that the child had an FBA, and making sure that there is behavioral support and rules in the classroom.

Borden, (2011) conducted a study where most recently there had been a new DSM-V to come out and help the process of diagnosing children with autism. It can be recommends that

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children that were diagnosed with autism start treatment as soon as possible. The treatment should consist of an intensive instructional program that last year round and last for about 25 hours a week. Since ABA is implemented in some schools it was important to plan teaching opportunities for brief periods of time with either a small group or individualizing it one to one (Borden, 2011). It was also important to make sure that there was a low student to teacher ratio in the classroom. There should be no more than two children per adult.

Since ABA is mostly done at homes and not in schools it is important to make sure teachers are individualizing the programs to the child while implementing ABA at school. The programs would be made by observations done by family and teachers, which would measure the child's behaviors. It will also include age appropriate educational tools based on their age and culture (Borden, 2011). Doing ABA at home is a little easier since there is a lot of data that is taken. The data is put into a book and reviewed by supervisors while at home.

At school it may be a little more challenging because teachers do not only have one child to take data on, teachers may have to take data on three or four children with different programs. Since it is more difficult to do ABA treatment in schools there has been an instructional curriculum for ABA programs. In those programs it has a good number of organized materials. But it is to be noted that ABA is not a one size fits all program. You need to make sure the curriculum you follow in your classroom is one that is suited for all kids not just the one child you are focusing on at the time (Borden, 2011). Since curriculum development is an individualized process for ABA it will vary on each child depending on what the family wants to focus on as well. It is also noted that since ABA is mostly data driven that if you are not seeing improvements in the child's work you need to think about changing the child's curriculum (Borden, 2011).

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Steege, Mace, Perry, Longenecker, (2007) conducted a research which gave the explanation that even though there were studies to show that ABA was truly effective it was also important to understand some of the struggles and disadvantages families may see when first starting ABA services. Many service providers that use ABA were subjected to DTT, Discrete Trial Training. If discrete trial training was implemented correctly, it was one of the most powerful tools out there to help teaching children on the autism spectrum .Discrete trial training was very effective in teaching situations like color recognition, verbal requests, or social situations. It is non-effective when teaching sequential behaviors. Some examples of those behaviors were making your bed, brushing your teeth, doing laundry, etc. (Steege et el 2007).

There are more advantages to ABA then there are disadvantages. These advantages include, allowing for numerous training trials, easy access for more than one staff member to use, good way to develop specific language skills, ease of use in classroom settings, all of the instructional stimuli and detailed curriculum is provided to the staff. It also allows students to know the targeted response and they are easily identified. Another big advantage to ABA is that data collection is relatively straightforward. It is easy to read and you are able to know when the child is mastering a target or is not able to grasp the idea of the target. You are able to see the progressive steps in the curriculum clearly and detailed. Going along with reading the data, you are able to see the progress of the lack of progress that is being measured (Steege et el 2007). It may also help ready to learn behaviors. For example, attending to the teacher, expectation of reinforcement for a correct response, the ability to make discriminations, and learning to sit (Steege et el 2007).

Even though there have been many studies done to prove that ABA is effective there are still some disadvantages to everything. Some of the disadvantages in discrete trial training are it

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requires additional procedures to promote generalization (Steege et al 2007). Children on the autism spectrum have a hard time with change. Therefore, if they learn something in one setting they have a hard time generalizing it to another environment. For example, if a child learns a positive behavior at school he might have a hard time generalizing that behavior into his family life.

Other disadvantages to discrete trial training include, prompts to respond often not present in the natural setting, and it is also primarily a teacher directed activity. There is also immediate and powerful reinforcers that are not always available outside of the classroom or training session (Steege et al, 2007). For example, during a session you might get to play with your train once you have done a positive behavior but at home you might not get that same reinforcer. Also the drill nature of the training may generate rote responding. For example, if you ask a student to name five animals they will most likely name those five animals every time since they got a reinforcer at the end of the trial. Another disadvantage is that the nonfunctional nature of the training may generate some escape and avoidance behaviors (Steege et al 2007). For example, if the child sees that he is going to have to learn body parts and he doesn't like that program he may find behaviors to get out of doing the task that is presented to him. Even though there are some disadvantages to ABA services, there are more advantages that lead to positive outcomes of the child (Steege et al. 2007).

Over the past couple of years the diagnosis of autism is becoming more and more prevalent each day. Since this is occurring it is important to make sure that we have services that help treat the child at hand. ABA is one of those services that are guided to help the recovery rate of children diagnosed with autism. Since ABA is very intense and follows a strict procedure, research has shown numerous times the improvement it can make on not only the child's life but also the families life as well.

1.5 Present Scenario of Autism in Bangladesh

According to Mannan, (2017), 0.84% children are suffering from Autism Spectrum Disorder. Currently in Bangladesh various organizations are conducting research & providing services of ABA therapy in order to serve families experiencing ASD. Such as –Sajida foundation, IPNA, Suchona foundation, ICDDR, Child Foundation, Beautiful Mind, Proyash, AWF etc .Bangladesh has three tiered health care delivery system but the service for autism is available only at the upper level of the pyramid. The community living at the rural and semi urban areas was devoid of appropriate services for all ,the country needs to be incorporated the care for autism from the bottom of health service system, which is at the primary health care.

According Hossain, Saima (2011), estimated that 1% of the world's population, suffer from an autism spectrum disorder. Bangladesh has a population of over 160 million. Unfortunately, in many developing countries like Bangladesh have no data for how many children or adults suffer from this lifelong debilitating developmental neurological condition. It can be suggest that many other scientific and medical questions need to be addressed urgently. In July 2012, Bangladesh hosted the largest conference on autism which addressed the socioeconomic needs of individuals, families and societies affected by autism spectrum disorders, developmental disorders and associated disabilities at the united general Assembly in 2013 which was unanimously adopted. Saima Wazed Hossain, a school psychologist and global advocate for autism who is also the daughter of Prime Minister Sheikh Hasina has been actively.

Engaged in this global and domestic advocacy of mental health disabilities. She has been a significant champion to support this resolution.

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Professor Shaheen Akter, Director of Institute of Pediatric Neurodisorder and Autism (IPNA) at Bangabandhu Sheikh Mujib Medical University (BSMMU) has performed the largest study on autism in Bangladesh. The finding is helping Bangladesh chalk out an elaborate program on finding out the causes and come up with a detailed plan to address the ABA therapy.

According to Chowdhury, Rahman& Haque, (2014) it is high time to integrate various ASD therapies and focus on capacity building of the primary health cares of 1300 community clinics around the country.

1.6 Rational of the study:

There are many different ways to educate children on the Autism Spectrum. Applied behavior analysis is one educational tool that has shown to be effective in showing progress of autism spectrum. ABA allows children to show progress at their own pace using a repetitive educational strategy. Educators that have implemented ABA have voiced their opinion on why it is effective and have given their input on what has worked best for them and some of the struggles that have gone through to make sure that it is an effective tool for children with autism, as mentioned by Kehoe & Megun, (2015).

Although there are various therapy used in treating Autism such as play therapy, cognitive behavior therapy, floor time method etc. Yet according to Steege, Mace, Perry & Longenecker (2007), ABA is the only therapy that involves and combines Positive reinforcement, physical and verbal prompt and also one to one session.

According to Border (2011) it is important to alter and individualize the ABA Program according to the child's age & culture as the observation is performed by the family and teachers. Moreover the biggest advantage of this therapy is it can be conducted in both home and classroom.

Applied behavior analysis is widely recognized as a safe and effective treatment for autism. From the pre findings it is clear that ABA therapy is effective in behavior modification of children with autism. AS this therapy involves the parents and teachers of children with autism they will be able to apply this in classroom as well as in home setting. Children with autism often have very challenging behaviors, such as avoiding eye contact and aggression among many ABA therapies is effective in minimizing negative behaviors, while encouraging desired behaviors. The findings of the present study would progress the professionals with an important tool working in this area.

1.7 Objective of the study:

- **General Objective**

Objective of the study was to measure effectiveness of the Applied Behavior Analysis (ABA) therapy on behavior modification of children with autism.

- **Specific Objective**

1. To measure effectiveness of Applied Behavior Analysis (ABA) therapy on eye contact avoiding behavior of Children with Autism.

2. To measure effectiveness of Applied Behavior Analysis (ABA) therapy on listening, speaking, inability, difficulty, anxiety to maintain eye contact with parents, friends and family and unfamiliar people.

2. Methodology

2.1 Participants: In this study there were 40 participants who are children with autism. They were purposive in case of socio-economic status, income level and in case of starting age of assessment. Socio-economic status of the participants were high and their Family income ranged from 100000-200000Tk (monthly).

2.1.1 Demographic Profile

Descriptive statistical analysis was used to identify frequencies and percentages to interpret the background information of the participants in the survey.

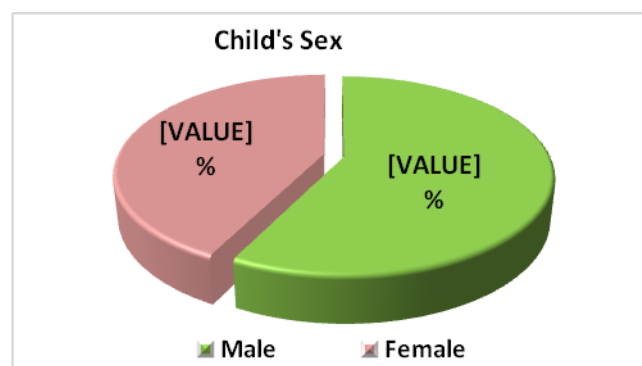


Figure 2.1 Gender Distribution of the Respondents From the above figure

Researcher observed that 57.5% of respondents were male, whereas 42.5% were female in this study.

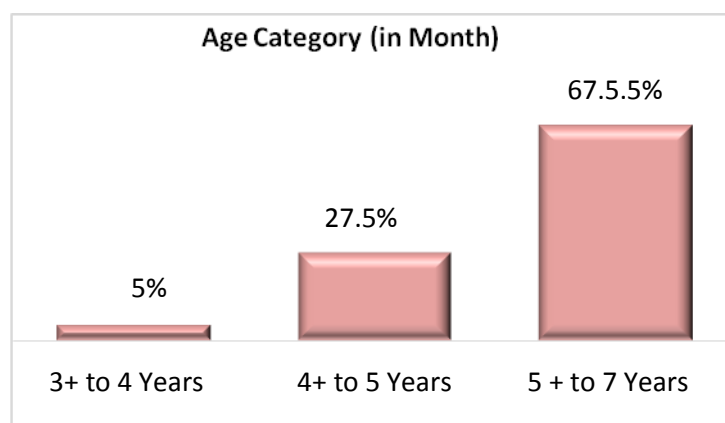


Figure 2.2 Age Distribution of the Respondents

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This bar chart revealed that most of the respondent of our study were aged 5+ to 7 (67.5%). 27.5% of children with autism those aged 4+ to 5 were select as respondents of this study, and only 5% of respondents those aged were 3+ to 4 years.

In this study the inclusion criteria and exclusion criteria are listed below

2.1.2 Inclusion criteria:

- Children diagnosed (by ADCL) with mild ASD.
- ASD children living with Mother.
- ASD children attending special need school.
- ASD children who fall into the age range of 3+ to 7 years

2.1.3 Exclusion criteria:

- Children with additional diagnosis those are not typically associated with ASD such as Down syndrome or Cerebral Palsy.
- Child who are normal

2.1.4 Sample Size:

In this study researcher used longitudinal data and selected a small number of samples so that researcher collected the total information correctly and completely. In this case researcher has been selected 20 samples for experimental group and 20 for control group out of 180 autism children of special school.

2.2 Sampling technique:

In this study researcher has been used Convenience and purposive sampling technique.

2.3 Measures

The following measures were used in the present study:

2.3.1 Antecedent Behavior Consequence (ABC)

Understanding antecedents (what happens before a behavior occurs) and consequences (what happens after the behavior) is another important part of any ABA program.

The following three steps – the “A-B-Cs” – help us teach and understand behavior:

An antecedent: this is what occurs right before the target behavior. It can be verbal, such as a command or request. It can also be physical, such a toy or object, or a light, sound, or something else in the environment. An antecedent may come from the environment, from another person, or be internal (such as a thought or feeling). A resulting behavior: this is the person’s response or lack of response to the antecedent. It can be an action, a verbal response, or something else. A consequence: this is what comes directly after the behavior. It can include positive reinforcement of the desired behavior, or no reaction for incorrect/inappropriate responses.

2.3.2 Eye contact Avoidance Scale (ECAS)

Hall & Venema 2017 developed the Eye Contact Avoidance Scale(ECAS).they examined the reliability, validity and factor structure of the Eye contact Avoidance Scale (ECAS),a new 15 item screening tool designed to measure eye contact avoidance in individuals with fragile

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X syndrome. Eye contact Avoidance Scale (ECAS) is divided into two sections. In the first section, caregivers completed basic demographical information concerning the child's sex, age, diagnosis of FXS, current level of support at school, and whether their child had been diagnosed with another genetic disorder (e.g., Autism spectrum disorder, Down's syndrome, cerebral palsy etc. To obtain information about the child's communication ability, they also include the following question 'does your child use full sentences to communicate things he wants or needs?' (0=never, 1=rarely, 2=sometimes, 3=often, 4=always).

The Second Part of the ECAS contains question specifically designed to measure eye contact avoidance in FXS. Scott S Hall and Kaitlin M. Venema devised questions on the ECAS in the following five domains of social functioning: 1) Avoidance when speaking to others; 2) Avoidance when listening to others; 3) Inability to maintain eye contact with others; 4) Difficulty maintaining eye contact with others. and 5) Anxiety if required to maintain eye contact with others. Items in each domain were preceded by an introductory explanation (e.g, We are interested in the extent to which your child avoid eye contact when he/she talks to people). For each domain, items were worded to elicit ratings from the perspective of the informant (e.g, "does your child avoid eye contact when he or she talks to you), friends and family (does your child avoid eye contact when he or she talks to friends and family) and unfamiliar people (e.g, does your child avoid eye contact when he or she talks to unfamiliar people). Thus, given that there were 5 domains with 3 items per domain, the ECAS contains 15 items in total.

Each item on the ECAS is rated on 0 to 4 point likert scale (0=never, 1=rarely, 2=sometimes, 3=often, and 4=always) with items 3a, 3b, and 3c being reversed score so that higher scores reflect levels of eye contact avoidance. Total domain scores (i.e speaking, listening, inability, difficulty and Anxiety) can be obtained by summing the scores across the three levels of

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familiarity in each question block (maximum possible score for each domain=12).Total subscale scores(i.e,Informant,friends and family, and unfamiliar people)can be obtained by summing scores for the five items at each level of familiarity(maximum possible score for each subscale =20)finally a total score can be obtained by summing the scores across all 15 items (maximum possible total score =60).There was a division in the next stage and that was the implication of Applied Behavior Analysis (ABA) therapy on Experimental Group and No application of ABA therapy on the control group according to the study design .so ABA therapy and its implantation has been done on Twenty children and rest of Twenty children were on the control group.

2.3.3 Applied Behavior Analysis (ABA)Applied behavior analysis (ABA) Therapy was first developed in the 1970s by Psychologist Ivar lovas and Robert Koelgel at UCLA.The original approached developed was a technique or sub set of ABA Therapy called Discrete Trial Training.ABA Therapy has been around for 44 years, and is based on the finding that when behavior is rewarded. It is more likely to be repeated.

Five techniques used in applied behavior analysis.

Positive Reinforcement: A child with learning or social disabilities may not know how to respond in certain situations. Children will learn the balance of when to reward somebody or when to consider the proper behavior to be expected.

Negative Reinforcement

Many times a child will not act properly. When this happens, the behavior needs to be corrected immediately .A good way to correct bad behavior is to punish the child.

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Prompting and Fading

Prompts are visual or verbal cues to encourage a behavior. Verbal cues are gentle reminders. Visual cues are even less direct and might be a gesture or look into eyes the child will see this cue and be reminded to behave in simple way. Example could be taking their shoes off when walking into the house or washing their hands before a meal. The idea is to eventually fade out the prompts when the child no longer needs them. The prompts can be helpful because they are typically not intimidating or accusatory.

Task Analysis

This is a model to help learn about the particular child rather than correct or reinforce behavior. A teacher will give a child a task and watch how they perform it. The analysis is broken down into a number of categories including:

- a) Physical actions b)Cognitive actions c)Repetition d)Allocation e)Environment

Once a professional has analyzed how a child performs tasks, they can use this information to make other tasks easier for the particular child.

Generalization

This is a model to help the child learn. The teacher will take what the child has learned in one setting and apply it to other settings. If a child knows how to sing the alphabet when singing it, the teacher can take their knowledge of the alphabet and try to apply it to other things, such as teaching the child to spell their name.

Table 2.1: Research Planning

Condition	Pre-test	Intervention	Post-test
Experimental (Intervention group)	• Selecting target behavior through ABC • Data collection using by ECAS	ABA therapy for 12 weeks by Researcher+12 weeks by teacher	Data collection using by ECAS
Control (No intervention)	• Selecting target behavior through ABC • Data collection using by ECAS	Regular classroom activities	Data collection using by ECAS

2.4 Procedure:

Standard data collection procedures were followed in the proposed study. Following ethical approval from the University of Dhaka the data collection process began. Data collection process included getting permission from authority, class teachers, establishing rapport with the children. All students were autistic and they were diagnosed ADCL (Autism Diagnosis check list). Their level were mild. After several visit in the classroom at school area a discussion with parents has been arranged with the consent that they are willingly interested to participate in this study. The next stage was to take the consent formally through a paper. This study assessed the effectiveness of Applied Behavior Analysis on behavior modification of children with autism.

Two tests were conducted among the children of Experimental group and Control group. One was pre test and another was post test. Pre test was done before intervention and Post test was done after intervention.

Pretest

40 Children's Target behavior lack of eye contact was done by ABC. With using ECAS, data was collected from 40 Children's mother to measure the eye contact avoiding. Another five domain such as ---- speaking, listening, inability, difficulty, anxiety was also observed with eye contact avoiding. Those Children Eye Contact behaviors with Father, mother, relatives, friends and unknown persons were also observed. When the children were called by name, did they respond perfectly? At the time of talking with the children, did they listen attentively? When the children maintained eye contact with other people, did they face any difficulty? Did the children feel anxious at the time of eye contact with other person? How many times did the children conduct eye contact with other? All of these were observed.

Intervention:

The intervention was given only to the experimental group. Out of 40 children, 20 children were selected for experimental group. These experimental groups were divided into two groups. These were group 1, group 2. There were 10 children in group 1. The remaining 10 children were in group 2. At first the teacher was trained up about ABA therapy by the researcher.

In Group 1, researcher applied ABA therapy from February to April. Simultaneously teacher applied ABA therapy with group 2.

Then September to November researcher applied ABA therapy In Group 2. Simultaneously teacher applied ABA therapy with group 1.

Task analysis of Individual Educational Plan (IEP)

- Researcher taught the child that “You can get what you want quicker when you check if people are paying attention on you.” While playing his favorite game (e.g. tickle, sing songs, etc.), pause when he was expecting you to continue. Verbally praised him (e.g. you’re looking at me! Let’s play!), and resumed the game as a reinforcement when he initiated eye contact. Each segment should consist of at least 4 trials.
- In beginning stages, researcher maintained eye level with the child to promote success. Once the child got a grasp of it researcher returned to natural height and gradually adjust our demand.
- Researcher Taught the child that “You can get what you want more effectively when you check if people are responding”
- Held the child’s favorite snack or toy, with your back facing the children. Researcher Turned around her face to the child once he/she tapped on her shoulder or made a request. While the child was looking at the researcher, she verbally praised the child and reinforced the behavior with the desired snacks or toys. Researcher let the child understood that good behavior (i.e. looking) will lead to positive consequences. If the child failed to look within 5 seconds, indicated that he/she missed out on the reinforcement by returning to the researcher original position.
- In beginning stages, researcher maintained eye level with the child to promote success, once the child got a grasp of it researcher returned to natural height and gradually adjust our demand. . Researcher Adjusted the speed turn to face the child to lengthen the duration the child had to sustain his/her eye contact.
- Researcher Taught the child that “You can obtain information when you are following people’s gaze” Line 5 or more small cups in a row, at least 10cm apart, and turned them

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over. Place the child's favorite snack in one of them and told him/her "your snack is here", gazed at the designated cup and instructed the child to flip it over. If the child got it right on his first attempt, it means that he/she was paying attention to the researcher's gazed and consumed the snack right away. If he/she failed, researcher removed the snack, indicating that he missed out on it, and try again.

- In beginning phases, researcher gazed at the cup for a longer period. When the child was getting fluent with the practiced, increased difficulty by glancing at the target and reduced verbal instructions, so the child could be accustomed to follow people's gaze on their own.

Table 2.2: *Duration of Intervention*

Length of session	Duration of entire session	Number of Session
30 minute	24 weeks	120

Post test

Post test was performed on both experimental and control group. Data was collected through ECAS.

2.5 Data Analysis:

In the present study researcher has been used Box and Whisker plot to present the summary statistics of impact of ABA therapy and presented the mean score with their respective standard deviation for nine variables. To find out impact of pre-test and post-test researcher performed paired sample t-test. A paired t-test is used to compare two population means where you have two samples in which observations in one sample can be paired with observations in the other sample (Rosie Shier, 2004). Finally, researcher has been performed independent sample t-test to evaluate the impact of the ABA therapy. The Independent Samples t-test compares the means of two independent groups in order to determine whether there is statistical evidence that the associated population means are significantly different.

3. Result

This study evaluated the impact of Applied Behavior Analysis (ABA) therapy on children with autism. In this section, we presented the results and key findings based on the various data analyses. Firstly, entailed Demographic Profile to formulate the summary of respondents' background information. Secondly, it involved the explanatory measurement for different attributes related to Eye Contact Avoidance by Performing mean score and standard deviation. Finally, we dealt with a t-test to justify the impact of ABA therapy.

However, before the tests were carried out, it was ensured that no missing values or irrelevant values existed in the data entry, which involved Data Cleaning process. The following sub-sections with detailed statistical tests used an alpha level of 0.05 and SPSS Version 25 used for the data analyses.

Figure 3.1Box and Whisker Plots of Pre-Test and Post-Test for Control and Experimental Group.

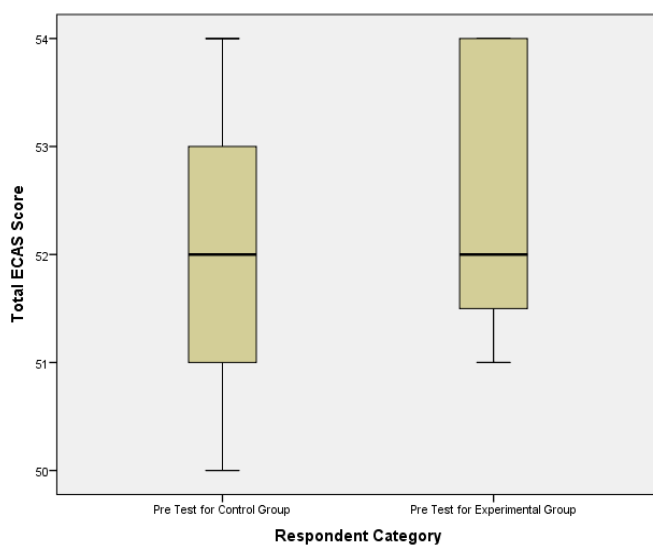


Figure 'A'

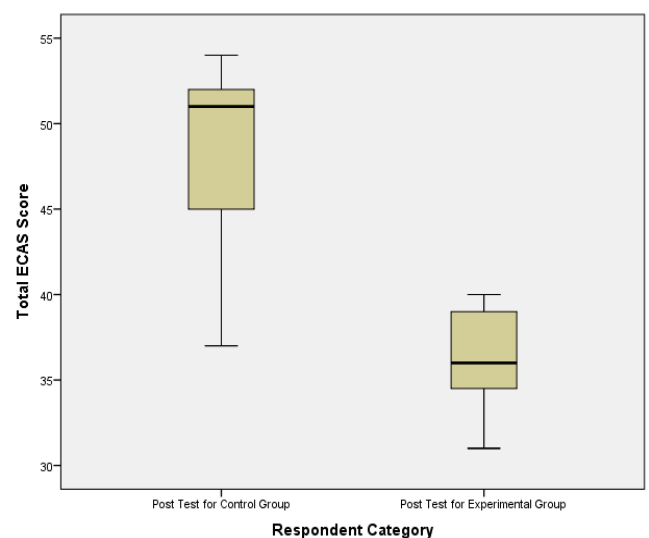


Figure 'B'

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From the above figure it is easily seen that the difference of average total ECAS score between control and experimental group for pre-test is almost same (Figure 'A') whereas the average total ECAS score widely differ between control and experimental group for post-test (Figure 'B').

Table 3.1 Mean and Standard Deviation for Pre-test of Experimental Group

Component	Domains					Subscales			Total ECAS Score
	Speaking	Listening	Inability	Difficulty	Anxiety	Informant	Friends/family	Unfamiliar people	
Mean	11.25	10.50	9.60	10.25	10.75	15.05	17.30	20.00	52.35
Std. Deviation	.851	.889	.940	.444	.444	.224	1.129	.000	1.182

Table 3.1 revealed that in cases of domains, the maximum avoidance appeared for speaking the score is 11.25 (0.851) out of 12, and the minimum for inability score is 9.6 (0.94). Autism children did not maintain eye contact with the unfamiliar people; the score of this case is 20 out of 20. In the case of total ECAS score, the average value is 52.35 (1.182) this indicates that the autism children avoided their eye contact in 87.25% cases for this group.

Table 3.2 Mean and Standard Deviation for Post Test of Experimental Group

Component	Domains					Subscales			Total ECAS Score
	Speaking	Listening	Inability	Difficulty	Anxiety	Informant	Friends/family	Unfamiliar people	
Mean	7.85	7.15	6.75	7.20	7.45	9.25	12.20	14.95	36.40
Std. Deviation	.671	.671	.967	.696	.759	.967	1.704	.510	2.583

Table 3.2 shows the mean score for all domains and subscales with standard deviation. From the Table, it can be concluded that for inability, the score is 6.75 (0.967) out of 12 this indicates that almost 50% of cases the autism children maintain their eye contact. In the other

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four domains (speaking, listening, difficulty, and anxiety) it indicate that around 40% of cases, they convey their eye contact. After the intervention, the autism children carry out their eye contact in 25.25% cases with unfamiliar people. The average total ECAS score of this group changed dramatically; that is 36.40 (2.583) this means that these children continue their eye contact in 40% cases.

Table 3.3*Mean and Standard Deviation for Pre-Test of Control Group*

Component	Domains					Subscales			Total ECAS Score
	Speaking	Listening	Inability	Difficulty	Anxiety	Informant	Friends/family	Unfamiliar people	
Mean	11.20	10.50	9.55	10.20	10.70	15.05	17.10	20.00	52.15
Std. Deviation	0.894	0.889	0.887	0.410	0.470	0.224	1.165	0.000	1.226

From the Table 3.3, it can be detected that for the control group of pre-test the average speaking score is 11.2 with SD 0.894, for listening 10.5 (0.889), for inability 9.55 (0.887), in case of difficulty and anxiety the mean score is 10.2 and 10.7 with SD 0.41 and 0.47 respectively. We have three component of subscale, average rating of the first component of subscale informant is 15.05 (0.224), for friend and family the mean score is 17.1 (1.165), and the mean score for unfamiliar people is 20 this means that in 100% cases, the autism children of this group avoided the eye contract for different people. Total ECAS score for the control group of the pre-test is 52.15; this indicates that the autism children avoided the eye contact in 86.92% cases for this group.

Table 3.4 Mean and Standard Deviation for Post-Test of Control Group

Component	Domains					Subscales			Total ECAS Score
	Speaking	Listening	Inability	Difficulty	Anxiety	Informant	Friends/family	Unfamiliar people	
Mean	10.25	9.95	8.95	9.65	9.90	13.80	16.00	18.90	48.70
Std. Deviation	1.251	1.432	1.317	1.089	1.210	1.936	1.747	1.889	5.192

From the above table, it can be observed that the range of average score for domains is 8.95-10.25 with SD 1.089-1.432. So that eye contact avoidance is almost the same compared to the pre-test of the control group. That means, there was no mentionable change between pre-test and post-test for the control group. In case of the informant, the avoidance is moderately changing (13.8 out of 20). The mean of total ECAS score is 48.7; this means that the autism children maintain eye contact in only 18.8% cases for post-test of the control group.

Table 3.5 Paired Samples Test for Experimental Group

		Paired Differences		t	P-value
		Mean	SD		
Pair 1	Speaking for Pre Test - Speaking for Post Test	3.400	0.995	15.286	<0.001
Pair 2	Listening for Pre Test - Listening for Post Test	3.350	0.875	17.120	<0.001
Pair 3	Inability for Pre Test - Inability for Post Test	2.850	1.040	12.255	<0.001
Pair 4	Difficulty for Pre Test - Difficulty for Post Test	3.050	0.759	17.967	<0.001
Pair 5	Anxiety for Pre Test - Anxiety for Post Test	3.300	0.801	18.417	<0.001
Pair 6	Informant for Pre Test - Informant for Post Test	5.800	0.951	27.262	<0.001
Pair 7	Friends/family for Pre Test - Friends/family for Post Test	5.100	1.651	13.813	<0.001
Pair 8	Unfamiliar people for Pre Test - Unfamiliar people for Post Test	5.050	0.510	44.247	<0.001
Pair 9	Total ECAS Score for Pre Test - Total ECAS Score for Post Test	15.950	2.502	28.508	<0.001

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In the experimental group, it can be observed that the mean scores of all components are significantly changed if it consider a 99% level of significance ($P < 0.001$ for all components).

This means that the impact of ABA therapy is highly significant

Table 3.6 Paired Samples Test for Control Group

		Paired Differences		t	P-Value
		Mean	SD		
Pair 1	Speaking for Pre Test - Speaking for Post Test	0.95	1.27630	3.329	0.004
Pair 2	Listening for Pre Test - Listening for Post Test	0.55	1.31689	1.868	0.077
Pair 3	Inability for Pre Test - Inability for Post Test	0.60	1.04630	2.565	0.019
Pair 4	Difficulty for Pre Test - Difficulty for Post Test	0.55	0.99868	2.463	0.024
Pair 5	Anxiety for Pre Test - Anxiety for Post Test	0.80	1.28145	2.792	0.012
Pair 6	Informant for Pre Test - Informant for Post Test	1.25	1.88833	2.960	0.008
Pair 7	Friends/family for Pre Test - Friends/family for Post Test	1.10	1.61897	3.039	0.007
Pair 8	Unfamiliar people for Pre Test - Unfamiliar people for Post Test	1.10	1.88903	2.604	0.017
Pair 9	Total ECAS Score for Pre Test - Total ECAS Score for Post Test	3.45	5.15522	2.993	0.007

From the table of paired sample t-test for the control group, the mean difference between pre-test and post-test is significant for most of the domains if we consider 95% level of significance except 'listening'. These results indicate that there are no plausible changes between pre-test and post-test for the control group.

Table 3.7 Independent Sample t-tests for Difference between Pre-test and post test of Control Group and Pre-test & Post test of Experimental Group

Components	Respondent Category	t-test for Equality of Means			
		Mean	Mean Difference	t	P-Value
Difference for Speaking	Control	0.95	-2.45	-6.771	<0.001
	Experiment	3.40			
Difference for Listening	Control	0.55	-2.80	-7.920	<0.001
	Experiment	3.35			
Difference for Inability	Control	0.60	-2.25	-6.821	<0.001
	Experiment	2.85			
Difference for Difficulty	Control	0.55	-2.50	-8.912	<0.001
	Experiment	3.05			
Difference for Anxiety	Control	0.80	-2.50	-7.398	<0.001
	Experiment	3.30			
Difference for Informant	Control	1.25	-4.55	-9.623	<0.001
	Experiment	5.80			
Difference for FnF	Control	1.10	-4.00	-7.736	<0.001
	Experiment	5.10			
Difference for Unfamiliar People	Control	1.10	-3.95	-9.028	<0.001
	Experiment	5.05			
Difference for Total ECAS	Control	3.45	-12.50	-9.755	<0.001
	Experiment	15.95			

To perform the independent sample t-test, firstly, we calculated the difference between pre-test and post-test for the control group and calculated the difference between pre-test and post-test for the experimental group. Then, we found the difference between the previous two differences. Finally, we performed an independent sample t-test. In this case, we observed that the results of these tests are highly significant, and all null hypotheses may be not accepted. So, the difference of eye contact avoidances is significant changes after ABA therapy; that is, the ABA therapy has a significant impact on reducing the eye contact avoidances on autism children

4. Discussion

The purpose of the present study was to see whether there is any effect of ABA therapy on behavior modification of children with ASD. Results revealed that ABA therapy has an positive effect on behavior modification (increasing eye contact) of children with autism.

In this research , the researcher have purposively selected children aging from 3 to 7 years as previous researches (Ekiseth, et al,2014) supported the age range as “most effective age for ABA therapy.”. Given the study results in the *figure 3.1 (A)* it can be seen that the difference of average total ECAS score between control and experimental group of pre-test is almost same. Whereas the average total ECAS score widely differ between control and experimental group for post-test *Figure 3.1(B)*.It implies that ABA therapy as the intervention for improving Eye contact avoidance.

The present finding is supported by Simpson (2001) where ABA was found to be effective in increasing spontaneous greetings in this student with autism and had improved his socialization by targeting specific behaviors that impacted upon his ability to interact with others. During the ten week program, the student demonstrated improvement in his ability to make a spontaneous social greeting and exhibited appropriate behaviors while interacting with others (i.e., making eye contact, demonstrating appropriate proximity between him and another person).In the present study also 12 week intervention program was conducted y the researcher and the teacher.

From Table 3.1, it is observed that, in pre-test of experimental the maximum eye contact avoidance appeared for speaking was mean score with 11.25, standard deviation of 0.851. Minimum for inability to maintain eye contact mean score is 9.6 (SD =0.94).

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This present finding is supported by NIDCD-NIH (2018) where they found some children with ASD may not be able to communicate using speech or language, and some may have very limited speaking skills. Others may have rich vocabularies and be able to talk about specific subjects in great detail. Many have problems with the meaning and rhythm of words and sentences.

Since autism children did not maintain eye contact with the unfamiliar people at all; the score of this case was 20 out of 20. This finding is supported by Cohen et al, 1988 wolf et al, 1989 where results indicated that eye contact avoidance occurred more frequently towards unfamiliar people than toward more familiar people.

In the case of total ECAS score, mean and standard deviation was found to be 52.35 and 1.182 respectively. It is observed that eye contact avoiding levels of the pre- test experimental group was 87.25 %.

From Table 3.2 it is observed that in post-test of experimental group for inability, the score was mean 6.7 SD 0.967 out of 12, this indicated that almost 50% of cases the autism children maintain their eye contact. After the intervention for unfamiliar ,the score was mean 14.95 SD 0.967.It can be concluded that the autism children carry out their eye contact in 25.25% case with unfamiliar people using ABA therapy.

The average total ECAS score of post-test experimental group changed dramatically; that was mean 36.40 and SD 2.583 that means eye contact avoiding levels of the post –test experimental group was 60 %. Therefore it can be concluded that these children eye contact level was increased by 40% using ABA therapy.

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The present findings is supported by Dillen burger,Keenan (2009) where ABA based interventions range from highly structured programs that were conducted in a one to one treatment setting to more naturalistic inclusion programs that include typically developing children as models. ABA brings improvements and changed in socially relevant behaviors within the context of the individual's social environment .ABA also is conducted within the scientific framework and focuses on functional relationships and replicable procedures. Because ABA was very data driven, it was able to achieve measurable changed in relevant target behaviors that last across time and environments

It is shown from Table 3.3 eye contact avoiding level of pre-test control group was 86.92%.

From Table 3.4 it is also shown that eye contact avoiding level of post test control group was 81.16 %. It can be concluded that eye contact avoiding level was increased by only 18.8%.that there was no mentionable changes between pre-test and post- test for the control group.

From table 3.5, it is observed that, beside eye contact another five domains such as speaking, listening, inability, and difficulty were also significantly changed in post test of experimental group by using ABA therapy. The level of eye contact avoidance was decreased significantly with informant, friends and family and unfamiliar People.

The present finding is supported by Thomas, Morrissey & McLaurin (2007) fifteen families volunteered to participate in a study where their children were involved in ABA therapy. The parents stated that ABA interventions had a positive impact on their child. They all emphasized that it reduced frustration and problem behaviors due to improved communication between the parents and the child. In the present study also applying ABA

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therapy the level of eye contact avoidance was decreased significantly with informant, friends and family and unfamiliar people and improved communication between parents and child.

Table 3.6 paired sample test of control group shows that there are no plausible changes between pre-test and post-test for the control group. Changes in some domains (Speaking, listening, difficulty, anxiety) a of eye contact avoiding were noticed in the post- test of control group. The probable cause of this could be that in classroom setting there were some activities that contributed in maintaining eye contact. Such as blow bubbles, show lighted ball, eye block etc

It is observed from the tale 3.7 that the difference between pre and post test of control group and pre and post test of experimental group was highly significance i.e. ABA therapy has a significant impact on increasing the eye contact on autism children.

This positive outcome is the result from using strong positive reinforcement, rigorous prompt, verbal praising and detailed task analysis of eye contact avoiding behavior. The present study is a supported by smith (2011) used a scientific tool to teach specific skills and the reinforce the positively. Since there were so many people involved in a child's daily life it was important to strive to use positive behavioral teaching to bring out the best in each child. In the research there was an individual approach that focused on increasing and teaching appropriate behaviors while decreasing the inappropriate behaviors

4.1 Limitations of the Study

This study examined the effects of Applied Behavior Analysis, using discrete trials to improve the eye contact avoiding of 20 students with autism. Results showed various degrees of improvements in specific targeted behavior components of eye contact avoiding behavior being observed by various raters. Undoubtedly the study has its limitation.

1. The research could have involved more than one target behavior such as sitting habit, joint attention etc.
2. Small number sample size
3. The therapy only occurred 5 times a week. AS a result other 2 days of week there were no therapy provided .Hence if the therapy were provided 7 days a week , it might be more impact on the research out come
4. Due to time and resource limitation the researcher could not involve parents in the training and research.
5. Due to the less number of samples the research does not fully represent the ASD children in Bangladesh. As a result, the findings cannot be generalized.

4.2 Conclusion:

This research was completed to see if ABA is an effective teaching tool for children on the Autism Spectrum. After analyzing the data researcher have found many reasons to say that it is very effective. It allows seeing progression and regression easily. Almost every child that has received ABA has shown some amount of progression in this/her abilities. Researcher really to observe a child that is getting ABA implemented with them on a daily basis. Researcher wanted to observe the child for about 24 weeks.. Even though researcher has worked with children on the Autism Spectrum and has had the chance to implement ABA, there is still a lot that researcher can pan for future. The researcher can involve parents in training phase to integrate them in providing therapy. Moreover, the researcher can take a bigger sample in order to increase the reliability of the intervention.

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Appendix

- Consent form (I)
- Consent form (II)
- Eye contact Avoiding Scale (ECAS) Data collection sheet
- ABC tool
- Individual Educational Plan (IEP)
- Event sampling Data collection sheet
- Score calculating table

প্রিয় অংশগ্রহনকারী

ঢাকা বিশ্ববিদ্যালয়ের এডুকেশনাল এন্ড কাউন্সিলিং সাইকোলজি বিভাগের অধীনে আমি এম ফিল গবেষণা করছি। আমার গবেষণার বিষয় বস্তু হলো অটিজম আক্রান্ত শিশুদের আচরণ পরিবর্তনে ABA থেরাপির কার্যকারিতা। গবেষণাটি এডুকেশনাল এন্ড কাউন্সিলিং সাইকোলজি বিভাগের ইথিক্স কমিটি দ্বারা অনুমোদিত। এতে অংশগ্রহণ সম্পূর্ণ বৈকল্পিক। গবেষণাতে অংশগ্রহণ করলে আপনার শারীরিক, মানসিক, আর্থিক ও সামাজিক কোন ধরনের ক্ষতির আশংকা হবে না। এখন আপনার সন্তানের Eye contact avoiding সম্পর্কিত কিছু প্রশ্ন করা হবে। প্রশ্ন গুলোতে আপনার সন্তানের বেলায় যে উত্তরটি প্রযোজ্য বলে মনে হয় সেটিতে টিক চিহ্ন দিন। খেয়াল রাখবেন যাতে কোন প্রশ্ন বাদ না পড়ে যায়। সংগ্রহীত তথ্য শুধু মাত্র গবেষণার কাজে ব্যবহার করা হবে। আপনার নাম, পরিচয় কিংবা ঠিকানা কোন কিছু এখানে নেয়া হবে না। প্রশ্ন-উত্তর শেষ করতে শেষ করতে আনুমানিক ১৫ মিনিট সময় লাগবে। সম্মতি ছাড়া আপনার কোন তথ্য নেয়া হবে না এবং আপনি চাইলে যে কোন সময় এই গবেষণা থেকে নিজেকে প্রত্যাহার করে নিতে পারেন।

ধন্যবাদান্তে

গবেষক

খাদিজা বিনতে হাবিব

এডুকেশনাল এন্ড কাউন্সিলিং সাইকোলজি বিভাগ

ঢাকা বিশ্ববিদ্যালয়

সম্মতি পত্র

আমি উপরে উল্লিখিত বিষয়বস্তু ভালোভাবে পড়ে ও বুঝে এই গবেষণায় নিজের সম্মতি প্রকাশ করছি।

সাক্ষর ও তারিখ

আক্রান্ত শিশুদের আচরণ পরিবর্তনে ABA থেরাপির কার্যকারিতা

প্রিয় অভিযাবক,

আমি ঢাকা বিশ্ববিদ্যালয়ের এডুকেশনাল এন্ড কাউন্সিলিং সাইকোলজি বিভাগের অধীনে অটিজম আক্রান্ত শিশুদের আচরণ পরিবর্তনে ABA থেরাপির কার্যকারিতা বিষয়ে আমি এম ফিল গবেষণা করছি। উক্ত গবেষণাতে আপনার সন্তানের আচরণগত সমস্যা (Lack of Eye contact) নিরাময়ের উদ্দেশ্যে প্রতি সপ্তাহে পরিচালিত ৩০ মিনিট একটি প্রশিক্ষণ কর্মশালা অংশ গ্রহণের অনুমতি প্রার্থনা করছি, এই প্রশিক্ষণটি ২৪ সপ্তাহ চলবে। এতে আপনার সন্তানের শারীরিক, মানসিক, আর্থিক ও সামাজিক কোন ধরনের ক্ষতির আশংকা নেই। আপনার শিশুর নাম, পরিচয় সব কিছু গোপন রাখা হবে এবং প্রাপ্ত তথ্য শুধুমাত্র গবেষণার কাজে ব্যবহৃত হবে। আপনি চাইলে যে কোন সময় এই প্রশিক্ষণ কর্মশালা থেকে নিজেকে প্রত্যাহার করে নিতে পারবেন। আপনিও আপনার সন্তানের সাথে প্রশিক্ষণ কর্মশালায় অংশগ্রহণ করতে পারবেন।

ধন্যবাদান্তে

গবেষক

খাদিজা বিনতে হাবিব

সম্মতি পত্র

আমি উপরে উল্লিখিত বিষয়বস্তু ভালোভাবে পড়ে ও বুঝে আমার সন্তানকে এই প্রশিক্ষণ কর্মশালায় নিজের অংশগ্রহণের সম্মতি প্রকাশ করলাম। আমি নিজেও এই কর্মশালায় অংশগ্রহণ করব।

হ্যাঁ		না	
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সন্তানের নামঃ

অভিযাবকের নাম, সাক্ষর, তারিখঃ

Applied behavior analysis on behavior modification

Student Name: _____ **Instructor:** _____

Location (circle one): **Classroom** **Office/Therapy** **Other** _____

Date	Time	Antecedent (What preceded the behavior? What was happening immediately before the behavior occurred?)	Behavior (What did ____ do?)	Consequence (How did you respond or react? What followed the behavior?)

Eye Contact avoidance Scale (ECAS)

2017, Scott Hall and Kaitlin Venema

Child's Name:

Child's sex: Male/male

Child's age:

Instruction :For Each question ,please circle the respose that best describes your child's behavior

1.We are interested in the extent to which your child avoid eye contact when he /she talks to poeple.

	Never	Rarely	Sometimes	Often	Always
a)Does your child avoid eye contact when he /she talks to You?	0	1	2	3	4
b) Does your child avoid eye contact when he /she talks to friends and Family	0	1	2	3	4
c)) Does your child avoid eye contact when he /she talks to Unfamiliar people	0	1	2	3	4

2.We are interested in the extent to which your child avoid eye contact when People talk to him/her.

	Never	Rarely	Sometimes	Often	Always
a)Does your child avoid eye contact when You look at or speak to him/her directly	0	1	2	3	4
b) Does your child avoid eye contact when friends and Family look at or speak to him/her directly	0	1	2	3	4

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c) Does your child avoid eye contact when unfamiliar people look at or speak to him/her directly	0	1	2	3	4
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3. we are interested in your child's ability to maintain eye contact with people.

	Never	Rarely	Sometimes	Often	Always
a) Is your child able to maintain eye contact with You for up to 5 seconds?	0	1	2	3	4
b) Is your child able to maintain eye contact with friends and family for up to 5 seconds?	0	1	2	3	4
c) Is your child able to maintain eye contact with unfamiliar people for up to 5 seconds?	0	1	2	3	4

4. we want to know how difficult it is for your child to maintain eye contact with people

	Never	Rarely	Sometimes	Often	Always
a) Does it appear difficult for your child to maintain eye contact with you	0	1	2	3	4
b) Does it appear difficult for your child to maintain eye contact with family and friends	0	1	2	3	4
c) Does it appear difficult for your child to maintain eye contact with unfamiliar people	0	1	2	3	4

5. we want to know whether your child gets anxious or upset if you require him/her to maintain eye contact with people

	Never	Rarely	Sometimes	Often	Always
a) Does your child gets anxious or upset if you require him/her to maintain eye contact with you	0	1	2	3	4
b) Does your child gets anxious or upset if you require him/her to maintain eye contact with friends and family	0	1	2	3	4
c) Does your child gets anxious or upset if you require him/her to maintain eye contact with unfamiliar people	0	1	2	3	4

Scoring

	Subscale			Domain totals
Domain	informant	Friends/family	Unfamiliar people	
1. speaking	1.a	1.b	1.c	Speaking total
2. Listening	2.a	2.b	2.c	Listening total
3. Inability	3.a	3.b	3.c	Inability total
4. Difficulty	4.a	4.b	4.c	Difficulty total
5. Anxiety	5.a	5.b	5.c	Anxiety total
	Informant total	Friends/family total	Unfamiliar people total	Total ECAS score:-----/60

Individual Education Plan for child

Name	X
Issue	Autism Spectrum Disorder
Level	Mild
Age	
Assessment	Doesn't maintain Proper eye contact
Area of target behavior	Social and communication skill
Social and communication skill area	Eye Contact
Long term objective (6 months)	Eye contact can be done at any time if needed
STO-1(4 weeks)	Make eye contact at least 20/40 times in 4 weeks
Step- 1	In order to make eye contact properly, rapport should be built up with the child's favorite toys/food/environment
Step-2	" While playing his favorite game (e.g. tickle, sing songs, etc.), pause when he was expecting you to continue. Verbally praised him (e.g. you're looking at me! Let's play!), and resumed the game as a reinforcement when he initiated eye contact. Each segment should consist of at least 4 trials.
Step-3	Held the child's favorite snack or toy, with your back facing the children. Researcher Turned around her face to the child once he/she tapped on her shoulder or made a request. While the child was looking at the researcher, she verbally praised the child and reinforced the behavior with the desired snacks or toys. Researcher let the child understood that good behavior (i.e. looking)

	will lead to positive consequences. If the child failed to look within 5 seconds, indicated that he/she missed out on the reinforcement by returning to the researcher original position.
Step-4	Line 5 or more small cups in a row, at least 10cm apart, and turned them over. Place the child's favorite snack in one of them and told him/her "your snack is here", gazed at the designated cup and instructed the child to flip it over. If the child got it right on his first attempt, it means that he/she was paying attention to the researcher's gazed and consumed the snack right away. If he/she failed, researcher removed the snack, indicating that he missed out on it, and try again.
Step-5	After doing the above steps, the child should be given reinforcement.
Attempt-40	The child will make eye contact 30 times.
STO-2(3 month)	Make eye contact at least 80/90 times in 4 weeks
Step	Work will proceed according to the previous step
Attempt-120	The child will make eye contact 80 times
STO-3(5 month)	The child will make eye contact with him/her needs and direction
STO-4	Generalization In this stage ,in any case, eye contact will be made as needed

Event sampling data collection sheet

Teacher Name.....

Class /Section.....

Student name..... Put v when behavior occurs

[illegible]

Score Calculating:

Before analyzing the data, we calculated the scores of our nine variables by dividing the four groups those are shown in the following tables:

1.Pre Test for Control								
Speaking total	Listening total	Inability total	Difficulty total	Anxiety total	Informant total	Friends/ family total	Unfamiliar people total	Total ECAS Score
11	10	11	11	11	15	19	20	54
10	12	9	10	10	15	16	20	51
12	10	9	10	11	15	17	20	52
12	10	9	10	11	15	17	20	52
10	12	9	10	10	15	16	20	51
12	10	9	10	11	15	17	20	52
10	12	9	10	10	15	16	20	51
10	10	10	10	10	15	15	20	50
10	12	9	10	10	15	16	20	51
12	10	9	10	11	15	17	20	52
11	10	11	11	11	15	19	20	54
12	10	9	10	11	15	17	20	52
12	10	9	10	11	15	17	20	52
11	10	11	11	11	15	19	20	54
12	10	11	10	11	16	18	20	54
12	10	9	10	11	15	17	20	52
11	10	11	11	11	15	19	20	54
12	10	9	10	11	15	17	20	52
10	12	9	10	10	15	16	20	51
12	10	9	10	11	15	17	20	52

2.Post Test for Control								
Speakin g total	Listenin g total	Inabilit y total	Difficult y total	Anxiet y total	Informan t total	Friends/ family total	Unfamilia r people total	Total ECAS Score
10	9	11	11	11	13	19	20	52
10	12	9	10	11	15	17	20	52
10	11	9	10	10	14	16	20	50
9	10	9	10	10	14	15	19	48
10	12	9	10	10	15	16	20	51
12	10	9	10	11	15	17	20	52
10	12	9	10	10	15	16	20	51
10	10	10	10	10	15	15	20	50
10	12	9	10	10	15	16	20	51
12	10	9	10	11	15	17	20	52
10	10	10	11	10	15	16	20	51
12	10	9	10	11	15	17	20	52
12	10	9	10	11	15	17	20	52
11	10	11	11	11	15	19	20	54
12	10	11	10	11	16	18	20	54
10	9	7	8	8	12	14	16	42
8	9	8	9	8	10	15	17	42
8	7	8	8	8	10	14	15	39
9	7	6	7	8	10	12	15	37
10	9	7	8	8	12	14	16	42

3.Pre Test for Experimental								
Speaki ng total	Listeni ng total	Inabilit y total	Difficul ty total	Anxiet y total	Informa nt total	Friends/fam ily total	Unfamili ar people total	Total ECAS Score
12	10	9	10	11	15	17	20	52
11	10	11	11	11	15	19	20	54
12	10	11	10	11	16	18	20	54
12	10	9	10	11	15	17	20	52
11	10	11	11	11	15	19	20	54
12	10	9	10	11	15	17	20	52
10	12	9	10	10	15	16	20	51
12	10	9	10	11	15	17	20	52
11	10	11	11	11	15	19	20	54
10	12	9	10	10	15	16	20	51
12	10	9	10	11	15	17	20	52
12	10	9	10	11	15	17	20	52
10	12	9	10	10	15	16	20	51
12	10	9	10	11	15	17	20	52
10	12	9	10	10	15	16	20	51
11	10	11	11	11	15	19	20	54
10	12	9	10	10	15	16	20	51
12	10	9	10	11	15	17	20	52
11	10	11	11	11	15	19	20	54
12	10	9	10	11	15	17	20	52

4.Post Test for Experimental								
Speaking total	Listening total	Inability total	Difficulty total	Anxiety total	Informant total	Friends/family total	Unfamiliar people total	Total ECAS Score
7	7	6	7	8	9	11	15	35
8	7	8	8	8	10	14	15	39
8	8	8	8	8	10	15	15	40
9	7	7	7	8	11	12	15	38
8	6	8	8	8	8	14	16	38
8	7	8	8	8	10	14	15	39
9	7	6	7	8	10	12	15	37
8	7	6	7	8	9	12	15	36
8	7	6	7	8	9	12	15	36
7	8	6	7	7	9	11	15	35
8	7	6	6	7	8	11	15	34
8	8	8	8	8	10	15	15	40
8	7	8	8	8	10	14	15	39
9	7	6	7	7	10	11	15	36
7	7	6	7	6	8	10	15	33
8	7	6	6	7	8	11	15	34
7	9	6	7	7	10	11	15	36
7	7	6	7	6	8	10	15	33
8	7	8	8	8	10	14	15	39
7	6	6	6	6	8	10	13	31