Autism: An Evolutionary Etiology:

A Meta-Synthesis

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Abstract

This meta-synthesis attempts a detailed look at how Autism Spectrum Disorder (ASD) evolved from Kanner's initial identification in 1943 to today's current understanding. Emphasis will be placed on characteristic change, prevalence increase, causality, and evolution of treatments, techniques, and methods. Equal weight will also be placed on what the best overall treatments, techniques, and methods should be used with an individual with autism.

1. Introduction

1.1 Background

Autism Spectrum Disorder or ASD is a neurologically based disorder characterized by persistent impairment in reciprocal social communication and social interaction, and restricted, repetitive patterns of behavior, interests, or activities. ASD includes a number of disorders in its spectrum such as: early infantile autism, childhood autism, Kanner's autism, high-functioning autism, atypical autism, pervasive developmental disorder not otherwise specified, childhood disintegrative disorder, and Asperger's disorder (American Psychiatric Association, 2013). Autism is the most common ASD condition. As the word spectrum suggests, the disorders under this umbrella vary greatly in degree of severity. Many people are familiar with individuals who are in the public eye such as Temple Grandin or familiar movies that portray individuals with Autism: Rain Man, Mercury Rising. However, not every individual with Autism has special splinter skills. There are those individuals who have high functional ability but then there are others who face challenges associated with taking care of ones self and being able to effectively interact and communicate with others (Polloway, Miller, & Smith, 2004).

For years, Researchers have been trying to discover the cause of Autism. There were many studies that suggested that "cold mothers' ' caused Autism. Others have connected it to vaccines given to young children. These hypotheses have since been discredited and although much of the disorder remains a mystery, research has indicated that there is no single cause of Autism. In fact, Autism may be a result of several factors.

Autism may be a result of brain damage, genetic links, or complications during pregnancy. Many factors could lead to Autism with no single cause and no "genetic, metabolic, or radiographic markers" (Polloway, Miller, & Smith, 2004) that aid in the diagnosis or known severity of the condition. The most recent shared hypothesis is that Autism is related to abnormities in the brain structure or function. According to the ASA (2008):

> "Brain scans show differences in the shape and structure of the brain. In many families there appears to be a pattern of autism or related disabilities, further supporting a genetic basis to the disorder. While no one gene has been identified as causing autism, researchers are searching for irregular segments of genetic code that children with autism may have inherited. It also appears that some children are born with a susceptibility to autism, but researchers have not yet identified a single "trigger" that causes autism to develop (Polloway, Miller, & Smith, 2004).

Over the years, the number of children diagnosed with autism has significantly increased. Autism is currently considered a low-incidence disability. However, parents, organizations supporting families, and individuals with autism, have expressed concern regarding the dramatic increase in the number of children who have been diagnosed with autism (Polloway, Miller, & Smith, 2004). Low incidence disabilities are defined as disabilities that occur in lower percentage based numbers when compared to the rest of the disability population. Within its low incidence category, autism is one of eight, and is by far the largest in the category. The U.S Department of Education (2007) reported that

the fastest growing age group of children with autism in the US is between the ages of six through 11. The most current prevalence rates, according to The Centers of Disease Control (CDC, 2009), are 1 in 68 children in the United States are considered to be on the spectrum. Of this population, males are considered to have a higher prevalence. Polloway, Miller, and Smith (2004) suggest that the following factors contribute to the increased ASD diagnosis:

- There is now a greater knowledge of ASD by parents, doctors, and educators.
- There is now a broader definition of ASD.
- Diagnosis can now be identified by age 2.
- Autism is not longer confused with other disorders.
- Increased availability to special services and interventions
- Diagnostic reclassification (some diagnosed with intellectual disabilities are now diagnosed with Autism)
- Epidemiological methods have changed
- Autism is now being used for individuals with medical disorders
- General overall population increase

Individuals on the autism spectrum all vary in range of abilities and display many strengths and additional areas that need improvement. As mentioned previously, the characteristics of an individual with ASD are usually categorized into three areas: communication, socialization, and repetitive behaviors.

ASD individuals tend to be very literal and perseverate over non-important fixations while at the same time are not privy to details included in their environment.

Other commonly recognized characteristics are lack of imaginative play, needing information to be concrete, and a compulsive need for things to be the same. Individuals with ASD have sensory processing deficits that may reveal other personal difficulties. Such difficulties as fear of new situations, noises, people, or changes in routine. Additionally, typical behaviors are demonstrated under responsiveness to pain, may appear to ignore, be deaf, or blind when they are not, may be ultra sensitive to particular food, clothing, or object textures (Polloway, Miller, & Smith, 2004).

The history of Autism shows us how far we have come in identifying the disorder and where we still need to go. In the past, children with Autism have not always been included in mainstream education systems. They have been institutionalized or kept from formal school settings. However, today students with autism are successfully integrated, not only into schools, but also into general education classes for large parts of the day, if not all day long. Today large percentages of students are served in general education-based programs and fewer served in separate programs or facilities. This advancement in integration is due in large part to understanding the disorder and having research based practices used to serve these students. Throughout this process, I want to have a better overall understanding of the history of autism, where it was, where it is, and where it needs to go. A more complete understanding of the etiology of autism will allow me to better prepare me as an educator in the field

1.2 Author's Beliefs and Experiences

Growing up, my best friend had a cognitive impairment. We were inseparable. We attended every class together; we went to recess, lunch and afterschool activities

together. Since we were from a small town, our school only had a resource room. My friend would go there for much of the day, but once or twice a week he was allowed to bring a friend. He always asked me to come to class with him. During these times, we played games with the other students, make snacks, or do an art activity. I loved being with my friend and with all of the other students in the class. As I got older, I continued to volunteer in the special education classrooms. I would help with homework or do fun extracurricular activities. As I transitioned to college, I took every opportunity I could to continue my volunteer work with children. I participated in big brothers big sisters programs, volunteered in classrooms, and coached Special Olympics. Initially, I did not pursue a degree in education; however, I knew that it was my calling, more specifically working with children with special needs. I went against my instincts of becoming an educator because I was hearing many negative aspects of the profession. Although I was told I would do great within this field, I was also told to never go into Special Education, which of course is the only area I would have wanted to pursue. I have a very large family, many of whom are in the medical field. Because of my medically skewed family members, I was encouraged to pursue that field of study. However, while playing college basketball, balancing science and math classes, and volunteering, I quickly realized that, although I could help people, I was not as passionate about the medical field as I was when compared to working with children with special needs. The day I changed my major, I flashed back to my high school advanced biology class where my teacher told me that she thought I had a calling to be a teacher. So started my journey in becoming a special education teacher.

Through my student teaching experiences, I worked with students who had varying disabilities. I was most intrigued by and formed a close bond with two brothers who had autism. They were new to the district and did not have a program in place. Both brothers varied in their degree of communication abilities while at the same time they had high degrees of deficits in all areas of communication. Difficulty communicating resulted in increased behaviors and confused teachers. I wanted to figure out a way to meet these boy's needs. I took it upon myself to develop basic task analysis programs for reinforcement and communication. I worked closely with the speech pathologist, my supervising teacher, and my student teaching supervisor in an effort to create individual communication and reinforcement systems apart from the class as a whole.

Initially, I began implementing a PECS system during eating times. I also began using the basic token economy reinforcement system. The boys, although resistant at first, caught on to both quickly. They picked up PECS quicker then I could make icons. I found myself drawing the icons because I did not have enough time to get on the computer to create ones for the day. This in turn led to more verbal communication and fewer behavioral outbursts. By the end of my student teaching, both boys were speaking in 3-4 word sentences. By using a token board reinforcement system, we were able to transition into using a money system. The boys were earning money and spending it at the classroom store. This was the beginning of my career working with children with autism.

After I graduated with my Special Education degree from Central Washington University, I married, went on my honeymoon, interviewed for a job for an autism Focus classroom in Fairbanks, got the job, moved to Fairbanks, began training, and then started the school year. It all happened so fast that I did not have time to second-guess myself; there is not a day that goes by that I regret my decision. I love my job and I am right where I believe I should be.

Since 2011, I have worked in an Intensive resource Autism Focus classroom. It has taken on many different forms. In my first year, my students had varying levels of communication abilities and skill levels. Of the nine students I taught, the majority verbally communicated and (were advanced enough to) had abilities that allowed them to go out into the general education setting for periods of the day. The other students needed more one on one behavior management. Today, my classroom picture is a bit different. I have seven students who range in their abilities but are considered to have lower cognitive function. Of these seven students, I have one student who uses some functional communication. Our main objectives in this program are behavior management and communication. There are days when we have several meltdowns because of the lack of ability to effectively communicate and understand language.

I received a young boy last year from Tennessee who had no communication program and severe behavior issues. Since coming into my classroom, we have worked specifically on establishing recognition of icons. However, my student does not differentiate between the icons or even show understanding that they have a different meaning. It is experiences such as this that leave me wondering if I am doing everything

I can to meet this student's needs. I am fortunate to work for a district that provides me with the necessary resources; however, I sometimes find myself looking for new and different answers.

Autism is an interesting field of study and the research surrounding this field grows exponentially. Having worked with these special children, I have a growing desire to learn more about the history of autism and what has been used to serve their needs. Historical study of the field and the different techniques used will give me a better understanding of where we were, where we are today, how far we have come, and where we need to go in finding ways to serve our students with autism.

My experiences in the autism field instills in me a burning desire to learn more about the field as a whole and perhaps find other ways in which to meet my student's needs. This desire has led me to formulate the following research questions:

1. How did autism evolve from when it was first identified? What are the characteristics and symptoms associated with ASD?
2. What are the causes of Autism Spectrum Disorders? Can they be avoided?
3. How is ASD treated? Is there a cure? What needs to be determined to efficiently treat people with autism?

1.3- Purpose of this Meta-Synthesis

This meta-synthesis, which focuses on the evolutionary history of autism and establishes effective treatment techniques used in the past and currently, has multiple

purposes. One purpose is to review journal articles related to the history of autism and showcase the progression and gains made through the years. My second purpose is to determine what the characteristics and symptoms are that identify the disorder and how they changed over time. My third purpose is to learn about what causes ASD and if causality can be limited or even avoided all together. My fourth purpose is to research methods of treatment and how best to treat individuals with ASD. A fifth purpose is to classify each article by publication type, to identify research design, participants, data sources of each research study, and to summarize the findings of each study. My final purpose in conducting this meta-synthesis is to identify significant themes in these articles and to connect the themes to my own classroom experiences in teaching students with autism.

2. Methods

2.1. Selection Criteria

The 55 journal articles included in this meta-synthesis met the following selection criteria.

1. The articles explored the evolution of Autism.
2. The articles explored treatments that children with autism received over a 50-year span.
3. The articles were published in peer-reviewed journals related to the field of education.

The articles were published between 1960-2013.

2.2. Search Procedures

Database searches and ancestral searches were conducted to locate articles for this meta-synthesis.

2.2.1. Database Searches

I conducted Boolean searches within the Educational Resources Information Center (ERIC, Ebscohost) using these specific search terms:

1. (“Autism”) AND (“History”)
2. (“Autism”) AND (“Techniques”)
3. (“Autism”) AND (“Diagnosis”)
4. (“Autism”) AND (“Treatments”)
5. (“Autism”) AND (“Causality”)
6. (“Autism”) AND (“Prevalence”)

These database searches yielded a total of 53 articles (Adams & Conn, 1997; Allen, Buell, Hart, Harris, & Wolfe, 1964; Boisvert, Lang, Andrianoplulos, & Boscardin, 2010; Bondy, 1999; Bower, 1989; Boyd & Shaw, 2010; Bryson, Rogers, & Fombonne, 2003; Bryson & Smith, 1998; Burns, 2013; Camaioni, Perucchini, Muratori, & Milone, 1997; Chez, 2000; Cohen, 1973; Cowan, Hoddinott, & Wright, 1965; DiLalla & Rogers, 1994; Drotar, 1975; Duclos & Ward, 1998; Easson, 1971; Edelson, 1999; Ferster, 1961; Garber, 1984; Gordon, 1979; Gresham, Beebe-Frankenberger, & MacMillan, 1999; Handen, 1993; Harris, 1984; Heflin, & Simpson 1998; Hobbs & Goswick, 1977; Holden, & Gotwals, 1984; Kanner, 1962;MacDonald & Allen, 2006; Mak-Fan, Taylor, Roberts, & Lerch, 2012; Matson & Dempsey, 2008; Nathan, Simpson, Anberg, &Patch, 1969; Oppenheim, 1961; Palermo & Curatolo, 2004; Peterson, Becker, Shoemaker, Luria, &

Hellmer, 1961; Polleux & Lauder, 2004; Quinn & Swaggart, 1994; Reichow, 2011; Reichow, 2012; Rogers, 1998; Rutter, 1979; Rutter & Bartak, 1973; Rutter & Sussenwein, 1971; Schopler, &Bristol, 1980; Schreibman, 2000; Seidman, 1961; Short, 1984; Shriver, Allen, & Matthews, 1999; Shyu, J. Tsai, & W. Tsai, 2010; Solomon & Chung, 2012; Soutor, Houlihan, & Young, 1994; Tanguay, 1973; Torres, Farley, & Cook, 2012; Wildman & Simon, 1978.

2.3. Coding Procedures

I utilized a coding form to categorize the information presented in each of the 53 articles. The coding form was based on: (a) Publication type; (b) research design; (c); Participants; (d) Data sources; and (e) Findings of the studies.

2.3.1. Publication Types

Each journal article was evaluated and classified according to publication type (e.g., research study, theoretical work, descriptive work, opinion piece/position paper, guide, annotated bibliography, review of the literature). *Research studies* use a formal research design to gather and/or analyze quantitative and/or qualitative data. *Theoretical* works use existing literature to analyze, expand, or further define a specific philosophical and/or theoretical assumption. *Descriptive works* describe phenomena and experiences, but do not disclose particular methods for attaining data. *Opinion pieces/position papers* explain, justify, or recommend a particular course of action based on the author's opinions and/or beliefs. *Guides* give instruction or advice explaining how practitioners might implement a particular agenda. An *annotated bibliography* is a list of cited works

on a particular topic, followed by a descriptive paragraph describing, evaluating, or critiquing the source. *Reviews of the literature* critically analyze the published literature on the topic through summary, classification, and comparison.

2.3.2- Research Design

Each empirical study was further classified by research design (i.e., quantitative, qualitative, mixed methods research). Quantitative research utilizes number to convey information. Instead of number, qualitative research uses language to explore issues and phenomenon. Mixed methods research involves the use of both quantitative and qualitative methods to present information within a single study.

2.3.3- Participants, Data, Sources, & Findings

I identified the participants in each study (e.g., children with autism, teachers/clinicians working with children with Autism, Characteristics of children with autism, Prevalence of Autism, Causality). I also identified the data sources used in each study (e.g., observations, surveys, & trials). Lastly, I summarized the findings of each study (Table 2).

2.4- Data Analysis-

I used a modified version of the Stevick-Colaizzi-Keen method previously employed by Duke (2011) and Duke and Ward (2009) to analyze the 55 articles included in this meta-synthesis. Significant statements were first identified within each article. For the purpose of this meta-synthesis, significant statements were identified as statements that addressed issues related to: (a): Characteristics of children with autism; (b) Prevalence; (c) Causality; (d) Neurological; (e) Brain abnormalities;

(f) Enlarged brains; (g) Vaccines; (h) Evidence based strategies; (i) Treatments; (j) Educational practices. I then generated a list of non-repetitive, verbatim significant statements with paraphrased formulated meanings. These paraphrased formulated meanings represented my interpretation of each significant statement. Lastly, the formulated meanings from all 53 articles were grouped into theme clusters, represented as emergent themes. These emergent themes represented the fundamental element of the entire body of literature.

3. Results

3.1 Publication Type

I located 53 articles that met my selection criteria. The publication type of each article is located in Table 1. Fifteen of the 53 articles (28.30%) included in this meta synthesis were research studies (Allen, Buell, Hart, Harris, & Wolfe, 1964; Beeghly, 1987; Camaioni, Perucchini, Muratori, & Milone, 1997; Chez, Buchanan, Bagan, Hammer, McCarthy, Ovrutskaya, Nowinski, & Cohen, 2000; Cowan, Hoddinott, & Wright, 1965; DiLalla & Rogers, 1994; Edelson, 1999; Fatemi, Realmuto, Khan, & Thuras, 1998; Holden, 1984; Mak-Fan, Taylor, Roberts, & Lerch, 2012; Nathan, Simpson, Anberg, & Patch, 1969; Peterson, Becker, Shoemaker, Luria, & Hellmer, 1961; Rutter & Bartak, 1973; Soutor, Houlihan, & Young, 1994; Wildman, 1978). Twenty-one (39.62%) of the articles were review of literature (Boisvert, Andrianoplulos, Boscardin, & Lang, 2010; Bondy, 1999; Boyd & Shaw, 2010; Bryson, Rogers, & Fombonne, 2003; Bryson & Smith, 1998; Gordon, 1979; Gresham, Beebe-Frankenberger, & MacMillan, 1999; Handen, 1993; Harris, 1984; Hobbs & Goswick, 1977; Kanner, 1962; Palermo & Curatolo, 2004; Parens, 1972; Polleux & Lauder, 2004; Quinn & Swaggart, 1994; Reichow, 2011; Rogers, 1998; Short, 1984; Shyu, J. Tsai, & W. Tsai, 2010;

Tanguay, 1973; Whittaker, 1975). Seven (13.20%) of the articles were opinion/position papers (Bower, 1989; Burns, 2013; Cohen, 1973; Garber, 1984; Oppenheim, 1961; Reichow, 2012; Time, 1968). Seven (13.20%) of the articles were descriptive works (Drotar, 1975; Easson, 1971; Heflin & Simpson, 1998; MacDonald & Allan, 2006; Rutter, 1979; Shriver, Allen, & Mathews, 1999; Seidman, 1961). Two (3.77%) of the articles were guides (Schopler & Bristol, 1980; Solomon & Chung, 2012). One (1.8%) of the articles was theoretical works (Ferster, 1961).

Table 1

Author(s) & Year of Publication	Publication Type
Allen, Buell, Hart, Harris, & Wolfe, 1964	**Research Studies**
Beeghly, 1987	**Research Studies**
Boisvert, Andrianoplulos, Boscardin, & Lang, 2010	**Review of the Literature**
Bondy, 1999	**Review of the Literature**
Bower, 1989	**Position**
Boyd & Shaw, 2010	**Review of the Literature**
Bryson, Rogers, & Fombonne, 2003	**Review of the Literature**
Bryson & Smith, 1998	**Review of the Literature**
Burns, 2013	**Opinion/Position**
Camaioni, Perucchini, Muratori, & Milone, 1997	**Research Studies**
Chez, Buchanan, Bagan, Hammer, McCarthy, Ovrutskaya, Nowinski, & Cohen, 2000	**Research Studies**
Cohen, 1973	**Opinion/Position**
Cowan, Hoddinott, & Wright, 1965	**Research Studies**
DiLalla & Rogers, 1994	**Research Studies**
Drotar, 1975	**Descriptive Works**
Easson, 1971	**Descriptive Works**
Edelson, 1999	**Research Studies**
Fatemi, Realmuto, Khan, & Thuras, 1998	**Research Studies**
Ferster, 1961	**Theoretical Works**
Garber, 1984	**Opinion/Position**
Gordon, 1979	**Review of the Literature**
Gresham, Beebe-Frankenberger, & MacMillan, 1999	**Review of the Literature**
Handen, 1993	**Review of the Literature**
Harris, 1984	**Review of the Literature**
Heflin & Simpson, 1998	**Descriptive Works**
Hobbs & Goswick, 1977	**Review of the Literature**
Holden, 1984	**Research Studies**
Kanner, 1962	**Review of the Literature**

MacDonald & Allan, 2006	**Descriptive Works**
Mak-Fan, Taylor, Roberts, & Lerch, 2012	**Research Studies**
Nathan, Simpson, Anberg, & Patch, 1969	**Research Studies**
Oppenheim, 1961	**Opinion/Position**
Palermo & Curatolo, 2004	**Reviews of the Literature**
Parens, 1972	**Reviews of the Literature**
Peterson, Becker, Shoemaker, Luria, & Hellmer, 1961	**Research Studies**
Polleux & Lauder, 2004	**Review of the Literature**
Quinn & Swaggart, 1994	**Review of the Literature**
Reichow, 2011	**Review of the Literature**
Reichow, 2012	**Opinion/Position**
Rogers, 1998	**Review of the Literature**
Rutter & Bartak, 1973	**Research Studies**
Rutter, 1979	**Descriptive Works**
Schopler & Bristol, 1980	**Guide**
Shriver, Allen, & Mathews, 1999	**Descriptive Works**
Solomon & Chung, 2012	**Guide**
Soutor, Houlihan, & Young, 1994	**Research Studies**
Seidman, 1961	**Descriptive Works**
Short, 1984	**Review of the Literature**
Shyu, J. Tsai, & W. Tsai, 2010	**Review of the Literature**
Tanguay, 1973	**Review of the Literature**
Time, 1968	**Opinion/Position**
Whittaker, 1975	**Review of Literature**
Wildman, 1978	**Research Studies**

3.2 Research Design, participants, data sources, and findings of the studies

As stated previously, I located 15 research studies that met my selection criteria (Allen, Buell, Hart, Harris, & Wolfe, 1964; Beeghly, 1987; Camaioni, Perucchini, Muratori,

& Milone, 1997; Chez, Buchanan, Bagan, Hammer, McCarthy, Ovrutskaya, Nowinski, & Cohen, 2000**;** Cowan, Hoddinott, & Wright, 1965; DiLalla & Rogers, 1994; Edelson, 1999; Fatemi, Realmuto, Khan, & Thuras, 1998; Holden, 1984; Mak-Fan, Taylor, Roberts, & Lerch, 2012; Nathan, Simpson, Anberg, & Patch, 1969; Peterson, Becker, Shoemaker, Luria, & Hellmer, 1961; Rutter & Bartak, 1973; Soutor, Houlihan, & Young, 1994; Wildman, 1978). The research design, participants, data sources, and findings of each of these studies are identified in table

Table 2

Authors	Research Design	Participants	Data Sources	Findings
Allen, Hart Buell, Harris, & Wolfe, 1964	Qualitative	4 year old student, group of 8 boys and 8 girls age ranging from 4-5, Intelligence level higher than average, Upper middle class	Observations	A preschool student's lack of peer socialization was improved upon using positive reinforcement. The student was given teacher attention when appropriate behavior was attained (peer interaction) but reinforcement was withheld with solitary play. As the school year progressed, the student was independently initiating peer interaction more frequently and relationships were maintained.
Beeghly, Kuperman, & Perry, 1987	Quantitative	7 boys and 2 girls, ages 7-14 meeting DSM-III criteria for infantile autism	Behavior Rating Instruments, Observations, Interviews	A double-blind crossover trial determined that the treatment of infantile autism with fenfluramine hydrochloride was not supported as an appropriate means of disability management.
Camaioni & Perucchini, 1997	Quantitative	3 children with autism: 2 years 1 month, 2	Observations, The Uzgiris-Hunt Scales	A longitudinal study between three children with autism demonstrated that children with autism

		years 8 months, and 4 years 6 months		can be taught, through imitation and social training to independently produce gestures hand clapping, waving, head shaking, pointing, to appropriately communicate. All three were able to learn a single gesture but only one was able to generalize all forms of instructed gestures.
Chez, Buchanan, Bagan, Hammer, McCarthy, Ovrutskaya, Nowinski, & Cohen, 2000	Quantitative	Study 1- 56 children 49 boys 7 girls Average age 6.4 years Study 2- 25 Children 22 boys 3 girls	CARS, Observations, Parental Interviews	Study 1- Secretin injections were administered to all participants at a rate of 2IU per kilogram of body weight. Post injection participants were observed for a period of 1 hour and results recorded. The data suggested that there was an overall positive result according to the CARS. A sample selection of those positively observed participants were used in Study 2 in an effort to eliminate placebo crossover affect. Although there was a significant positive result for 13 participants, there was either no change or a negative change for 11 participants: increased hyperactivity, agitation, decreased, focus, and lack of responsiveness towards others. Study 2-

				Study 1 method was reproduced but in a double blind study to eliminate selection bias. 25 participants from Study 1 who exhibited positive behavioral changes, were used for Study 2. Results of Study 2 did not show positive behavioral changes. Therefore, once placebo bias was stripped out of Study 1, the use of secretin as a method of positively affecting behavior is nullified.
Cowan, Hoddinott, & Wright, 1965	Quantitative	12 autistic children ages 4-9 years	Test Administrator, Weigl-Goldstein-Scheerer Color Form Sorting Test	It was determined that children with autism have general resistance to requested commands. More importantly, some children in this experiment were aware of the environmental demands, rewards, and punishments, and still stubbornly resisted compliance. Operant conditioning was used in this study with popcorn being the reinforcement. Better compliance was experienced with those individuals who had higher IQ's. They organized color and formed concepts more spontaneously. The resistance phenomenon may help advance implications for treatment of children

				with autism by the successful use of operant conditioning.
DiLalla & Rogers, 1994	Mixed Methods	Ages 24-73 months 33 children AUT, 18 children-PPD, 18 children-Oppositional Disorder, Adjustment Disorder, Attachment-related Disorders, and Mental Retardation, 18 of the total children-NPDD	Childhood Autism Rating Scale (CARS)	An effective diagnostic outcome was experienced when using the CARS. The CARS effectively diagnosed children with or without autism. Although the study was performed with a small ratio of subjects, the results revealed the CARS' ability to differentiate between children with or without autism.
Edelson, Arin, Bauman, Lukas, Rudy, Sholar, & Rimland, 1999	Mixed Methods	19 individuals with an autism disorder diagnosis ages 4-39 years, 17 men and 2 women	AIT Device, Observation, Aberrant Behavior Checklist, Questionnaires	With use of Auditory Integration Training (AIT) positive results were experienced when compared to the placebo group. AIT treatment resulted in a significant decrease measured by the Aberrant Behavior Checklist scores. The variable participants showed reduced behavioral problems in the 3rd month after the listening sessions. Additionally, the findings show that the participants experienced increases in attention, memory recall, information processing, and reduction in

				confusion, stress, and anxiety.
Fatemi, Realmuto, Khan, & Thuras, 1998	Quantitative	3 males 4 females Ranging in age from 9-20 years	End Point ABC Subscale Scores	Trial participants were administered fluoxetine treatments from 1-32 months. The trial was designed to treat symptoms related to autism such as: persistent repetitive behaviors, self-injurious behavior, aggressive behavior. Mean ABC scores demonstrated improvement in irritability, lethargy, stereotypy, and inappropriate speech. An adverse side affect was improvement in lethargy but a substantial increase in hyperactivity.
Holden, Wagner, & Gotwals, 1984	Quantitative	3 children with Autism: 15 year old male 9 year old male 6 year old female	Observation	Aversive conditioning was used to decrease self-injurious (SIBS) behavior responses in 3 children who have autism and low cognitive abilities. Treatment for SIBS responses used mild shock therapy coupled with a neutral stimulus. In all 3 cases, decreased rates of SIBS responses were found through adverse conditioning.
Mak-Fan, Taylor, Roberts, & Lerch, 2012	Quantitative	25 children all male with an ASD and 63 typically developing control children	Brain scans	It was determined that individuals with ASD have larger brains when they are children than their typical control group. Oddly enough, this trend flips as both

				groups age. Older people with ASD see their brains shrink while the control group saw their brain increase in volume, as they grow older. It was determined that the evidence showed that children with autism have larger brain volume while younger and that as they age brain volume decreases. It was also theorized that brain underconnectivity may be held responsible for behaviors related to autism. Findings supported the growth dysregulation hypothesis.
Nathan, Simpson, Andberg & Patch, 1969	Quantitative	924 psychiatric patients	100 Item Questionnaire	38 common signs and symptoms of cognitive abnormality, disordered form of thoughts, disordered content of thoughts, obsessional thinking etc., were determined to be differentiated through 5 diagnostic categories: psychosis, psychoneurosis, personality disorder, acute brain disorder, and chronic brain disorder. Although autism was thought to be closely related to schizophrenia, it was determined that autism was not a condition

				defined by schizophrenia.
Peterson, Becker, Shoemaker, Luria, & Hellmer, 1961	Mixed Methods	53 kindergarten children and 24 children attending a guidance clinic and their corresponding parents	Interviews, Independent Evaluations, Checklists	Personality problems among young children were found to be related to harsh, autocratic parental attitudes. Interestingly, evidence suggested that these behavioral issues were more prevalent with correlating strict cold father attitudes and was determined through interviews and observation.
Rutter & Bartak, 1973	Quantitative	50 students, Average age 7-9 years old	WISC, Merrill-Palmer Scales, Observations, Checklists, Interviews	Specific and focused teaching for students with autism in a well structured classroom environment, showed the greatest scholastic progress in the areas of cognitive, linguistic, social, and behavior. The study was conducted over a 3.5-4 year period.
Soutor, Houlihan, & Young, 1994	Mixed Methods	Twin brothers age 3 years and 8 months, Control student- Joey Variable student- Mikey	Observation, Scatter Plot Analysis	Twin boys living in the same household and have an autism diagnosis were compared: one as control and the other as variable, to determine if treatment for compliance and/or attention would garner the greatest positive result. 10 commands were issued and compliance observed. Reinforcers were dry cereal either Fruit Loops or Alphabets

				cereal for correct compliance. Findings were substantiated through scatter plot analysis, attending, compliance, and direct verbalizations, and further solidified with cross control analysis. Reinforcement for compliance showed the best across the board results as well as positive collateral outcomes.
Wildman & Simon, 1978	Mixed Methods	9 year old boy, sister, parents	Observation, Interviews	A family who has a son with Autism experienced increased interaction through a dual intervention process- practicing hand writing and prompting increased interaction with parents and family. A concrete schedule for practicing hand writing administered by the parents, showed increased interaction during handwritten lessons with parents and family members. A two fold affect was achieved. The child was more prone to interacting with his family and his hand writing substantially improved. It was concluded that providing help in this one area of deficiency proved to have positive

				affects for the child's social interactions.

3.2.1- Research Design

Nine of the 15 studies (60%) used quantitative research design (Beeghly, Kuperman, & Perry, 1987; Camaioni, Perucchini, Muratori, & Milone, 1997; Chez, Buchanan, Bagan, Hammer, McCarthy, Ovrutskaya, Nowinski, & Cohen, 2000; Cowan, Hoddinott, &Wright, 1965; Fatemi, Realmuto, Khan, & Thuras, 1998; Holden, 1984; Mak-Fan, Taylor, Roberts, & Lerch, 2012; Nathan, Simpson, Anberg, & Patch, 1969; Rutter & Bartak, 1973). Five of the 15 studies (33.33%) utilized a mixed methods research design (DiLalla & Rogers, 1994, Edelson, Arin, Bauman, Lukas, Rudy, Sholar, & Rimland, 1999, Peterson, Becker, Shoemaker, Luria, & Hellmer, 1961, Soutor, Houlihan, & Young, 1994, Wildman & Simon, 1978). One of the 15 studies (6.66%) used qualitative research design (Allen, Hart Buell, Harris, & Wolfe, 1964).

3.2.2. Participants & Data Sources

All 15 research studies included in this meta-synthesis analyzed primary data collected from human subjects. These studies collected data from a variety of participants including children with Autism and their families, children who are emotionally disturbed and the clinicians working with them, preschool aged children, their teachers and their families, and Kindergarten aged children, their families, and their teachers. Eleven of the 15 studies (73.33%) gathered data from children with Autism and their families (Beeghly, Kuperman & Perry 1987, Chez,

Buchanan, Bagan, Hammer, McCarthy, Ovrutskaya, Nowinski, & Cohen, 2000; Cowan, Hoddinott, & Wright, 1965; DiLalla & Rogers, 1994, Edelson, Arin, Bauman, Lukas, Rudy, Sholar, & Rimland, 1999; Fatemi, Realmuto, Khan, & Thuras, 1998; Holden, Wagner, & Gotwals, 1984; Mak-Fan, Taylor, Roberts, & Lerch, 2012; Rutter & Bartak, 1973, Soutor, Houlihan, & Young, 1994; Wildman & Simon, 1978) . One of the 15 studies (6.66%) gathered data from emotionally disturbed children and the clinicians working with them (Nathan, Simpson, Andberg & Patch, 1969,). Two of the 15 studies (13.33%) gathered data from preschool aged children, their teachers, and their families (Allen, Hart Buell, Harris, & Wolfe, 1964; Camaioni & Perucchini, 1997). One of the 15 studies (6.66%) gathered data from Kindergarten aged children, their families, and their parents (Peterson, Becker, Shoemaker, Luria, & Hellmer, 1961). In addition, participants also included general education students, groups of "typical" developing children, and clinicians assistants.

Eight of the 15 research studies (53.33%) included in this meta-synthesis utilized scale based assessment instruments to collect data (Beeghly, Kuperman & Perry 1987; Camaioni & Perucchini, 1997; Chez, Buchanan, Bagan, Hammer, McCarthy, Ovrutskaya, Nowinski, & Cohen, 2000; Cowan, Hoddinott, & Wright, 1965; DiLalla & Rogers, 1994; Edelson, Arin, Bauman, Lukas, Rudy, Sholar, & Rimland, 1999; Fatemi, Realmuto, Khan, & Thuras, 1998; Rutter & Bartak, 1973). Six of the 15 research studies (40%) collected data through interviews, questionnaires, observations, and checklists (Allen, Hart Buell, Harris, & Wolfe, 1964; Holden, Wagner, & Gotwals, 1984, Nathan, Simpson, Andberg & Patch, 1969, Peterson,

Becker, Shoemaker, Luria, & Hellmer, 1961; Soutor, Houlihan, & Young, 1994; Wildman & Simon, 1978). One of the 15 research studies (6.66%) collected data through brain scans. Additionally, a small portion of the data collected used both scale based assessment instruments as well as observations.

3.2.3. Findings of the Studies

The findings of the 15 research studies included in this meta-synthesis can be summarized as follows:

1. Characteristics of children with Autism have changed throughout the years. These changes have gone from a narrow psychosis perspective to more of a broad spectrum.
2. The prevalence of autism has increased substantially in the past 70 years and as a result, the question as to what causes autism is highly researched. The search for what causes autism garners interesting results.
3. Implementation of appropriate interventions for children with Autism are crucial for their development behaviorally, socially, and communicatively. Interventions have come in many different shapes and sizes. All interventions at one time or another were considered best practice. As time progresses and more research is established for working with children with autism, best practice is redefined.

3.3. Emergent Themes

Three themes emerged from my analysis of 56 articles included in this meta-synthesis. These emergent themes, or theme clusters, include:

(a) evolutionary change of characteristics defined for children with autism, (b) prevalence and causality; (c) methods, treatment, techniques for working with children with autism. These three theme clusters and their formulated meanings are represented in Table 3.

Table 3

Theme Clusters	Formulated Meanings
Evolutionary Change of Characteristics Defined for Children with Autism 1960's -Today.	**60's:** ● Bleuler and Kraepelin held to the understanding that child psychosis is directly parallel to that of schizophrenia in adults. ● Children experiencing characteristics such as disorganized feelings, thinking, and acting were sought to be mysterious and misunderstood. ● The erratic behaviors of children during this time were categorized as "inherently evil" ● Physicians considered children with extreme behaviors to be "insane" ● Infantile autism is a rare form of schizophrenia. ● When children exhibited what would now be considered autistic like behaviors or paleologic thinking, it was almost always predicted to be one of the several schizophrenias. ● When children demonstrated difficulty processing, sorting their feelings, focusing, thinking that is not

	congruent with the average individual, a psychotic diagnosis was predicted. ● Autism was beginning to be recognized as its own impairment through what was known as Infantile Autism. ● Infantile Autism was defined by two symptoms: extreme self-isolation and obsessive insistence on sameness. ● If several cognitive symptoms are seen together that normally signify schizophrenia or another "brain disorder" are not observed, then the child is considered to have depression. **70's:** ● The description of childhood psychoses began to evolve away from direct links to schizophrenia. ● Early Infantile autism was more clearly defined as a child who is placid and undemanding. ● A child with early infantile autism is unable to respond with and to a smile. ● The child is unable to appropriately respond with proper posture to an adult picking them up. ● The child fails to develop appropriate eye contact and is unable to properly focus on faces. ● The child does not appropriately respond to noises or receptive language, which suggests that the child is deaf. ● The child has the inability to develop verbal communication skills due to lack of response to verbal and nonverbal stimulation. ● If the child does develop the ability to produce speech, it may often be robotic and emotionless that is used inappropriately with echolalic manner. ● Autism can be categorized 4 separate ways: Normal Autism, Infantile Autism, Secondary or Regressive Autism, and Symptomatic Autism. The characteristics of each are described by the following: 1. Normal Autism: ● Child begins by living in a world all their own and reacts accordingly when absolutely necessary. ● Self centered. ● Emotionless and could be described as an emotional vegetable. ● As child grows, he will begin to relate to the environment and the people in the environment more positively. 2. Infantile Autism: ● Child cannot reach out emotionally and connect with others and/or when does is rejected. ● Child is unable to emotionally attach with others.

	● Extremely rare. ● Prognosis is not positive for reasonable social competence. 3. Secondary or Regressive Autism: ● More prevalent than Infantile Autism. ● Child begins to develop normally but then for unknown reasons, withdraws into an autistic state. ● Typically very guarded in their interactions. 4. Symptomatic Autism: ● A physician is most likely to be able to recognize this type of autism. ● Develop in their own reality due to their disability. ● The more the child develops in their own reality, the more common place it is for the individual to exhibit bizarre behavioral traits. ● Because of altered development due to differing perceptual reality, the individual will tend to develop a form of symptomatic autism. ● Makes up and communicates with their own language. ● A child with Autism may explore their environment mainly through mouthing and smelling objects, running their hands or fingers over surfaces and listening to the various sounds that these motions cause. ● A child with Autism response to stimuli may consist of under reactivity or over reactivity depending on severity, situations, and environment. ● A child with Autism is fascinated by various textures either by feel or sight. Repetitive motions by an object puts a child with Autism in what looks like a trance. ● A child with Autism engages in many unusual behaviors that are considered "self-stimulatory." These behaviors may be rocking, whirling, flapping their arms, and flicking their hands and fingers before their eyes while starring at lights. They may stare off into space and when excited may engage in irregular darting or lunging. ● A child with Autism has difficulty with a change in routine and or in the environment. However, a child with Autism does not respond to the "coming and goings" of their parents or other significant adults. ● Autism is heavily regarded to be associated with family discord and disharmony, more specifically, maternal deprivation. Therefore the child will undoubtly engage in delinquent behavior. ● A child with Autism lives in a constant state of "here and now." The child has difficulty understanding concepts having to do with the past and the future.

	● A child with Autism is rarely able to delay gratification. ● A child with Autism demands things to be their way. They may have little patience for others views, thoughts, or standards. ● A child with Autism may exhibit obsessive behaviors that seem to consume much of their time, leaving them in a panicky state that becomes increasingly worse with changes to their surroundings or routines. ● A child with Autism may experience repeated cycles of tension build up and tension release. To release this tension, the child may rock, rush around, and or may be destructive until the tension is released. ● A child with Autism does not have adequate socialization skills and manifests this in a variety of ways, some of those ways being: seclusiveness, loss of interest in surroundings, disturbance in emotional response to people, negativism, sensitivity to criticism, repetitive movements, and distinctive speech patterns. ● Autism is a lifelong developmental disability that severely affects an individual's cognitive functions. ● A diagnosis of Autism is difficult. There is no medical test that can accurately diagnose such a condition but rather behavioral factors consistent with past experiences are analyzed before conclusion ● Autism and schizophrenia are not related. **80's:** ● Fewer than one in 20 individuals diagnosed with Autism continue on to lead an independent functioning life outside of institutional/custodial care. ● Autism is viewed as a biological disorder of unknown origin. The biological hypothesis is widely accepted but treatment of Autistic individuals is centered around environmental manipulation. ● Originally, it was common practice to have children treated separately from their parents, however it is becoming more apparent that the parent's role in their child's treatment is one that cannot be ignored. ● There is no treatment that will cure autism but when parents and therapists work together towards a common goal, both the child and the parents are more affectively equipped to manage the condition. **90's:** ● Autism cannot be defined by any identifiable biological marker but rather observable behavioral traits and peer-to-peer interaction.

	● The definition of autism has been redefined as more of a spectrum that covers a number of different disorders. This readjusted view of autism runs contrary to the long held view that autism was defined as socially inept and uninteresting individuals who have difficulty dealing with changes in routine. ● Although autism is beginning to be defined as a spectrum, severity of the disorder needs to be considered as well. ● The majority of individuals who fall within the autism spectrum, in fact do not have mental retardation. ● 25% of the individuals who are cognitively impared also have autism. ● Interestingly, those individuals who have autism and are cognitively impaired diagnosis have a 2:1 male to female ratio compared to a 4:1 ratio in the generally diagnosed autism population. ● Individuals with autism have a difficult time applying learned social behaviors to every day life. ● Learning to deal with the unpredictable intricacies of every day life poses problems for individuals with autism. **2000's:** ● Unable to use physical motions to show personal interest in objects- toy, bike, car etc. ● Unable to follow physical gestures and understand their meaning. ● Has trouble developing emotional relationships with other individuals. ● Experiences difficulty making and maintaining eye contact. ● Individual appears to have little to no empathy. ● Physical contact such as cuddling, hugging, or holding is not preferred and could cause behaviors. ● Although an individual may be interested in people, they may not understand how to interact. ● The individual experiences difficulty adapting to changes in routine. ● Mental and emotional regression. ● Verbal repeating- echoing words or phrases that are said to them, what they have heard on the radio or in another setting. The repeating of words and phrases doesn't necessarily have to be congruent to present situation and many times is not. ● The current general view of autistic behavior has dramatically shifted from that of schizophrenia and

	unpredictably aggressive behavior to an understanding that is much more refined. ● Currently, autism is considered a neurodevelopmental disorder characterized by the following: 1- Social awareness deficits. 2- Communication deficits. 3- Behavior deficits such as repetitive behaviors and interests. ● Teenagers who have an autism diagnosis are more apt to receive a psychiatric diagnosis such as anxiety disorder or depression.
Prevalence and Causality	**60's:** ● Through much of the 1960's a widely accepted cause of autism was that of disinterested and emotionally unavailable parents. This view was propagated strongly by Bruno Bettelheim. ● Autism is 3-4 times more prevalent in males than in females. ● There is a strong correlation between causality and the lack of interaction between mother and child. ● It has been suggested that a fathers neglect, rigidity, poorly adjusted emotional patterns, lacking in warmth, and overly aggressive behaviors are causes of Autism. ● Both parents were considered contributing factors to the cause of their child's Autism. The mother being considered maladjusted and the father lacking involvement in the child's life were the strong factors. ● The maternal and paternal variables included to cause Autism are: ● Strictness ● Adjustments (self-esteem) ● Warmth ● Responsibility ● Aggression **70's:** ● The prevalence of early infantile autism is recorded to be 4.5 per 10,000 in England, 4.3 per 10,000 in Denmark, and .7 per 10,000 in Wisconsin. ● The family etiology hypothesis states that children from troubled homes, adverse environmental factors, are the cause of such behavioral disorders such as Autism. The shortcomings of the parents are directly projected onto the children by which the influence of said shortcomings is manifested in the exhibited behavioral traits of the child. The cause of Autism is still unknown. What is known is that it is a complex diagnosis that incorporates a multitude

	of variables centered around chemical imbalances and brain abnormalities. **80's:** Autistic prevalence from 1985-94 is observed to be 1-980. **90's:** ● Autistic prevalence in 1997 is observed to be 1-250. ● Since autism has shifted to a broader definition in regards to being more related to a spectrum, there has been a greater increase in prevalence. ● Do the higher rates actually correlate to an increase in prevalance or is it simply diagnostic criteria which is creating the increase? Thalidomide exposure to child development is the 20^{th}-24^{th} day (neural tube closure), resulted in an autism diagnosis 30% of the time. **2000's:** ● 2000- 1 in 150 individuals are recorded as diagnosed with Autism. ● 2002- 1 in 150 individuals are recorded as diagnosed with Autism. ● 2004- 1 in 125 individuals are recorded as diagnosed with Autism. ● 2006- 1 in 110 individuals are recorded as diagnosed with Autism. ● 2008- 1 in 88 individuals are recorded as diagnosed with Autism. ● 2010- 1 in 68 individuals are recorded as diagnosed with Autism. ● ASD is 5 times more common in boys 1-42 than in girls 1-189. ● The current general view of autistic behavior has dramatically shifted from that of schizophrenia and unpredictably aggressive behavior to an understanding that is much more refined. In the past, parents were largely associated with the cause of their child's behavior. Currently, autism is considered a neurodevelopmental disorder characterized by the following: 1- Social awareness deficits. 2- Communication deficits. 3- Behavior deficits such as repetitive behaviors and interests. ● Autism Spectrum Disorder covers a number of different diagnoses separately: autistic disorder, pervasive developmental disorder not otherwise specified (PDD-NOS), and Asperger syndrome.

	• ASD covers a wide spectrum and correspondingly there are many different factors that contribute to an ASD diagnosis: environmental, biologic and genetic. • Most individuals in the scientific community related to Autism agree that genes are one of the many casuality risk factors. When one sibling has autism, the other siblings are at a higher risk for a diagnosis as well. • Women who bear children at older ages have a higher risk factor for children with autism. • Some evidence has shown that a critical time for children to be exposed to factors that cause autism are before, during, and shortly after birth. • The prescription drugs valproic acid and thalidomide have been associated with higher risk of ASD diagnosis when taken during pregnancy. • The growing number of autism diagnosis can partly be attributed to a greater understanding and awareness of the condition. • The prevalence has substantially increased within the last two decades, as much as twenty fold by some estimates. • Autism is a spectrum disorder, meaning it spans a broad section of disabilities and characteristics defined to be on the spectrum whether sever or mild in nature. • Since autism has a wide spectrum, those who are at the mild end of the spectrum display few characteristics while those who are at the severe end display a multitude and a severity of characteristics. Secondly, autism spectrum disorder can be sliced into three diagnostic classifications: autistic disorder, Pervasive Development Disorders- Not Otherwise Specified, and Asperger's syndrome. With additional diagnostic classifications, more and more children are going to fall in said classifications. Thirdly, the general population is becoming increasingly aware of autism and the characteristics for which to look. Thus parents are asking questions and obtaining diagnosis for their children in an attempt at helping them with their overall education and development. Lastly, diagnosis are becoming reliably achieved at younger ages, as young as 2. • The present evidence debunks the hypothesis that vaccinations were contributing to the increasing prevalence. • There is better founded evidence that suggests autism is genetically related, for example if one identical twin has an autism diagnosis, the odds of the other twin also being diagnosed is between 69-95%.

	Although there is a greater understanding of parental genes and prevalence, potential environmental factors also need to be kept in mind and observed for their potential contributions, viruses, prenatal exposure etc.
Treatment, Techniques, & Methods for Working with Children with Autism	● Behaviorism techniques such as Pavlov's classical conditioning have been readily used with children and adults with autism. ● Skinner's operant conditioning has been used as a reward and punishment system. For desired behavior, a reward is given. For an undesired behavior a type of punishment is granted (with holding or removing of a desirable outcome or application of a negative outcome). ● For years, children with Autism have been "treated" in a multitude of ways. As time advances, treatments and/or techniques to either "curing" autism or simply managing behaviors have evolved. In the early years of autism, regulating behaviors such as biting, hitting, head banging etc., aversive techniques such as shock therapy were used and deemed moderately successful. ● Positive social reinforcement has been shown to improve peer interaction. A child with autism who frequently isolated herself from her peers increased her peer interaction through an intervention that involved an adult talking to, smiling at, touching, offering and or giving assistance to her when she engaged in appropriate play with her peers. Because adult attention was so important to her, using that as a reinforcement help to foster a desired behavior. ● Auditory Integration Training (music therapy) has been used to enhance developing social behaviors, developing communication skills, improving focus and attention, ease stress and anxiety and improving body coordination in a child with autism. ● The use of combining music with actions in an attempt to connect the auditory and motor sections of the brain has shown to help with a child's receptive language. ● Along with the combination of music with action, repetitive training has helped in improving the brain paths that are required to speak. ● Rhythmic music that has a steady consistency and predictable beat or classical music is suggested to ease anxiety in a child with autism. ● A child with Autism, who may struggle with attending to various tasks has shown great success at attending in

	music therapy session for long periods of time without needing a break. ● Augmentative and alternative communication devices have opened doors for communication for children with autism. There are types of communication that are used such as sign language but there are other forms that range from pictures, communication boards to speech generating devices (Dynavox, switches, go talk's, Ipads, etc). ● Typically, high rates of children with autism learn best through visual representation. The picture exchange communication system (PECS) is highly regarded for fostering communication with children. ● It is important for families to play a part in their child's therapy. Collaboration is key when establishing appropriate care for children with Autism. Having a multidisciplinary team approach is the best way to ensure all needs are being considered for the child. ● Early identification results in early intervention, which allows for more opportunities to build on necessary abilities. ● Integration and inclusion allow children with autism to experience modeled behavior, communication, and socialization skills they may be lacking. ● It has been suggested that high doses of niacin or other vitamins may be beneficial in helping reduce symptoms of early infantile autism. ● Medication has been on the forefront for identifying ways to decrease and manage symptoms of Autism. ● Using play as a form of teaching to focus on the development of social emotional, cognitive, and communication is highly regarded. ● Modeling, encouragement, coaching and training are all techniques in which educators use to promote positive peer interactions for students with autism. ● When teaching students with autism is it especially important as an educator to implement certain behaviors. These consist of: ▪ Appropriate pace when speaking ▪ Having visuals appropriate to the lesson ▪ Reviewing the instruction or demand on student ▪ Monitoring student progress ▪ Providing a clutter free structured environment ▪ Recognizing appropriate behavior and addressing it ▪ Exhibiting enthusiasm

	▪ Use appropriate wait time when questioning a student ● To reduce symptoms of autism in children, specialized diets are attempted. By restricting glutton/casein from the child's diet, parents have reported change in speech ability as well as reduced aggressive behaviors. ● Applied behavioral analysis (ABA) encompasses interventions that are used to change a child's behavior through measurable and accountable ways. These ways are scientifically (evidence based) researched and built to shape, foster, and support appropriate social habits and to lessen or change the more problematic behaviors that may be interfering with a child's ability to appropriately manage the many unknowns that everyday societal living requires.

4. Discussion

4.1 Characteristics

To begin to understand Autism Spectrum Disorder (ASD) and its broad nature, one needs to first understand the development of the spectrum and our evolved understanding of it. In 1943, Kanner identified a unique group of children who fell under, what today is considered, the severe and profound side of the spectrum or low incidence. At the time, autism was narrowly defined and not even considered a spectrum. Kanner identified children who required daily routine, sameness of living, and were unable to affectionately connect with others. This description of autism is known as classic or nuclear autism. Kanner's understanding of autism largely held its validity for close to 30 years.

After Kanner identified autism and later into the mid 60's, there were still views of the disorder that were quite different compared to how we understand and view ASD

today. The most notable diagnosis associated with autism, even infantile autism, was schizophrenia. The behaviors both adults and children exemplified were viewed as schizophrenic, insane, and in some instances inherently evil. Even pre Kanner, Bleuler and Kraepelin theorized that child psychoses were directly related to schizophrenia in adults. Infantile autism was even viewed as a rare form of schizophrenia. Interestingly enough, a schizophrenic association with autism was largely viewed as valid and not overly challenged until late 60's early 70's. Although, autism is looked through Kanner's lens, one can find validity in associating schizophrenia with autism.

Physicians, during this time, would diagnosis patients as insane rather than having autism. The reason physicians experienced such difficulty identifying autism was due to two main reasons: 1. The prevailing understanding during that time period. 2. Physicians biological point of view. For starters, Physicians only had access to what was available to them at that time. Since the schizophrenic parallel was largely publicized to the associated behaviors expressed by an individual with autism, a simple diagnosis of insane or schizophrenia was used. Physicians come to diagnostic conclusions based upon the evidence they observe from their patient and from the most current research. Retrospectively pointing the finger to those who identified individuals with autism as schizophrenic or inherently evil appears to be a bit unfair considering our current understanding of the spectrum. Secondly, doctors look to fix the biologic functions and a person with autism would appear to behave as if they were schizophrenic. Those would be the symptoms the physician would use to diagnose insanity rather than trying to dig

deeper as to the root problem. Physician's biological treatment of ASD is a point of topic that will be further discussed.

The 1970's began to delve deeper into and broaden the understanding of Kanner's original findings and challenge long held beliefs. The 1970's could be considered the renaissance of autism because the understanding of the disorder began to evolve by leaps and bounds. Autism was identified as a lifelong developmental disability that severely affects an individual's cognitive functions. The field also began to understand that an autism diagnosis was not necessarily easy to recognize. There is no medical test that can accurately diagnose such a condition but rather behavioral factors consistent with past experiences are analyzed before a conclusion is made.

Autism was not yet considered a spectrum but was split into 4 different categories:

1- Normal Autism

2- Infantile Autism

3- Regressive Autism

4- Symptomatic Autism

Normal autism was defined as a child who begins to live in its own world and reacts to the "outside" world only when it is necessary to do so. Individuals who fall into the normal autism category are self centered and emotionless but as they grow they begin to more positively relate to their environment and people who occupy that environment.

Infantile autism is extremely rare, characterized by a child who is unable to connect with others on an emotional level and does not have a positive outlook for

reasonable social competence. A common trait of infantile autism is when the child experiences hardship when trying to connect with their parents on the level the parents would like to connect with the child. Additionally, a child, who is categorically designated as having infantile autism, may prefer not to be held by their parents or others, for that matter.

Regressive autism, at that time, may be felt as most detrimental to some parents because of how it manifests. Regressive autism is more prevalent than infantile autism and is observed through a typically developing child who appears to withdraw. For example, the child may be walking, talking, engaging with adults, and responding to stimuli but then suddenly, for unknown reasons, the child looses abilities previously demonstrated.

Symptomatic autism is a categorical type of autism that physicians are most likely to recognize. Individuals with symptomatic autism develop their own reality due to their disability and, as a result, the more they develop their own reality the more they exhibit bizarre behavioral traits. Symptomatic autism diagnosed individuals even make up and communicate in their own language.

Moving a step further and categorizing Kanner's classic definition of autism helped the etiology of autism move in an important direction. The understanding of the condition helps foster research and the advent of ideas. For quite some time, autism was defined by one small category. We currently know that ASD is not merely a small category but a large spectrum.

There were two major advancements for ASD in the 80's. The first major advancement was the general acceptance of the 1970's biological hypothesis. The biological hypothesis describes that autism is a biological disorder of unknown origin rather than abhorrent social behaviors caused by poor and emotionless parenting. The second major advancement was to have a child with autism work one on one with a therapist; however, the shift from specialized therapy sessions to parental inclusion began to show merit. The dual parental and therapist approach helps in a couple of ways. First, the child with autism is constantly receiving the same and consistent therapy whether the child is at home or at school. Secondly, the parents are now better equipped to manage their child's erratic behaviors and appropriately meet their child's needs. The parents feel like they are helping their child while the therapist does not experience regression from session to session. Receiving treatment at home also plays into the same routineness children with autism value. It was also reiterated that there is no treatment that cures autism, only treatments that help manage the conditions symptoms.

Parents were thought to be a bigger piece of the puzzle. As a result, therapists provided skills training for parents so they could be quipped to emulate the therapist's techniques. However, is treatment going to be uniform across all administration avenues? Are parents going to be able to provide everything the therapists do? Most likely not. Children act differently with their parents than they do with therapists. However, the attempt to emulate the same environment and provide similar demands and ways of fostering skills provides consistency in the child's life. This type of consistency also provides opportunity for successful generalization.

Ninety's research continued to confirm that autism could not be defined by any identifiable biological marker but rather identified by observed behavioral traits: Peer-to-Peer, Peer-to-Adult interaction. The new shift in the definition of autism takes the categorical model of the 70's and turns it on its head. Autism was defined in the 90's as a spectrum that covered a number of different disorders. This view of autism as a spectrum has held true even to this day. Even with the expanded definition from autism disorder to autism spectrum disorder, those on the spectrum still continue to have difficulty applying learned social behaviors to every day life. In fact, the fluid dynamic that is everyday life poses challenges to the individual with ASD because of the unpredictable nature of every day life. As a result of the expanding definition of autism into a spectrum, the mild part of the spectrum became more prevalent and now the severity of each individual on a case-by-case scenario requires additional services in order to determine how best to help said individual.

Finally, the current general definition of ASD is characterized by the following but not limited to:

1- Social awareness deficits
    a. Has trouble developing emotional relationships with other individuals.
    b. Experiences difficulty making and maintaining eye contact.
    c. Although an individual may be interested in people, they may not understand how to appropriately interact.
2- Communication deficits

a. Unable to use physical motions to show personal interest in objects- toy, bike, car etc.
b. Unable to follow physical gestures and understand their meaning.
c. Mental and emotional regression.
d. Receptive language

3- Behavior deficits (repetitive behaviors)

a. Physical contact such as cuddling, hugging, or holding is not preferred and could cause behaviors.
b. The individual experiences difficulty adapting to changes in routine therefore reacting in inappropriate ways (tantrums, aggressive behavior etc.).
c. Verbal repeating- echoing words or phrases that are said to them, what they have heard on the radio or in another setting. The repeating of words and phrases does not necessarily have to be congruent to present situation and many times is not.
d. Finger movements or flapping.

The current definition of ASD covers a wide array of disorders:

Infantile Autism

Child Autism

Kanner's Autism

High-functioning Autism

Atypical Autism

Pervasive Developmental Disorder Not Otherwise Specified

Childhood Disintegrative Disorder

Asperger's Disorder

When looking at how the fundamental view of autism changed over the past 70 years, it is remarkable. Kanner first recognized the spectrum back in 1943 and his perception of what autism was helped begin the journey to our current understanding of ASD. Even in the last 20 years, evolutionary understandings brought helped bring us to where we are today. ASD is a complex disorder and, as time goes on, our understanding of it may continue to change.

4.2. Causality & Prevalence

Prevalence-

As described above, autism has quite the evolutionary history. Prevalence has also closely followed characteristic progression. When Kanner identified autism, the prevalence was extremely rare. Autism had a long way to go before it became the identified spectrum of today's autism. However, Kanner only identified the severe and profound side of the spectrum, which is agreeably low incidence. As the definition of autism began to broaden, more and more people began to fit into the spectrum, prevalence thus grew.

Early observations of prevalence were roughly around 1-10,000 births. It was accurately observed that autism is predominantly a male occurring disorder on the order of 3-4 times to that of their female counterparts. Early recorded prevalence in males of

3-4 times was only slightly recently modified by conflicting reports. The Center for Disease Control states that male prevalence is 5 times more prevalent when compared to female prevalence, the DSM5 states that it is only 4 times more prevalent. Regardless, this historical accuracy for male dominated diagnosis does not correlate to overall prevalence through historical trends. Overall prevalence drastically changed through the years. In 1997, autism diagnoses were observed to be 1-250. 1-250 is a far cry from 1-10,000. In fact that is a 3900% increase in prevalence. From where does such a large jump in prevalence occur? Keep in mind; the 90's were responsible for developing the idea of autism as a spectrum disorder. By casting a wider net, individuals who before fell outside of an autism diagnosis were now included. Therefore, with a wider spectrum, prevalence naturally goes up. It should be noted that population prevalence did not necessarily increase but rather the method of inclusion caused an increase in population observations. The individuals who fell outside of an autism diagnosis before the diagnosis was expanded to a spectrum were still people living with autism. Those outlier individuals demonstrated characteristics of their condition but were only included once autism was classified as a spectrum. It would follow that prevalence would begin to plateau after such an increase but the Center for Disease Control's most recent numbers show otherwise:

Prevalence of Individuals Diagnosed with Autism Spectrum Disorder

2000: 1-150

2002: 1-150

2004: 1-125

2006: 1-110

2008: 1-88

2010: 1-68

Again, when looking at the increase in prevalence between 1997 and 2000 there is a jump of 66.67%. Another increase in prevalence can be attributable to the fact that ASD covers a number of different diagnoses separately: Autism Disorder, Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS) and Asperger syndrome just to name a few. ASD continues to expand and, as it does, so does observed prevalence. From 2000-2010 there was an increase in prevalence of 120.6%. Was this increase also due to an increasing of the spectrum like the increases before? No, this growth was due to multiple factors. Yes, the broadening of the spectrum in the past helps increase prevalence but more appropriately, the general population, as a whole, is more aware of the condition. The general population has a greater understanding of ASD and with greater understanding there is a greater general awareness. Parents ask more questions and obtain earlier diagnoses for their children in an attempt to help them with their education and development. Additionally, an accurate diagnosis of ASD can be made as early as 18 months. However, children typically are not identified with ASD until after the age of 4. Asperger disorder takes a few years longer with the average diagnosis age of 6 years and two months. Interestingly enough, parents of children with autism have recognized developmental deficits before age 1. With such early ASD diagnoses early intervention services can be implemented. The earlier children are diagnosed with ASD, the better opportunity they have to sooner acquire needed skills.

Causality-

As described above, ASD is a prevalent disorder that affects roughly 1.5% of the population whether diagnosed or undiagnosed individuals. 1.5% does not appear to be a large number when talking about the entire population, but what about 1-68. How many friends do you have on Facebook, followers on Twitter, family, friends, and coworkers? 1-68 quickly does not sound like a miniscule number. The United States population on July 4, 2013 was approximately 316,148,990. Of that population, 4,742,235 are considered on the spectrum- 1.5%. Does 4,742,235 seem like a small number? With ASD consistently increasing in prevalence and affecting roughly 4.7 million Americans, we strive to understand why prevalence has increased 20 fold in little over two decades.

The human condition is a complex and interesting psychological arena. We strive to understand the world around us and discover the "Why?" in all that affects our lives. Generally speaking, our search for greater understanding typically yields positive results. On the other hand, at times, we experience broad negative effects. The evolution of the causality of ASD has demonstrated both positive and negative effects.

Through the 1960's and into the 70's a widely accepted cause of autism was that of disinterested and emotionally unavailable parents. This perceived causality was known as the family etiology hypothesis. The family etiology hypothesis indicates that parents who raise their children in troubled homes, experience adverse environmental factors in said homes, are the cause of behavioral disorders such as autism.

The shortcomings of the parents are directly projected onto the children by which the influence of said shortcomings is manifested in the child's exhibited behavioral traits.

In short, the parents of children with autism are the cause of their child's disorder. Imagine parenting a child with autism back in the 1960's. You attempt to do everything you can to be the best parent you can. Working with a child with autism is challenging, but imagine your child's physician stating that you and your parenting style is the cause of your child's condition. Most parents would be crushed to hear that they were the cause of their child's disorder and carry around massive amounts of guilt through their child's development. We know today that parents are not the sole cause of their child's disorder and that autism is understood to be a complex spectrum disorder that incorporates a multitude of variables centered around chemical imbalances, brain abnormalities, environmental, and genetic factors.

Even with our current understanding of autism as a complex spectrum disorder with multiple causes, we tend to overreact in the face of scientific evidence. When children are affected, overreaction is commonplace. ASD has advanced a long way from Kanner's description. ASD covers multiple disorders and can be diagnosed as early as 18 months. When a child is diagnosed with autism at such a young age, there tends to be an overreaction as to what caused the disorder. This overreaction is most notable with autism. At one point the child interacts with their parents, speaks, plays, and communicates, the next the child regresses in those abilities they once exhibited.

There is a potion of the population who believes the Measles Mumps Rubella vaccine is responsible for autism although numerous scientific studies have disproven such claims. It appears that there is more of a coincidental circumstance with the MMR vaccine. Autism can be diagnosed as early as 18 months and typically around 3 or 4

years of age. During those ages, doctors push for immunization. On the surface, it may appear vaccination was the cause of a child's autism but a more likely explanation, one backed by scientific studies, is the explanation that regardless of the vaccine, the child was going to regress. I agree humans should ingest as little mercury as possible, but in light of new vaccines that are mercury free, prevalence continues to rise. Regardless of scientific studies, when such things affect children, the general populous tend to ignore evidence-based research and believe anecdotal claims.

There appears to be quite a bit of anecdotal information out in the view of the general public science has not substantiated. These claims and over-reactions are a result of people trying to figure out reasons for causality. Genetic factors are one area where science has established evidence-based results. Genetic associations related to an autism diagnosis are most significant when looking at identical twins. In 2010, researchers found that if one identical twin is diagnosed with autism that the other sibling has a 69%-95% change of also falling somewhere on the spectrum. The most recent statistics show that twin concordance rates actually fall somewhere between 37%-90%. Regardless of the rate being 69%-95% in 2010 and or in fact closer to 37%-90% in 2013, the numbers are significant in nature. The significant nature makes it clear that there is a genetic component to ASD. It would be interesting to determine if behavior severity is similar in twins with autism. Such a finding would further substantiate genetic relevance and intrigue.

Neurological abnormalities are well proven to be another area of ASD that has significant causality supporting evidence. It is well documented that the brain of a person

with autism is larger in volume than their "typical" peers. The mounting evidence confirming such an observation even dates back to Kanner in 1943. He observed that of the 11 children, 5 of them showed an enlarged head. Large scale surveys have even garnered such results as 20% of individuals with autism have larger heads than the 98th percentile for head circumference. It is hypothesized that the enlargement of both white and grey matter of the brain increases underconnectivity resulting in behaviors related to autism. Advancement in the field of neurological autism helps researchers understand how the brain of a person with autism affects their cognitive functions. Understanding the cognitive functions of a person with autism, this could help treatment, technique, and method advancement.

Autism is a spectrum disorder that has undergone substantial changes in our understanding of how it is caused. From the perception that parents were the cause of MMR vaccinations to the understanding that ASD is a multifaceted disorder with multiple causes: environmental, genetic, and biologic. There is a lot that we do not know about autism but what we do know is that it is, according to DSM-V, a spectrum disorder characterized by persistent impairment in reciprocal social communication and social interaction, and restricted, repetitive patterns of behavior, interests, or activities. The definition has shifted many times over the years. For all we know, through another couple of decades, ASD will undergo further changes and our understanding of causality will change as well.

4.3. Treatment, Techniques, & Methods for Working with Children with Autism

As humans, we constantly evolve. Our beliefs, our practices, and the way we live life, is ever changing. We almost never seem to do the same thing twice. As we grow and experience more of our world, we learn, build upon theories, and grow our knowledge about the world around us. This type of knowledge seeking is especially evident in what we have come to know about children with autism. The main question surrounding individuals with autism is, "What is needed in order to foster development for each individual with autism?" For years, researchers attempted to cure autism. However, it was not as simple as curing what was thought of as a disease. Other techniques found ways in which to condition a person to stop engaging in unusual behaviors. Yet again, it is not as simple as ringing a bell to elicit a response, however, over time, we build from the past. Although research continues to strive to discover ways to best meet a child with autism's needs, the field, nevertheless, has come a long way.

For years, people with autism were treated, or not treated for that matter, in many different ways. There were many instances where answers were difficult to come by for addressing necessary support for these individuals. Rather than receive support, they were institutionalized and heavily medicated to suppress erratic behaviors. History moved us from hopeless children, to ASD, which is more characteristically defined. After Kanner identified autism, history experienced researchers who, although their methods not entirely practiced today, were a starting point to where our journey has taken us. Over time, behaviorists developed ways for treating individuals in an effort to eliminate unwanted behaviors. Although past techniques championed by such known

figures as Pavlov and Skinner may be considered inhuman or unethical, we cannot ignore the fact that much of what we do today has evolved from such practices.

The word treatment may take on many forms when discussing ways in which to "treat" children with autism. There is no cure for autism. There are merely ways in which symptoms of autism can be treated. Different treatments help individuals with autism develop skills they need in order to enhance their quality of life. In the past, aversive treatment was used to correct aggressive behaviors. The research showed moderate effectiveness in decreasing unwanted behaviors. These treatments (shock therapy) are considered quite harsh by current standards. In the end, what is the child learning? Combating aggressive behavior with harsh and aggressive techniques may stop the child from that particular behavior during those sessions, but can that technique produce generalization across settings? As the understanding of autism advanced, aversive therapies such as shock therapy and negative reinforcement were left to the wayside and newer behavior modifications were introduced. This is not to say that aversive forms of treatment do not occur today. Spanking a child for wrong doings is certainly considered aversive and many argue inhuman or abusive. However, parents practice this method of behavior modification everyday. Research began to indicate that positive reinforcement is more effective in changing behavior than harsh aversive therapies.

As treatment for children with autism began to evolve, researchers established that there was no single treatment that meet all the needs established by the changes in diagnostic criteria. Knowing that a child with autism shows deficits in the areas of

communication, social awareness, and behavior, proves the point that more than one approach is needed in treating these children. This does not even acknowledging the comorbid conditions associated with autism. A multi-disciplinary approach is highly regarded in developing treatment for children with autism. Collaboration amongst all who work with the child is important for the child's overall development. The needs of the child dictate the types of therapy needed to meet their specific needs.

Medication, diet, and vitamin therapy have been explored as viable options for suppressing behaviors combined with treating comorbid conditions associated with autism. These three types of treatments continue to be explored regardless of the difficulty determining their positive effects on top of the lack of scientific evidence. There are many factors at play when involving pharmaceuticals. Some factors that should, in my opinion, be taken into account before administering doses to individuals with autism are the following: What medication is the individual currently taking? How is age factored? What are the negative side affects? How strong are the doses?

Medication treatment for autism related behaviors is a popular subject, but risks need to be weighed before administration. There were medications that were used in the past that are no longer available due to their negative side affects. One such formerly popular medication was fenfluramine. Fenfluramine was originally used as diet control for obese individuals. For people with autism, fenfluramine acted as a depressant and was used to suppress hyperactive and explosive behavior by reducing serotonin levels in the body. Two issues presented themselves: 1- Over exaggerated results were recorded but later disproven for direct correlation to positive behavioral outcomes in individuals

with autism. 2- Fenfluramine was discovered to cause heart disease. Fenfluramine was not the only drug to catch the public's overly eager eye. Secretin, a drug used to treat pancreatic insufficiency, is another such overly pushed non-affective treatment. On the positive side, there have not been any high-risk side effects but there also has not been any significant data to suggest that secretin injections are an appropriate treatment method. Fenfluramine and secretin are simply a few of the many medications used to treat behaviors related to autism. The following is a list, not comprehensive, of additionally used medications and the symptoms they attempt to combat:

Medication	Treatment
Fluoxetine	SIBS
Lithium Carbonate	Aggression, SIBS, Hyperactivity
Clonidine	Antihypertensive Agent, Mania, Panic Attacks
Propranolol	Aggression, SIBS
Naloxone & Naltrexone	SIBS, Social Withdrawal

As described above, there are different medication types used to treat different behaviors related to autism but it should be acknowledged that medication therapy for behaviors related to autism should be used minimally. Even then, medication therapy needs to be used in conjunction with evidence-based techniques.

Physicians, to this day, continue to recommend medications in an effort to regulate certain behaviors, yet, in my experience, they are not always affective. Perhaps this reoccurring treatment direction relates to what was mentioned earlier, doctors attempt to fix biological issues with pharmaceutical treatments. As an educator, I work with

parents on monitoring their child's medications. I pay close attention to changes and/or negative side effects. In my experience, negative side effects of medications typically out weigh the positive.

A student of mine who has autism was recently taking a medication for a comorbid conditional treatment. However, while trying to contain certain symptoms, he became more aggressive. When medication was switched he became overly lethargic and was unable to complete even simple tasks. The family spent a year trying different medications and varying dosages but with each attempt came negative outcomes that overshadowed the positive. If there are positive results related to one of my student's medications, that is fantastic. My worry is that the student's overall health may be compromised, because they take medication that is largely non-affective and can produce negative outcomes. My student's age is a concern to me in relation to the medication treatments. Because they are young and growing individuals, my students physically develop every day. This constant growth obviously changes their body chemistry in a way that may not always align with prescribed medication dosages. Therefore, the family needs to find a correct balance to meet their child's needs. Finding an appropriate balance can prove to be difficult.

Vitamin and dietary therapies are also another popular perceived method of treatment for children with autism. There has been evidence to suggest that using a multivitamin composed of vitamin C, B, and magnesium has produced a desirable outcome with regards to decreased behaviors, increased eye contact, and decreased self stimulation, to name a few. Gluten/casein free diets also gained traction in recent years.

The idea behind gluten or casein free is to avoid foods in which individuals with autism have difficulty digesting, gluten/casein being common proteins that are difficult to digest. It is hypothesized that the inability to digest these proteins results in signal transmission interference and altered brain activity. Therefore, eliminating both proteins from the diet should result in diminished behaviors related to autism.

Both vitamin and diet therapy are touted as treatment techniques but there lacks a preponderance of evidence to support such claims, ergo, these claims are unfounded and more anecdotal than scientific. Using healthy diets and vitamin supplements is never a bad idea. Naturally, the general population should be more healthy and it could be argued that when our bodies operate at their fullest potential, mental functions improve. Would mental functions improve to the point to where autism related behaviors are significantly reduced? The answer to the question might be "Yes" for some or "No" for others. What we do know is that science states that there is no significant evidence to suggest vitamin and diet therapy techniques as viable treatment methods.

Applied behavioral Analysis is a type of behavioral therapy developed from Skinner's theory of behaviorism. This therapy observes what causes a behavior and uses discrete trials to change or shape the behavior so that it no longer interferes with the child's ability to manage him or herself appropriately. It is also used to shape, foster, and support appropriate social habits while providing opportunities to learn skills to appropriately interact with others.

ABA has not always been viewed positively. ABA techniques were, in the past, used in conjunction with aversive methods. Although, some aversive methods are used

today (spanking, is seen as a valid method of discipline for changing a behavior) overall this is not considered best practice. Controversially, it has been observed that some parents and technicians would only use ABA and discreet trials for a single means of therapy. For treatment to be affective, there needs to be more than one technique that is used. Students require different ways of learning and simply using ABA as the only means of education does a disservice to the child. The fact that ABA is one of the most affective treatments, one can see why some educators and therapists tend to use it exclusively.

ABA is a therapy that has a high success rate when working with children with autism, however it is important to remember that like with all children there is more than one strategy used to meet the many needs. Additionally, ABA is just a piece of the overall treatment method. Just like one size does not fit all, ABA should not be the exclusive method but rather one of many. Just as each person learns in a different way, a child with autism also learns differently when compared to his classmate. Different learning styles translate into needing different treatment methods.

Sensory integration (SI) is a form of intervention that is used to help bring individual's with autism to an equilibrium state by receiving input through various methods. Some of these methods include compression vests, weighted blankets or vests, swinging on/in a swing. Additional, methods may include specific sensory inputs by brushing feet, arms, legs or back. The research shows that improvements in behavior and function are made through these methods. However, the research also shows that the improvements are on a case by case basis and do not necessarily apply across the

spectrum. In my experience, sensory issues have been different with each one of my students. The school OT and I work closely to monitor and develop plans that will support the student's sensory needs. For one of my students, basic compression works to regulate him. We are able to recognize signs that indicate that he may need sensory input and we are working on him recognizing these signs himself. For another student, the OT tries various research-based techniques with him but nothing is ever consistent. Some days swinging can completely change his entire demeanor or putting pressure on his body may relieve anxiety, however, on other days he may need something totally different. It is an every changing dynamic that we strive to keep up with.

Auditory integration training (AIT) is a technique by which children with autism listen to sound based treatment to AIT processed music. Processed AIT music is specifically designed to filter out certain frequencies that cause auditory sensitivity. Children listen to modulated sounds and music over prescribed periods of time for AIT treatment in an attempt to temper the child to intense sounds. Affects of AIT treatment show an increase in children's auditory processing abilities, social abilities, communication skills, and a decrease in behaviors. Research has also indicated improvement in the brain paths that are required to speak. Another reason AIT is thought to be a successful treatment is because music has been proven to simultaneously activate both sides of the brain.

There are many forms of therapies that focus on autism communication deficits. Many communication types are readily available and the field continues to evolve to this day. Speech therapists are specialized professionals who have various researched based

strategies they choose from to help foster various forms of communication for children. These supports range from articulation support to implementing and supporting children's use of augmentative and alternative communication (AAC). In short, AAC is used to enhance a child's communication, but not just children with autism. Children with all disabilities benefit from using AAC. The technique can be administered in a variety of ways.

Administration ranges from sign language to electronic devices. Sign language is a common alternative way of communication for children who have difficulty communicating. The form of communication and assistance needed depends upon the severity of the child's language deficit and comorbid conditions.

Visual representation has been established as an effective learning mechanism for children with autism. That being said, the Picture Exchange Communications System (PECS) is a commonly used system. With the PECS, children learn to use pictures as a way of identifying wants and needs. Research indicates that two thirds of children who have been introduced to PECS developed speech. Children learn the appropriate sequential steps from PECS and learn to create sentences. The final step is encouraging the children to verbalize those sentences they created.

Students I work with, and in the past, experienced large rates of success with PECS. I witnessed a varying range of abilities. The range of abilities extended from basic picture icon identification to students using basic sentence structures, "I want, I need." More complex sentence structures included, "I want to play a game. Please or Pass me the mustard and ketchup, please." I even experienced some of my students

develop verbal speech. In my experience, providing students with opportunities to express themselves, albeit in simple forms, has decreased the amount of frustration a that child may experience and outwardly demonstrate.

Technology has come a long way in the development of augmentative and alternative communication devices. These communication devices opened doors and helped children "find their voice." Dynavox's, switches, go talk's, and ipad's are just a few support devices used today. Of course, children are all different and their individual needs dictate their type of communication support. I have observed all previously mentioned supports and their corresponding pros and cons. One of my students had a dynavox, but he was barely able to use it. It was very complicated and did not meet his needs appropriately. However, I also had a student who smoothly navigated through his dynavox and, although he has yet to develop verbal speech, he communicates fluidly with the device.

Another student of mine did not verbalize speech and we tried various communication devices. He broke many of the devices and used PECS when prompted but did not like to do so. Different children have different needs and when iPad's became popular, we tried one with Proloquo2go 2. He loved this communication method. He made huge strides with this device mechanism and iPad application. There are many supports available for children with communication deficits, but as formerly stated, we must find what works best for each individual child.

Strong emphasis is placed on early identification as a major proponent for executing appropriate treatment options. This emphasis is an important piece for many

reasons. One in particular is that the earlier you recognize an issue, the earlier the intervention process can begin. Early intervention optimizes possibilities for the child. Research shows that early intervention for children before the age of 3 ½ have higher rates of effectiveness then after age 5. If we know with what we are dealing, we are better able to find effective means of treatment. Throughout this meta-synthesis one common theme is the importance of using multi-disciplinary approaches when building plans to meet children with autism's needs.

Evidence-based strategies produce the most meaningful and affective programs for children with autism. This analysis demonstrated a variety of evidence-based strategies that have proved to support and nurture areas in which children may lack. Being an educator, I see first hand the importance and results of evidence based strategies. I place emphasis on collaboration with other specialists and individuals in the child's life. With collaboration we implement a well-rounded approach for working with the individual student. Evidence-based strategies provide structure and stability for my classroom. As a teacher in an autism focus program, I use evidence based practices everyday. Whether it is to structure the classroom or when implementing interventions, I find what best works for the individual child and tailor the tactics to their needs.

The program in which I teach uses ABA principles as structure. As mentioned previously, ABA research has demonstrated success when implemented with children with Autism. However, as mentioned before, there is controversy that accompanies ABA. Since ABA is so affective, therapist and or teachers have a tendency to focus solely on ABA and disregard any other methodologies. This pigeon holed thinking is not

the case for my program. Yes, we use ABA but on the other hand, I also see the importance of involving other therapies and research-based techniques. I do not want my students to become overly prompt dependent to the point that their generalization skills are robotic and unnatural.

Children with autism are not that different from others. Everyone has different learning styles and strengths. It is our job, as educators, to support different learning styles by providing opportunities for all students to succeed. Just because it is evidence-based, does not mean that it is a one size fits all solution. We go to the drawing board and look at the individual child and work off of their interests, learning style, and strengths. This is best practice, not just in special education but for education as a whole. The following are a few examples of popularly used evidence-based strategies in educational settings:

Providing a clutter free environment

Having visual representation appropriate to the lesson

Picture schedules

Set clear and concise expectations

Breaking tasks down into steps that can be understood and followed

Provide integration through various activities

Modeling skills and behaviors

Providing encouragement and coaching when teaching social skills an peer interaction

Social videos

Using play or role-playing to promote positive peer interaction

Integration

This list is by no means exhaustive and it should be noted that there is always room for expansion and implementing new and beneficial strategies.

5. Conclusion

Autism Spectrum Disorder is a complicated and multifaceted neurological disorder. It has been a long journey for ASD since Kanner identified it in 1943. Throughout this journey, ASD experienced quite the evolution. At one point ASD was thought to be caused by poor and emotionless parenting. At another point Measles Mumps and Rubella vaccinations were thought to be the cause. Even yet, schizophrenia was thought to be directly linked to individuals with autism. Even large bombastic media reports claim that certain diets and medications are the cure all to autism. Autism cannot be cured and with each of the aforementioned anecdotal claims are convincingly disproved through evidence-based research. Nevertheless, there are portions of the population who latch on to such wishful thinking. The spectrum was narrowly defined in the early years but later expanded to include early infantile autism, childhood autism, Kanner's autism, high-functioning autism, atypical autism, pervasive developmental disorder not otherwise specified, childhood disintegrative disorder, and Asperger's disorder. ASD has also seen prevalence massively increase from 1-10,000 in observed prevalence to 1-68 people.

Needless to say, this journey has been a roller coaster with many twists and turns. Unfortunately, the people most affected by autism's etiology are the babies, children, and

adults who have lived, and continue to live, with the disorder. Treatments, techniques, and methods for helping those who comprise the spectrum have come a long way. Advancements in behavior methodologies demonstrated success in helping modify different behaviors. Greater understanding of the child with autism's communication deficits has expanded the amount of available support because of innovative communication technology. Even progress with social therapy has helped individuals with autism integrate into social groups and further into the interactions of daily living. Other improvements include managed medication treatments and dietary restrictions. These treatment methods, although popular, hold no water when held to the light that is evidence-based research. Although the progression of these techniques have come a long way, there is still a lot more ground to cover.

Although, there is a lot about the spectrum that we do not know, what we do know is that a multipronged method of approach is one which reaps the best results. There is no one size fits all, there is no silver bullet, scenario in helping people with autism. Just like everyone else has their strengths and weaknesses, individuals with autism have theirs as well.

Because ASD is a dynamic and ever changing topic, it can be difficult to determine where the journey will end but there is one thing for sure, 10 years from now ASD and how we view it will be different then how we view it today. ASD is an enigmatic disorder that needs researchers, teachers, and parents to continue to strive to discover better and more effective ways to treat individuals with autism.

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