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The Development of Pragmatic Communicative Skills in Speakers Children with Autism Spectrum Disorders: Case Study :Algerian Autistic Children.

Thesis Submitted to the Department of English in Candidacy for the Degree of "Doctorate" in Psycholinguistics

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Declaration

I, Hadjira HICHOUR declare that my thesis entitled the Development of Pragmatic Communicative Skills in Speaker Children with Autism: Case Study, Algerian Children contains no materials that have been submitted previously, in whole part or part, for the award of any academic degree or diploma, except where otherwise indicated, this thesis is my own work.

February 09th, 2019 Mrs. Hadjira HICHOUR

Dedications

This dissertation is dedicated to:

The absents present in my heart, my father and my mother, to whom I express here a word of love and memory;

My parents in law;

My dear husband, Dr. Ahmed Chikhaoui;

The candles of my life, my daughter Ilef, my son Adam, and the new comer;

My brothers: Mohamed, Toufik, Djelloul, and Akram;

My sisters: Imen, and Fatima Zohra;

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Abstract

Autism Spectrum Disorder (ASD) is a severe neurodevelopmental disorder, whose symptoms are usually identified early in childhood and remain present throughout one's lifetime. One of the primary diagnostic symptoms of autism is a qualitative impairment in communication in general and pragmatic in particular. Social communication or the pragmatic of the language is the principal mechanism by means of which interpersonal relationships are achieved. Indeed, it is to social communication that all other functions of communication are ultimately subordinated. Given that impairments in pragmatic are a hallmark feature of ASD, children with autism spectrum disorder need to learn how to develop their pragmatic skills so as they could be integrated into their societies. In this respect, the main objective of this thesis is to investigate the development of pragmatic communicative skills in speaker children with autism in Algeria in relation to age, gender, Mean Length of Utterance (MLU) and level of education. For this purpose, a longitudinal case study was conducted as research fieldwork. The data collected from a combination of assessment tools: spontaneous language sampling, an elicitation procedure, a Speech Generative Device (SGD) and content analysis were analysed both quantitatively and qualitatively. The main results obtained revealed that pragmatic impairment in children with autism is not a process linked to a specific language, this disorder is a result of a cognitive process rather than a cultural one. Besides, children who attend schools and care centers showed more control over the use of different pragmatic skill, as a result, their MLU was better than those who do not attend schools. Moreover, this study supports the use of Speech Generative Device (SGD) as an alternative means to promote pragmatic communicative skills.

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List of Abbreviations and Acronyms

ASD: Autism Spectrum Disorder

AS: Asperger Syndrome

PP: Pragmatic Protocol

AAC: Alternative and Augmentative communication

SGD: Speech Generating Device

LI: language Impairment

MLU: Mean length of Utterance

DSM: Diagnostic and Statistical Manual of Mental Disorders

APA: American Psychiatric Association

ADDM: Autism and Developmental Disabilities Monitoring

ADHD: Attention Deficit Hyperactivity Disorder

ATCA: Autism Treatment Center of America,

CHAT: Checklist for Autism in Toddlers

M-CHAT: Modified Checklist for Autism in Toddlers

PDDST-II: Pervasive Developmental Disorders Screening Test–II

SCQ : Social Communication Questionnaire

ADOS: Autism Diagnostic Observation Schedule

CSBS: Communication and Symbolic Behavior Scales

ADI-R: Autism Diagnostic Interview-Revised

PLD: Pragmatic Language Disorders

ADD: Attention Deficit Disorder

ASHA: American Speech-Language-Hearing Association

PE: Picture Exchange

PECS: Picture Exchange Communication System

VOCA: Voice Output Communication Aid

General Introduction

Language is an important tool for social interaction as well as a means to control one's own and other's emotions and behaviors. From their very first cries, human beings communicate with the world around them. Starting with sounds and body language, humans pass through a major developmental milestone that occurs when infants begin to use words to speak until acquiring a good set of language. Nowadays, human language development is one of the most questionable research fields for scientists in different domains. Despite the reachable findings regarding human language faculty, it is still believed that the puzzling nature of this faculty remains unsolved and unanswerable.

Child development, in particular, has attracted much of researchers' attention. It is generally introduced as the combination of different obligatory occurring changes. According to Perkins (2002, p3), "language is an emergent consequence of interaction between cognitive, linguistic and sensorimotor processes"; it is seen as an integrated faculty which develops in parallel with the development of biology (physical development), thinking (cognitive development) and behavior (socio-emotional development) (Levine and Munsch, 2011).

Researchers interested in the scientific study of language argue that in the study of language development, a number of different developmental aspects (levels) are combined. These aspects include: phonology which has to do with sounds and intonation patterns, morphology which is concerned with rules governing use of morphemes, syntax which deals with grammatical rules, semantics which investigates words and their associated meaning and pragmatics which deals with language use, speech adjustment and appropriateness (Bochner and Jones, 2008, pp 3-13). Studies of language development were extensively interested in syntax, semantics, and phonology. However, during the last three decades, there has been a major shift in focus. Researchers from a number of disciplines have shown an increasing interest in the pragmatic aspects of language. They tried to investigate

how young children become able to communicate their needs, desires, attitudes, and ideas. Linguists, developmental psychologists, pathologists, and sociologists have all contributed to the understanding of pragmatic language development. (Bates, 1976; Creaghead, 1984; Naremore, 1985; Carpenter & Strong, 1988; Ninio & Snow 1999; Clarck, 2004; Ervin Tripp, 2012).

The abilities to understand and use language represent two of the most important developmental competencies that children must master during the first three years of life (Hart and Risley, 1992; Hoff, 2006). More generally, developmental competencies are established and nurtured through infants' transactions with multiple persons, objects, events, and other environmental factors present in their everyday settings (Carta and Greenwood, 1987; Greenwood et al., 1991). Early language development is stimulated by the linguistic input that an infant hears on a regular basis. The most proximal and influential of these sources are households and the myriad of other environmental sounds to which infants are exposed.

A child who is able to use language to regulate his emotions and behaves in a socially appropriate way is more likely to develop good peer relations and form new friendships (Im-Bolter and Cohen, 2007). However, when a child's language development does not follow the normal developmental course for no obvious reasons, specific language impairment is diagnosed. As researchers become increasingly interested in classifying children with communication disorders more precisely, the difficulties in describing the specific characteristics of different profiles of impairment have been highlighted. One particular group that has been the focus of much debate is the subgroup of children described as having 'semantic-pragmatic syndrome'(Rapin and Allen, 1998), 'conversational disability' (Conti-Ramsden and Gunn, 1986), 'pragmatic disability' (McTear and Conti-Ramsden, 1992), 'semantic-pragmatic disorder' (SPD), (Bishop and Rosenbloom, 1987) or more recently 'pragmatic language impairment' (PLI), (Bishop, 1998).

There is debate as to whether children with this type of impairment exist as a valid separate clinical group (Brook and Bowler, 1992; Gagnon et al., 1997). From a clinical perspective, children with primary pragmatic language impairments have been described as having superficially normal language development, unusual language constructions, difficulty using pragmatic cues in conversation, difficulty in turn-taking and complex difficulties with comprehension (Bishop and Rosenbloom, 1987; Rapin and Allen, 1987; McTear and Conti-Ramsden, 1992; Attwood, 1998). Thus, there is controversy as to whether in fact they should be diagnosed instead of having high-functioning autism or Asperger syndrome (Gagnon et al., 1997).

Autism is a syndrome in which not all of the symptoms need to be present in each case. The group of autistic individuals is highly heterogenic, thus, posing many problems in the definition and classification of the disorder. It is increasingly accepted today that there may be a wide spectrum of autistic disorders, ranging over various variations of Autism, that manifest themselves with different degrees of severity. Autistic individuals suffer from a circumscribed brain abnormality that affects development from birth; as such, it is a disorder for life. (Meilijson, 1999)

Research in the area of Autism has concentrated on the interactive, affective and social aspects of the deficit. It is believed that the core deficit in Autism lies in the area of the pragmatics of language and propose to approach the problem from this point of view. Aspects of phonology, syntax, and semantics have been studied previously with confusing results. Lately, the aspect of pragmatics has become prominent in research and it is generally accepted that difficulties in the domain of pragmatics are present in Autism (Rapin, 1991).

Therefore, since the primary concern of this research is to investigate the development of pragmatic language in autistic children, this chapter is to present an overview of the theoretical dimensions of both autism spectrum disorder and pragmatic development. It tries to answer the following questions: What is

autism? what are the characteristics and the symptoms of autism? and what is pragmatics? What is the difference between pragmatics and other languages aspects like syntax and semantics? What is the place of pragmatics in developmental psycholinguistics? What is the importance of pragmatics? What are the governing factors that affect normal and abnormal (autistic) child's pragmatic development?? And how to evaluate pragmatic development in autistic children?

For many years, studies of the development of pragmatic skills in young children have predominantly focused on normal children, studies in hearing impaired, autistic and mentally disordered children are rare.

Furthermore, English and other European languages, reflecting the development of the field of child language in general. The review of related literature concerning pragmatic development in children shows a limited number of published studies on Arab children's pragmatic development from a psycholinguistic point of view. Most studies investigate western children neglecting children with different languages and cultural backgrounds.

The goal of this research is to further investigate and assess pragmatic development among Algerian autistic children. It tries to answer the following questions concerning the development of communicative skills of children:

1- What are the pragmatic intents and devices that are early acquired and which ones are not yet developed?

2- How do variables like age, gender, mean length of utterance (MLU), and attending schools affect children's pragmatic development?

3- To what extent does MLU correlate positively with attending Schools in Algerian children?

4- Do speech-generating devices (SGD) help in augmenting pragmatic performance as well as MLU in Autistic children?

Trying to find reliable answers to these questions, this study was developed with four hypotheses in mind:

1- It is well known that pragmatic deficits are symptomatic of children with Autism Spectrum Disorders. This claim is generalized on all children with ASD, in addition, it is not related to a particular culture or language. Therefore, Algerian autistic children are hypothesized to confirm this claim and exhibit poor performance in terms of their pragmatic communicative skills.

2- Pragmatic development in children with autism spectrum disorders is noted to be affected by some external variables such as gender, attending school and Mean Length of Utterance (MLU). Furthermore, it is hypothesized that age has no effect on the development of pragmatic communicative skills since autism is a cognitive disorder and delay.

3- Contrasting to typically developed children, the development of MLU in autistic children is hypothesized to be connected and affected by attending school only. It is not affected by age or other variables. It is claimed that as much as children are engaged in different social communications, they will promote and enhance their linguistic skills.

4- Autistic children who have no opportunity to attend schools or care centers due to their impairment severity are hypothesized to develop and maintain their pragmatic communicative skills through the use of the speech-generating device (SGD).

Thus, the present research displays an outline of four chapters in which the first starts with the review of the related literature and gives insights of autism spectrum disorder two and its fundamental theories which are used as references and bases for analysing the data. In the second chapter, we will review the field of pragmatic and discover the relationship between pragmatics deficits and autism. The third chapter will contemplate the steps of research and its ethics in general and the methodology pursued in this survey in particular. Lastly, in the fourth chapter, we will represent the practical side of the study where the collected data from the employed tools of the investigation will be analyzed and discussed.

This study is significant for the following reasons:

1- It helps parents as well as people working in childcare centers to understand the pragmatic development of autistic children.

2- It contributes to generalize a comprehensive theory about autism in Algeria as well as pragmatic development and gives support for or against some universal claims of children's pragmatic development.

3- It is useful to pathologists, neurologists, and psychologists when comparing normal children with language impairment (LI). i.e, autistic children.

This work is constrained by a number of limitations:

1- It investigates the development of only 30 pragmatic communicative skills. This means that other aspects of pragmatic competence such as narration are excluded.

2- The population of the study consists of children aged 5 to 14 years old. This means that other age groups such as adolescents and adults are not included.

3- The study examines children who were born and raised in Algeria, which indicates that children who have been exposed to other cultures are not examined.

4- The study deals with pragmatic development in autistic children, which means that normal children and other disorders such as Down syndrome (DS), traumatic brain injuries (TBI) infants, right-hemisphere damage (RHD) are excluded from this study.

This study reviewed all internationally published studies from different Arab countries in different aspects of ASD. However, the main limitation that faced authors was the difficulty in accessing studies published in different national periodicals in different Arab countries. This limited our review to only internationally published articles.

Chapter One

Chapter One: Theoretical Background

Chapter One

Autism Spectrum Disorder: An Overview

1.1 Introduction

Child psychology is one of the most important fields that focuses on the mind and behavior of children from prenatal development through adolescence. It deals not only with how children grow physically, but with their mental, emotional, and social development as well.

The current chapter, mainly introductory in form, is devoted to yield the reader with basic definitions of a variety of key-concepts which are thought to be relevant to our study. It defines Autism Spectrum Disorder; shedding light on its etiology, prevalence, theories, perspectives and how it is identified in the Arab World in general and Algeria in particular.

The present psycholinguistic research, as its title indicates, attempts at examining the development of pragmatic communicative skills in Algerian Children having autism. Therefore, this chapter presents and synthesizes literature about this disorder.

1.2 Autism Definition and History

Autism Spectrum Disorder (ASD) is a developmental disorder that involves impairments in social interactions and communication, stereotyped behaviours, and a preference for sameness. It is a life-long developmental disability with a neurological basis (Hill & Frith, 2003). According to the American Psychiatric Association[1] (APA), DSM-V, (2013, p.203), autism is defined as: "a complex developmental disorder that can cause problems with thinking, feeling, language and the ability to relate to others. It is a neurological disorder that affects the functioning of the brain*."*

[1], The American Psychiatric Association is an organization of psychiatrists working together to ensure humane care and effective treatment for all persons with mental illness, including substance use disorders. It is the voice and conscience of modern psychiatry.

Ritvo and Freeman (1977, p.146) defined autism as a life-long incapacity, in this respect they wrote:

> Autism is a severely incapacitating life-long developmental disability that typically appears during the first three years of life. It occurs in approximately five out of every 10,000 births and is four times more common in boys than girls. It has been found throughout the world in families of all racial, ethnic, and social backgrounds.

Moreover, Williams (1994, p.234), an autistic woman, has described in an exceptional way her own experience as an autistic person and her understanding of other autistic individuals she had met. In her remarkable second book, she wrote:

> Autism is just an information processing problem that controls who I appear to be. Autism tries to stop me from being free to be myself. Autism tries to rob me of my life, of friendship, of caring, of sharing, of showing interest, of using my intelligence, of being affected ... it tries to bury me alive.

Historically the term has been used in a broad range of contexts and as a consequence Autism has been interpreted in various ways. The term Autism has been used for a little over 100 years now. It was first used by (Eugene Bleuler, n.d., as cited in Meilijson, 1999). Bleuler is a Swiss psychiatrist who used the term to describe schizophrenia, which is not associated with Autism today. Autism, or *autismus* as it was in the original Latin that Bleuler used, comes from the Greek

word “autos”, which means “self.” It was meant to describe the “isolated self” that he saw in those with schizophrenia (Meilijson, 1999). It wasn’t until 1938 that Autism started to take on a more modern meaning and separation from schizophrenia. This came because of Hans Asperger (1940., as cited in Autism Society, n.d., para. 1) of the Vienna University Hospitals research in investigating what came to be known as Asperger syndrome.

In 1943, Autism became even more defined when Kanner (1943) came up with early infantile autism to describe the behavioral similarities in 11 children he was working with. Some of the behaviors these children shared were “autistic aloneness” and “insistence on sameness.” Although many publications have appeared in the literature of the condition, Kanner's original reports provide the most accurate description of the behavioral characteristics of Autism . He described the defining features of autism as:

- A profound autistic withdrawal
- An obsessive desire for the preservation of sameness
- A good rote memory
- An intelligent and pensive expression
- Mutism, or language without real communicative intent
- Over-sensitivity to stimuli
- A skillful relationship to objects

(as cited in Jordan, 1999)

Moreover, Ousley and Cermark (2014, p.24) argued:

> …Dr. Leo Kanner published a series of case studies describing eight boys and three girls between the ages of 2 and 11 years who were exhibiting a similar cluster of symptoms. He described the children's preference for using objects repetitively

> in lieu of socially interacting with others and wrote, “the outstanding, ‘pathognomonic’ fundamental disorder is the children’s *inability to relate themselves* in an ordinary way to people and situations from the beginning of life." He noted numerous commonalities across these children, including an atypical "relation to people," language consisting mainly of naming objects, literalness, delayed echolalia, excellent rote memory, repeating phrases with personal pronouns in the exact way heard, early concern about hearing impairment, strong reactions to noises and moving objects, "monotonous repetition" of noises, motions, and verbal utterances, and "limitations in the variety of spontaneous activity.

The information provided by Kanner’s (1943) observations on the nature of autism became more widely known, more children were referred for diagnosis. However, as more children were seen, it became clear that Kanner (1943) had only recognised one small group of 11 children who fitted his particular criteria. The list of Kanner’s defining features was felt to be too limiting by those who were involved with diagnosing the syndrome. There were children for whom it was felt that a diagnosis of autism would be a useful descriptor yet who did not fit exactly into the criteria outlined by Kanner (as cited in Wing and Gould 1979).

At about the same time, in 1943, Asperger observed a pattern of abnormal behaviour in a group of adolescents, which he chose to call "Autistic Psychopathy". Krevelin (1971) compared the two disorders and found that there were many similarities with Kanner's subjects, but also significant differences.

Unlike the children described by Kanner (1943), those reported by Asperger (1943) had an adequate spoken vocabulary, with other abnormalities such as an obsessional interest in factual matters. Like the children described by Kanner, they had great difficulty in situations requiring two-way social interaction and communication. Essentially, they did not seem to be interested in or to understand the responses of other people. "Autistic" was also the term used by Asperger (1943) to describe his group. This condition bears his name now and is called Asperger syndrome[2]. (Wing and Gould, 1979)

Since that time, other researchers have listed their own criteria, and for a number of years it was usual to diagnose autism by counting up a requisite number of points (Creak, 1964; as cited in Rutter et al, 1999).

Autism is referred to as a spectrum disorder, which means that the symptoms can be present in a variety of combinations, and can range from mild to severe. Multiple abilities can be affected, while others are not (Bristol et al., 1996; Minshew et al., 1994). For example:

- Some individuals may have a severe intellectual disability, while others have normal levels of intelligence.
- There may be a range of difficulties in expressive and receptive language and communication. It is estimated that up to 50% of individuals with autism do not develop functional speech. For those who do, speech may have unusual qualities and be limited in terms of communicative functions.
- There are problems with attention and resistance to change.
- All individuals with autism have difficulties with social interaction, but the extent and type of difficulty may vary. Some may be very withdrawn, while others may be overly active and approach others in peculiar ways.

[2] Asperger syndrome is a form of autism, which is a lifelong disability that affects how a person makes sense of the world, processes information and relates to other people.

- Individuals with autism may respond differently to sensory stimuli and may exhibit odd behaviours such as hand flapping, spinning, or rocking. They may also demonstrate the unusual use of objects and attachments to objects.

(APA, 2013).

Although individuals with autism share some common features, no two individuals are the same. In addition, the pattern and extent of difficulties may change with development.

According to Baltaxe & Simmons (1975), it is possible to describe six broad categories as the behavioral definition of autistic syndrome:

1. Impairment of interpersonal relationships characterized by aloofness decreased physical contact and lack of eye contact.
2. Deficits in social behavior seen in severe limitations in cooperative play, toy play, and self-care skills.
3. Stereotyped activities including self-stimulatory behavior, various kinds of repetitions and preoccupation with sameness;
4. Impairment of intellect manifested by the concreteness of thought, school performance deficits and difficulties with judgment and abstract thinking;
5. Disturbances of speech and language are seen in various forms such as mutism, echolalic speech, delayed development and a variety of other idiosyncrasies in word usage, speech modulation, and content;
6. Onset prior to the age of 30 months.

I.2.2 Prevalence

According to Autism and Developmental Disabilities Monitoring Network[3](2015), autism prevalence has been commonly cited as 1 in every 68 births. It is reported to occur in all racial, ethnic, and socioeconomic groups. There is a higher incidence among males; about 4.5 times more common among boys (1 in 42) than among girls (1 in 189).

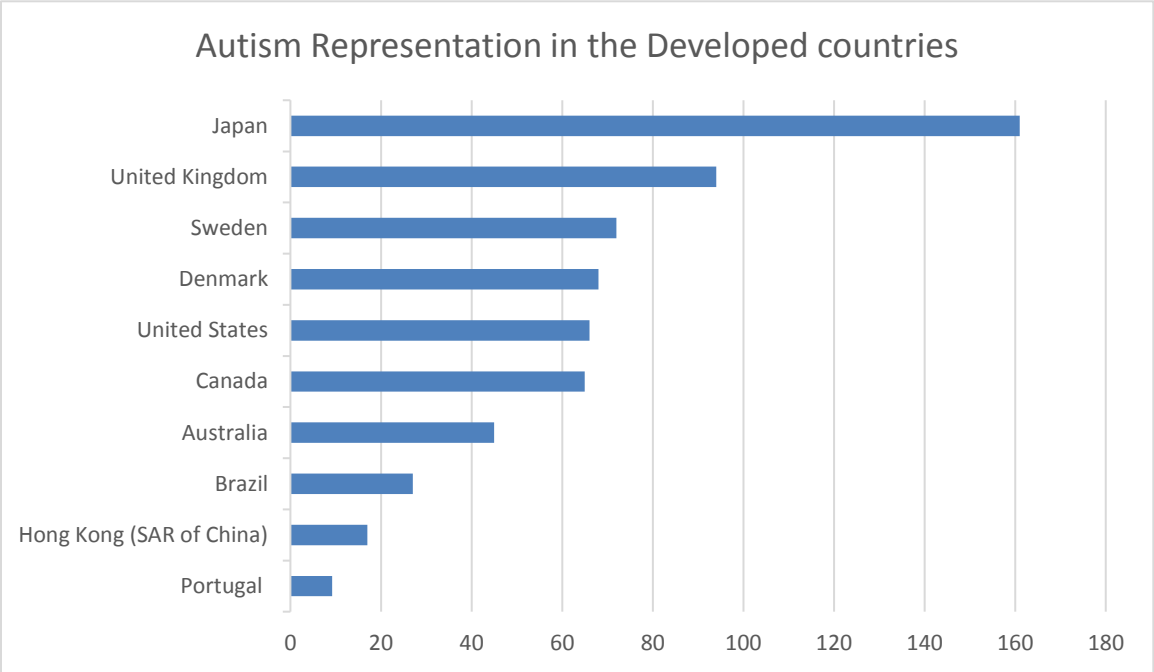

***Figure 1*:** Number of Children with Autism per 10.000 Children Studied

The above statistics show a great disparity in autism rates across the developed countries, namely, Japan; United Kingdom; Scandinavian countries; the United States and Canada…etc. (Focus for Health Foundation, 2017) reported two reasons behind this fact:

- Many countries do not report their autism rates publicly: Few prevalence studies on autism have been conducted in developing countries probably

[3], The Autism and Developmental Disabilities Monitoring (ADDM) Network is a group of programs funded by Centers for Disease Control (CDC) to estimate the number of children with autism spectrum disorder (ASD) and other developmental disabilities living in different areas of the United States.

because of the problem of stigma, lack of awareness about mental health and limited health infrastructure;

- The absence of worldwide uniform criteria to assess autism: this may be attributed to the difficulty of the diagnostic because of its criteria and the differences in the application of different ASD measurements.

In non-western countries, limited information about the syndrome is reported except for Indonesia, China, and Iran (Samadi and McConkey, 2011). The total absence of central documentation of ASD cases in African and some Asian countries have led to the unrepresentativeness of these countries in the worldwide prevalence rank. In this respect, Samadi and McConkey (2011, p.01) argued:

> Nearly all prevalence studies reviewed by Fombonne (2005) and Williams et al (2006), were undertaken in Western countries or Asian affluent countries such as Japan. There is limited information on the identification of children with this condition in non-Western, less affluent countries where services for children with any form of special needs are less developed. This shortage of information has raised the unwarranted assumption made by some writers, that autism is rare in non-Western cultures.

Various reasons are cited: first, the syndrome of autism generally is associated with stigma in developed countries; especially in the Arab world, as parents are keen for their child to attend schools for ordinary developing students rather than being referred to special schools, they may underreport the child's difficulties to assessors even though they are aware of them. Second, the screening tools that are

used in developing countries rely heavily on parental reports with limited time and opportunity for assessors to observe and interact with the child and for them to make consensus decisions. By contrast, in Western countries, parents may be eager to obtain a diagnosis for their child's difficulties as this enables them to access additional services, whereas these are not readily available in developing countries. Third, children who have associated conditions such as intellectual disabilities and epilepsy may have been diverted from educational services at an earlier age and, therefore, are not included in the screening for pupils enrolling in elementary schools. In addition, childhood mortality for more severely affected children could be greater, especially in poorer areas. All these factors would reduce the prevalence of ASD compared to Western countries with their more developed health and education services.

1.2.3 Etiology

What causes autism? There is no accepted single cause of autism although there are numerous theories. It is becoming apparent that ASD is most probably caused by multiple factors interacting in complex ways (i.e. genes, environment and brain). Genetics have been shown to play a role; that autism is a genetic disorder (Bristol et al. 1996). The mode of genetic transmission appears complex. For at least a significant subgroup of persons with autism, there appears to be a genetic susceptibility that most likely involves more than one gene and may differ across families (i.e., different genes may be responsible in different families) (Szatmari et al. 1998).

Studies have shown that if one identical twin has the diagnosis, then there is a 30 -40% chance that the other twin will develop ASD. This concordance is hardly ever seen with non-identical twins, (Bailey et al., 1995). The probability of receiving an ASD diagnosis when another sibling has already been diagnosed is estimated between 2% and 14%. (Hertz-Picciotto et al., 2006). No single gene

has been identified as responsible and most genetic researches believe that multiple genes are involved.

Few studies have begun to find some cases of ASD linked to maternal exposure to certain viruses (measles, mumps, rubella, herpes, syphilis, cytomegalovirus, and toxoplasmosis) and chemicals (thalidomide and valproic acid). However, these accounts for a very small proportion of all cases (Hertz-Picciotto, et al. 2006).

In other words, maternal effects or environmental factors might be important in interaction with genetic susceptibility in the child with autism. How genes and the environment interact to cause the brain to begin developing differently is still being debated. What is clear is that these differences in brain development can be traced to either before birth or very soon after birth even though the behavioral and social signs of Autism tend not to be observable until after 18 months of life. The exact nature of the brain differences is not clear either. Studies have shown differential development in many brain areas including the frontal and temporal lobes, the cerebellum, and the sub-cortical amygdala and hippocampus, autistic brains are also slightly larger and heavier than normal and differences have been observed in the size and number of certain cells within the central nervous system. (Bristol et al., 1996).

Scarcity of evidence, methodological challenges, and conflicting findings have not yet allowed precise conclusions to be drawn about either the specific brain regions affected or the mechanism of development that lead to observed brain differences. Other studies point to the patterns of connectivity between and within brain areas as the issue (Courchesne and Pierce, 2005).

Due to the lack of consensus about what causes Autism, there is not yet any widely accepted medical treatment for this disorder.

1.2.4 Autism Symptoms

The timing and severity of autism's early signs vary widely. Some infants show hints in their first months. In others, symptoms become obvious as late as age 2 or 3. Not all children with autism show all the signs, for this reason, a professional evaluation is crucial. According to Autism Speaks Foundation (n.d), the following "red flags", if appear, may indicate the child is at risk for an autism spectrum disorder:

By 6 months :

- Few or no big smiles or other warm, joyful and engaging expressions.
- Limited or no eye contact.

By 9 months :

- Little or no back-and-forth sharing of sounds, smiles or other facial expressions

By 12 months

- Little or no babbling
- Little or no back-and-forth gestures such as pointing, showing, reaching or waving
- Little or no response to name.

By 16 months

- Very few or no words.

By 24 months

- Very few or no meaningful, two-word phrases (not including imitating or repeating)

At any age

- Loss of previously acquired speech, babbling or social skills
- Avoidance of eye contact
- Persistent preference for solitude

- Difficulty understanding other people’s feelings
- Delayed language development
- Persistent repetition of words or phrases (echolalia)
- Resistance to minor changes in routine or surroundings
- Restricted interests
- Repetitive behaviors (flapping, rocking, spinning, etc.)
- Unusual and intense reactions to sounds, smells, tastes, textures, lights and/or colors.

1.2.5 Diagnosis

Diagnosing autism spectrum disorder is difficult since there is no medical test to diagnose the disorders. Sometimes autistic children are mistakenly diagnosed with a different disorder, like ADHD, or are told that nothing is wrong. Other times kids are diagnosed as autistic when they actually aren't. Therefore, doctors and healthcare professionals should rely on reliable methods to ensure the evaluation of children such as observation, talking with parents, physicians, and therapists about the child in question to make a diagnosis. They examine a core group of three behaviors that tend to hallmark the disorder. The first being social interaction, the ability of a child to interact with both peers and parents. Secondly, verbal interactions, children may have trouble vocalizing needs and conversing, usually relying on grunts and pointing and thirdly doctors look at repetitive behaviors and if a child has a narrow field of interests that may be exclusive from others, Autism and Developmental Disabilities Monitoring Network (2015).

Since Autism is such a wide-ranging disorder with many levels of severity, it is not common for one doctor to decide and make a diagnosis. Often time professionals have to work together and compare observations and notes. Autism

Treatment Center of America, ATCA, (n.d)[4] proposed two steps for professionals and doctors to well diagnose the disorder. These are:

- First, since vocal communication may be a problem, hearing tests are generally one of the first tests to be completed. Once hearing tests are completed, a complete neurological exam is given, along with cognitive and language testing.
- Neurologists, speech therapists, and psychiatrists are usually brought on board, and at the end of testing parents should be heavily involved in talking to doctors about the prognosis and decide together which way to proceed for treatment.

Despite growing evidence that ASD is genetically based on the neurodevelopmental disorder (Folstein and Sheidley, 2001) and the fact that many parents report suspecting a problem prior to 12 months, the general consensus is that ASD cannot be diagnosed reliably before age two.

1.2.5.1 Stages of an Autism Diagnosis:

According to (Autism Treatment Center of America, n.d., para. 2), the diagnosis of autism has two stages. The first stage is a developmental screening during "well-child" check-ups. The second stage involves a thorough evaluation by a multidisciplinary team.

[4] The Autism Treatment Center of America is the worldwide teaching center for The Son-Rise Program, a powerful, effective and totally unique treatment for children and adults challenged by Autism Spectrum Disorder.

1.2.5.1.1 Screening:

A "well child" check-up (Autism Treatment Center of America, n.d., para. 3), should include a developmental screening test. This test is done to see if the child is developing at a rate that is appropriate for his or her age. In addition, the parents' own observations and concerns about their child's development are important in helping to screen a child for autism. Several tests can be used to screen for ASD in children younger than 30 months. The Checklist for Autism in Toddlers (CHAT), (Cohen et al, 1966 as cited in Robins, 2008), is the first autism screen. This test was modified by (Alisson et al, 2006 as cited in Robins, 2008) to improve sensitivity.

The Modified Checklist for Autism in Toddlers (M-CHAT) was introduced by Alisson et al, in 2006. It is a kind of questionnaire filled out by parents, with a follow-up questionnaire given by a health care professional if needed. Other tests also are used in screening children such as the Pervasive Developmental Disorders Screening Test–II (PDDST–II) introduced by (Siegel, 2004., as cited in Robins, 2008) and the Social Communication Questionnaire (SCQ) (Rutter et al., 2003a., as cited in Robins, 2008) which is designed for children over 4 years old. If the results of these screening tests are positive, further diagnostic testing is required.

1.2.5.1.2 Comprehensive Diagnostic Evaluation

If a screener indicates that a child may have autism spectrum disorder, the child should receive a comprehensive evaluation from a team that includes a psychologist, a neurologist, a psychiatrist, a speech therapist, or other professionals who are trained in diagnosing autism. a complete evaluation may involve a number of different types of tests. Professionals will test the child's learning skills, social skills, communication skills, listening responses, body movements, hearing, relationships to people, and more. These are often done through a set of instruments. the Autism Diagnostic Observation Schedule (ADOS) is a test with different modules to accommodate a range of children, it's purpose is to evaluate the social skills and repetitive behaviors the child displays

during the test, (Maddox et al., 2017). This means the evaluator is paying attention to things like if the child asks for help when he needs it, gives other people a chance to speak, and follows along with changes of subject.

The Communication and Symbolic Behavior Scales, CSBS, (Maddox et al., 2017) is another good diagnostic instrument for toddlers and young children. This play-based instrument is also backed by research but is used less than the ADOS, which covers a broader age range.

Screening and diagnostic tools are not enough, a full evaluation should also include an interview with the child's parents and teachers. The Autism Diagnostic Interview-Revised (ADI-R) is a structured interview used to assess individuals suspected of having autism spectrum disorder. It is useful as an aid to formal diagnosis as well as treatment and educational planning. This instrument is used with adults and children with a mental age above 2 years. Using the ADI-R, the trained interviewer evaluates three functional domains: language and communication; reciprocal social interaction; and restrictive, repetitive and stereotyped behaviors and interests, through 93 items, based on parents' responses to open-ended questions (Magana and Smith, 2013).

Nearly all medical professionals agree though, that early diagnosis is very important in the treatment of Autism, as it gives doctors and therapists a chance to begin work immediately on confronting the various challenges both child and parent will face.

1.2.6 Characteristics Associated with Autism

Characteristics that are included in the criteria for the diagnosis of autism fall into what is known as the autism triad of impairments: impairment of social development, impairment of social communication and impairment of social understanding and imagination. (Wing and Gould, 1979; Frith, 2003; Tager-Flusberg, 2000; Howlin, 2003).

1.2.6.1 Impairment of Social Development

Autism is first and foremost a neurodevelopmental disorder impacting on foundational social adaptive skills. Children with autism show striking deficits in social development, the most consistent of these deficits is the lack of non-verbal social gestures such as pointing, showing, and giving. In normal children, communication develops from the first years of birth, including synchronized actions, social smiling, and sharing eye contact with a primary caregiver. Later on, these skills develop into more complex social interactions that involve objects and co-participants beyond primary caregivers. (Davis and Carter, 2014 as cited in Dindar et al., 2017).

In contrast, most autistic children do not show a special interest in faces and seem to have tremendous difficulty learning to engage in everyday human interaction. Even in the first few months of life, many autistic children seem indifferent to other people, lacking eye contact and interaction with others that non-autistic children are expected to exhibit. Individuals with autism demonstrate qualitative differences in social interactions and often have difficulty establishing relationships. They need help in learning how to act in different types of social situations. ASD's often have the desire to interact with others, but may not know how to engage friends or may be overwhelmed by the idea of new experiences. This limited social interaction demonstrated by autistic persons does not necessarily reflect a lack of desire to be with and interact with other people but maybe a result of the impairment in reciprocal social interaction (Jordan, 1999).

Social skills are the rules, customs, and abilities that guide our interactions with other people and the world around us. (Dindar et al, 2017). In general, people tend to "pick up" social skills in the same way they learn language skills: naturally and easily. Over time they build a social "map" of how to act in situations and with others.

For people with autism, it is often harder to learn and build up these skills, forcing them to guess what the social "map" should look like. According to Jordan (1999, p.58), Social skills development for ASDs involves:

- Direct or explicit instruction and "teachable moments" with practice in realistic settings
- Focus on timing and attention
- Support for enhancing communication and sensory integration
- Learning behaviors that predict important social outcomes like friendship and happiness
- A way to build up cognitive and language skills

Wing and Gould (1979:78) classified social interaction into three subtypes. It should be noted that individuals with autism do not necessarily fall into one distinct category, but the description of the subgroups does help to understand the range of impairment.

- *Aloof Group:* Those who show no observable interest or concern in interacting with other people except for those necessary to satisfy basic personal needs. They may become agitated when in close proximity to others and may reject unsolicited physical or social contact.
- *Passive Group:* Those who do not initiate social approaches, but will accept initiations from others.
- *Active but Odd Group:* Those who will approach for social interaction but do so in an unusual and often inappropriate fashion.

1.2.6.2 Impairment of Social Communication

Communication problems have always been considered a core feature of autism. Yet there are substantial and wide-ranging differences in how people with autism communicate. That reflects not only the inherent variability of the condition but also the complexity of communication itself encompassing the words we use, the order in which we use them, eye contact, facial expressions, gestures, and other nonverbal cues. Kanner (1943), noticed that most of the children he had observed showed many problems with social communication. for example, failure to make eye contact or respond to questions, and a tendency toward obsessive conversation. Since then, language and communication impairments have consistently been part of the concept of autism, but not always a separate criterion for diagnosis.

Individuals on the spectrum have been shown to face challenges with a range of verbal and nonverbal skills, including grammar, the correct use of pronouns and responding when spoken to. Differences in some nonverbal aspects of communication, such as facial expressions and the tempo of speech, may account for what others perceive as ‘awkwardness’ in people with autism. (Denworth, 2018).

Social communication can be defined as "the synergistic emergence of social interaction, social cognition, pragmatics (verbal and nonverbal), receptive and expressive language processing" (Adams and Lloyd, 2005, p. 182). Impairment of social communication refers to impaired and deviant language and communication, both verbal and non-verbal. Difficulties in language and communication are characteristics common to all individuals with autism. The extent of difficulties ranges from being nonverbal to those who have extensive vocabularies but may have deficits in the social use of language. Although the development of speech may vary, all individuals

display some degree of difficulty in communication, particularly in the area of pragmatics (the social use of language).

Pragmatics is the appropriate use of language in social situations. Examples include being able to stay on topic and take turns in a conversation, ask appropriate questions and use a tone of voice suitable for the setting. While prosody is the rhythm of speech and encompasses aspects of both verbal and nonverbal communication. Carried in the spoken words and the pauses in between, prosody has multiple functions. For one, it conveys pragmatic information. A rising tone, for instance, indicates a question. Prosody also communicates emotion. The question ‘What do you mean?' can be positive, negative or neutral depending on how it's spoken; prosody is what alerts a listener to the difference. (Denworth, 2018).

Pragmatic Language Disorders (PLDs) affects all autistic children (Young et al., 2005). Those Pragmatic Language Disorders are identified by deficits in comprehension, in particular (i) a low understanding of non-literal sequences such as metaphors, jokes or irony; (ii) a poor command of indirect speech acts such as questions (Aarons & Gittens, 1999) and (iii) difficulties with presuppositions and other conversational conventions such as politeness, turn-taking or "levels of formality" (Young et al, 2005). Problems with prosody can vary. Some individuals speak in a monotone, whereas others exaggerate high and low pitches so dramatically that listeners find their speech unnatural. (Denworth, 2018).

Since this thesis is concerned with the development of pragmatic skills in autistic children, the focus will be shown on pragmatic language disorders deficits.

1.2.6.3 Impairment of Social Understanding and Imagination

Social imagination allows us to understand and predict the behaviours of other people. It also helps us to make sense of abstract ideas and to imagine situations outside our immediate daily routine. Being unable to predict what will happen next can affect the ability to move from one activity or environment to another (transition). It can also cause extreme anxiety and be a major cause of behaviour issues. Many children with autism have trouble taking on the perspective of another person, which can affect their ability to recognise, understand or predict the feelings of other people and possible reactions. They are unlikely to predict the consequences of their own behaviour. This impairment of social understanding refers to the rigidity of thought and behaviour and impoverished social imagination. Also, ritualistic behaviour, reliance on routines and extreme delay or absence of "*pretend play*". (Wing and Gould, 1979).

Autistic persons usually find difficulties in flexible thinking regarding interests, routines, perspectives, and rules. Children with autism typically have limited skills in creative and imaginative play. Many enjoy activities such as lining up toys or objects or games which sometimes give the impression of imaginative play, but often the child is copying a scene from a favourite film or tv program or ideas are stereotyped and repetitive. ASDs are often obsessed and preoccupied with one or more interest, object or routine. While new interests will develop during different stages in life, involvement in daily activities can be significantly affected by these interests, placing great stress on parents, siblings, and teachers. According to Autism Toolbox (2009, p.198), Difficulties with Social imagination may affect the ability to

- Accept others' points of view
- Accept changes in routine
- Cope with 'mistakes'
- Be aware of unwritten rules

- Deal with rules being broken
- Organise their time as well as equipment

1.3 Gender and Autism

All over the world, autism is characterized by a higher rate of ASD diagnosis in males than females. Autism is approximately four times more common among males than females and the frequently stated sex ratio is 4:1 (Halladay et al., 2015, p, 2). In addition to prevalence rates, research also indicates that males and females may have different autism profiles, i.e., they may differ in the ways in which they exhibit both the strengths and difficulties of autism (Lai et al., 2015).

In the last few years, researchers turned their attention towards understanding the effect of gender on autism prevalence and symptomatology. One of the strong arguments for why autism might be missed in females has been linked to diagnostic criteria itself. According to Robinson et al (2013), females with ASD are protected against some of the symptoms of ASD often called the 'female protective effect' or FPE. In this respect, autism presents itself differently in girls and therefore often goes unrecognised, especially in verbally fluent girls with normal intelligence. Girls with autism also appear to be better at 'camouflaging' their symptoms in order to fit in. With the diagnostic criteria for ASD based largely on how autism presents in males, girls can often 'slip under the radar' or get misdiagnosed. Girls with ASD seem to have less restricted and repetitive behaviours than boys, but it's also possible that some of these behaviours go unrecognized.

Being female does appear to protect the brain from many developmental disabilities, not just autism. There is emerging evidence that girls with autism need more extreme genetic mutations than boys to develop autism.

1.4 Theories of Autism

A number of psychological theories have emerged to account for autism, these theories do not explain autism, however, they are useful in helping to understand ASD' s psychology.

1.4.1 Theory of Mind and the Triad of Impairment

Theory of mind remains one of the quintessential abilities that makes us human (Whiten, 1991). This term is often used to refer to the quite unconscious ability to attribute mental states and to use these invisible postulates to explain behaviour in everyday life. Premack and Woodruff (1978., p.515 as quoted in Baron-Cohen et al, 1985, p. 39) defined the concept of theory of mind as follows:

> In saying that an individual has a theory of mind, we mean that the individual imputes mental states to himself and others […] A system of inferences of this kind is properly viewed as a theory, first because such states are not directly observable, and second, because the system can be used to make predictions, specifically about the behaviour of other organisms.

The theory of mind is the cognitive or 'mind-reading' process, or ability that we all individually have in order to make sense of the world we live in. Every individual's thoughts, knowledge, beliefs, and desires make up his own unique theory of mind. In brief, having a theory of mind is to be able to reflect on the contents of one's own and other's minds. (Belkadi, 2006). From the age of around 4 years, children understand that other people have thoughts, knowledge, beliefs, and desires that will influence their behavior. However, people with autism appear to have some difficulties conceptualizing and appreciating the thoughts and

feelings of others. It is this *'Mind-Blindness'*[5] that may impair autistic people to be able to relate to and understand the behaviors of others. (Belkadi, 2006).

The triad of impairments seems to be well explained by the hypothesis that autistic people lack a theory of mind. Baron-Cohen and his colleagues revolutionized autism research when they introduced the theory of mind hypothesis to explain the main behavioral symptoms that characterize this neurodevelopmental disorder. Their initial studies showed that most children with autism whose mental and verbal abilities were well beyond the 4-year-old level nevertheless failed the Sally–Anne task[6], a paradigm that was introduced by Wimmer and Perner (1983, as cited, in Belkadi, 2006), requiring the ability to attribute a false belief to another person. They found that almost all children of 4 years were able to pass this test, correctly attributing a false belief to Sally, and predicting her search in the original location. However, Baron-Cohen, et al. (1985) found that, by contrast, only 20% of a sample of autistic children were able to pass this test, despite mental ages well over 4 years. Subsequent studies have confirmed that autistic children have great difficulty with a variety of tasks designed to tap the "theory of mind" ability. Thus, there is much support for the view that autistic children are impaired in their ability to understand their own and other people's mental states.

[5] The Mind-blindness hypothesis holds that one unique deficit, in the cognitive function of mentalizing, causes the range of deficits found in autism.

[6] In the classic Sally–Anne false-belief task, a child is told the following story, accompanied by supporting pictures or toy props: Sally places her ball in a basket and goes out to play; while she is gone, Anne takes the ball from the basket and hides it inside a box. The child is then asked where Sally will look for the hidden ball (or where she thinks it will be located) when she returns to play with it again. Baron-Cohen et al. (1985)

1.4.2 Weak Central Coherence Theory

Understanding perceptual processes in autism may involve explaining both disordered and superior processing. One cognitive theory that has specifically sought to address both deficits and assets in ASD is the ‘‘weak coherence" account. The central coherence hypothesis differs radically not only from the theory of mind account but also from other recent theories of autism. It is the ability to focus on both details as well as wholes. (Frith and Happé, 2006)

People with autism, however, appear to have a heightened focus on details rather than wholes thereby suffering from what is known by the weak central coherence which is an inability to bring together various details from perception to make a meaningful whole. Frith and Happé (2006) suggest that autism is characterized by a weak or absent drive for global coherence. That is individuals with autism process things in a detail-focused or piecemeal way – processing the constituent parts, rather than the global whole. This is the reason why some individuals with autism have hypersensitive sensory perceptions. This theory has been developed further by Happé (1994) who concludes that the central coherence forms a continuum of cognitive style from ‘weak' to ‘strong' ; with autistic people falling in the extreme ‘weak' end.

This inability to understand wholes resides in the frontal cortex of the brain, which in turn also explains the theory of mind deficits in people with autism. The inability to hold information in mind in order to use it later in other tasks is what causes the autistic individual to lack central coherence. (Baron-Cohen et al, 1985).

1.4.3 Deficient Executive Functioning

Executive function can be defined as, "the way in which people monitor and control their thoughts and actions" (Carlson and Moses, 2001., p. 1032). It refers to the ability to free the mind of the immediate situation and context to guide behaviors through mental models or internal representations. The executive functions include organizing, planning, monitoring progress towards a goal and taking a flexible approach to problem-solving. (Bogdashina, 2006). Unlike the theory of mind, executive function lacks a unitary concept. Accordingly, a typical definition of executive function takes the form of a list of cognitive skills as follows:

> The key elements of executive function include (a) anticipation and deployment of attention; (b) impulse control and self-regulation; (c) initiation of activity; (d) working memory; (e) mental flexibility and utilization of feedback; (f) planning ability and organization; and (g) selection of efficient problem-solving strategies.
>
> (Anderson, 2008., p. 04).

As this list demonstrates, executive function is integral to the planning, execution, and regulation of goal-directed behaviour. It is the ability of executive function to coordinate and direct the brain's cognitive functions that have found it likened to the conductor of an orchestra (Brown, 2006).

The executive dysfunctioning theory is originated by Ozonoff (1995) who has studied the impairment of executive functions in autism and found that behavioural peculiarities of autistic people in this area appear very similar to those

of people who have suffered frontal lobe damage[7]. (Bogdashina, 2006). The deficit in people with frontal lobe injury seems to have problems not with the ability to understand but rather with the ability to execute. (Belmonte, 2000). The executive functioning theory can easily account for the lack of flexibility and the rigidity exhibited by people with autism, their difficulties in planning, their problems in starting and finishing actions.

1.4.4 Sensory Perceptual Theory

Many autistic individuals seem to have sensory impairments in one or more of their senses. These impairments are different from blindness or deafness and are characterized by differences in perception. There is a piece of scientific evidence that deficits in information processing, both perceptive and executive, appears in all autistic members. (Bogdashina, 2006). Some researchers describe autism as a disorder of senses rather than as a social dysfunction, where each sense operates in isolation and the brain is unable to organize the stimuli in any meaningful way. (Hutch-Rasmussen 1995, as cited in Bogdashina, 2006). Therefore, it has been hypothesized that all autism symptoms are a consequence of the brain injuries that make brains of autistic children perceive inputs from the world differently from non-autistic brains. As such, autism is sometimes defined as sensory dysfunction. (Delacato, 1974, as cited in, Bogdashina, 2006) ; a sensory disorder in which the brain is not able to attach meaning to sensations and organize them into percepts and finally into concepts. (Ayres, 1979, as cited in, Bogdashina, 2006).

[7] The frontal lobe is the leader part or the boss of the brain, if it is damaged, the brain stopped to execute. (Atkins, 2013).

1.5 Neurological Perspective of Autism

It is clearly evident today, as substantiated by both Magnetic Resonance Imaging (MRI) (including functional MRIs) and Positron Emission Technology (PET) scan studies, that the brains of children with autism are different. Electroencephalograms (EEGs) and Magnetoencephalography (MEG) have also been used to measure fluctuations in electrical and magnetic responses generated by neural activity in the brain (Schreiber, 2010). Autism is associated with severe anomalies in the configuration of the cerebral organ (Hill & Frith, 2003). Such regions of the brain as the amygdala, the cerebellum, and the frontal cortex said to implicate the mentalising function have been proved by neuroimaging and post-mortem analyses to function abnormally (Happé & Frith, 1996; Baron-Cohen, 2004). So far, to test whether language deficits are consistently linked to any specific brain abnormalities.

Herbert et al. (2002 ; cited in Tager-Flusberg & Joseph, 2003) compared the brain structures of 16 male children with autism, who were part of a language-impaired subgroup, with the brain structures of 16 boys without any language disorder or learning disabilities. In particular, they observed the size of the language area situated in the left and right hemispheres of the cortex. They found that the lateral frontal language cortex in the right hemisphere was significantly larger in autistic children with language impairments than in normal children. This increase in size and growth becomes evident at approximately 6 to 14 months of age. This may be due to an excessive number of neurons. Rapid head growth has therefore been suggested as one of the early warning signs.

Abnormalities in structure, growth, and function have been substantiated in many of the structures of the brain in individuals with autism (Brambilla, et al. 2003). In describing these differences from the lower brain structures to the higher brain structures, differences in the structure and transmission of information have been noted. (Schreiber, 2010). Besides, important language regions in the left

hemisphere, perisylvian area, planum temporale and Heschel's gyrus of children with autism were found to be smaller than those of the children in the control group. Herbet, et al. (2002, as cited in, Tager-Flusberg & Joseph, 2003) concluded that these cerebral asymmetries, also found in children with other language disorders, could be directly linked to the language impairments found in this subgroup of autistic children.

Other deficits found in autism have not yet been linked to the enlargement of specific parts of the brain. It is therefore hard to draw a conclusion on the correlation between the irregular size of specific brain regions and particular cognitive deficits. Yet, Herbert's findings suggest that irregularities in specific areas of the brain could be responsible for the malfunction of cognitive modules located in those regions (Tager-Flusberg & Joseph, 2003). which results in over-connection in these areas. However, their links to other areas of the brain appear to be weak (Herbert 2005). There seems to be a lack of coordination among brain regions.

There is a lack of synchronization between the various areas of the brain, which seem to impact function. People with autism have difficulty bringing different cognitive functions together in an integrated way. They also have problems in planning and organization (Ozonoff et al. 1991). In autism, each area of the brain seems to do its own thing (Cherkassky et al., 2004, as cited in, Happé and Frith, 2006). Therefore, integration of information does not occur as it should, besides, the idea of autism being caused by a language deficit, amongst other cognitive discrepancies, is not inconsistent with the anatomy of the autistic brain. Significant anomalies are, indeed, prominent across the entire cerebral configuration, including around the regions involved in language production and comprehension.

1.6 Language of Autism

The fullest expression of normal human speech and language requires the desire or intent to communicate something and an appreciation of what the other individual understands about a situation and how they are supposed to react to what is being communicated. As the next stage beyond the formulation of an intent or goal in communication, speech and language normally require a mental representation of the message (semantics), next, a representation of the message in terms of words (mentally), and, finally, an articulation of the mental words as physical sounds (articulation of speech). This process results in four interrelated systems of linguistic communication: pragmatic; semantics; syntax and phonology.

Comprehension of speech and language is normally done through sound, this requires paying attention to the sounds, then being able to decipher the sounds in terms of words, then being able to understand the words in terms of intended meanings, and, finally, appreciating the meanings in terms of intentions, actions, vision (perception of gestures and signs or of printed words) and touch (Braille) can also be used as alternative or additional routes into the perception of letters and words. (Greenfield and Smith, 1976).

All children start developing language from the day they are born, this happens through their relationships and the interaction with others. However, it is harder for children with autism to learn, use and develop language because of the so-called “carelessness situation” that all autistic children pass with. children with ASD tend to show less interest in other people in the first 12 months of life, they are more focused on things going on around them because they don’t need or want to communicate with others.

Children with autism generally have problems with all aspects involved in producing or understanding speech and language. In particular, for example, because of their deficits in appreciating social situations, they may not feel any

need to communicate and may very well not have any understanding of how other people might respond to a communicated message. (Ferrari, 1982, as cited in, Gernsbacher et al., 2016). They frequently appear to have deficits in paying attention to auditory information. Even when they are paying attention, many individuals with autism seem to have difficulty in decoding what sounds mean and in matching them to words or thoughts. (Gernsbacher et al., 2016).

In some individuals with autism, this may be because they actually have difficulties with words and thoughts themselves. In others, it may be more because of a mapping problem. They frequently have difficulties with articulation, often as part of a broader problem of difficulty with oral-motor functions (movements of the lips and tongue and associated breath control). (Ornitz and Ritvo 1976, as cited in, Miller, 1981). On the plus side, however, individuals with autism are frequently very good at paying attention and appreciating visual materials. Therefore, the visual route is often one way of getting access to their minds and giving them a way of expressing themselves. (Rutter et al., 1999).

Autistic children have been shown to be significantly poorer than normal children at distinguishing between inappropriate and appropriate utterances (i.e., utterances that avoid redundancy, are informative, truthful, relevant and polite), suggesting that they have a poor knowledge about the social constraints of appropriate communication, and the function of language as it is used to convey information in a communicative sense (Surian, et al. 1996).

Although they appear to have a good vocabulary and a sophisticated command of the language system based on their verbal utterances, Kanner (1943) noted that verbalize children show no comprehension of what they are actually saying, he also reported that those children show a high echolalic speech[8] and the

[8] or Echolalia is a condition associated with autism. People with echolalia repeat noises and phrases that they hear. They may not be able to communicate effectively because they struggle to express their own thoughts. For example, if asked a question, they might be able only to repeat the question rather than answer it. (Stubblefield 2013).

presence of pronominal reversal[9].This means that, the sophisticated language used by verbalize children may reflect the repetition of bits of dialogue heard on television or in the conversation of others. This mitigated echolalia is often used in inappropriate contexts. Moreover, autistic children's performances have been shown to be inferior to those of non-autistic children on tasks of verbal memory and word repetition (DeMyer, 1976), as a result, they usually tend to omit grammatical morphemes, the smallest units of meaning in speech, more often than normals (Bartolucci et al., 1980, as cited in, Howlin, 1984).

Autistic children have comprehensive and extensive language impairment, as well as memory processing, categorization, abstraction, and concept use. Besides, they have been shown to have language delays out of keeping with their mental age, even when it can be accurately determined. Thus, childhood autism is a pervasive developmental disorder, invariably involving some type of language disorder.

1.6.1 Discourse, Semantic and Pragmatical Impairments

The concept of ‘‘pragmatics’’ refers to the use of language as a tool for communication; specifically, how language is used in the context of social interactions. Pragmatics comprises both linguistic functions, such as register (altering one’s speech depending upon whom one is speaking to), negotiation of turn-taking, and the choice of referential expressions (‘‘a’’ versus ‘‘the’’), as well as non-linguistic functions, such as eye contact, body language and facial expressions (Ninio and Snow, 1999). Discourse is a closely related concept, which refers to longer connected streams of speech. Pragmatics and discourse serve as the most ‘‘socially motivated’’ domains of language, in that they require the speaker to be aware of and respond to the social status, knowledge, interest, motivation, and other qualities of the listener; these skills exhibit a long trajectory

[9] "Pronoun reversal is when the person with autism confuses first and second-person pronouns in speech. (Autism and Language: Description and Diagnosis) He will use "you" to refer to him or herself and use "I" to refer to his or her listener. This might be a sign that children with autism fail to identify themselves as separate from the person with whom they are speaking or might just be experiencing linguistic confusion." (Karanth 1989).

of development in most children, with an asymptote at approximately five years of age (Ninio and Snow, 1996).

In general, discourse and pragmatics are commonly acknowledged as the most consistently-impaired domains in ASD. Early research in this area suggested that individuals with autistic disorder were likely to use overly formal or precise words, and generally ‘‘odd phrasing,’’ in talking to others (Rutter et al., 1992, as cited in, Wallace, 2011). Lord (1996, as cited in, Wallace, 2011) has suggested that pragmatic impairments may reflect, at least in part, a lack of experience in peer interactions. If children have had little practice talking with children their own age, preferring instead to interact with adults, they may end up using adult-like speech and may fail to learn age-typical vocabulary items.

There two proposals that explain the discourse and pragmatic deficits in the ASD population. One influential view grows out of the ‘‘Theory of Mind" approach, which suggests that difficulties in representing the contents of other people's minds are central in our understanding of ASD, and may provide a critical constraint on pragmatic language skills (Baron-Cohen, 1988). There is another possible source of pragmatic and discourse impairment.

The ‘‘executive functions" (EF) theory is designed to explicate the core deficits in ASD. Briefly, the EF theory suggests that ASD involves impairments in a set of cognitive processes associated primarily with the functional circuitry of the frontal lobes of the brain. These processes include working memory, inhibition, set-shifting, goal maintenance, and cognitive control, and the EF theory proposes that deficits in these processes may account for the symptoms in ASD, including social deficits, communication delays, and repetitive behaviors (Ozonoff et al., 2004). By this account, children with autism may fail at pragmatic and discourse tasks because they are unable to simultaneously consider and respond to multiple sources of information or to inhibit inappropriate, potent, or salient responses.

1.6.2 Prosodic Impairments

Closely linked to pragmatic abilities is the production and comprehension of prosody, which involves the rhythm, stress, and intonation of speech. To our knowledge, prosodic impairments have been found in every study of children with ASD conducted to date, although it should be noted that relatively few studies have been conducted in this area. Deficits in prosody have been consistently described as an integral part of the speech and language disorder in autistic children (Kanner, 1946, as cited in, Ornitz & Ritvo, 1976). Such deficits still remain evident in the language characteristics of children whose speech showed considerable improvement over time (DeMyer et al., 1973; Baltaxe & Simmons, 1983). However, there is still a paucity of research investigating the deficits in this important aspect of speech and language.

1.6.3 Syntactic Impairments

Syntax refers to the combination of words into phrases. As such, it may be considered the most complex of the core linguistic domains. Findings of syntax have been somewhat conflicting in addressing the relative delay or deficit in the syntactic development of children with ASD; however, the majority of studies have concluded that there is a clear delay in this domain of language (Stevens et al., 2000).

1.6.4 Morphological Impairments

Morphemes are the smallest meaningful units of language; morphological development refers to the development and understanding of these units and how such units are combined into words. Studies of morphological development in children with ASD are few in number but suggest that at least early-acquired morphological rules are learned as efficiently in ASD as in controls (Waterhouse & Fein, 1982). In contrast to this null finding, Bartolucci et al., (1980, as cited in, Howlin, 1984) found that 10 children with ASD were more likely to omit obligatory morphemes than TD and developmentally delayed control groups

matched on mental age, which they suggested may reflect a specific delay in morpheme production rather than general language delay.

1.6.5 Phonological Impairments

Phonology refers to the way in which a speaker organizes the sounds of a language to encode meaning and overlaps with phonetics, which refers to the physical production and articulation of speech. Phonology has been found in a variety of clinical studies to be sensitive to neurological problems as in ASD (Culbertson & Tanner, 2001). Most studies suggest that individuals with ASD do not have specific impairments, phonological and articulatory problems can be found in low-functioning individuals with autism, and early in childhood. Alternatively, phonological deficits may be specific to particular subgroups within the autism spectrum with the rest following a typical trajectory in phonological development (Tager-Flusberg et al,. 1997).

1.7 Autism in the Arab World

The Arab sphere is the area that occupies North Africa and West Asia, consisting of 22 Arab countries and stretching from the Atlantic Ocean in the West to the Arabian Sea in the east and from the Mediterranean Sea in the north to the Horn of African and the Indian Ocean in the southeast. Arabs have a rich diversity of ethnic, linguistic, and religious communities, its population exceeds 400 million inhabitants.

As it was mentioned earlier, autism appears in all societies, ethnicities, and cultures without exceptions. In the Arab World, the number of autistic persons is not confirmed and appears to be less in comparison to the developed world with 39 per 10,000 for autism in the Arab sphere and 77 per 10,000 for the developed countries, talking about all forms of autism spectrum disorders. (Hussein and Taha, 2013). This does not necessarily mean that the condition is less prevalent in the Arab world, however, many factors contribute to the lower incidence of autism in the Arab world.

First, the difficulty in obtaining a diagnosis, as the pediatricians are often inexperienced in the diagnosis and management of these disorders. In general, there is a shortage of specialists to diagnose specializing in childhood problems. In addition, the lack of screening programs and difficult access to care due to various reasons might have also contributed. (Salhia. et al., 2014).

Second, the lack of awareness among parents regarding ASD, including a failure to recognize symptoms and seek diagnosis and treatment is also likely to be a factor, especially in cases of children with mild forms of the disorder. Most parents explain the symptoms of ASD by supernatural causes (Bakare et al, 2009) such as witchcraft, demonic afflictions, and evil spirits, evil eye or black magic. Moreover, individuals with autism and their families are often faced with rejection, negative and derogatory comments, further promoting stigma. therefore, families tend to hide away the affected children from society. This may lead to late presentation and diagnosis of the disorder among Arab children.

Third, Arab countries are characterized by social inequality, where the socioeconomic status of families plays a great role in identifying autism. The socioeconomic factors affect the prevalence rate prominently, for instance, studies in India have shown that most diagnosed cases belong to middle-class families. Upper-class families do not frequently visit public health centers to treat autistic children. Generally, this class uses to go to private and international health centers. However, families from low socioeconomic strata do not access such facilities i.e public health centers unless the child is acutely ill. (Salhia et al., 2014). This is the case for the Arab world, wealthy families often go to private and international hospitals to diagnose their diseases. While the poorer families do not even go to the public ones unless the child is ill and they tend to access alternative medicine more than medical ones.

Fourth, considering its resources, the Arab world has achieved less than expected in health and development. Most countries in this area are determined by wars, occupation, sanctions, civil strife, and insecurities as they are in active, post-conflict or instability. And since political and economic stability has a powerful direct impact on healthcare and disease prevalence, this caused a wide variation in health problems facing the various Arab countries. Compared to the western countries with trained professionals, better access to childcare facilities and available intervention services, Arab children are seriously underserved and have limited access to the few available child health care facilities (Bakare et al, 2009). Moreover, Arabs health workers do not routinely undergo training in the identification of neurodevelopmental disorders (NDD) such as ASD due to the shortage of doctors specialized in pediatric psychology. This inadequate healthcare facility contributes to late diagnosis and interventions for African children with ASD.

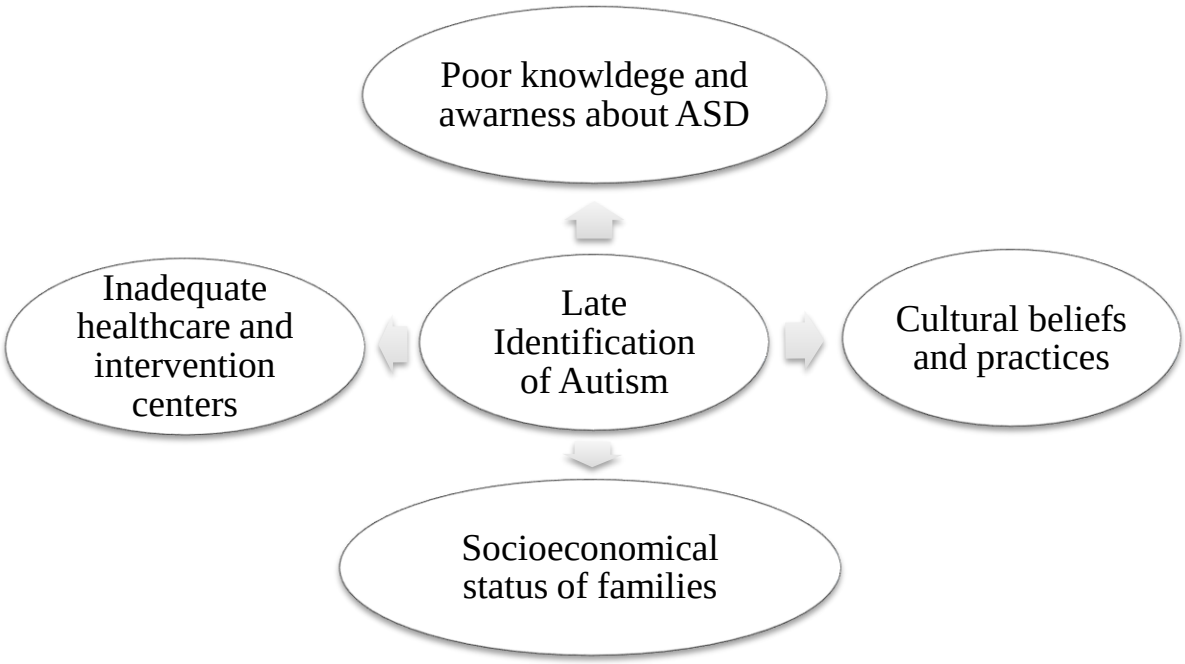

***Figure 2*:** Factors Associated with Late Identification of Autism in the Arab World.

1.7.1 Etiology of Autism in the Arab World

The causes of autism remain unclear even though genetic and environmental factors may play a role in increasing the risk of autism. Although various studies have been conducted in ASD etiology across the world, only a few scientific researches have been conducted in the Arab World, most of them in the Middle East.

Oommen (2018), conducted a study about the role of environmental factors in autism spectrum disorders in Saudi children. The objective of this research was to study the environmental factors which can contribute to the development of autism spectrum disorders in Saudi children aged 3-10 years in the Northern region (Arar) and the Eastern region (Dammam) in the Kingdom of Saudi Arabia. From 25 different items, the most significant environmental factors determining ASD were consanguineous marriage, family income, medications taken by the mother during pregnancy, and maternal age during pregnancy.

Talking about consanguineous marriage, this kind of relationship is very common and is deeply rooted in the Arab culture. It has been over many generations. The most common form of consanguineous marriage is between first cousins, particularly paternal first cousins and includes double first-cousin marriage. According to Hussein and Taha (2013), a group of researchers compared the DNA of family members (married cousins) and found missing regions of genes that could play a role in autism. This claim was strongly correlated with the findings of the study carried by Oommen (2018).

The socioeconomic status or the family income was seen as playing role in the late identification of Autism in Arab children as well as a common factor in the appearance of ASD. Recent European studies agree with this claim, Delobel-Ayoub et al, (2015) confirmed that low socioeconomic status is associated with an increased risk of ASD.

Maternal prenatal medication use is also associated with an increase in autism prevalence in the Arab world. Oommen (2018) interviewed a group of mothers of autistic children about whether they were having medications during their pregnancy. They found that the majority of those mothers were taking medicines for hypertension, diabetes, asthma, antepartum hemorrhage, depression and infections (Oommen, 2018). Moreover, in many studies, maternal and paternal age older than or equal to 34 years were found to be associated with increased risk of autism in their offspring. Researchers who studied the risk of autism with older reproductive age concluded that maternal age is an important factor in the development of autism (Idring et al. 2014).

Many other factors contribute to the increased prevalence of autism in the Arab World. The role of the vaccine as a risk factor in the development of ASD has been questioned. Although Arab and even Western scientists, physicians, and public health researchers have come to the conclusion that there is no association between vaccines and autism, most parents claimed, when they were interviewed by the researcher, that their children were in a normal development before taking their vaccines. Mrs. Hocini a responsible for Autism Association of Saida in Algeria and a mother of an autistic child argued that the vaccines played a big role in the development of ASD in Algeria. Talking about her son, she confirmed that he was in a normal development until the age of 18 months when he received his vaccine. From this period, she said, the situation of her son becomes worse.

Nevertheless, Davidson (2017, p. 403) disagreed with this claim, he argued:

> In many regards, vaccines—and in particular, those for mumps, measles, and rubella (MMR)—have the makings of a cause-effect myth. The notion that "if B follows A, then A is probably the cause of B" is the most common misinterpretation

of causality. The MMR vaccine is administered to 12- to 18-month-old children. At this age, the first signs of an impending developmental condition, such as autism, start creeping in and become noticeable.

To sum up, there is no accepted single cause of autism although there are numerous theories, it is becoming apparent now that ASD is most probably caused by multiple factors interacting in complex ways (i.e. genes, environment and brain).

1.7.3 Literature of Autism in the Arab World

In the Arab world, the research conducted in the field of autism is relatively less. Autism is not yet a priority in research in most Arab countries, it was not the subject of interest in the region until the late 1990s (Hussein and Taha 2013). This might be because the field of child psychiatry is relatively new in some countries and does not exist in other countries such as Algeria where this field is studied as a chapter only from general psychiatry.

A total of 168 articles were published from all Arab countries from 1991 to 2014, (AlNemary et al, 2017; Hussein and Taha, 2013). 97% of Arabic Studies were produced from 2003 to 2014 (AlNemary et al. 2017), these studies were conducted in 13 countries only out from 22 countries in the Arab World. Most of it was conducted in Saudi Arabia, Egypt, Oman, and Tunisia. The other countries contributed with 1 to 6 studies. More details are given in the following table.

Table 1.

Frequency of studies on autism published from different Arab countries, (AlNemary, 2017; Hussein and Taha, 2013).

Country	N%
Egypt	44
– Libya	2
– Tunisia	7
– Algeria	0
– Morocco	1
– Mauritania	0
– Sudan	0
– Somalia	4
-Djibouti	0
– Gaza	0
– Lebanon	11
-Jordan	9
– Syria	1
– Iraq	0
– Kuwait	6
– Bahrain	2
– Qatar	4
– UAE	4
– Sultanate Oman	17
– Saudi Arabia	56
– Yemen	0

The following figure showed the growth of the publication in the period from 1991 to 2014:

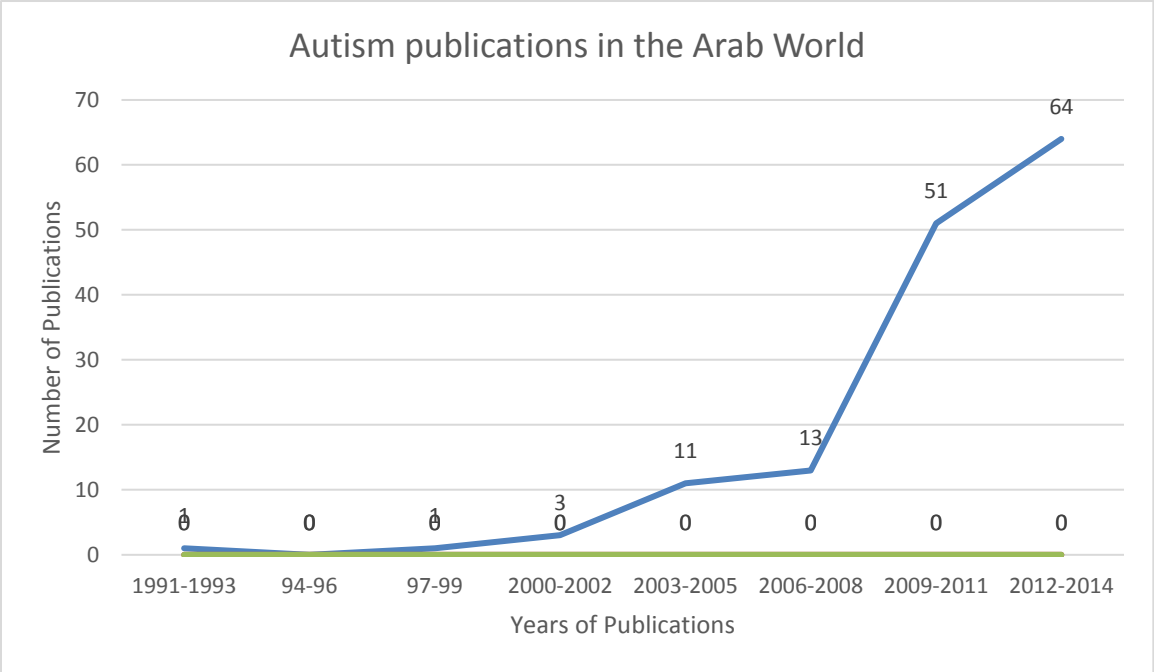

Figure 3: Growth in ASD Publications from 1991 to 2014. (AlNemary et al. 2014).

All publications are medical and psychological studies only. Thereby, the other fields were neglected. The largest proportions of publications address the biology of ASD (34.5%), followed by risk factors (28.9%) and diagnosis (14.1%). Comparatively, fewer research publications address the treatments and intervention of ASD (9.2%), services (8.5%), infrastructure and surveillance (3.5%), and life span issues (1.4%). (Alnemary, 2017). No studies are investigated in the linguistic area of ASD.

The shortage of ASD studies in the Arab World might be due to many factors. However, the most prominent one is the lack of funding and infrastructure such as staff, administrative arrangements, and legal frameworks (Jaalouk et al. 2012, as cited in, Alnemary et al., 2017). Governmental ministries and organizations need to fund individual and private sectors so as to allow researchers to enlarge their areas of study.

1.8 Autism in Algeria

Algeria is the largest African country located in the northwest of Africa. The capital city is Algiers. Algerian society is distinct from other Arabic societies of the Middle East in terms of its long history of civilization, its geographical location and separate dialect (Algerian dialect of Arabic). It is a vast country of 2.38 million sq. km, extending in the northwest of Africa from the Mediterranean Sea in the north to Mali and Niger in the south, and from Tunisia and Libya in the east to Morocco and the Western Sahar in the west. Algeria's population is over 43 million (Worldmeters, 2018). Due to the country's vast size, the majority of the population lives in the north, along the Mediterranean coast.

Indigenous Berbers, as well as Phoenicians, Romans, Byzantine Greeks, Arabs, Turks, various Sub-Saharan Africans, French, and Spanish, have contributed to the history of Algeria which resulted in a very rich linguistic variety and repertoire (Douglas, 2005). Despite the dominance of the Berber culture and ethnicity in Algeria, the majority of Algerians identify with an Arabic based identity (90% population), they are the largest ethnic group in the Republic within the total population of more than 30 million. Berbers and Berber-speaking Algerians are divided into many groups with varying languages, the largest of these are the Kabyles, who live in the Kabylie region, east of Algiers, the Chaoui of Northeast Algeria and the Tuaregs as well as the Mizabs in the southern desert. Algeria became a dependent Republic in 1962 and is divided into 48 provinces, each of which is headed by a governor-general appointed by the Minister of the Interior.

Little information is available about autism and autism services in Algeria. Prevalence studies have never been presented before. Therefore, Algeria has no official estimate of its autistic population. Autism in Algeria is still unknown, some people say that is a handicap, while others claim that it is an illness. The fact

is that it is neither an illness nor a handicap, but a spectrum. During a seminar in Sidi Belabes about autism on 22 November 2016, Dr. Benhouidga, a clinical psychologist who has been working with autistic children for many years, argued that several of those diagnosed with autism are not autistic. In this respect, he says.

> Sometimes kids with attention deficit disorder, obsessive-compulsive disorder or learning disabilities are labelled as autistic. I personally have seen several cases that were first diagnosed with autism, but then as time went by, the diagnosis changed to ADD or hyperactivity.

As autism is diagnosed through the national screening program, this later does not exist in Algeria, confirming Dr. Benhouidga. Therefore, children with ASD are often diagnosed by medical doctors either privately or through child and family clinics provided by voluntary organisations. Furthermore, no state-funded special schools are provided through the Algerian Educational program, this led many parents to opt for private schooling. For children more severely affected or with other conditions such as intellectual disability, day center placements are available in Algeria. However, these services are only available in larger cities and probably only for more affluent families. Many parents of children who suffer from autism have complained of the refusal of a majority of nurseries to accept their children. Other kindergartens invest in this disorder and increased the charge to a rate three times higher if they agree to take kids with autism. All these occur in the absence of competent centers in Algeria.

Comprehensive care for children with neurodevelopmental disorders requires coordination across education, health, and social developmental service systems. Meslem (2017) pointed out that her ministry is working in coordination with the Ministry of Education for the opening of integrated classes in schools, to provide the autism patients with suitable education taking into account the psychological and speech therapist aspects.

To ensure the education of children with special needs, the National Ministry of Education in Algeria plans with the contribution of the Ministry of National Solidarity, to double the number of sections for children with special needs especially for those with autism.

The Minister of Education noted in this regard that there are currently 142 educational institutions in 22 states who have opened divisions within the educational institutions for this category. School attendance of autistic children has reached 1236, which is not really remarkable compared to the huge number of autistic children who are really in need of specific education.

1.8.1 Obstacles Facing Autistic Children in Algeria

Autistic persons suffer from many obstacles that inhibit their acceptance as citizens. The first obstacle is the absence of a state health care policy that can alleviate the expenses of medical treatments and therapies that the parents of autistic persons must pay every month.

The second obstacle is the integration of autistic children in the educational system. Algeria has no public schools specifically for autistic, these children remain limited to a small number of classrooms opened in public schools, and are led by local associations. Since Algeria has no public schools specifically for autistic children so they are taught or treated in schools with others who are mentally challenged.

Consequently, the third obstacle is the shortage of qualified personnel working in this field, an outcome of the absence of the state's willingness to invest in the training and certification of qualified persons to fill this shortage.

Culturally speaking, autism is rarely mentioned in the press and different mass media networks, except for some annual articles published on the 2nd of April to celebrate the international day of autism. As a result, the awareness of autism in Algeria is still weak.

1.8.2 Autism Research in Algeria:

In 2015, the Minister of National Solidarity, Family and Women's Status Mounia Meslem presented a project to create a national reference center "Autism"(Allfrica, 2015). According to her speech, this center will be in charge of collecting resources, development of research and documentation, setting up screening and orientation mechanisms for this category of disabilities, said the Minister during a regular meeting of the National Council on Disability. However, until 2019, this project is unrealized. To the best of our knowledge, this is one of the first studies to comprehensively investigate the problem of ASD in Algeria. Since it is a case study, this research will attempt to reflect the real image of the situation of Autism Spectrum Disorder in Algeria.

1.9 Interventions

When it comes to autism spectrum disorder, there are many kinds of interventions. Different interventions might involve children, parents or both. They might be one-off events or involve many sessions spread over the years. These interventions range from those based on behaviour and development to those based on medicine or alternative therapy, they even can combine several different types such as interventions that involve a mix of behavioural and developmental approaches. It can be difficult sometimes for parents and therapists to make decisions about which approach is right for the autistic child because autism is complex and what helps one person may not help others.

1.9.1 Augmentative and Alternative Communication (AAC)

From the beginning of the 1980s, there has been an explosion in the appearance of communication technologies and methods that were designed as attempts to support and improve communication for individuals with autism. In terms of language difficulties, Augmentative and Alternative Communication (AAC) is among the most famous interventions that can help autistic children to promote and enhance their speech and communicative skills.

According to the American Speech-Language-Hearing Association 'ASHA' (1991), Augmentative and Alternative Communication is an "integrated group of components, including the symbols, aids, strategies, and techniques used by individuals to enhance communication". (as quoted in Hourcade et al., 2004, p. 235). It emerged in the 1950s and 1960s as a communicative tool for individuals with communication disorders. More significantly, those who had not developed the more traditional communication skill of speech. (Hourcade et al., 2004).

The primary aim of AAC intervention is to enable individuals with specific disabilities to efficiently and effectively engage in a variety of interactions and to enhance a child's communicative competence through the use of multiple communication modalities that are by their very nature supplementing "augmentative" or replacing "alternative" natural speech (Light et al, 2003). In this respect, Briglio and Ermold (nd, p. 3) provided a deep explanation about 'augmentative and alternative', they said: "The term augmentative communication refers to the use of aids or techniques that augment or supplement existing vocal or verbal communication skills. Alternative communication involves the use of communication methods or strategies in place of natural vocal or verbal abilities". Thereby, Augmentative and alternative communication (AAC) is a system composed of four key elements: symbols, aids, strategies, and techniques. In addition, it should be achieved either by unaided approaches, such as gestures or manual signing; or by aided systems, involving graphics (traditional

orthography, photographs or line drawings). Aided systems use external equipment with a communicative function, such as Picture Exchange (PE) (Bondy and Frost, 2001) or speech-generating Devices (SGDs), otherwise referred to as voice output communication aids (VOCAs) (Lancioni et al., 2007).

Recent developments in mobile technology, as well as the introduction of the iPad and other tablet devices, have provided new tools for communication. They make it easy for all categories of complex communication needs to access AAC activities. Since this latter is now provided through software applications. In the past various types of AACs such as Speech Generative Devices (SGD) were provided by clinical support with high prices and weighty devices. However, the widespread availability of mobile technologies as well as software programs contributed to the spread of the various types of AACs and SGDs. Nowadays, individuals who require AAC are now able to use mainstream technologies to meet their communication needs. AAC applications are readily available for purchase from the same app store that offers other business, educational, and social apps with cheap prices, therefore expanding general public awareness of AAC.

Briglio and Ermold (nd, p.4) went further to identify which categories can benefit from AAC, they mentioned:

> AAC strategies aid people with severe communication disabilities to contribute more fully in their social roles involving interpersonal interaction, learning, gestures, education, and so on. AAC is used by individuals with a variety of speech and language impairments, including congenital impairments such as cerebral palsy, intellectual disabilities, and autism, or acquired conditions such as amyotrophic lateral

> sclerosis (ALS), multiple sclerosis (MS) and Parkinson's disease. When children and adults cannot use speech to express communication efficiently in all circumstances, an AAC device could be beneficial. An AAC device can be a permanent addition to an individual's communication or a temporary aid.

However, according to Von Tetzchner and Martinsen (2000), three groups were identified to well benefit from AAC, these are:

(1) The Expressive Language Group: this group is characterized by a gap between their understanding of other people's speech and their ability to express themselves through spoken language. The difficulties of this group are persistent and they need an AAC system that can be used permanently.

(2) The Supportive Language Group: this group needs an AAC system at certain periods of their life or in certain situations and is divided into two subgroups in this respect: the developmental group and the situational group. For the developmental group, the AAC is often a step towards the development of speech. The situational group is made up of individuals who have learned to speak, but who have difficulty in making themselves understood, most often with people who do not know them well.

(3) The Alternative Language Group: this group consists of individuals who will need their alternative language form for the rest of their lives. The intervention comprises both comprehension and production and the communication partners will also need to use the AAC mode.

Von Tetzchner and Martinsen (2000) specifically mention children with autism as belonging to the third group. This is often true of children with autism and learning disabilities and definitely of those who do not develop speech.

1.9.2 The Use of Generative Speech Devices (SGD) as Aided System of AAC in ASD Population

There are many aided systems of AAC, including picture exchange (PE) the picture exchange communication system (PECS), and, speech-generating devices (SGD). SGDs, also known as Voice Output Communication Aid (VOCA) became prominent communication options for many individuals with autism by the 1980s and 1990s. They have recently increased in popularity for targeting communication disorders in ASD population and other developmental disabilities (Lancioni et al., 2007).

SGD is an aided system used under the augmentative and alternative communication program. It is a portable electronic device that plays pre-recorded words either digitized or synthesized speech output. Or it can be provided by a software application. The SGD displays a variety of graphic symbols to represent a message that is activated resulting in voice output when the individual uses a finger, hand or some other means to select the message. This system is defined by Lorah et al., (2014, p. 2): "SGD or VOCA are electronic devices that rely on the speaker's pressing of a picture, word, or other symbol depicting an item, activity, response, or statement on an electronic screen with enough force to evoke a synthetic speech output".

In SGD, the speaker is not required to first gain the visual attention of the listener prior to communicating and therefore, the listener can interpret the request even if he or she is not looking at the speaker (Lancioni et al. 2007). Moreover, the user of SGD is not required to demonstrate topographically dissimilar fine motor movements for acquisition purposes (Lorah et al., 2014). Additionally, SGD transmits digitized output that is synonymous to vocal output and thus can be easily interpreted by a listener. Finally, as the speaker acquires a larger verbal repertoire, storing, carrying and deploying PE picture symbols or PECS cards can become heavy and unwieldy. As an electronic apparatus, an SGD may potentially

be able to store thousands of icons or ‘‘picture cards" in a much more compact and efficient manner (Lorah et al., 2014).

The idea behind using Speech-generating devices is allowing people who can't use spoken language to ‘speak' electronically. Psychologically, it is assumed that children with autism spectrum disorder (ASD) are often good at visual processing, and the idea is that they can combine this ability with a speech-generating device to improve their communication.

At the International Meeting for Autism Research, IMFAR, (2013), the educational psychologist Dr. Kasari described the promising results of a study that incorporated speech-generating devices into a language and play-based autism therapy. The study recruited sixty children with autism spectrum disorder (ASD) ranged in age from 5 to 8 years and used fewer than 20 words at the start of therapy. The researchers measured their word use before, midway-through and after the six-month study.

All the children participated in a play-based intervention that encouraged engagement with the therapist and the use of spoken language, and a speech-generating device, the researchers used it with half the children from the very start of therapy. Speech-generating devices come in many forms, including iPads with special applications. After 3 months, the researchers measured the children’s progress in both groups and it was found that those engaged in conversations without SGD showed slow performance in comparison to those who used the SGD. Accordingly, the researchers added the communication device to the therapy of children who were responding slowly without it. After another 3 months, all participants gained words; but progress faster with the device. The researchers noticed that at the end of the six months, all the children in the study had made gains in language and communication. They used words more often and engaged in more communication with a social partner. On average, they took four or more conversational turns with a partner. However, the children who used the speech device from the beginning made more rapid progress.

These findings suggest that children with ASD who are minimally verbal can make significant progress in spoken social communication after age five, and proved the credibility of speech generative devices in promoting communicative abilities in children with autism spectrum disorder as an augmentative and alternative communication system. The following table reviewed by Thunberg (2007), represents the most important studies included SGD with the ASD population:

Table 2.

Studies of SGD Intervention that Include Children and Adolescents with ASD.

Authors	Year	Title	Intervention
Romski, Sevcik	1996	Breaking the speech barrier: Language development Through augmented means	SGDs with lexigrams Naturalistic teaching SAL 23–104 symbols
Light, Roberts, DiMarco, Greiner	1998	Augmentative and alternative communication to support receptive and Expressive communication for people with autism	Present and demonstrate the use of the 'Participation Model' for AAC implementation Naturalistic teaching Anecdotal data on outcome Laptop, word-based communication book with a large vocabulary, Remnant pocket
Schepis, Reid, Behrman n, Sutton	1998	Increasing communicative interactions of young children with autism using a voice output Communication aid and Naturalistic teaching	Naturalistic teaching SGD, 4–8 messages
Taylor Dyches	1998	Effects of switch training on the communication of children with autism	Simple switches with photo connected to a tape-recorder Incidental teaching, five levels.
Sigafoos, Drasgow, Halle, O'Reilly, Seely-York, Edrisinha Andrews	2004 a	Teaching VOCA use as a communicative repair strategy	Use VOCA to repair Communicative breakdown, Child-centred one-to-one instruction SGD: Big Mack

Sigafoos, O'Reilly, Seely-York, Edrisinha	2004 b	Teaching students with Developmental disabilities to locate their AAC device	Teach locating of device Child-centred one-to-one instruction (3 different trainers) SGD: TechTalk
Sigafoos, O'Reilly, Seely-York, Weru, Son, Green, Lancioni	2004 c	Transferring AAC intervention to the home	Transfer intervention to Home Child-centred one-to-one instruction SGD: TalkTrac
Sigafoos, O'Reilly, Ganz, Lancioni, Schlosser	2005	Supporting self-determination in AAC interventions by Assessing preference for communication Devices	Choice of SGD Child-centred one-to-one Instruction SGDs: TechTalk, BigMack.
Sonnenmeier, McSheehan, Jorgensen	2005	A case study of the team supports for a student with autism's communication and engagement within the general education curriculum: Preliminary report of the Beyond Access Model	Presentation of an intervention model, anecdotal reports of outcome SGD: Dynamite

1.10 Conclusion

Autism spectrum disorder has evolved over time. Sixty years ago, the condition was nothing more than an unrecognized developmental delay generally lumped in with intellectual disabilities. Today it is recognized as an independent neurologically based disorder of significance, a major public health issue, and a topic of much research. Researchers have struggled to find a cause for the disorder without great success. Despite this difficulty, research continues in ever more sophisticated directions. Numerous treatments have been developed that help children with an autism spectrum disorder to maximize their potential to learn and become socially fluent, no matter how strong their impairments may be. There is cause for hope.

As it has been highlighted in the introduction of this chapter, the aim of this first part was to provide a general overview of autism. The current chapter has emphasized the necessity to describe the phenomenon of autism in general and that of Arabic and Algeria in particular. The purpose in our case is to explore the pragmatic communicative skills in Algerian children identified with autism, unveiling the attitudes and the reasons that stand behind such pragmatic deficits. in addition to test the reliability of speech generative device in the development of these skills. This is why a detailed analysis of a set of phenomena has been noticed mainly; autism and speech generative device.

The chapter has, eventually, exposed a detailed review of this disorder. Though it is theoretical in form, it will be more helpful for examining the fieldwork results that will be explained in detail in the next chapters. Since the aim of this study is to investigate the development of pragmatic communicative skills in children with an autism spectrum disorder, a general explanation about pragmatics will be presented in the next chapter.

Chapter Two

Chapter Two: Pragmatic Deficits in Autism Spectrum Disorder

Chapter Two

Pragmatic Deficits in Autism Spectrum Disorder

2.1 Introduction

The ability to use language for different purposes, adapt it to meet the needs of the listener or situation and following the often “unspoken” rules of conversation is very important to control your own social communication skills which refer to the way in which persons use language within social situations. However, in some disorders such as autism, persons, especially children, find difficulties in developing these skills.

Indeed, this chapter presents a definition of some concepts related to social communication (pragmatics), its importance, theories and provides a more detailed picture about how children with autism spectrum disorder often find difficulties in learning the rules of pragmatics.

2.2 Defining the Domain of Pragmatics:

Bates (1974) was the first to introduce the word *"pragmatics*" into the field of speech and language pathology. She defined pragmatics: "Pragmatics refers to the study of the use of language in context, by real speakers and hearers in real situations. In 1976, Bates gives a very detailed definition of pragmatics; she defined it as a "rule governing the use of language in context" for the purpose of communication" (p. 420). Moreover, Crystal (1985) offered this practical definition which tells that:

> Pragmatics is the study of language from the point of view of users, especially of the choices they make, the constraints they encounter in using language in social interaction and the effects their use of language has on other participants in the act of communication.
>
> (p. 240)

Geoffrey (1989) defined pragmatics as ‘the study of how utterances have meaning in situations'. (p.2). A more detailed definition of Pragmatics is provided by Ninio & Snow (1999) who state that the main concern of the pragmatic aspect of language is:

> the description of phenomena related to the use of meaningful linguistic forms for communicative purposes. Chief among these is the production and comprehension of speech act-making statements, requesting, promising and the like. Other phenomena include the regulation of conversational exchange; politeness rules and other culturally conventionalized variations in speech register that convey social meaning and determine appropriateness; the control of presuppositions; and the creation of connected discourse.
>
> (p.2)

Paul et al., (2009), in his definition of pragmatics, asserts that:

> Pragmatics is the range of communicative functions (the reason for talking), the frequency of communication, discourse skills (turn-taking, topic maintenance, and change), and flexibility to modify speech for different listeners and social situations.
>
> (p. 28)

Marasco, et al. (2004) adds that pragmatics:

> refers to the underpinnings of conversation: how something is said, the intention of the speaker, the relationship between the participants, and the cultural expectations of exchange. It is by its nature, a complicated and elusive part of communication.
>
> (p.2)

In short, pragmatics is the theory of linguistic communication, it is a branch that is concerned with the area of language that embraces the functional use of language in social contexts including ways of using language to convey different speech acts such as requests, assertions, or promises; the appropriate use of language in specific contexts such as dialogue, monologue, or narrative; and also structuring utterances to distinguish between already given and new information (Sperber and Wilson, 2002).

Moreover, the area of pragmatics includes several aspects related to the topic, such as selection, introduction, maintenance and change, and turn-taking, including initiation, response, pause time, interruption/overlap, feedback to speakers, contingency and politeness (Prutting and Kirchner, 1987).

2.4 Pragmatic development in children's language development

There has been a considerable amount of research on early childhood language development focusing mainly on syntactic, morphological, and lexical development. While all of these developments are crucial steps to an adult-like language system, children in the second and third years of life also show enormous development in the kinds of communicative intentions they express. However, the research on the development of communicative intents has been neglected.

As Fletcher and Garman (1986) claim, one ability in which children are very precocious is the ability to understand social acts - to distinguish among directives, descriptions, prohibitions, offers, and requests for information. Children, even the prelinguistic child in the early stages of language acquisition, will have no trouble using pragmatic differences among utterances as one basis for sorting out their formal differences. Furthermore, children are more socially than linguistically precocious – they come to language learning with a good understanding of what constitutes communication.

Accordingly, children are capable of interpreting many adult responses other than explicit correction or total failure of comprehension as negative feedback. Any response that reflects a need to negotiate about the exact meaning of the child's utterance is negative feedback.

> Speech acts such as request, protest, and greeting are some of the children's communicative acts produced very early while speech acts such as promise, persuasion develop later (Astington, 1988). Children's capacities to express communicative intentions verbally show similarities with their cognitive abilities and their social understandings. As Ninio and Snow (1996) state, children need to learn how to formulate their social moves through language in a form interpretable by their interlocutors and to interpret correctly the interpersonal significance of others' verbal overtures, which has been classified as "pragmatic development." (Ninio & Snow, 1996, p. 5-6).

It has been claimed that a complete picture of language development would incorporate a description of how children's capacities to express communicative intents in interaction with familiar adults grow (Snow, et.al., 1996). This claim leads to several questions; such as a) how many and which communicative intents are expressed at various ages or stages of language development? b) how are they expressed, nonverbally or verbally? autonomously or only with considerable support from the interlocutor?

In addition, prior research findings reveal that infants are highly socially interactive, differentially responsive to social and non-social stimuli, and able to produce behaviours which are interpreted as explicitly communicative by adults (Snow, 1977; Trevarthen, 1977, 1979; Trevarthen & Hubley, 1979). These

findings have led to the characterisation of children as “pragmatically precocious” (Ninio,1993; Ninio & Snow, 1988). The very earliest intentional communications are likely to be expressed through gestures and vocalisations rather than through conventional linguistic forms. Even during the one-word speech stage, much of the children’s repertoire is likely to be idiosyncratic (Snow et.al., 1996). Children’s use of the speech act repertoire in communicative interaction grows faster between 12 and 22 months of age than between 22 and 32 months (Ninio & Snow, 1996).

To understand the development of pragmatics in children, three major aspects will be presented in the following;

1- The first of these is the development of communicative functions, the way the child comes to be able to express a range of intentions, such as requesting, greeting and giving information, through a variety of communicative behaviours, such as gesture, vocalization, and language.
2- The second aspect is that of the child's response to the communication, the way the child reacts to and understands communication from other people.
3- The third aspect is the way the child participates in interaction and conversation, looking at the child as a participant in social interactions involving initiation, turn-taking, and repair.

In addition, it is essential to look at the way the expression of these aspects of pragmatics is affected by variations in context, such as time, place and the people involved.

The following tables presented by Dewart and Summers (1995) show the major developments in each of the three areas of pragmatics mentioned above for six age ranges, from infants through to children of seven and beyond.

2.4.1 Communicative Functions

Communicative functions appeared from birth. From birth to nine months: babies use signals such as eye-gaze, smiles, cries, vocalisations, but without specific communicative intention. These skills are developed after nine months where the child begins to express a range of communicative intentions, first by gesture combined with vocalisation and then by words. The function of these skills are summarized as:

- attention-seeking;
- requesting objects, action or information;
- rejecting or protesting;
- greeting;
- naming.

From 18 months to three years a range of communicative intentions increases:

Uses single or multiword utterances to:

- comment;
- express feelings;
- assert independence.

In this stage, the child begins to use language imaginatively.

From three to four years the use of language is developed to:

- talk about past and future events;
- give information.

From four to seven years show his needs of the listener and politeness constraints. In this, level he begins to use indirect requests such as:

- gain and hold adults' attention, for example 'know what?';
- give information;
- seek information from other people;
- give instructions to peers;

- state rules;
- negotiate and bargain;
- express a range of feelings/emotions;
- state beliefs and opinions;
- taunt and threaten.

In this stage, the child begins to tell jokes (punchline often misses the point) and use narrative to report experiences, complain about others' actions and to tell simple stories.

From seven years and beyond, more sophisticated functions of language become established:

- promising;
- hypothesizing;
- describing own and others' feelings and reactions.

The child starts to use language to develop ideas:

- planning, predicting and hypothesizing;
- reasoning and evaluation;
- explanation;
- expressing abstract ideas and opinions;
- argument and debate.
- Greater flexibility in the use of indirect requests and other indirect forms, for example, hints.
- Skills in negotiation and persuasion develop further.
- Narratives become longer and more complex: can sequence and
- organize events in stories in time and space.
- Develops the use of non-literal language, for example, idiom, simile, metaphor.
- Begins the use of sarcasm and irony.

Response to Communication

Response to communication is summarized as follows:

Birth to nine months:

- The infant pays attention to the human voice and the human face.
- Responds to interaction by looking, smiling and laughing.
- Begins to enjoy action games (such as ‘Round and round the garden’) and begins to smile in recognition of familiar words or in anticipation of tickling.

Nine to 18 months:

- Begins to understand adult gestures such as pointing (first for near objects, then more distant ones).
- Responds appropriately to simple directions.

18 to three years:

- Begins to recognize a range of adult communicative intentions and respond appropriately.
- Responds to speech with speech: can make verbal responses that directly complement previous utterances (for example, ‘yes' or ‘no' to ‘yes/no?' questions, or specific location as a response to ‘Where?' questions).
- Comes to realize that such phrases as ‘In a minute’ mean he or she is being asked to wait.

Three to four years:

- Understanding of adult communicative intentions develop further.
- Notices changes in the wording of familiar stories and rhymes.

Four to seven years:

- Understanding of indirect requests developing.
- Beginning to rely less on the context for understanding, for example, in the classroom.
- Requests clarification when it hasn't understood.
- Takes instructions from peers and responds to their questions.
- Becomes able to treat language as an object of analysis and to use language to talk about language (metalinguistic awareness).

- Enjoys jokes but doesn't fully understand play on words/puns.
- Listens to extended stories from books and can read simple ones.

Seven years and beyond:

- Greater facility in understanding indirect forms.
- Can cope with little non-verbal support for linguistic messages, for example, in reading, and in the classroom.
- Can judge utterances as appropriate for a particular listener or setting.
- Can assess the adequacy of communication and comment on where it has gone wrong.
- Can respond appropriately to idiomatic language.
- Can understand figurative and non-literal language.
- Aware of the politeness of various forms of request.
- Shows awareness of how intonational cues affect meaning.
- Learns to make more subtle distinctions between communicative functions, for example, promise and prediction.
- Can understand jokes based on a play on words.
- Can read and extract information from books.

Interaction and Conversation

Interaction and conversational skills are summarized as the following:

Birth to nine months:

- Early interactions between infants and caregivers:
- involve turn-taking and temporally linked behaviours;

- maybe initiated by infant looking at a caregiver's face and terminated by infant looking away;
- often consist of ritualised and repetitive games (‘peekaboo'), which also involve turn-taking;
- involve joint attention between infant and caregiver, which expands to include external objects and events.

Nine to 18 months:

- Interactions initiated non-verbally by child, for example, by giving, pointing, showing or making requesting gestures and vocalisations.
- Interactions may be terminated by the child moving away.
- Responds to questions by non-verbal vocalization or gesture.
- Interactions limited to one or two turns per partner.

18 to three years:

- Begins to use speech in response to the speech, (gives a verbal response to questions, for example).
- Initiates interactions by using vocative (for example, ‘Mummy!’).
- Responds to requests for clarification by repetition or by revision of the original form of the utterance.

Three to four years:

- Becomes more able to communicate with strangers.
- With peers, talk may alternate between private talk to self and talk to partner.
- Can participate in pretend conversations and switch from one speech code to another when taking stereotypical roles in the play.
- Will respond to things overheard in other people’s conversations.
- Rapid change of conversational topics.
- When the child is not understood, it tends to repeat without modification.

Four to seven years:

- controlling the timing of conversational turns. The number and length of turns increase significantly.
- Learns to choose the most appropriate timing for attempts to join in other people's conversations.
- When telling something, it has difficulties in taking into account what the listener knows and needs to know in order to understand, for example, assumes knowledge of the context or participants is shared.
- May distinguish deictic terms, such as ‘here' and ‘there', ineffectively so that the listener has to probe to find out what is being referred to.
- When the child has not been understood, can repeat with some elaboration so that more information is conveyed to the listener.
- Uses contingent queries to request clarification from others.
- Participates in games involving role-play, negotiated through language.
- Gradually learns to adapt conversational style to a variety of conversational partners who differ in age, sex, status, and familiarity.
- Shows some awareness of social conventions for language use, for example, modifies request forms to make them more polite and makes judgments about degrees of politeness in others' requests.

Seven years and beyond:

- Gets better at setting the scene to take account of listeners’ needs.
- Becomes more proficient at the use of cohesive devices in discourse.
- When conversation breaks down can repair by addressing the source of breakdown and elaborating appropriately.
- Topics of conversation extend into abstract ideas.
- Adapts style of speech to age, status and other variables related to listener.
- More proficient at using politeness as a strategy in communicating.
- Develops appreciation and use of social conventions relating to facial expression, gesture, posture, distance, eye contact.

2.7 Pragmatic Deficits in Autism

The traditional components of language, phonetics, semantics, and syntax, adequately characterize the structure of language but are insufficient to explain the richness of meanings that arise whenever language is used to communicate. In our daily life, we often communicate using language that is abstract and relies only on conventions to understand the real meaning behind the words. Idioms, proverbs, and figures of speech are frequently embedded in our conversation and reading materials.

Research since the 1980s has identified communication deficits in children with autism that fall into two major areas: the capacity for joint attention, which reflects difficulty coordinating attention between people and objects, and the capacity for symbol use, which reflects difficulty learning conventional or shared meanings for symbols and is evident in acquiring language as well as symbolic play (Wetherby, et al. 2000). According to Koegel (2000), the communicative difficulties, both in the verbal and in the non-verbal domain, that are common in children with autism, as well as the lack of sufficient language development, can lead to significant disability in the area of pragmatic competence.

While communicative dysfunction is one of the central characteristics of ASD, its profile of symptoms varies widely from one person to another. At one extreme, there are children with ASD whose structural language is within normal limits, this category is known as having high functioning autism. While at the other extreme, some children with autism remain essentially nonverbal. However, in both cases, difficulties with pragmatic language persist (Adams, 2002; Tager-Flusberg, 2004). Thus, pragmatics is consistently agreed to be the communicative domain that is universally impaired in ASD (Tager-Flusberg, et al. 2005)

A range of language impairments appears in verbal autistic children. One category of these impairments is the Pragmatic Language Disorders (PLD) which affects all autistic children (Wing and Gould 1979). Pragmatic Language Disorders are characterised by deficits in comprehension, in particular, it is demonstrated with a low understanding of non-literal sequences such as

metaphors, jokes or irony. Besides, a poor command of indirect speech acts such as questions, and difficulties with presuppositions and other conversational conventions such as politeness, turn-taking. Furthermore, many other impairments are linked to PLD in the production of speech. Among those prosodic, syntactic, phonological, and morphological impairments.

Pragmatic language impairments in children with autism have been noted since the earliest descriptions of this condition. Many scholars try to define it, for instance:

- Kanner (1943, p. 243) described this communicative impairment as "peculiar and out of place in ordinary conversation, irrelevant".
- Rutter (1965, p. 41) reported that pragmatic impairments in autism are "formal, demonstrating a lack of ease in the use of words".
- Bartak et al., (1975, p.137) see it as "stereotypic, inappropriate"
- Cantwell et al., (1978: 357) describe it as "metaphorical".
- (Baron-Cohen, 1988; Tager-Flusberg, 1996) described it as difficulties in initiating a conversation
- However, Stone & Caro-Martinez (1990) see it as difficulties in responding to others' initiations.

- (Botting & Conti-Ramsden, 2003; Curcio & Paccia, 1987; Prizant & Duchan, 1981; Prizant & Rydell, 1984) reported that Once a child is engaged in a conversation, he appears to have difficulty taking turns appropriately.

(as cited in Volden and Philips, 2010, p. 204)

Lacking the ability to comprehend abstract meanings, individuals with autism may find themselves overwhelmed in the social world and their problems surface when they try to communicate. Lam (2014, p. 538) claims that 'people with

autism do not appreciate abstraction and tend to speak in a rigid or overly literal fashion. He provides an example of a child with autism who responded *"I cannot smell anything" when you say "I smell a rat."'*. In social interaction, we are bound by a large set of rules that determine our choice of language. Yet, improper use of language should not be simply interpreted as a pure pragmatic issue. According to Lam (2014, p. 539) lack of abstraction comprehension in the above examples "semantic concern" led to a reasonable incapacity to use these abstractions appropriately "pragmatic issue".

Moreover, children with autism very often violate the unwritten rules of pragmatics. They can, for example, introduce their favourite topic and talk excessively about it without taking into account their listener's needs. They may ignore the rules of turn-taking, be unable to understand how long it is appropriate to talk about the same topic or that their listener may be bored or might need additional information in order to understand. Non-verbal aspects may include such behaviours as eye gaze or proximity between the communicative partners. These rules can also be corrupted by children with autism. Furthermore, tantrums, aggression, and other avoidance or attention-seeking behaviours often displayed by children with ASDs are also included in the pragmatics area if they are used for communicative purposes (Koegel, 2000).

More generally, a number of scholars noted that autistic children do not seem to recognize the informative function of language. thereby, their language has been described as being primarily instrumental and stereotyped. In a study given by Cunningham (1968, as cited in, Baron-Cohen, 1988), the researcher divided speech into "egocentric" and "socialized" and found more egocentric remarks in autistic children's speech than in matched controls. Egocentric speech comprised echolalia, self-repetition, thinking aloud, and apparently purposeless remarks. Cunningham (1986, as cited, in Baron-Cohen, 1988) did not find autistic children asked more questions than control children but did find their questions related

more to obsessional interests. He also found autistic children made far fewer remarks giving spontaneous information. He discussed the excess of egocentric speech in terms of Piaget's (1932) theory of young normal children's egocentrism and concluded that autism may represent an immaturity of development. Cunningham (1986) wrote:

> As Piaget (1932) points out, the exchange of information requires the speaker to place himself at the point of view of his hearer. This the psychotic lie: autistic] child is unable to do. He shows a lack of empathy or ability to apprehend his hearer's state of mind and therefore falls back on non-communicative or demanding speech.
>
> (p. 243, as cited, in Baron-Cohen, 1988, p. 385)

Besides, Bail (1978), in her study found that, compared to matched aphasic children, autistic children were more impaired in the range of "speech acts" they employed (such as relating past experiences, conveying thoughts, commenting on objects, etc.) and in their understanding of discourse rules (such as the illegality of no sequiturs). They were also less likely to use gesture communicatively. She argued that autistic children lack "communicative intent," and appear not to understand pragmatic presuppositions. (as cited in, Baron-Cohen,1988).

Hurting, et al. (1982) manipulated another variable, namely, listener-response to questions. They found that more conversational breakdowns (discontinuations) occurred if the listener did not ask a question back to the child, suggesting that the autistic children were unable to maintain the conversation by themselves. In addition, the autistic children appeared to use questions as to their main device to initiate and continue the conversation but tended to ask questions to which they

already knew the answers. They appeared not to understand the function of questions as requests for information. (as Cited in, Baron-Cohen, 1988).

In analyzing a range of speech acts, Wetherby and Prutting (1984) found autistic children requested objects and actions more often than normal children did, and protested more. However, there was a complete absence of speech acts used for requests for information, for acknowledgments of others, for showing off, and for commenting. This supports Bail's (1978) findings. Wetherby and Prutting reported that autistic children demonstrated the ability to regulate: an adult's behavior to obtain objects, or to obtain an environmental end, but lacked the ability to attract and direct an adult's attention to him or herself or an object as an end in itself. (as cited in, Baron-Cohen, 1988).

From all the above, it will be apparent that what is distinctive about the communication of children with autism is that it reflects the cognitive and social impairments associated with the disorder of pragmatics. For both verbal and non-verbal individuals, impairments in social aspects of language are related to pragmatic impairments.

2.8 Understanding Pragmatic Deficits

Pragmatic language difficulties, deficits or impairments have been described in a variety of psychiatric and neurodevelopmental disorders, including Autism, schizophrenia, Down syndrome, attention deficit, hyperactivity disorder and even in other neurological conditions such as epilepsy. Since this research is limited to autism spectrum disorder, it is needed to well understand the pragmatic deficits in terms of the autistic population. Thereby, three theories are presented in the following:

2.8.1 Effective theory

This theory was originally proposed by Kanner (1943). It states that in autism there is an innate inability to enter into emotional touch with other people. Later, in 1987, Hobson reviewed this theory and summarized it in terms of four major axioms :

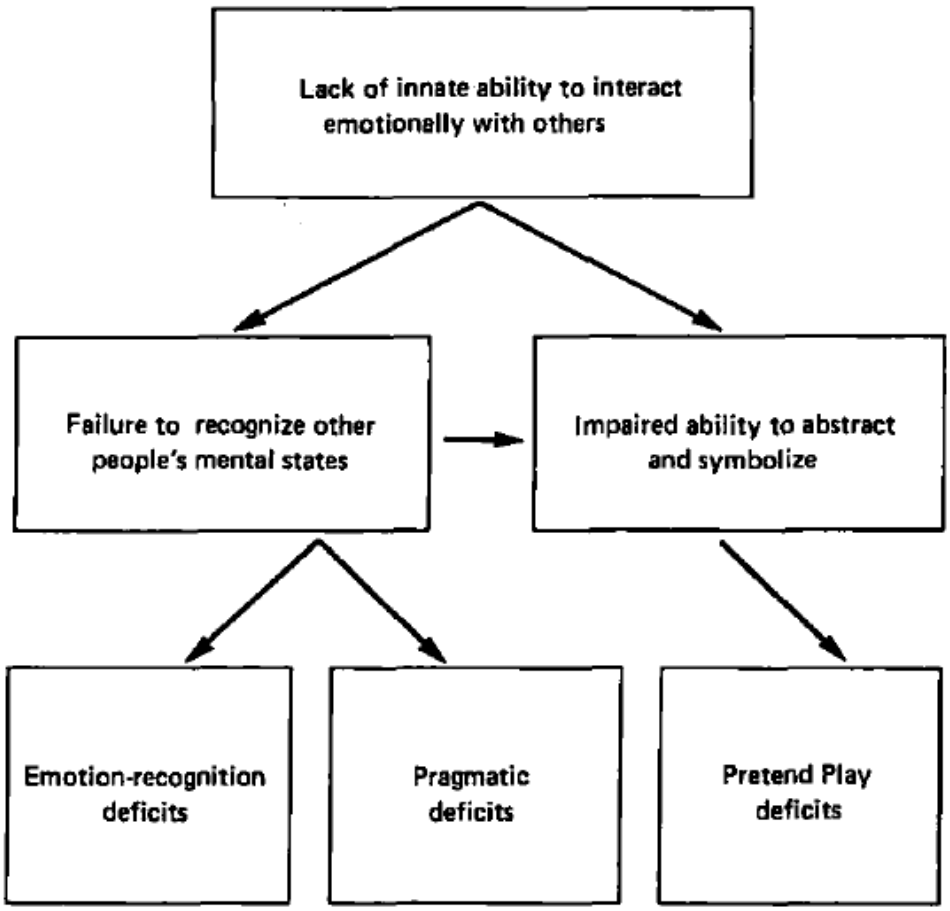

***Figure 4*:** The Effective Theory according to Hobson (1987).

According to Hobson (1987), autistic children lack the constitutional components of action and reaction as are necessary for the development of reciprocal personal relations with other people, relations that involve feelings. Such personal relations are necessary for the 'constitution of an own and common world' with others (Bosch, 1970: 115). Those children's lack of participation in intersubjective social experience has two results which are especially important, namely (a) a relative failure to recognize other people as people with their own feelings, thoughts, wishes, intentions, and so on, and (b) a severe impairment in the capacity to abstract and to feel and think symbolically. The greater part of autistic children's cognitive and language disability may be seen to reflect either lower-order deficits that have a specially intimate relationship with affective and social development and/or impairments in the social dependent capacity to symbolize. (as Cited in, Baron-Cohen, 1988).

2.8.2 Meta Representation Theory : (Cognitive Theory)

In contrast, the effective theory, the cognitive or the metarepresentation theory is proposed as an explanation for the social and the pragmatic impairments. Like the previous theory, the cognitive theory also considers central the autistic child's difficulty in understanding other people's mental states. However, unlike the Affective theory, this view starts from the premise that mental states are not directly observable but have to be inferred, an inference that requires a complex cognitive mechanism which is described later.

The Cognitive theory also places more emphasis on the ability to infer mental states such as beliefs, rather than emotions. The ability to attribute mental states with content to others has been called a 'theory of mind" (Premack & Woodruff, 1978) because it involves the person postulating the existence of mental states and then using these to explain and predict another person's behavior. The cognitive theory is shown in the following figure :

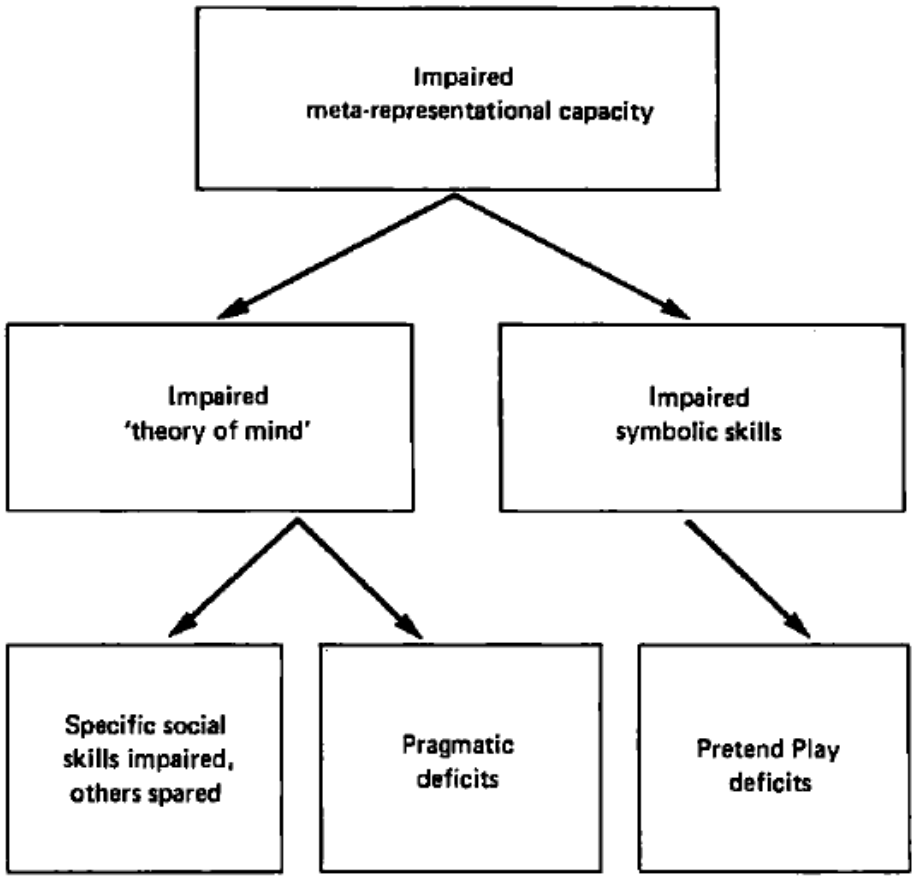

***Figure 5*:** The Representation of the Cognitive Theory.

This figure proposes that pragmatic skills are predicted to be impaired in the theory for the same reasons as certain social skills, that is, because of an inability to attribute mental states to others. Let us consider this claim in more detail. There are a number of reasons why, in order to communicate in a socially appropriate way, a speaker must be aware of the listener's mental state. These include the following : (a) The listener holds certain *beliefs* about what particular words refer to when the speaker uses them; (b) the listener is trying to *represent the* message in just the way the speaker intended it to be represented (Shatz, 1978); and (c) the listener and speaker share some *information* but do not share other information. This involves the speaker making what Bates (1976) calls "psychological presuppositions"; and finally (d) the listener holds certain *beliefs* about how the speaker will act, such as that the speaker will be informative, truthful, relevant, sincere, etc. (Grice, 1967/1975). This what is called the "Cooperative Principle"

of conversation, and he argued that violations of these maxims provide additional (meaningful) information. (Cited in, Baron-Cohen, ibid).

2.9 Pragmatic Development and its Governing Factors:

Children's pragmatic development is affected by a number of factors. Chief among these are cultural background, socio-economic status, age, gender differences, context and mean length of utterance (MLU). The variety and interaction of these factors show the complexity of the study of pragmatic development. The following is a brief review of some factors which proved to be of great influence on children's pragmatic development.

2.9.1 Cultural Differences:

Culture and language are closely related and an assumption was made that children are socialized into a specific culture via language with their parents, family members, and peers even before they enter school (Vygotsky, 1978). If a child comes to school influenced by a culture different from the culture of his peers and teachers in the school, he may face difficulty to socialize in the classroom (Heath, 1983). Also, the social language conventions of the child's culture can be different from the listeners' norms which might result in misunderstanding of intended communicated pragmatic utterances or behaviors. It might also result in developing negative attitudes towards the social language conventions that differ from the listener's norm (Tylor, 1973 as cited in Kasambira 2008, p. 17). These assumptions support the idea that culture has an effect on pragmatic skills.

2.9.2 Socio-economic Status (SES): Researchers posit that SES can influence the child's pragmatic language development. While observing families of different SES (public assistance and working-class), Hart & Risely (1995, as cited in Kasambira, 2008, p. 22) found out that pragmatic development was affected by SES differences and that child's talkativeness was positively correlated with SES. However, some other researchers have found that children from families with low and middle SES within a racial group did not exhibit differences in pragmatic skills and language acquisition.

2.9.3 Effects of Parents and Context: parents' overall style of interaction with their children may affect their children's communicative behavior. Becker (1994) claims that parents while interacting with their children, provide a variety of direct and indirect pragmatic input in response to their children's pragmatic behaviors which force the child to devise the correct pragmatic response by mainly using their cognitive skills. This asserts that the practice of pragmatic skills with increased parental cognitive input can facilitate a child's acquisition of more complex pragmatic skills. Also, Becker (1994) noted that individual differences across families are sometimes related to the number and length of interactions the parents provided.

Concerning context, Becker (1994) claims that the context in which parents interact with their children can have an influence on a child's pragmatic production in the same way that the school setting and interaction with peers and teachers may affect his language skills. Interactional context needs to be taken into consideration whenever conversational participants are to be studied. This indicates that different conversational contexts can be dynamic and constitute a variable affecting the pragmatic development and skills of the child extensively.

2.9.4 Age: It is agreed that, like other language acquisition domains, pragmatic development and the number of skills acquired increases with age. Investigations within the domain of pragmatic development have detected age effects on a child's pragmatic behavior. For example, Ryder & Leinon (2003) observed a developmental nature in question answering skills and that children's ability to provide complex contextual information for their answers increased with age. Also, Pellegrini, et al. (1987) assume that children would violate maxims less with increasing age. Another group of researchers investigated pragmatic language development in adolescents. The results show the development of language does not stop in late childhood as previously believed. It was noticed that pragmatic development in adolescence is more gradual than the rapid growth found in preschool ages (Nippold, 2000, as cited in, Kasambira, 2008, p. 4). Therefore, the study of developmental stages of pragmatic abilities cannot be ignored since major developmental shifts have been observed with specific communicative functions and strategies at certain ages (Haslet, 1983). Since the data exploring the effective role of age can be very useful to represent how pragmatic skills are gradually developed, the present study aims to investigate the age levels of preschoolers and first graders, from 3 to 12 years, concerning the development of a number of pragmatic skills in order to add more reliable empirical data to this domain.

2.9.5 Gender: Like age and culture, it was agreed that gender has an influence on the development of language as a whole. Many studies tried to investigate gender as a variable affecting pragmatic development. *Pointing*, as an early pre-linguistic pragmatic behaviour, is observed earlier in girls than in boys. Butterworth and Morissette (1996), also, investigated the early gesture behaviour and language development in a number of infants over time. They observed that girls acquired pointing skills earlier than boys and claimed there exists a potential difference in nonverbal pragmatic skills by gender. Haslett (1983), on the other hand, claims that although there is no significant difference in the types of communicative

skills demonstrated by gender, girls develop language strategies earlier than boys and they achieve a more advanced level of cognitive complexity in their pragmatic language strategies. However, Loukusa, et al. (2007) studied the pragmatic language comprehension development in children and found no gender differences in their pragmatic development. These different conclusions about the effective influence of gender in acquiring communicative competence led researchers to either control gender variables by balancing samples or having only one gender in the study. The present work will, therefore, try to further investigate the role played by gender differences in order to add some empirical data in support of or against the positive influence of gender on the pragmatic behaviour of the child.

2.9.6 Mean Length of Utterance (MLU): The morphological development is analyzed by computing the child's Mean Length of Utterances. Usually, a sample of 50 to 100 utterances is analyzed to draw conclusions about the child's overall production. Brown (1973, p. 54) claims that a child's MLU corresponds closely to his age. He states that by age five, the child is able to use most of the morphological variations of the English language. The order that these varieties are acquired indicates a pattern of cognitive, social and pragmatic growth. Language continues to develop into early adulthood to indicate more sophisticated usages and thus more pragmatic skills. Some researchers try to find out the link between the child's MLU and his pragmatic development. While some studies found a positive relationship between the child's MLU and his pragmatic development. While some studies found a positive relation between syntactic and pragmatic development (Dale, 1980; Carpenter & Strong, 1988), others resulted in the belief that these two aspects of language have different developmental pathways (Rollins, et al, as cited in, Ninio & Snow, 1999, p. 15).

Few studies focused on MLU as a variable indicating pragmatic development. This work, therefore, is to better investigate the effect of MLU on the development of pragmatic skills in children with autism spectrum disorders. In addition,

attending school as a factor will be added to test and compare the development of pragmatic as well as MLU between autistic children attending schools regularly and those who have no opportunity to attend schools.

2.10 Importance of Pragmatic Competence

In acquiring language, the mastery of grammatical competence is not enough for the child to get socialized within his group. Pragmatic competence comprises a crucial component of language which is necessary to maintain successful communication.

Naremore (1985) stated:

> Language users must not only know how to construct grammatical sentences, but also how to take a turn in a conversation, how and whether to request or command, and much more. The skills that make language users effective go far beyond their capacities to construct grammatical sentences.
>
> (P. 67)

Researchers in the domain of developmental pragmatics strongly support this idea. Ninio & Snow (1999, p. 20) add that conversational skills can play a major role in a child's success in social interaction with peers, and in achieving peer acceptance. Also, the acquisition of communicative competence helps second language learners access input in their target language, and in making a positive impression on teachers, monitors, and powerful adults. By an early age, children interact better with their caregivers and with more communicatively competent peers than with poor responsive peers. Taking communicative competence as an integral component of social interaction, any deficit in this area might clearly predict social and academic failure, particularly if the child is not responsive to his teacher or monitor which may cause class failure (Kasambira, 2008, p. 7). Therefore, in the academic setting, a child must be communicatively competent

in order to convey successfully their intentions, be understood and comprehend the communicated intents of his teacher (Halliday 1975).

Children, also, must be able to answer questions to prove their mastery of this pragmatic skill which is evaluated in exams when teachers assess student's knowledge. Teachers also observe and critique the manner in which the children apply the various communicative skills like asking questions, making an inference and using the appropriate conversational devices (Kasambira, 2008). To better help teachers and parents measure the communicative competence of a child, researchers should put more efforts into investigating how typically developing children acquire pragmatic skills.

2.11 Previous Studies about the Pragmatic Deficits in ASD's and other Disorders

Investigating pragmatic development is an interesting topic. From the 1940s, many studies appeared to deal with the topic. However, few studies appeared to deal with pragmatic impairment in the autistic population.

To start with, Carpenter & Strong (1988) investigated the pragmatic development in normal children. They try to find out what specific behaviours occur by age 3 and in what progression they develop. The aim of their study is to provide information concerning the development of specific pragmatic intents and devices for children functioning above the preverbal stage and lower than the preschool stage. They were selected from preschools in North Carolina, US. The assessment procedure consisted of naturalistic language sampling sessions followed by the administration of Creaghead's Testing Protocol (1984). The subjects consisted of 30 normal children divided into three groups according to age: G1(18-23 months), G2 (24-29 months) and G3 (30-35 months). They are also divided into 3 language groups according to their MLU. The results show that the expression of communicative intents and conversational devices are developmental in nature. Using the age or MLU as a variable, some behaviours

(request for action, taking turns, clarifying, requesting an object, closing and answering) occurred with 80%-100% frequency in all groups which mean they were developed prior to 18 months of age. On the other hand, three behaviours, hypothesizing, denial and giving reasons, did not occur for the majority of children. The overall results indicate that MLU and age are highly related to slight differences noted for individual communicative intents and devices.

In 1993, Eales conducted a study about the pragmatic impairments in young adults with a childhood diagnosis of autism or developmental receptive language disorder; aiming to explore the factors associated with these impairments. The subjects used in this study were two groups: G1) 15 males with a childhood diagnosis of autism; G2) 17 males with a childhood diagnosis of receptive language disorder (RLD), the mean ages in the two groups were 23.9 and 24.7 years. The group of autism was subdivided into those with severe impairment in overall language level, and those whose overall language level was comparable with the RLD subjects. This was done using the Autism Diagnostic Observation Schedule (ADOS; Lord et al., 1989) measure of "Overall Level of Non-echoed Language," Audiotaped conversational samples were transcribed and analyzed using methods based on those of Bishop and Adams (1989). Subjects with autism showed substantially greater pragmatic impairment not explicable by generalized impairment of verbal skills. This was mainly due to autistic subjects' greater difficulty in forming context-relevant communicative intentions; in contrast, pragmatic impairments arising from failures in translating intentions into spoken utterances (i.e., impairments at the level of execution) did not distinguish between the groups. In both diagnostic groups, impairment in forming appropriate communicative intentions was closely related to the more generalized impairment of reciprocal social behavior.

Another study by Didus et al., (1999), they tried to investigate the development of pragmatic communicative skills in head-injured (HI) children in comparison to their uninjured peers. The sample of this study consists of 30 head-injured

children, who were selected from the Royal Children's Hospital in Melbourne, Australia, and 19 normal children as a control group. They were all classified into a young age group, 8-9 years, and an old age group, 11-12 years. All subjects were required to complete two tasks, a negotiating request task and a hint task. In each task, children were presented with verbal descriptions of a range of familiar, everyday situations involving both adults and children, and asked what they would say in order to get what they want. All scenarios and instructions were presented verbally. These tasks were to assess verbal reasoning skills and abilities to be indirect. The results show that negotiation and hinting strategies were rapidly developing in normal children supporting the hypothesis that abilities to use pragmatic language skills increase with age. Higher levels of negotiating strategies and levels of hinting were exhibited by older children. As it was expected, HI children showed impaired performance on both tasks, which indicates the main effect for injury on cognitive and functional language tasks, reflected by lower performance levels in reasoning for the head-injured group.

Pragmatic development in young children with ASD was examined by Wallace (2001). Participants in this study were 30 children with ASD ranging in age from 3 to 9 years. Subjects were recruited through Ohio State University's Medical Center. To test the different pragmatic impairments that may exist, Wallace (2001) adapted the Gricean Pragmatic Test. This test requires a number of materials: two dolls named John and Tabitha, a computer with prerecorded answer sets for the dolls and speakers to ensure that the child could hear what was being said. Six questions and answer sets were presented to the child, with the experimenter shaking which every doll was speaking to ensure the child knew who was speaking. The child was required to choose one doll for each set. This study tries to evaluate how severe the pragmatic impairments were in the subjects with ASD, how their performance difference compared to their neurotypically developing counterparts, and if there were any underlying factors that contribute to pragmatic ability. It examines how factors such as age, diagnosis, memory,

language ability and theory of mind contribute to the pragmatic difficulties experienced by children with ASD. The results show that there was no significant difference in performance between the two diagnostic groups. The fact that children with ASD performed successfully on this task indicates that the majority of the children in this study had a less severe form of ASD. Concerning the affecting factors, language ability and working memory were found to play a role in overall Grice performance indicating that children with higher IQ's will perform better on the task.

Another study was conducted by Adams and Llyod (2005) to establish an appropriate pragmatic assessment for children with developmental pragmatic language disorders (PLI). They investigated children who have difficulty with the interpersonal use of language in social contexts. These children typically have poor turn-taking skills, difficulty staying on topic, semantic problems and difficulty in developing conversational skills in the presence of good expressive skills. In order to ascertain the degree of variability on pragmatic assessments such as conversational coding and elicitation tasks, 15 children having PLI (10 boys and 5 girls, mean age = 9,5 years) were included in the study. Diagnostic information was supplemented by data from completed Children's Communicative Checklist (CCC). An age-matched control group (mean age= 9,4 years) also took part in the study.

Both groups participated in the elicitation task. A subset of ten children from the PLI group with a mean age of 9,10 and 10 children from the control group with a mean age of 9,8 years took part in the conversation study. Assessment on elicitation and conversation tasks took place in a quiet room with only the child and tester present. The sessions were videotaped and a protocol was developed to score the recordings for the elicitation task. In order to permit an assessment of variation in pragmatic performance, each child was assessed on a second occasion, the period between testing ranged from 2-16 weeks.

To elicit the communicative functions, a scripted procedure for eliciting pragmatic beahviours was adapted based on the work of Creaghead(1984). This method involves setting up situations that tempt the child to exhibit typical communicative functions using a series of tasks and props. For example, in an attempt to elicit a "request for an object", a child was asked to get a pen from a locked box. A request for a key was, therefore, appropriate behaviour in that situation. For each type of pragmatic behaviour that was examined, the scoring was as follows: *Yes* if the behaviour was elicited; *No* if the behaviour was not elicited; and *Not Observable* if the behaviour could not be observed due to contextual factors (e.g., the child became uncooperative, or one of the prompts did not work properly).

Concerning the Conversation task, the data was gathered using black and white photographs as prompts to initiate particular topics. For example a visit by a doctor, a birthday party, a family day trip..... etc. The recordings were transcribed, and turns and utterances were identified and numbered. The results of this study reveal that using the speech act elicitation procedure was not sufficient to distinguish between the PLI and control groups on the number of communicative acts elicited. Both groups were performing at or close to the ceiling level for most of the items. Most children with PLI could produce the full range of elicited communicative functions with no difficulty. So, the elicitation task proved to be insensitive to identify the communicative limitations of children with PLI. However, the communicative functions within conversation analysis and the conversational indices analysis were able to show differences between groups.

In another study conducted in 2008, lewis et al report on the linguistic and pragmatic language skills of adults with a diagnosis of autism spectrum disorder (ASD). Seventeen adults with average intelligence (8 male; 9 female; mean age: 35 years; S.D.: 12 years;range: 18–67 years; M years of schooling: 12; range: 8–15) with a diagnosis of Asperger syndrome (AS), high functioning autism (HFA) and Autism spectrum disorders (ASD), were recruited through the Asperger

Syndrome Support Network of Queensland, Autism Queensland, and newspaper articles. The inclusion criteria for the study were: 1) English as a first language; 2) no neurological disease or trauma ; 3) no other co-morbid condition; 4) no history of drug and/or alcohol abuse; 5) and normal vision and hearing.

Performance by the ASD participants was compared to 13 peers (6 males; 7 females; M age: 35 years; S.D.: 13 years; range: 18–65 years; M years of schooling: 13; range: 11–15) with non-significant developmental histories recruited as control participants. Recruitment of control participants was through newspaper articles in local papers, and local sporting clubs in the south-east corner of Queensland. To be included in the control group, participants were required to have English as a first language, no history of neurological trauma or disease, no history of drug and/or alcohol abuse, and normal hearing and vision.

The language assessments administered were the Western Aphasia Battery (WAB) (Kertesz, 1982) and the Right Hemisphere Language Battery (RHLB) (Bryan, 1989) were chosen for the investigation of basic linguistic and pragmatic language skills. In addition to the Test of Nonverbal Intelligence-Second Edition (TONI-2) (Brown, Sherbenou, & Johnsen, 1990) that was administered to determine if differences in verbal results were due to nonverbal cognitive abilities rather than linguistic and/or pragmatic factors only.

The results reveal that, despite presenting with comparable nonverbal cognitive skills, the adults with ASD in this study experienced difficulties in a number of language areas relative to their peers. Additionally, an examination of performance differences within the ASD participants revealed the language skills associated with the disorder ranged from intact to severe difficulties. The current study also suggests that difficulties with complex language skills may not be the only restriction to language competence in adults with ASD. Basic linguistic skills, such as Auditory Verbal Comprehension skills and naming abilities, as assessed by the WAB (Kertesz, 1982), were compromised in the adults with the diagnosis involved in the study. Additionally, the ASD participants were less

competent than their peers on a range of pragmatic language skills, such as understanding inference, appreciating humour and producing emphatic stress.

Osman et al (2011) conducted a study to investigate the pragmatic difficulties in children with specific language impairment. The study examined the pragmatic profiles of 60 Cairo- Egyptian Arabic speaking children with age range 4–6 years old. All the children under study had a mean length of utterance equal to or greater than 5 words. They were all able to follow commands and free from any mental deficiency or hearing difficulties. The cases were divided into two groups; Group A and Group B. Group A included 30 children with normal language development whereas Group B included 30 children who had been previously diagnosed as having Specific Language Impairment.

Children under study were subjected to the Arabic Pragmatic Screening tool. For each child, the screening was scored by three readers. Average scores were then obtained, thereafter; the numerical results obtained were statistically analyzed, compared, and checked for validity and reliability. A comparison between groups was done using the Independent Sample Test (student t-test) for normally distributed

quantitative values and non-parametrical Mann–Whitney Test for qualitative variables that are not normally distributed. P values less than or equal to 0.05 were considered statistically significant. Reliability between the three readers for all the included Pragmatic Screening subtotal and total scores were then studied using the

intra-class correlation coefficient. ROC Curve (Receiver Operating Characteristic Curve) analysis was used to test the diagnostic abilities of the Pragmatic Screening Tool and expressed as areas under the curve and its P-value (significance) for total and subtotal scores. The cut-off level for each score was also determined. At each cut off level, sensitivity, specificity, positive predictive, negative predictive, and total accuracy values were calculated for all the subtotal and total scores under study.

Results revealed that All the values obtained by the control group were found to be significantly higher than those obtained by the SLI group except for some non-verbal paralinguistic skills where non-significant differences were found between the two groups. Through the ROC curve, cut off level for Total Pragmatic Score (TPS) was found to be less than or equal to 78.16, i.e. 4–6-year-old children with a TPS equal to or less than 78.16 were considered to have pragmatic difficulties. Thorough screening of pragmatic skills while evaluating the communication skills of children with specific Language Impairment should be seriously considered.

Reisinger, et al (2011) conducted a study to examine diagnostic differentiation between school-aged children with autism spectrum disorders (ASD) and children with pragmatic language impairment (PLI). The aims of the study were, first, to ascertain whether school-aged children with ASD and PLI have comparable levels of behaviors associated with the 'autism triad' when tested on standard behavior measures; second, to identify a profile of commonalities and differences between the two groups.

Forty-one children with communication impairments were recruited, aged 7–15 years, and had been residing in Quebec for at least 5 years. Twenty-two of the children (18 males, 4 females) either had a diagnosis of Autistic Disorder or PDD NOS, hereafter referred to as having an autism spectrum disorder (ASD group), and 19 children (17 males, 2 females) were identified with pragmatic language impairment (PLI group). The participants were drawn from public schools in the Montreal region, The Montreal Children's Hospital, a private psychology clinic, and one private school for children with special needs.

For the ASD group, participants were further assessed for ASD using both the Autism Diagnostic Observation Schedule (ADOS) and the Social Communication Questionnaire (SCQ), Lifetime form. For children referred to the PLI group, parents of participants were asked to complete the Children's Communication Checklist (CCC-2; Bishop 2003b) and the SCQ.

Upon examination of group differences on the autism and ASD cut-off scores from the ADOS and SCQ, it was revealed that as a group, children with PLI have less severe impairments related to the autism triad when compared to children with ASD. The ADOS and the SCQ were better at differentiating between ASD and PLI on two of the diagnostic sub-domains, Communication, and RSI. The ADOS had more discriminate validity when the higher cut-off score for ‘autism' was applied. When using the combined measures, it was possible to separate out PLI (those not scoring above the ASD threshold on any measure) and PLI with definite features of autism (PLI members scoring above the ASD threshold on only 1 behavior measure) from those in the ASD group (scoring above the ASD threshold on both measures), in 74% of the PLI cases. Four cases of PLI could not be differentiated from the ASD group (due to scores above the threshold on both measures), with 3 of these cases meeting criteria for ‘autism' on the ADOS (given considerable clinical importance). Therefore, it was concluded that it was not possible to differentiate between ASD and PLI using the behavior measures alone.

A study in 2011 was conducted by Ben-Yizhak, et al to compare the linguistic abilities (pragmatic language, school achievements, and underling reading processes) of school-age siblings of children with autism (SIBS-A) to those siblings of children with typical development.

The sample of SIBS-A was divided into those identified with BAP (SIBS-A-BAP) and those identified with TD (SIBS-A-TD) The SIBS-A group comprised 35 siblings (11 girls, 24 boys) between the ages of 9–12 years, having an older sibling with autism. The SIBS-TD group comprised 42 siblings (21 girls, 21 boys) between the ages of 9–12 years, having an older sibling with typical development. The participants took part in this longitudinal study on the development of SIBS-A and were previously seen at the ages of 4, 14, 24, 36, and 54 months, and at 7 years.

Autism Diagnostic Observation Schedule (ADOS; Lord et al. 2002), semi-structured, a standardized observational assessment designed to assess behaviors

related to autism or ASD, based on the DSM-IV (American Psychiatric Association 1994) and the ICD-10 (World Health Organization 1992) criteria for ASD. Social and Communication Questionnaire (SCQ; Rutter et al. 2003) was also used for siblings' assignment into diagnostic outcome categories. Additionally, Wide Range Achievement Tests (WRAT-II I; Jastak and Wilkinson 1993) was used to investigate acquired school-related abilities. Other measures were also used in this study, notably, the Diagnostic Battery for Reading Processes in Hebrew (NITZAN ; Shalem and Lachman 1998) which is a standardized diagnostic assessment designed to assess reading-related learning disabilities in the Hebrew language and the Wechsler Intelligence Scale for Children (WISC-III ; Wechsler 1991) that was designed to assess intellectual abilities of children between the ages of 6–16 years. Finally, Clinical Evaluation of Language Fundamentals: 3rd Edition (CELF-III; Semel et al. 1995) was designed to assess a wide range of language abilities of individuals between the ages of 6 and 21 years.

The findings of this research reveal that SIBS-A-BAP showed poorer performance only on a measure of pragmatic language compared to SIBS-A-TD and SIBS-TD-TD, whereas no significant findings emerged for general linguistic measures as well as for school achievement and reading processes measures. Findings suggest also that lowered pragmatic abilities, which constitute a universal impairment in ASD, comprise the BAP in school-age SIBSA, whereas cognitive abilities, receptive and expressive language abilities, and other school-related abilities, as examined in the current study are intact. Furthermore, the performance of SIBS-A-TD indicates that this group is indeed developing typically, at least as measured in this study.

Lam and Yeung (2012), attempted to depict a relatively comprehensive profile of language pragmatics in children with high-functioning autism (HFA) using the Pragmatic Rating Scale (PRS).

Thirty-one children with HFA were recruited from a special school and two Parent Resource Centers serving families with autistic children. Thirty-four normal children in the control group were volunteers recruited from different schools. Children with HFA included in this study received their diagnoses of autism from either clinical psychologists in child assessment centers or pediatric psychiatrists. Caregivers of prospective participants were interviewed before infant testing using a translated Chinese-version of the complete Autistic Diagnostic Interview-Revised (ADI-R) (Lord, Rutter, & Le Couteur, 1994).

Pragmatic Rating Scale (PRS) was employed to tap the language characteristics of children with HFA. A video-camera was set up to record the whole test session for each participant. During the screening interview, all prospective participants completed the verbal subtests of the Wechsler Intelligence Scale for Children-Revised (adapted Hong Kong version) (Wechsler, 1981; The Psychological Corporation) as a measure of verbal intelligence. The Raven's Progressive Matrices (Raven, Court, & Raven, 1976) were administered to measure their non-verbal intelligence and any child with an IQ less than 80 was excluded. T-tests for independent samples were performed to compare the group differences in chronological age, verbal competence, and non-verbal intelligence.

The results were as the experimenters predicted, the group with autism demonstrated substantial pragmatic difficulty when compared to their normal counterparts matched stringently on both verbal and non-verbal intelligence. The findings were discussed with relevance to lacking a ‘‘theory of mind’’, weak central coherence and executive dysfunction.

In 2014, Paelt et al conducted a study about social-communicative abilities and language in preschoolers with autism spectrum disorders. The aim of the study was to look at the unique contributions of imitation, pretend play and joint attention to differences in receptive and expressive language.

92 children, recruited from 16 treatment centers, participated in this study; the Autism Diagnostic Observation Schedule (ADOS; Lord, Rutter, DiLavore, &

Risi, 1999) was used to confirm diagnoses. The sample was divided into two subsamples based on either the receptive or expressive language age for each of the analyses.

Four measures were used in this project, they are cited as follows: 1) Preschool Imitation and Praxis Scale (PIPS; Vanvuchelen, Roeyers, & De Weerdt, 2011a) was used to measure motor imitation. 2) Test of Pretend Play (ToPP; Lewis & Boucher, 1997) was used to asses three main types of pretend play: object substitution, property attribution and reference to an absent object. 3) Early Social Communication Scales (ESCS; Mundy et al., 2003) was used to measure initiation of joint attention (IJA), initiating behaviour request (IBR) and response to joint attention (RJA). 4) Reynell Developmental Language Scales-Dutch version (RTOS; Schaerlaekens, Zink, & Van Ommeslaeghe, 2003) was used to assess expressive and receptive language.

The results revealed that imitation, pretend play, response to joint attention and imperative and declarative joint attention, were all uniquely associated with language. However, these relationships were different for receptive and expressive language and they also differed depending on the language age of the children. While imitation and pretend play showed unique associations with language in children with a language age under 2 years old and children with a language age above 2 years old, joint attention abilities were only uniquely associated with language in children with the youngest language age. These findings lend support to the idea that social-communicative abilities are important intervention targets for children with ASD.

In a study conducted in 2015, White and Nelson examine pragmatic and nonliteral language development in 69 typically developing (TD) children and 27 children with ASD, ages 5–12 years.

The trajectory analysis methods of Thomas, et al (2009) was used to examine how age, vocabulary, syntax, and theory of mind predict performance on the pragmatic language and nonliteral language subtests of the Comprehensive

Assessment of Spoken Language (CASL; Carrow-Woolfolk, 1999) for children with ASD and TD.

For both groups, performance on pragmatic language and nonliteral language scores on the Comprehensive Assessment of Spoken Language increased significantly with chronological age, vocabulary, syntax, and theory of mind abilities both for children with ASD and TD children. Based on a cross-sectional trajectory analysis, the children with ASD showed slower rates of development with chronological age relative to TD children for both the pragmatic language and nonliteral language subtests. However, the groups did not show significant differences in the rate of development for either pragmatic language or nonliteral language abilities with regard to their vocabulary abilities or TOM abilities. It appears that children with ASD may reach levels of pragmatic language that are in line with their current levels of basic language abilities. Both basic language abilities and theory of mind abilities may aid in the development of pragmatic language and nonliteral language abilities.

Differently, from the reviewed literature, this study is to investigate the development of pragmatic communicative skills including speech acts, topic, turn-taking, lexical selection, stylistic variation, intelligibility, and prosodics, and kinesics and proxemics in autistic children

2.13 Conclusion

Pragmatic is a systemic way of explaining language use in context. It seeks to explain aspects of meaning which cannot be found in the plain sense of words or structure. In this chapter, an overview of pragmatic was presented including definitions, the domains, the perspectives, different measures and pragmatic problems in the autistic population as well as other disorders.

In the next chapter, the pragmatic development of autistic children older than 5 years old will be measured through the Pragmatic Protocol (Prutting and Kirshner, 1987), in relation to the variables of age, gender, MLU, and level of education. Moreover, the reliability of speech generative devices as a method of developing pragmatic skills in the autistic population will be tested in non-schooled ASDs. A combination of assessment tools: spontaneous language sampling and an elicitation procedure will be employed as a methodology.

Chapter Three

Chapter Three: Research Design and Methodology

Chapter Three
Research Design and Methodology

3.1 Introduction

The current chapter attempts to describe the methodology followed by the researcher focusing on research design, approaches, the participants, data collection and data analysis procedures. It also states the rationale behind using the case study.

Undoubtedly, the effectiveness of the right methodology depends first and foremost on the objectives of the present study. Therefore, it is fundamental to select properly the different tools through which linguistic data are collected. Besides, we should determine the right sample population achieving representativeness and effectiveness. To achieve the best possible understanding of the population under investigation, it is necessary to employ both quantitative and qualitative investigations.

As there are various methods of data gathering, to get reliable data and to analyse them as objectively as possible, a combination of language sampling and an elicitation assessment strategy, recording of spontaneous conversations and note taking are the main tools used to obtain data within children with an autism spectrum disorder.

3.2. The Research Design

In any research work, the research design is considered as an important step; that aims at obtaining data in order to answer the research questions. Correspondingly, it is the overall approach to the study in hand. It refers to the philosophy or the methodology undertaken by the researcher; involving all issues which must be investigated such as constraints and choices within the research.

Thus, the researcher usually goes through a general plan of data collection and procedures used in data analysis. In this respect, Mc Millan & Schumacher(1993, p. 31) define it as: "…the procedures for conducting the study, including when .from whom and under what conditions data were obtained. Its purpose is to provide the most valid, accurate answers as possible to research questions". Mouton (2001, p. 133) in his turn argues: "To satisfy the information needs of any study or research project, an appropriate methodology has to be selected and suitable tools for data collection and analysis have to be chosen". Moreover, Parahoo (1997:142) defines research design as "a plan that describes how, when and where data are to be collected and analyzed". The definitions affirm the fact that any research design is closely associated with the research questions of the study.

Study design depends greatly on the nature of the research question. In other words, knowing what kind of information the study should collect is the first step in determining how the study will be carried out. This research was conducted under the umbrella of the case study research design.

3.2.1 Case Study

The reason for choosing this type of research is that it focuses on understanding the phenomenon -the development of pragmatic communicative skills in verbal children with autism- within its natural settings and objectives.

In this respect, Yin (1994) asserts that the case study is determined by the ‘how' and ‘why' research questions. He (1984, p. 23) unveils that a case study is **“**an empirical inquiry that investigates a contemporary phenomenon within real-situation context, in which multiple sources of evidence are used”. Moreover, Anderson (1986, p. 157) explains that a case study is “concerned with how and why things happen, allowing the investigation of contextual realities and the differences between what was planned and what actually occurred”. According to

Harling (2002), defining the case study requires explaining some particular terms which are:

- **The Phenomenon** can be many different things: a program, an event, an activity, a problem or an individual(s).
- **The Natural Setting** is the context within which this phenomenon appears. Context is included because contextual conditions are considered highly pertinent to the phenomenon being studied either because many factors in the setting impinge on the phenomenon or because the separation between the phenomenon and the context is not clearly evident. The phenomenon and setting are bound systems; that is, there are limits on what is considered relevant or workable. The boundaries are set in terms of time, place, events, and processes.
- **Holistic Inquiry** involves the collection of in-depth and detailed data that are rich in content and involve multiple sources of information including direct observation, participant observations, interviews, audio-visual material, documents, reports, and physical artifacts. The multiple sources of information provide a wide array of information needed to provide an in-depth picture.

The case study model is considered subjective, descriptive, and analytical. It allows the investigators to use different research methods and approaches and helps them assess and test the approaches, methods, and theories in different fields. Furthermore, the case study usually refers to an equitable rigorous investigation of a single unit such as a person, a group of people, or a company. It can enable the investigator to search, understand, and analyse problems, phenomena, or academic issues. The case-study method is based on the following steps:

- Spotting the research problem.
- Setting the research objectives.

- Designing research approaches and instruments.
- Collecting Data.
- Analyzing data.
- Reporting the results.

Accordingly, the case study is an experimental method that investigates and examines contemporary phenomena within their real-life contexts (Yin, 1984). It is a concentrated examination which provides detailed accounts, facts, and information about a given research topic.

3.2.1.1 Types of Case Studies

Stake (1995) classified cases into three categories: (1) *intrinsic,* (2) *instrumental,* and (3) *collective*. The difference between these three types of case study is depending on the methodology, the hypothesis, the research question, and the research design.

- **An Intrinsic Case Study:** The objective of this study is to learn about a unique phenomenon that the study focuses on. It involves the exploration of one particular case for its own sake, where there is no expectation that results have implications for other case studies.
- **An Instrumental Case Study:** It is the study of a case such as a person, specific group, occupation, department, organization. Its objective is to provide a general understanding of a phenomenon using a particular case. In this case, there is likely to be a question or a set of predetermined criteria or a theory that is being explored and tested through the case study.
- **A Collective Case Study:** It involves the exploration of multiple instrumental case studies. It is done to provide a general understanding using a number of such case studies that either occurs on the same site or come from multiple sites.

It is worthy to mention that the case study is not itself a research method, but the researcher should select methods of data collection and analysis that will generate material suitable for case studies.

Examining the development of pragmatic communicative skills in verbal children with autism spectrum disorder is a case study where the researcher tried to explain how Algerian verbal autistic children develop their pragmatic communicative devices. This study is classified under the instrumental case study since it involves the examination of a specific group, i.e. Algerian verbal children with autism syndrome, and it provides a general understanding of autism phenomenon in relation to the pragmatic of language. The methodology in this research took about one year of time, it was based on the observation that has been repeated once again after eight months from the first time the researcher started the first observation. In this case, this research is also classified under the longitudinal case study also.

3.2.2 Longitudinal Research:

A longitudinal study is an observational research method in which data is gathered for the same subjects or the same cohort repeatedly over an extended period of time. This study employs continuous measures to follow particular individuals over prolonged periods of time often years or decades. Cherry (2012, p. 02) defined longitudinal study, she wrote:

> Longitudinal research is a type of correlational research that involves looking at variables over an extended period of time. This type of study can take place over a period of weeks, months, or even years. In some cases, longitudinal studies can last several decades.

Cook and Ware (1983, p. 01) in their turn, defined a longitudinal study: "We define a longitudinal study as one in which each individual is observed on more than one occasion".

Longitudinal studies are based on observation, data is first collected at the outset of the study, and may then be repeatedly gathered throughout the length of the study. In this respect, Cook and Ware (1983) put two different longitudinal designs by which studies are applied, they are:

- To increase the precision of treatment contrasts by eliminating interindividual variation: This is achieved by observing each subject under the several exposure conditions to be compared. Such designs are called repeated measures designs and include the cross-over design as a special case. Repeated measures designs use each subject as his or, her own control.
- To examine the individual's changing response over time: Longitudinal designs have a natural appeal for the study of changes associated with development or aging. They have value for describing both temporal changes and their dependence on individual characteristics.

(p. 01)

A longitudinal study is also correlational in nature, i.e. it tries to discover the relationships between variables where the correlations can be strong or weak, as well as positive or negative, or there might be no correlation at all between the variables of interest.

According to researchers, this type of research is very useful since it allows the researchers to look at changes over time, they can observe at how certain things may change at different points in life and explore some of the reasons why these developmental shifts take place. Deschenes (1990) argued:

> …Longitudinal research is useful in testing theory because it allows the examination of causal hypotheses. For example, the

> researcher can examine the relationship between school failure and delinquency rates and determine if those who fail are more likely to be delinquent than those who succeed in school. Longitudinal research is also useful in describing the progression of life events, such as the effect of marriage or becoming unemployed on offending. Does unemployment lead to an increase in criminal behavior? Is there a greater likelihood of desisting from crime after one is married? These questions are just two of the many that are best answered with a longitudinal design.
>
> (p. 152)

In this way, longitudinal studies provide unique insight that might not be possible to be achieved with cross-sectional studies. Like any research method, this study has many major goals which are:

- to quantify trends in human behavior;
- to describe the progression of life events;
- to identify patterns of behavioral change;
- to test theory;
- to justify interventions to prevent human and societal ills.

Deschenes (1990, p. 152)

3.2.2.1 Types of Longitudinal Studies

According to Deschenes (1990), there are four major types of longitudinal designs, the difference between these types is depending on the group that is sampled, the length of time under study, and the number of measurements obtained:

- **Trend Study:** They are employed to examine the changes over time among samples that are representative of a general population.
- **Panel Study:** It involves sampling a cross-section of individuals.
- **Cohort Study:** It involves selecting a group based on a specific event such as birth, geographic location or historical experience, such as a " "birth" cohort (all those born in a given year), a "school entry" cohort or “autistic cohort” as appeared in this study. The same population is studied each time data is collected, even though the sample may differ from one time to the next.
- **The Time-Series Study:** It involves a series of measurements at periodic intervals, usually to measure the impact of a specific change that occurs at some point during those measurements.

(Deschenes, 1990, p.154)

Choosing between these types of longitudinal studies involves making the decision about the sample of the population to be studied, the period of time needed to accomplish the study, and the number of measurement should be used to gain reliable results. Since our study is based on examining the pragmatic skills of autistic children in Algeria, this development is investigated for more than eight months where autistic children participated in this study are reassessed two times during this period. In this respect, this research is considered as a longitudinal study.

3.2.3 Research Method

The researcher conducted her study by combining both quantitative and qualitative approaches. More precisely, the current study has been built on the basis of a mixed-methods design since employing solely one method seems to produce weaknesses. This is why, it is necessary to mix methods in order to get multiple standpoints and, therefore, valid and objective data. Indeed, the use of a mixed research approach has been praised and recommended by many researchers because it provides ground for searching, analyzing, and comparing subjects in a statistical way, Patton (2002). Robert and Weir (1994) state the importance of triangulation as follows:

> A combination of data sources is likely to be necessary for most evaluations because often no one source can describe adequately such a diversity of features as is found in educational settings and because of the need for corroboration of findings by using data from these different sources collected by different methods and by different people (i.e. „triangulation"). It is now widely held that multiple methods should be used in all investigations.
>
> (p.137)

Creswell (2014, p. 32) also demonstrates that,

> Mixed methods research is an approach to an inquiry involving collecting both quantitative and qualitative data, integrating the two forms of data, and using distinct designs that may involve philosophical assumptions and theoretical frameworks. The

> core assumption of this form of inquiry is that the combination of qualitative and quantitative approaches provides a more complete understanding of a research problem than either approach alone.

That is to say that the use of mixed methods in conducting research is important for the accuracy, validity, and reliability of the results. Indeed, using multiple methods is necessary for gathering evidence and evaluating the findings because no one source can perfectly provide adequate data about a certain phenomenon or subject.

The quantitative method is supported and favored by the fundamental sciences and is based on the construction of hypotheses that can be tested and confirmed by collecting, evaluating, and analyzing data in an empirical style. It is useful in finding facts and addressing the “what”, “when”, and “where”. It is “an approach for testing objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analyzed using statistical procedures” Creswell (2014, p. 33).

Furthermore, Dörnyei (2001, p. 192) points out that,

> [Quantitative research] employs categories, viewpoints, and models as precisely defined by the researcher in advance as possible, and numerical or directly quantifiable data are collected to determine the relationship between these categories, to test research hypotheses and to enhance the aggregation of knowledge.

Quantitative research methods aim to analyze the development of pragmatic communicative skills in children with autism through 30 pragmatic parameters divided into three groups; verbal acts, paralinguistic aspects and non-verbal aspects. The scores are summarized in tables and presented by means of graphs and figures. The findings can be analytical, descriptive, and confirming as well.

As for the qualitative research method, it is sustained by the human sciences and is based on enquiring, exploring, and discovering. According to McDonough and McDonough (1997, p. 53): "Qualitative research usually gathers observations, interviews, field data records, questionnaires, transcripts, and so on". Indeed, it entails various research instruments that help the researcher to gather reliable data that give the reason for the findings. Burns & Grove (2003, p. 19), in their part, announce that a qualitative approach is “a systematic subjective approach used to describe life experiences and situations to give them meaning”. Accordingly, the qualitative approach is used to explore people's behaviours, perspectives, experiences, and feelings as well as to understand thoroughly these elements. Yet, complete objectivity is impossible and this approach is not fully precise because human beings do not always act logically or predictably, Holloway & Wheeler (2002).

The use of a qualitative approach in this research approximately expected to explore the reasons behind the differences between autistic children in terms of their pragmatic developments. To that end, both quantitative and qualitative data are used as two complementary elements by the researcher and given equal priority.

3.2.4 Research Tools

After choosing the topic, planning the research and organizing its steps, the researcher should decide which tool is appropriate to collect data for his study.

Yet, the basic instruments of gathering data are observation, checklists, recordings questionnaires and interviews. The selection of any tool instead of the other depends on the type of research that the researcher tends to use in addition to which kind of information he needs, availability of sources, and time constraint. Thus, the selected instruments guide the researcher and help him to measure the result, interpret them and test the hypotheses. However, it is important to consider that tools are variable in terms of their complexity, interpretation, design, and administration. This can be regarded as a sound reason for which the investigator should select carefully the ones which really suit his purpose and serve his requirements. In what concerns our research, A combination of natural language sampling and an elicitation assessment strategy (checklist) -the pragmatic protocol developed by Prutting and Kirchner (1987)-, video recordings, participant observation, and speech generative device are used. The two initial instruments were largely intended to collect qualitative data, whereas, the third and the fourth research tools built both quantitative and qualitative data. They are matched by employing the quantitative results to shape the qualitative research questions to help achieve careful understanding. The results of the phases will be interpreted together in the interpretation phase. The research instruments adopted for collecting data are presented in the next sections.

3.2.4.1 Assessment of Language Pragmatics

Language assessment is based on a detailed description of the child's communication skills using appropriate formal instruments and informal checklists or observations, this description is then compared to the sequence and profile of the development of the typical child. The assessment of pragmatics is quite distinct from typical language assessment methods, studies of pragmatic development have centered on the emergence of early communicative intents or primitive speech acts as easily identifiable communicative behaviours, Dore (1974) and Halliday (1975). Within recent years, several measures of pragmatics

have been developed as guidelines for clinical observations, according to Adams (2002, p. 976), these measures can be divided into four categories:

- published tests of language pragmatics;
- published checklists or profiles;
- coding systems of naturalistic assessment of interaction;
- assessment of the comprehension of language pragmatics.

3.2.4.1.1 Published Tests of Language Pragmatics

Published tests of language pragmatics are not tests purely of pragmatics, they are standardized tests that have pragmatic elements and they contain subtests devoted to inferential comprehension and interpretation of non-literal language, (Adams, 2002, p. 977). these tests are summarized in the following table:

Table 3.

Formal Tests with Pragmatic Content, (Adams, 2002).

Name of test	**Authors/date**	**Age**	**Methodology**	**Aspects of pragmatics targeted**
Assessment of Comprehension and Expression (ACE 6–11)	Adams et al., 2001 Wx	6–11	Picture supported subtests Story plus pictures	Non-literal comprehension Inferential comprehension Narrative
The Listening Skills Test (LIST) The Listening Skills Test (LIST)	Lloyd et al., 2001	3;6–6;11	Pictorial and spoken tasks	Detecting ambiguity Message appraisal Comprehension of directions Verbal message evaluation
Test of Language Competence – Expanded (TLC)	Wiig & Secord, 1989	5–18	Interpretation of spoken utterances and inferences	Understanding ambiguity Making inferences Understanding metaphors
Test of Pragmatic Language (TOPL)	Phelps-Terasaki &	5–13	Social context is established for	Physical setting Audience

	Phelps-Gunn, 1992		each of 44 items, plus picture	Topic Speech acts
Understanding Ambiguity	Rinaldi, 1996	8–13	Identification of pictures and taped messages and facial expression picture	Multiple meanings in the context Inconsistent messages of Emotion

3.2.4.1.2 Published Checklists or Profiles

Profile and Checklists of pragmatic behaviours are more comprehensive and popular with practitioners than tests, the problem with these measurements is the lack of normative data. Commonly used pragmatic checklists are described in this table:

Table 4.

Commonly Used Pragmatic Checklists and Related Assessments, (Adams, 2002)

Name	**Authors**	**Coverage**	**Purpose/method**
Assessment of Language Impaired Children's Conversations (ALICC)	Bishop & Adams, 1989 Bishop et al., 2000	Exchange structure, Repairs, Multipart turns, Meshing	Coding aspects of conversational behaviour into categories; can be quantitative
Children's Communication Checklist	Bishop, 1998	Pragmatic rating scale	Presence of pragmatics language Impairment
Directing Discourse Checklist of Linguistic Processes	Blank & Marquis, 1992	Probing questions and instructions	Information about the ability to formulate explanations etc
Pragmatics Profile of Communication Skills in Children	Dewart & Summers, 1997	Communicative intent	Questionnaire delivered to parents/ carers by a practitioner; requires interpretation
Pragmatic Protocol	Prutting & Kirchner, 1987	Verbal, non-verbal and paralinguistic aspects	Rating of 30 items on a 3-point scale
Social Interactive Coding System	Rice, Sell, & Hadley, 1990	Coding of responses, initiations and ignoring speech acts	Observation of videoed interaction

Social Use of Language Program	Rinaldi, 2001	Rating chart of pragmatic features	Use of communication in social contexts

3.2.4.1.3 Coding Systems of Naturalistic Assessment of Interaction

Naturalistic assessment is based on coding the behaviours of human being and it is mostly used in socio-psychological works. This measure can provide researchers with rich observational data, it is summarized in the following table.

Coding Systems for Naturalistic Assessment of Interaction

Types of Coding System	Function	Methodology
Communicative intent: the purpose or the expected effect of the communicative act	Taxonomies of communicative intent have been used in research studies and are undoubtedly one of the most frequently used types of coding system for use with pre-school children.	Assessment of communicative intent in the early years is based on detailed observational longitudinal research studies representing a synthesis of developmental work by: Bates, Begnini, Bretherton, Camaioni, and Volterra (1979), Coggins and Carpenter (1981), Dore (1979) and Halliday (1975).
Speech acts: the act which is done or performed by speaking.	Speech act analysis has been employed in the assessment of language pragmatics with older children in order to profile the child's use of communicative functions in terms of variety and to indicate how the acts are used in specific contexts. Speech acts which are typically targeted in assessment are: *request, command, question (or requesting information), challenge, denial, negation, statements, and greetings*.	Fey (1986) describes a system of coding in which speech acts are subdivided into requestives (request for information, request for action, request for clarification), assertive acts (comments, statements, disagreements) and performatives (teasing, exclamations). This system has the advantage of being able to characterise the child as, for instance, an assertive, or a non-responsive communicator.
Responsiveness and initiation : exchange structure	Initiations and responses have been used in studies to assess the talkativeness and responsiveness of children with communication impairments	As an index of conversational dominance, these assessments enable the practitioner not only to investigate problematic strategies or behaviours such as non-responding but also to identify problems of responsiveness across verbal and non-verbal domains

Repairs: a set of behaviours which attempt to mend exchanges where information has been inadequate, the message poorly planned or misunderstood because of external factors such as noise.	children with specific language impairments tended to leave problematic utterances unrepaired as compared to language- and age-matched peers. These behaviours should be assessed in naturalistic contexts	Observation and coding of repairs provides an important measure of how problematic the interaction is on both sides. A system for coding breakdowns in conversations (Breakdown Coding System) with young children, described by Yont, Howard, and Miccio (2000) holds considerable potential for a focused practical assessment of repair strategies.
Turn Taking: a skilled behaviour dependent on the recognition and synthesis by participants of a series of cues (prosodic, linguistic, non-verbal and visual) which indicate a speaker's intention to finish talking.	Children with receptive language problems appear to be at more risk for turn-taking clashes than children with pure expressive language problems. These problems may be dependent on monitoring comprehension in the interaction too.	The assessment of turn-taking is therefore likely to be redundant except in planning and monitoring intervention for individuals with significant problems in this area.
Cohesion: a number of linguistic devices which set up links between different utterances in an interchange	The use of cohesive devices sets up a series of inferences to be made by the interlocutor and reduces redundancy in communication. In order to interpret or use cohesive devices shared and mutual knowledge must exist between the interlocutors, implying a strong cognitive dimension to cohesion.	There are no published assessments of cohesion .Studies have established simple assessment systems such as : 1- referent recoverable from linguistic context (anaphora= referring back or cataphora = referring ahead); 2- referent recoverable from the situation (exophoric reference); 3- ambiguous or unrecoverable referent (Adams & Bishop, 1989).
Topic: 'a clause or noun phrase that identifies the question of immediate	Topic analysis considers whether each utterance 1-contains information;	The best reference for assessing topic is the work of

concern and that provides a global description of the content of a sequence or utterance', Mentis & Prutting, (1991) quoted in Adams (2002:978)	2-is pertinent to the overall topic; 3-maintains or introduces a new subtopic; 4-contains no new information; 5- is a side sequence (not contributing to topic maintenance but not a different topic); 6- is problematic (ambiguous, incomplete or unrelated information).	Brinton and Fujiki (1989) which provides a checklist of topic management and a consideration of the development and variability of topic. The usual manner of assessment is via a series of categories included in a checklist, such as topic introduction, topic continuation, topic shift, topic chain (where topics are linked together), topic recycling (where previous topics are reused) and topic reintroduction.
Coherence: refers to the way in which a theme is built into discourse or interaction.	In studies, judgements of whether events are retold logically with adequate reference for the interlocutor to follow the 'thread' are usually made. Irrelevance, topic drifting, lack of elaboration and omission of events in sequences are noted	The assessment of coherence has the potential to address pragmatic problems in the older verbal child

3.2.4.2 Assessment of the Comprehension of Language Pragmatics

The comprehension of the language requires how the child is understanding the context of the language. Especially when the language is constrained by limitations of language comprehension or limitations of social cognition (Leinonen & Letts 1987; Weismer, 1985, as cited in, Adams, 2002). In this respect, reference; inference and non-literal language as aspects of language pragmatics, are assessed with different measures. Details are given in the following table:

Table 5.

Related Measures of the Comprehension of Pragmatics, (Adams, 2002).

Pragmatic Aspect	Function	Measure	Author	Method

Reference (the adequacy of referential communication between the speaker and the listener)	The child is asked to communicate instructions or descriptions to a person who cannot see the referent.	The Listening Skills Test The Test of Language Competence	(Lloyd, Peers, & Foster, 2001), Wiig & Secord, 1989	Incorporates message appraisal and detection of ambiguity, in an attractive child-friendly format, and provides (UK) norms. Taps understanding of ambiguous sentences also.
Inferences: verbal Inferences	to 'fill in' information that is not explicitly provided in order to enable comprehension of the overarching organisation of the text or discourse.	Test of Language Competence The Inferential Comprehension subtest of the ACE 6–11 test The Test of Problem Solving	Wiig & Secord, (1989) Adams et al., (2001) Bowers, Huisingh, Barret, Orman, & LoGuidice, (1994).	using story or picture contexts followed by questioning to tap what has been inferred
non-literal comprehension: the interpretation of opaque meanings or idiomatic language	focused on the interpretation of 'classic' idioms which must be disambiguated by context and/or shared knowledge. such as 'It's raining cats and dogs' and 'He broke the ice' (Vance & Wells, 1994).	Understanding Ambiguity The Understanding Metaphoric Expressions subtest of the Test of Language Competence The Non-literal Comprehension subtest of ACE (6–11)	Rinaldi, (1996) Wiig & Secord, (1989) Adams et al., (2001)	the child is required to choose an interpretation of a sentence containing a figurative use of a phrasal verb, such as 'went off' (as in 'The phone went off in her bag').

3.2.4.3 Choosing an Assessment Method

Selecting an appropriate method for assessment is a complex process, as far as pragmatic is concerned, Roth and Spekman (1984), made proposals about sample types, the degree of formality to be used, the type of interaction or tasks and the importance of analysis. According to them, working with pre-school children requires observation of a play section; preferably using a checklist of communicative intents and noting all the pragmatic functions. However, with older children, written assessment tools are rare accordingly, the researcher should focus on tasks that allow him contrasting formal and informal contexts. Since our study is concerned with disordered verbal children, the researcher found that the best tool to assess pragmatic language in this category is The Pragmatic Protocol developed by Prutting & Kirchner (1987).

3.2.4.4 The Pragmatic Protocol by Prutting & Kirchner (1987)

This assessment strategy was developed by Prutting and Kirchner in 1987 to be used as an index to children, adolescents, and adults in assessing the pragmatic language. It is a descriptive taxonomy of 30 pragmatic parameters rated according to whether they are used ‘appropriately' or ‘inappropriately' or ‘not observed' and is of use with a wide range of pediatric clients. In this respect, Prutting and Kirchner (1987, p. 106) argued:

> The pragmatic protocol, developed by Prutting (1982), was designed to provide an overall communicative index for school-age children, adolescents, and adults. The protocol consists of 30 pragmatic aspects of language. These parameters were extrapolated from the developmental child language literature as well as the adult literature. It was particularly important for

us to design a tool that would represent a range of diverse aspects discussed in the literature.

The Pragmatic Protocol includes observation of three interacting communication modalities:

- **Verbal behaviors** (speech act pair analysis; variety of speech acts; topic selection; topic introduction; topic maintenance topic change; turn-taking initiation; response; repair / revision; pause time; interruption/ overlap; feedback to speakers; adjacency; contingency; quantity/ conciseness; specificity / accuracy; cohesion; the varying of communicative styles);
- **Paralinguistic behaviors** (intelligibility; vocal intensity; vocal quality; prosody; fluency);
- **Nonverbal behaviors** (physical proximity; physical contacts; body posture; foot/leg and hand/arm movements; gestures; facial expression; eye gaze); (see Appendix 6).

According to Prutting and Kirchner (1987), these aspects of pragmatics are to be observed in a natural setting, with scoring focused on the success of the communicative interaction between the speaker and the listener rather than on the conventional linguistic expression of the message.

The protocol proposed the use of a speech act theory as a means of organizing pragmatic parameters and offered the following breakdown: utterance acts, propositional acts, illocutionary and perlocutionary acts. In this respect, Prutting and Kirchner (1987) argued:

> In fact, we originally classified the pragmatic parameters according to a speech act model (Austin, 1962; Searle, 1969). In other words, each parameter was classified as belonging to the utterance act, propositional act, or illocutionary/ perlocutionary act.
>
> (p. 106)

In addition to inclusiveness or broadness of scope, the following properties were taken into consideration in constructing the protocol:

- **Homogeneity:** all parameters represent a logical relationship to communicative competence and to each other;
- **Mutually Exclusiveness:** all items refer to one unique dimension of communicative competence and can be classified into only one category;
- **Usefulness:** each parameter serves a function in relation to the purpose of the study.

The Pragmatic Protocol was developed to observe systematically how communication breaks down in different clinical populations. It has been applied in a comparative study of pragmatic impairment in four clinical populations: children with articulation disorders, children with language disorders, aphasic adults and adults with right hemisphere lesions, normal children and adults were also included in the study. Reliability for all groups acceded 90%: with those children diagnosed by articulation and language disorders, reliability ranged between 93% and 100%; those adults with aphasia and right hemisphere damage lesions reliability ranged between 90 to 100% and for normal children and adults reliability was 100%.

As a result of these good achievements, the pragmatic protocol started to be used in a wide range of clinical assessments. For instance, the pragmatic measure has been used by McCabe et al (2007) to assess the pragmatic skills in a group of men diagnosed with AIDS. Another study included the use of that pragmatic protocol was done by Fyrberg et al (2007), to measure the pragmatic skills in brain-injured children and youths. Aubert et al (2004) assessed non-verbal communication in four men with TBI using the protocol. To obtain the profile of the pragmatic abilities in a group of subjects with chronic schizophrenia, the protocol was applied by Meilijson et al in 2004. Mcnamara and Durso (2003), examined the pragmatic communicative skills in a group of patients with Parkinson's disease using the protocol. Another study represented by Avent et al in 1998 used this measurement to assess the relationship between language impairment and pragmatic performance in aphasic adults. In 1995, Mentis and Lundgren assessed the discourse-pragmatic components in children who were prenatally exposed to cocaine. (as cited in, Cummings, 2009, pp. 182-183).

To the best knowledge of the researcher, using the pragmatic protocol to assess the pragmatic communicative skills in verbal children with autism spectrum disorder is rare if not ever been used. This study is the first attempt to examine the pragmatic skills in verbal children with autism.

3.2.4.4.1 The pragmatic Parameters to be Assessed in the Pragmatic Protocol (1987)

As mentioned above, the Pragmatic parameters are organized according to three categories, these are:

a- Verbal Acts: it is divided into five groups

1- Speech acts: in speech acts, Prutting and Kirchner included two aspects which are:

- Speech act pair analysis: The ability to take both speaker and listener roles appropriate to the context.

- Variety of speech acts: The variety of speech acts or what one can do with language such as comment, assert, request, promise, and so forth

2 -Topic: the notion of the topic is divided into:

- Selection: The variety of speech acts or what one can do with language such as comment, assert, request, promise, and so forth.
- Introduction: Introduction of a new topic in the discourse.
- Maintenance: Coherent maintenance of topic across the discourse.
- Change: Change of topic in the discourse.

3- Turn-Taking: as a pragmatic aspect, turn-taking is divided into other parameters:

- Initiation: Initiation of speech acts.
- Response: Responding as a listener to speech acts.
- Repair/revision: The ability to repair a conversation when a breakdown occurs, and the ability to ask for a repair when misunderstanding or ambiguity has occurred.
- Pause time: Pause time that is too short or too long between words, in response to a question, or between sentences.
- Interruption/overlap: Interruptions between speaker and listener; overlap refers to two people talking at once.
- Feedback to speakers: Verbal behavior to give the listener feedback such as yeah and really; nonverbal behavior such as head nods to show positive reactions and side to side to express negative effects or disbelief.
- Adjacency: Utterances that occur immediately after the partner's utterance.
- Contingency: Utterances that share the same topic with a preceding utterance and that add information to the prior communicative act.

- Quantity/Conciseness: The contribution should be as informative as required but not too informative.

4 -Lexical Selection/Use Across Speech Acts: in the lexical selection two aspects are assessed:

- Specificity/Accuracy: lexical items of best fit considering the text.
- Cohesion: The recognizable unity or connectedness of text.

5- Stylistic Variations: Only one parameter appeared under this group:

- The varying of communicative styles: Adaptations used by the speaker under various dyadic conditions (e.g., polite forms, different syntax, changes in vocal quality).

b- Paralinguistic Aspect: It is the second category and it is centered about:

1- Intelligibility and Prosodics: this later is divided into five aspects to be measured:

- Intelligibility: The extent to which the message is understood.
- Vocal intensity: The loudness or softness of the message.
- Vocal quality: The resonance and/or laryngeal characteristics of the vocal tract.
- Prosody: The intonation and stress patterns of the message; variations of loudness, pitch, and duration.
- Fluency: The smoothness, consistency, and rate of the message.

c- Non-verbal Aspect: this is the last category in the protocol and it is devoted to assess the kinesics and proxemics:

1- Kinesics and Proxemics: assessing kinesics and proxemics need to measure the following parameters:

- Physical Proximity: The distance that the speaker and listener sit or stand from one another.

- Physical Contacts: The number of times and placement of contacts between speaker and listener.
- Body Posture: Forward lean is when the speaker or listener moves away from a 90-degree angle toward the other person; recline is slouching down from the waist and moving away from the partner; side to side is when a person moves to the right or left.
- Foot/leg and hand/arm movements: Any movement of the foot/leg or hand/arm (touching self or moving an object or touching the part of the body, clothing, or self).
- Gestures: Any movements that support, complement, or replace verbal behavior.
- Facial expression: A positive expression as in the corners of the mouth turned upward; a negative expression is a downward turn; a neutral expression is a face in resting position.
- Eye gaze: One looks directly at the other's face; the mutual gaze is when both members of the dyad look at the other.

3.2.4.5 Spontaneous Language Sampling

In the assessment of language, spontaneous language sampling analysis is a very important part. It aims at assessing the speech of children to detect if their language is following the typical patterns. In addition, it is useful in obtaining a language sample that maximally corresponds with the daily speech of the child. This language evaluation tool also offers a clear insight into the full repertoire of language skills used by the child. There are many forms of spontaneous language assessment, among which are: Conversation, Freeplay, and storytelling Mirsaleh et al., (2011). During each method, the assessor plays with the child and ask him questions to discover his communicative problems.

Because of the limitations of standardized language tests and the lack and unavailability of these tests in the Arabic language, the necessity for application

of the spontaneous language sample analysis in the assessment of language skills of Algerian children is obvious. Since language sampling embraces both the content and context of language use, it can present more detailed information about communicative difficulties in children with autism.

Therefore, structured conversation, Freeplay and storytelling were all used in the actual study. Since the researcher spent eight months with ASD children participated in this research, this period was enough to obtain detailed and exact information about the pragmatic difficulties exhibited subjects.

3.2.4.6 Video Recordings

In qualitative research, it is crucial for the researcher to ask whether, in light of his or her object and goals, it would be more appropriate to conduct systematic observations, to produce a handwritten or recorded field journal, to conduct interviews; questionnaires, to photograph, to videotape and so on. The proper response to these questions will determine to some extent the quality, scope, adequacy, and feasibility of the empirical data gathered. Video recording arises as a necessary resource to conduct qualitative empirical research. In this respect, (Honorato et al. 2006; Larocca 2004; Carvalho 2004; Kakehashi and Angelo 2005, Leonard et al. 1999; Silva 2007, as cited in, Garcez 2011) indicate that the proper use of the moving image, coupled with the audio, allows capturing aspects that may go unnoticed when other resources are used. Such aspects are: body, facial and verbal language used in everyday situations as in systematic observation; reactions of different subjects in the face of an activity or issue proposed by the researcher such as visualization and interpretation of a film and or fixed image; listening to music; reaction to reading a text aloud; individual reading of a text; participating in focus groups; performance of tasks and / or activities in groups or individually.

As a qualitative study, the video can capture the context of interactions and allows us to make repeated revisions in order to create a code for the

comprehensive analysis of the phenomenon. Furthermore, video recording also favors establishing the reliability of judgments and the application of codes. According to Honorato et al. (2006, p. 06), the capture of video images is a rich source of information, especially in research with children, they argued:

> after all, how can one register so many intricacies, so many details, so many relationships and then look into them? There are sayings that are not pronounced orally, sayings that are not captured by a recorder and that end up lost without a record…
>
> (as quoted in Garcez, 2011, p. 02).

With regard to researches with children in groups, it is important to remember that participants speak at the same time, interact, play, sit, get up, communicate among themselves and with the researchers all the time. Thus, certain aspects can only be recorded and analyzed through the use of video recording.

As far as our study is concerned, all conversations have been recorded within the class or home practice sessions in order to measure visible children' behaviours directly. They have been recorded by the researcher and sometimes by one of the child relatives (father, mother, sister, brother...) i.e., in certain contexts where it is better for the researcher not to be present or when feeling that the child did not behave as he/she used to behave in ordinary conversations or when he/she refused sometimes the presence of a stranger i.e., the researcher, due to their autistic situation. All sessions were recorded through the use of a hidden camera to not disturb the children.

3.2.4.7 The participant Observation

Observation involves the direct control of participants and their ongoing behaviours in natural settings.it has long been used in a diversity of disciplines as an instrument for gathering reliable data about processes, people and cultures, particularly in qualitative research. It is a tool of data collection that allows the investigator to obtain more information and better explore the situation under investigation in its natural environment. In this respect, Schensul and LeCompte (1999, p. 92) define participant observation as "the process of learning through exposure to or involvement in the day-to-day or routine activities of participants in the researcher setting".

One of the greatest advantages of this method is that participant observation enables researchers to reveal factors significant for a thorough comprehension of the research problem, but that was obscured when the study was designed. Therefore, what we determine from participant observation can help us in two ways: First, understanding data gathered via other methods (such as checklists and recordings). Secondly, designing questions for those methods that will provide us the perfect understanding of the phenomenon being investigated. Observation allows the researcher to watch peoples' behaviours and interactions directly. Indeed, ‘watching' and ‘listening' is key to observation since this latter provides the researcher the opportunity to document activities and behaviours without having recourse to peoples' willingness and capacity to answer questions.

Participant observation is also viewed as a qualitative method with roots in traditional ethnographic investigations whose principal objective is to aid researchers to learn the perspectives undertook by study populations. Schensul and LeCompte (1999, p. 91) list the following reasons for using participant observation in research:

• to identify and guide relationships with informants;

• to help the researcher get the feel for how things are organized and prioritized, how people interrelate, and what are the cultural parameters;

• to show the researcher what the cultural members deem to be important in manners, leadership, politics, social interaction, and taboos;
• to help the researcher become known to the cultural members, thereby easing facilitation of the research process; and
• to provide the researcher with a source of questions to be addressed with participants

Observation can be either a participant or non-participant. The former requires the researcher involved in the context by interacting with the students and the teacher in a direct way. According to Burns (1999, p. 82): "The researcher becomes a member of the context and participates in its culture and activities". That is to say that the inquirer can even ask questions and have answers about the behaviors and the practices of both teachers and learners. As for the non-participant observation, the researcher sees, remarks, and records the activities without being verbally involved in context. Indeed, he /she could have little contact with the members (Burns, 1999).

The observation period depends firmly on the research aims and there is no time limitation. However, researchers have shown that the more time spent in observation, the better results are gained (Flick, 2006). In order to reach the research objectives and to answer the research questions, the observer needs to clearly define his/her goals, select what elements he/she really wants to observe and set a clear timetable for his/her activities. These procedures should be in relation to the research topic.

In fact, the inclusion of ‘observation’ as an additional tool emerged from the fact that it might examine and reinforce our triangulation of research tools and might lead to other interesting issues. Hence, in our investigation, the observation has included the attendance of three sequenced sessions in each child home or classroom and has focused on exploring the different pragmatic behaviours in autistic children with the help of their parents or teachers.

In a good atmosphere, we sat at the back so as not to disturb the children and paid attention to everything that occurred in each session taking into account the children's degree of motivation, their interaction, and their language difficulties. During each session, the researcher tried to observe several elements related the pragmatic communicative skills and filled in the checklist of each child and she also wrote down her observations in a form of notes, a fact which has allowed her further to notice what has been accomplished by children and their teachers or parents.

3.2.4.8 Speech Generating Device Application

Important developments in the field of information and communication technology offer individuals with communication impairments new ways to communicate and express themselves. Several studies have documented positive outcomes in speech, language, and social communication following Augmentative and Alternative Communication as well as Speech Generating Devices intervention (Luke, 2016; Barket et al., 2013; Nigam and Wendt, 2010; Romski et al., 2009; Cheslock et al., 2008).

In this study, activity-based spontaneous communication through the use of SGD is adopted. This tool is used only with five participants (those who had no opportunity to attend schools due to their impairment severity). It was noted that those participants had a very poor linguistic repertoire in comparison with the other subjects participated in the study. In addition, they exhibit poorer performance when assessing their pragmatic skills. Moreover, there is a claim that the majority of children with autism are interested in mobile phones (Mazurek and Shattuck, 2012). Indeed, this claim was confirmed by the subjects' parents. From this point, it seems reasonable and helpful to exploit the use of mobile phones in order to expand communicative abilities in youngers with autism.

Using Android mobile devices, the researcher base her Speech Generating Device on an improved and validated version of Super Duper Publications "*Practicing Pragmatics Fun Deck*". This SGD was issued in Arabic so as to meet

the needs of the subjects who participated in the study. It is a colorful, educational social skills application that contained 52 illustrated flashcards with a wide range of essential pragmatic skills divided into 3 groups:

- **Developing Communicative Intents:** it includes social greetings, social terminating, requesting for objects, requests for actions, requesting for information, comment on the object, comment on the action, describing an event, predicting, hypothesizing, denying, making choices, giving reasons, expressing feelings, apologizing.
- **Developing Conversational Devices:** it includes answering questions, volunteering to communicate, attending to the speaker, taking turns, acknowledging, specifying a topic, changing a topic, maintaining a topic, asking conversational questions, giving expanded answers, requesting for clarification, clarifying, starting conversations, problem solving, telephone manners, maintaining topic, share personal experience or comment on a topic, waiting for turns in conversations, retelling stories, creating stories, learning vocal quality and intense, speech act skills.
- **Developing Proxemics and Kinesics:** it includes maintain eye contact, physical proximity, physical contacts, body posture, supporting speech by gesturing, facial expressions.

This application was implemented in the mobile phones of subjects' parents with the help of the software team. It was recommended to be used for eight months (2 hours/day) as a home intervention with the presence of the child's parent especially in the first month following (Sigafoos et al., 2003).

3.2.5 Sample Population

The informants are considered as the most important elements of any research work. According to Gardner (1974, as cited in, Flahault, 2005, p. 860), a population is a group of individuals who share common characteristics. Polit (2001) defines the population as an aggregation of cases that meet specific criteria. However, the sample is a subset of the population, it is the group of individuals who actually participate in a specific study, these are the individuals who the researcher end up using in his research.

In any research, it is preferable to select only certain portions from the whole population in order to be able to use the data collection instruments such as distributing the questionnaire, making an interview or observing people. These instruments can be employed with a large sample but not with a whole population. Profetto-McGrath et al (2010, p. 208) say that:

> Researchers work with samples rather than populations because it is more practical to do so. Researchers have neither the time nor the resources to study all members of a population. Furthermore, it is unnecessary to study everyone because it is usually possible to obtain reasonably good information from a sample.

The sample of the study is recruited from two Wilayas; Saida and Sidi Belabess. It consists of 12 participants (9 children from Saida and 3 children from Sidi Belabess). Seven of the children were males and five were females. The participants' age ranges from 6 to 14 years. All participants were identified as being autist children by a neuropediatric. Participants from Sidi Belabess were

Recruited from the "En Niama" Association, and those from Saida were recruited from Saida Autism Association.

3.2.5.1 The Participants' Profile

The following table will show the profile of each child participated in this study:

Table 6.

Participants' Profile.

Participants	**Age**	**First Diagnosis**	**Communication**	**City**
Subject One	6	Age of 2	-Random word utterances -Limited speech -Severe phonological deficits	Saida
Subject Two	12	Age of 2.5	-Random word utterances -Limited speech -Moderate phonological deficits	Saida
Subject Three	14	Age of 2.5	-Normal word utterances -limited speech -Moderate phonological deficits	Saida
Subject Four	12	Age of 2.5	-Normal word utterances -limited speech -Moderate phonological deficits	SBA
Subject Five	6	Age of 3	-Random word utterances -Limited speech -Moderate phonological deficits	Saida
Subject Six	13	Age of 2.5	-Random word utterances -Limited speech -Severe phonological deficits	Saida
Subject Seven	10	Age of 2	Random word utterances	Saida

			-Limited speech -Severe phonological deficits	
Subject Eight	7	Age of 3.5	-Normal word utterances -limited speech -Moderate phonological deficits	SBA
Subject Nine	8	Age of 2.5	-Normal word utterances -limited speech -Moderate phonological deficits	SBA
Subject Ten	12	Age of 2.5	-Normal word utterances -Normal speech -Moderate phonological deficits	Saida
Subject Eleven	12	Age of 2.5	-Normal word utterances -Normal speech -No phonological deficits	Saida
Subject Twelve	12	Age of 3	Random word utterances -Limited speech -Severe phonological deficits	Saida

3.3 Data Collection Procedures

The data collected for this study relied mainly on the Pragmatic Protocol adapted from Prutting & Kirchner (1987), spontaneous language sampling and observation took eight months. Throughout this period, 5 videos were recorded to each participant from five different sessions. Thereby, we have collected as much information as possible in order to find out answers to our research questions. The selection of these methods for gathering information was prompted by the research conditions such as the timing assigned for data collection and the availability of the informants.

The assessment procedure consists of spontaneous language sampling sessions. Freeplay session took place during the first 20 to 30 minutes of 1 hour videotaped session to overcome limits between the participant and the assessor. Then it was followed by sometimes by conversation or storytelling. By the use of different types of spontaneous language sampling, the child is given more than one opportunity to demonstrate communicative behaviour and to obtain each child's Mean Length of Utterance.

In order to get each child's MLU and complete the checklists, the following steps were followed:

1- Analyzing the Video-Tapes:

The researcher listens to each videotape carefully. From each tape, she writes down 100 utterances and completes the checklist for each child.

2- Calculating Mean Length of Utterance:

It involves two stages:

a) *Identifying 100 Consecutive Independent Utterances for all the Children*: MLUs were computed for each child using the criteria described by Brown's own rules (1973, p. 54).

b) *Identifying the Number of Morphemes in each of these Utterances*: for the calculation of the morphemes in each utterance, the researcher followed a number of rules, based on the work of Dromi & Berman (1982) for Hebrew and adapted the rules to Arabic to accommodate idiosyncrasies of Algerian Arabic morphology (see appendix 7). Then, the researcher takes the total number of morphemes and divides it by the total number of utterances:

$$\text{MLU} = \frac{\text{No. of Morphemes}}{\text{No. of Utterances}}$$

The following table shows the MLU of each participant.

Table 7.

MLU of the Sample of the Study.

Participants	**MLU**
Subject One	1.95
Subject Two	3.45
Subject Three	5.30
Subject Four	4.32
Subject Five	3.78
Subject Six	3.16
Subject Seven	2.85
Subject Eight	4.71
Subject Nine	5.01
Subject Ten	5.32
Subject Eleven	5.46
Subject twelve	2.93

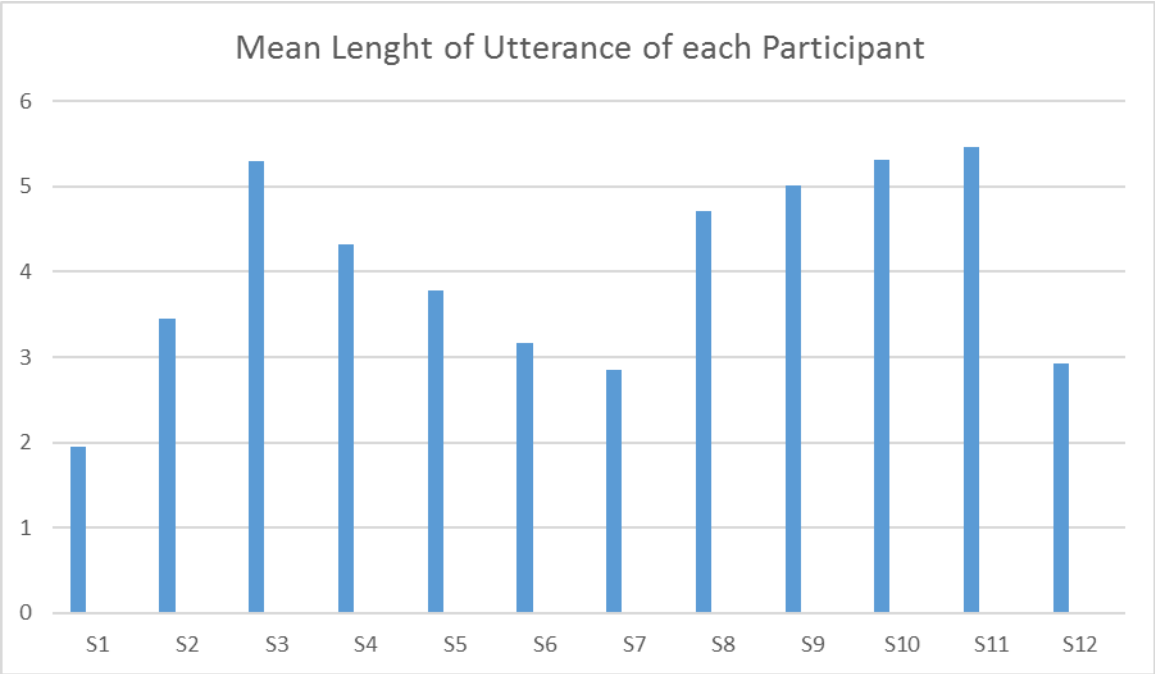

Figure 6: The Representation of MLU for Each Participant.

3- Filling the Pragmatic Protocol: according to Prutting and Kirchner (1987), this protocol was used to check the occurrence and non-occurrence of each communicative skill or pragmatic aspect. Each pragmatic aspect of language on the protocol is judged as always appropriate =if the behavior is always elicited (verbally or nonverbally); sometimes appropriate = if the behavior was sometimes elicited or sometimes observed; and absent = if the behavior was not elicited or observed.

4-SGD: was used with five participants (those who had no opportunity to attend school or care center) to test if there is a development in the previously mentioned pragmatic parameters.

3.4 Study Design:

The following are the dependent and independent variables of the study:

3.4.1 Dependent Variables:

In this study, the dependent variables are 30 pragmatic skills chosen by Prutting & Kirchner (1987). They include:

- **Verbal Acts:** speech acts (speech act pair analysis, variety of speech act); topic (selection, introduction, maintenance, change); turn-taking (initiation, response, repair/revision, pause time, interruption/overlap, feedback to speakers, adjacency, contingency, quantity/ conciseness); lexical selection/use across act speech acts (specificity/accuracy, cohesion); stylistic variations (the varying of communicative styles).
- **Paralinguistic Aspects:** intelligibility and prosodics (intelligibility, vocal intensity, vocal quality, prosody, fluency).
- **Non-verbal Aspects:** kinesics and proxemics (physical proximity, physical contacts, body posture, foot/leg and hand/arm movements, gestures, facial expressions, eye gaze).

3.4.2 Independent Variables:

In this study, the independent variables are age, gender, attending school and MLU. The following tables show the distribution of the independent variables applied in this study:

Table 8.

The Distribution of the Participants according to their Ages.

Age	**Frequency**	**percentage**
6 years	2	16.7
7 years	1	8.3
8 years	1	8.3
10 years	1	8.3
12 years	5	41.7
13 years	1	8.3
14 years	1	8.3
Total	12	100.0

Age groups are presented in the following figure:

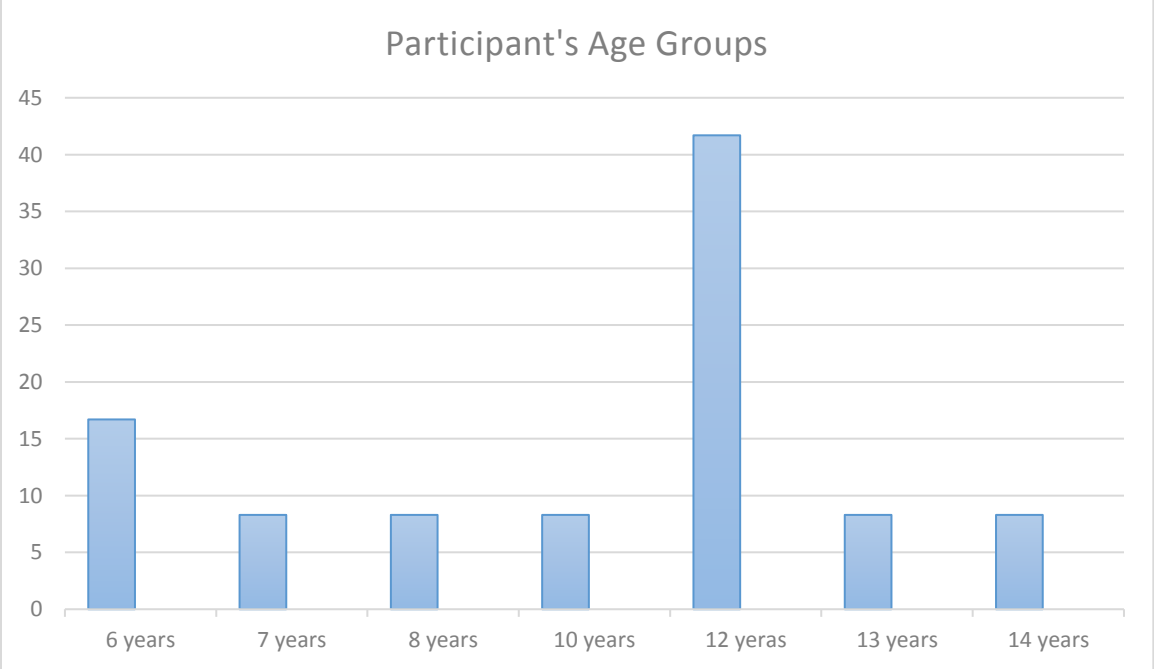

Figure 7: The Distribution of the Participants according to their Age**.**

Table 9.

The Distribution of the Participants according to their Gender.

Gender	Frequency	Percentage
Male	7	58.3
Female	5	41.7
Total	12	100.0

This table shows that the percentage for "Gender" reached (58.3%) for (male), but the percentage for females reached (41.7%). This is more illustrated with the following figure:

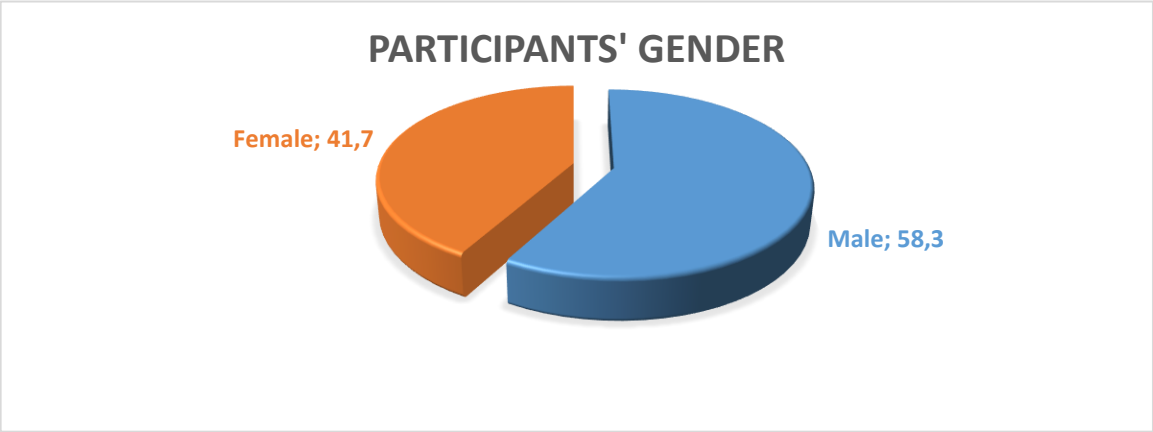

Figure 8: The Distribution of the Participants according to their Gender.

In addition to age and Gender, the children who participated in this study were also classified according to their education, since there are some children who attend school regularly whereas, others had no opportunity to attend school. This is more illustrated in the following table:

Table 10.

The Distribution of the participants according to their education variable.

Education	Frequency	percentage
No	5	41.7
Yes	7	58.3
Total	12	100.0

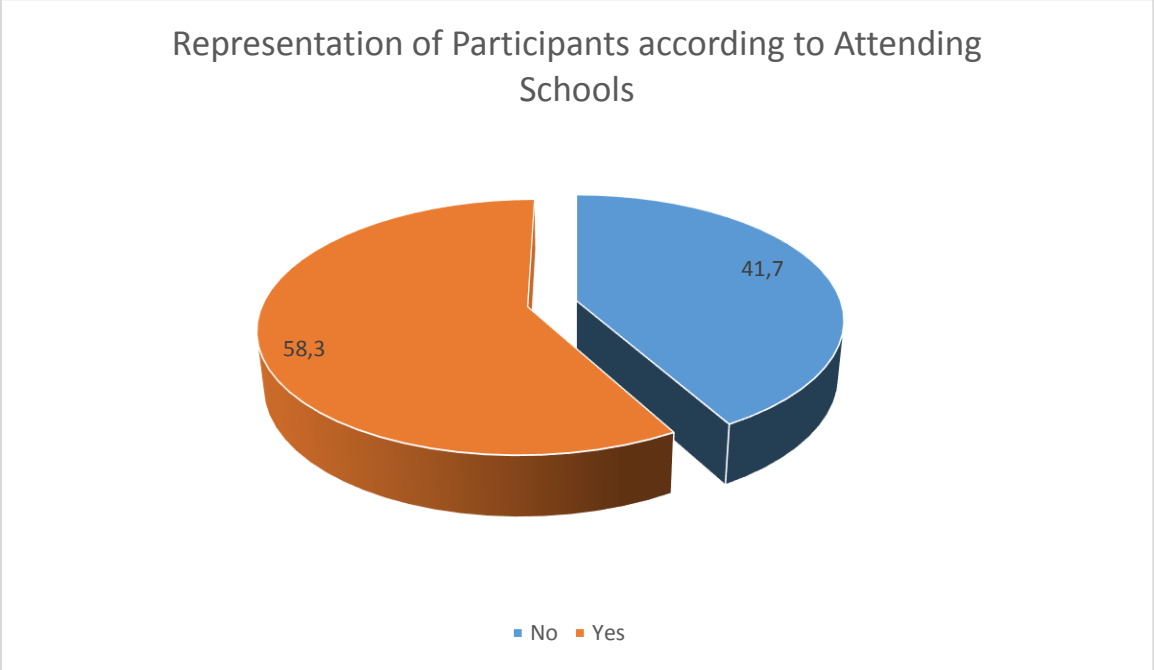

Figure 9: The Distribution of the Participants according to Attending Schools.

3.4.3 Statistical Treatment

The following statistical techniques are used to analyze the data of the study, they are defined according to Coldarsi et al., (2004).

1) Frequency and Percentage Distribution: they are the basic building block of statistical analytical methods and the first step in analyzing survey data. They help in organizing and summarizing the survey data in a tabular format. In the actual study, frequencies and percentages are used to analyze children's general achievement in the 30-elicited pragmatic behaviours.

2) Means and Standard Deviations (M/Std): they are basic Statistical Descriptions. Std is a statistic that measures the dispersion of a dataset relative to its mean and is calculated as the square root of the variance. It is calculated as the square root of variance by determining the variation between each data point relative to the mean. If the data points are further from the mean, there is a higher deviation within the data set; thus, the more spread out the data, the higher the standard deviation. In this study, Mean and Standard Deviation are applied to see if there are differences in the children's production of pragmatic skills.

3) T-test: It is is a type of inferential statistic used to determine if there is a significant difference between the means of two groups, which may be related to certain features. In the actual study, the T-test is applied to examine the significant effect of the independent variables.

4) Pearson correlation coefficients: it is a test that measures the statistical relationship, or association, between two continuous variables. It is known as the best method of measuring the association between variables of interest because it is based on the method of covariance. It gives information about the magnitude of the association, or correlation, as well as the direction of the relationship. In this study, Pearson Correlation Coefficients are used to assess the degree of correlation between MLU and the other independent variables. As well as the significant effect of MLU after the introduction of SGD.

5) Arithmetical averages: The arithmetic mean is the simplest and most widely used measure of a mean, or average. It simply involves taking the sum of a group of numbers, then dividing that sum by the count of the numbers used in the series. This method is used in the actual study to analyze non-educated children's general achievement in the 30-elicited pragmatic behaviours after the introduction of SGD. It is also used to see the difference in children's achievement in pre-SGD and post-SGD.

3.5 Problems and Limitations:

In Algeria, as well as the Arab world, talking about autism is taboo. Many Algerian families reject anyone from their community to know about their autistic children. Moreover, in Algeria, there are no official schools or Hospitals that children with autism can attend regularly. All that exists is some private associations where parents of autistic children meet and negotiate their children's problems. Therefore, it was very hard to access those children and work with them.

The researcher met the Head of Social Activity Directorate in Saida, to ask the possibility to attend some sessions with autistic children in the only care center that exist in the wilaya of Saida. This later is not an official center for children with autism, it contains all children categories of mental retardation and handicaps. Autistic children have only one day per week where they meet some speech therapists and teachers. Of course, one day a week is not enough for disordered children to learn and improve their social and cognitive skills. However, the demand was rejected without any reason.

Thereupon, the researcher contacted Mrs. Houcini Fatiha a mother of an autistic child and the director of "Saida Associations of autism". This latter arranged a meeting between parents and the researcher. Some families were met in schools and care center, others at their homes, and others in the meeting room of "Leisure Center" in Saida, rent by the researcher.

Furthermore, the majority of autistic children, the researcher met, are nonverbal, since our study is directed on children speakers with an autism spectrum disorder, this category of nonverbal children was excluded. Verbal children in Saida are fewer. For this reason, the researcher was obliged to move to another Wilaya (Sidi Belabas) to meet other speakers with autism.

In several cases, most participants exhibit hyperactivity, it was very hard to keep them in one sitting. Therefore, the researcher was obliged to repeat the record many times to make sure that all pragmatic devices were covered in the conversation.

Short attention is another feature that most participants were characterized with. Thereby, conversations with autistic children were scheduled for no more than 20 minutes to make sure that the participant is concentrating on the conversation.

3.6 Conclusion

Chapter three tried to offer a discussion of the rationale behind the choice of case study as a research design and the choice of the methodology used to conduct the present work. The range of methods and approaches that were highlighted falls within the paradigms of both quantitative and qualitative research. This was supported by a description of the use of combination and its benefits. Finally, the method of data collection, analysis, sampling (informants), and procedure were also described.

The following chapter will essentially deal with the findings of each instrument and the analysis of data as well as the interpretation of the main results according to the stated objectives, research questions, and hypotheses.

Chapter Four

Chapter Four: Findings and Discussions

Chapter Four
Findings and Discussions

4.1 Introduction

Communication is a broad concept, encompassing linguistic, paralinguistic, and pragmatic aspects of functioning. This chapter discusses Algerian autistic children's pragmatic development of 30 communicative behaviours, divided into verbal acts, paralinguistic aspect, and non-verbal aspects, through providing a general repertoire of the acquisition of these skills between the age ranges of 6 to 14. It tests children's pragmatic development against four variables: age, gender, attending school and MLU. Also, it tries to provide evidence about the correlation between MLU and the other three variables (age, gender, attending school). To better understand the correlation between the development of MLU and the other independent variables of the study, MLU is put together once with age, gender and once with attending school using Pearson Correlation Coefficient Program.

Moreover, the current chapter examines the pragmatic development of non-schooled autistic children after the introduction of speech-generating devices and gives a comparison between the results of the same pragmatic development before and after the introduction of SGD. In the end, it provides us with another comparison between non-schooled autistic children MLU scores before and after the use of SGD.

4.2 Children Overall Performance on the 30 Elicited Pragmatic Skills:

Data concerning children's production of pragmatic skills were analyzed by counting the number of occurrences for each parameter. (see Appendix 1)

For more details, the overall results are divided into three groups, according to the procedure followed by Prutting and Kirchner (1987):

a) Always appropriate: means that the parameter is always present during the assessment.
b) Sometimes appropriate: means that the parameter appears and disappears in the same conversation. It is not always present.
c) Absent: This means that the parameter is absent during the conversation.

- **Appropriate pragmatic parameters:**

Starting with the first group, appendix 1 shows that the most appropriate skills in all children were: foot/leg and hand/arm movements with (100%); followed by topic change demonstrated with (75%) and interruption/overlap with (50%). These pragmatic parameters are present in all children under study.

- **Sometimes-Appropriate Pragmatic Parameters:**

Appendix 1 shows that 13 parameters are demonstrated by occurring with a high percentage (more than 50%), these parameters are: feedback to listener (83%); vocal intensity (75%); vocal quality (75%); physical proximity (75%); physical contacts (75); body posture (75%); variety of speech acts (66.66%); intelligibility (66.66%); facial expression (66.66%); adjacency (58.33%); response (50%); and prosody (50%).

- **Absent Pragmatic Aspects:**

Appendix 1 also shows that two parameters were totally absent in autistic children, these are: repair/revision (100%) and pause time (100%). Followed by the absence of other 8 parameters which are demonstrated by high percentage (more than 50%), they are classified according to their occurrence: gestures (91.66); selection (83.33%); cohesion (83.33%); introduction (75%); initiation (75%); contingency (75%); quantity/conciseness (66.66%); fluency (66.66) and maintenance with (58.33). The other parameters are demonstrated by occurring with a range between (00.00% and 41.66%). (see appendix 2)

4.2.1 Variety of Speech Act Pair Analysis:

Each utterance has a speech act. However, this speech act is understood only in terms of social convention. It is defined as the function of Verbal language categories including making requests, asking questions, giving orders, making promises, thanking, offering apologies, and so on, are usually described under speech act Austin (1962). In language communication, each utterance is designed to serve a specific function. People do not just use words, but also, they perform certain "actions". They are required both to acquire the language and to have the knowledge to use the language they acquired in order to communicate. According to Searle (1969), understanding the speaker's intention is essential to capture the meaning. Without the speaker's intention, it is impossible to understand the words as a speech act.

Speech act theory has contributed to the rules perspective in communication because it provides a basis for examining what happens when speakers use different definitions and behavior rules. By analyzing the rules used by each speaker, researchers can better understand why conversational misunderstandings have occurred.

How language represents the world has long been and still is, a major concern of linguistic studies. The development of speech acts occurs simultaneously with

the development of linguistics aspects of language in each stage of language development. Autistic children, by contrast, are often characterized as having a rigid and stereotyped use of language, in which a word or phrase is used in limited contexts and verbal routines (Loveland et al., 1988). Moreover, they have more incidents of no responses and they are more likely to produce fewer communicative acts than normal children. They use language to serve a limited range of communicative functions.

The results obtained from the data showed that although varieties of speech acts were produced by the autistic group as a whole, many children actually produced only a few of it, such as affirming, negating, direct attention and requesting. Furthermore, the findings indicated that ASD children are deficient in directives and responses which require communicative ability to agree or disagree with others, direct the other's attention, give a warning, and ask the interlocutor about his/her wish or intention, as well as taking the interlocutor's perspective and sharing the goals collaboratively. These findings are supported by Cho et al (2007); Loveland et al (1988); Prutting and Kirchner (1987); Loveland and Landry (1986).

4.2.2 Topic Initiation, Selection, Introduction, and Maintenance:

Young children with autism less often initiate communication bids to regulate the behavior of others in order to achieve the desired object or action Landa (2007).

Topic selection, introduction, and maintenance are essential for effective communication. It was mentioned before that ASD participants in this study showed a high performance in topic change. Thus, poor performance in topic maintenance was demonstrated. Subjects with autism are unable to develop an effective strategy for maintaining a topic, choosing which facts or propositions are important to carry on a conversation because they might remember a series of unrelated facts and hence have difficulty remembering the gist of the topic. There

is a claim that children often fail to maintain a topic when interacting with peers. (Blank & Franklin, 1980, cited in Schley & Snow, 1992:20). Being passive in a conversation with an adult or unable to maintain a topic can be related to ignorance of the culturally determined list of topics that organize casual conversation for adults (Kellerman, et al., 1989, cited in Ninio & Snow, 1999:18). Therefore, in this study, the researcher thinks that the violations of maintaining a topic by ASD children are related to problems in their comprehension of connections between conversational topics.

Selecting an appropriate topic to the conversation is another deficit demonstrated in our participants. It is common for individuals with autism to have difficulty choosing an appropriate topic to open a conversation because their conversational skills are often impaired this will result also difficulties in introducing topics in ASDs.

4.2.3 Topic Change:

The topic of change was demonstrated by a high percentage (75%) following foot/le and hand/arm movements. When a conversation is perceived as coherent, it is usually assumed that the conversation succeeds in maintaining relevance. This is not the case for our subjects, the analysis of conversations with children under study showed that conversations with ASD subjects are filled with inappropriate topic shifts and maintenance of topic, aborted phrases, hesitations, abnormal semantic content and more turns as compared to conversations with typical children. Children under this study have difficulties in maintaining a topic of conversation, the data showed more Topic Initiations and Unexpected shifts in the conversations with them.

Changing topics in ASD conversations are related more to outside stimuli than to specific knowledge. Trying to explain the reasons for changing the topic, it is assumed that the appropriateness of this aspect in ASD subjects was due to failure to continue in a specific topic and the desire to repeat a particular idea. It is known

that the literature on language in autism spectrum disorder is flooded with comments such as increased repetition in ASD children or what is known in pediatric as Aphasia, children might shift topics as they repeat the same ideas over and over again (Repetition of an Idea). Moreover, it is possible to assume that if the ASD subjects are unable to develop an effective strategy for maintaining a topic, choosing which facts or propositions are important to carry on a conversation, they might remember a series of unrelated facts and hence have difficulty remembering the gist of the topic. The reason behind changing or shifting topic in ASD subjects may be also due to difficulties in understanding a particular topic. For instance, during an ongoing conversation, one from the subjects we had in this study, was asking his mother about a lion toy in his room, the mother when explaining, she started talking about the lion as he lives in the forest and prefers eating meat…etc. However, the child kept saying: "Mina's lion, Mina's" (many times; meaning that this is the lion of Mina, his sister) interrupting his mother's speech. Although the mother was responding by: "yes this is Mina's lion" and going back to her speech about the lion. The child kept repeating the same sentence: "Mina's lion", showing by this, misunderstanding of his mother's explanation.

Once again, the findings of topic change in ASD subjects support the findings presented by Prutting and Kirchner (1987). This aspect parameter was demonstrated appropriate in Prutting's study with 81%.

4.2.4 Response:

Successful conversation requires that the speaker's behavior is sensitive to nonvocal listener responses. Children with autism spectrum disorder during conversation probes in which a listener periodically displayed nonvocal+ cues that she was uninterested in the conversation. Response in speech is another aspect that was demonstrated by a low percentage and evaluated as sometimes appropriate. Unlike typically developing children, children with autism are often

insensitive to speech. In fact, Response to spoken language can reveal whether that child is likely to develop speech, comprehension and social skills or whether his social and expressive disabilities are likely to remain profound. The findings of our study concerning conversational response revealed that ASD subjects showed a worse performance in response to conversations. According to neurobiological studies, children with ASD show a larger right hemisphere activity than the left one which is responsible for responding to conversations in typical children, Seery et al., (2013). The findings of our study are supported by Prutting and Kirchner (1987); Haessen et al (2011) who argues: "people with ASD show more right hemisphere activity than left hemisphere activity during speech or language processing". (p.709)

4.2.5 Repair/Revision:

Repair/revision and pause time are totally absent in our subjects. Conversational breakdown and the need to repair can occur in any interaction. Repair skills are an important part of a speaker's pragmatic communicative competence, Gallagher (1981). With respect to our study, it was mentioned before that conversations between children and parents/teachers were natural conversations. Taking into account that repair couldn't have any opportunity to appear in dialogues, the researcher asked parents/teachers to pretend a breakdown in the child's speech and asking him/her for clarification by this the researcher could test repair in children's communications. Unfortunately, this aspect was absent in every child's speech without any exceptions. According to the 'theory of mind' hypothesis, the person with ASD would be unable to determine what might or might not be present in another person's mind, and as a result, they could not determine what might have gone wrong in an original message. Consequently, they would be unable to generate an effective repair.

4.2.6 Pause Time:

Pauses are a natural part of speech and learning more about them can help to understand how the participants in a conversation take turns talking. According to Rodriguez and Francisco (2015, p. 229), pauses are defined as:

> Apart from the silences that mark the beginning and end of a dialogue, we find a great number of pauses that follow one another along with the discursive flux, carrying out different functions. For example, they can serve to allow breathing during the emissions or can be used to plan the following speech.

Moreover, Saville-Troike (1985, p. 11), quoted in Rodriguez and Francisco (2015:230), points out: pauses can have propositional content and illocutionary force, since they are used to ask, to promise, to decline, to warn, to threaten, to discredit, to order, inter alia.

However, it is claimed that long pauses in speech are a part of autism syndrome. ASDs have very long pauses when they talk, they will be speaking and then suddenly a long pause appears until they are reminded to continue talking. In our study, disrespecting conversational pauses patterning was observed in all conversations carried out with all participants without any exception. It is hypothesized that this impairment in pause time is due to general speech deficits and delayed that appear in all autistic children. Persons with ASD engage in long periods of silence because of the inability to recognize the need for contact with others.

4.2.7 Interruption/Overlap:

The major aspect of a conversational organization is the orderly exchange of the speaker's role. Speech overlap has been mentioned in relation to the acquisition of the turn-taking rule in young infants. However, turn-taking usually depends on the person's developmental level.

Children Often interrupt adult conversations because they may feel bored from adults' conversations or because they are not involved in it. They may also use interruption because they attempt to amuse themselves or to gain attention. Interruption/overlap occurred with 50%. Children often interrupt adult's conversations, but ASD subjects use interruption more than typical children do because, simply, they are not aware of social graces. In Prutting and Kirchner's analysis, it was found that interruption/overlap was appropriate with 91%. A fact that support the findings presented by this study.

4.2.8 Feedback to Speakers:

Feedback to the listener was demonstrated in our study with 83% under "sometimes appropriate" evaluation. Talking about feedback to speakers needs to talk about turn-taking. Auditory feedback provides information not only about one's internal cues for regulating speech, but also provides feedback from the environment and about how others are responding to what was said. In particular, some ADS children find difficulty in understanding the message as it has been mentioned before, accordingly, they showed to be neutral; they do not respond or give feedback. Others seemed to be careless about adult's conversations. Furthermore, ASD children also may find difficulty in judging the message, whether it is informative or not and consistently find more difficulty in identifying good clues from poor ones.

With respect to our study, the researcher has noticed that the majority of the children who give feedback in conversation were conversing with one member of

their family. However, those who did not give any feedback were conversing with members of the research team. This can be explained under the subject of familiarity, ASD children are more familiar with their parents or siblings more than they are with teachers. This aspect was evaluated in Prutting and Kirchner's (1987) study as always appropriate with 98%.

4.2.9 Adjacency:

In all conversations, adjacency is an important skill. It is the basic unit of the conversational organization since it serves to maintain the atmosphere of discourse. It is known as the utterances that occur immediately after the partner's utterance. In conversation analysis, an *adjacency pair* is a two-part exchange in which the second utterance is functionally dependent on the first, as exhibited in conventional greetings, invitations, and requests. It is also known as the concept of *nextness*, where each pair is spoken by a different person just after the first utterance. Having an adjacency pair is a type of turn-taking. The form of the adjacency pair consists of a first pair part (FPP) and a second pair part (SPP) (Schegloff & Sacks, 1973). The nature of an FPP is such that it makes relevant the next action, an SPP. However, there are constraints on the form of the action. In the case of questions, for example, the answer cannot be just any answer-the SPP must be an appropriate answer to the question. It is generally considered the smallest unit of conversational exchange, as one sentence doesn't make for many conversations. What is in the first part of the pair determines what needs to be in the second part.

The adjacency pair sequence in autism spectrum disorder is marked by the disorder. All autistic children understudy had difficulties in respecting pause time in conversations. Their utterances were all characterized by long pauses when talking. It is hypothesized that this impairment in pause time is due to general speech deficits and delayed that appear in all autistic children. As result adjacency pair is impaired and absent.

4.2.10 Contingency:

Talking about contingency is talking about utterances that share the same topic with a preceding utterance and that add information to the prior communicative act (Prutting and Kirshner, 1987). This parameter can be analyzed through topic maintenance. It is known that deficits in ASD are marked by the topic change which is related more to outside stimuli than to specific knowledge. Trying to explain the reasons for changing the topic, it is assumed that the appropriateness of this aspect in ASD subjects was due to failure to continue in a specific topic and the desire to repeat a particular idea. It is known that the literature on language in autism spectrum disorder is flooded with comments such as increased repetition in ASD children or what is known in pediatric as Aphasia, children might shift topics as they repeat the same ideas over and over again Repetition of an Idea.

4.2.11 Quantity/Conciseness

The fullest expression of normal human speech and language requires the desire or intent to communicate something. The quantity of speech or conciseness refers to brief utterances that are direct to the point, where a great deal is conveyed in a few words. ASDs participated in the study were all characterized by echolalia, an act that never permit speech quantity or conciseness.

In all conversations ASD children used imitation, though they sometimes used very complex words or adult words, but these words are said in the same order, and usually in the same tone, as those, they have heard on a TV show, in a book, from their parents, or from some other source. The majority of the sentences, words and even contributions received from children participated in the study have no communicative meaning, for this reason, ASD speech is not a concise communication.

4.2.12 Specificity/Accuracy

It is argued that to become a competent user of spoken language requires several types of skills among is lexical, semantic and syntactic knowledge (Chenausky et al, 2017). When it was first observed independently by Kanner (1943) Autism was viewed as a psychiatric condition that encompasses a range of presentations that may be traced to a triad of symptoms: impaired reciprocal social interaction; disordered verbal and nonverbal communication; restricted, repetitive behavior or circumscribed interests. As a result, autistic persons usually have immature lexical-semantic knowledge.

According to Haebig et al (2015), lexical-semantic knowledge is frequently described in terms of breadth or depth. Breadth is often measured in the number of words an individual knows, like in receptive vocabulary assessments. However, depth is often measured through word definition tasks, assessments indexing knowledge of multiple word meanings, or word association tasks to examine semantic networks (McGregor et al., 2012). In normal children, as much as the lexical-semantic knowledge grows, they are able to use words more flexibly in various contexts.

Due to the previously mentioned triad impaired communication, it is hypothesized that ASDs often display deficits in both breadth and depth of lexical-semantic knowledge. Most children with autism show a lower frequency of breadth than typically developing children. Additionally, they are not aware of the meaning of most words they know because these words are learned through echolalia. As a result, ASD children are found to produce rather superficial utterances (Haebig et al., 2015).

4.2.13 Cohesion

Cohesion is defined by Halliday and Hasan (1976) as a semantic relationship that is based on the meaning existing between an element in an utterance and another element that is crucial to its interpretation. It is seen as the recognizable unity or connectedness of speech. Halliday & Hasan (ibid) identified 5 types of cohesive devices, including conjunctions, reference, ellipsis, substitution, and lexical cohesion. These five types have been demonstrated to be sensitive measures of language impairment in speech production. As far as children with autism are concerned, Baron-Cohen (1988) argued that autistic individuals lack the representational capacity and the symbolic skills that are necessary to take another person's perspective and abilities needed in the development of adequate pragmatic skills. As a result, prominent deficits in the social use of language are hallmarked.

Disconnection in discourse is one of the various deficits that appeared in autistic populations. Deficits in cohesion and coherence have been well documented in the discourse of children participated in this study. Indeed, they produced fewer cohesive ties in all conversations. The adequacy of their ties was more often judged to be incomplete and misplaced. Especially, the misplacement of conjunctions that relates semantic content across propositions. In this respect, ASD participants were all characterized by the use of one conjunction only: “aya= أيا ". in the Algerian dialect, this conjunction is known as additive conjunction that involves the co-occurrence of two independent events. In ASD children participated in this study, the use of this conjunction extended its additive function to other functions such as sequential ordering, adversative and causal functions.

Moreover, the faulty use of cohesive ties of reference was found. Pronoun reference was present in almost conversations; errors with third-person pronoun reference were prominent, followed by the first-person pronoun and with the

fewest errors made with second-person pronoun reference. However, the use of demonstrative and comparative references was infrequent in all dialogues.

One possible hypothesis that can explain the disconnection of speech in children with ASD, is that this category suffers from underlying social, linguistic, cognitive limitations affecting the development and use of adequate cohesive ties. These findings are compatible with those of Baltaxe & D'Angiola, (1992) and Baltaxe et al (1995).

4.2.14 Varying of Communicative Styles

Communication within a social situation can be more challenging than just understanding the words of others. There are unwritten rules that govern interactions and these may change depending on the circumstances and whom one is talking to. Communicating also requires an understanding of which type of speech is appropriate in a particular situation, for instance, how to be polite; the appropriate use of loudness, etc.

One of the core aspects of autism spectrum disorder is social dysfunction. Persons with autism always have immediate and obvious difficulties in social interactions. Most importantly, these social skill deficits make it difficult for the individual to develop and keep meaningful and fulfilling personal relationships. All of the skills involved with social communication presuppose an understanding of complex social expectations, coupled with an ability to self-modulate based on that understanding. ASDs generally lack these abilities.

As far as communicative styles of language are concerned, politeness was found to be the most prominent social skill used by autistic children. It is defined as a speech act that expresses concern for others and minimizes threats to self-esteem, Brown, and Levinson (1978). In this study, the researcher noticed that different strategies of politeness were expressed by ASD participants. These strategies were presented in greetings, thanking, asking for permission to take

objects, etc. These findings agree with Sirota's (2004) findings. She examined whether ASD children utilize politeness forms such as polite greetings and compliments. Her study's results revealed that the participants often used a face-to-face setting where an adult had a conversation with an ASD child. Consistent with Li et al (2011), she found that autistic children do make use of politeness strategies, for example, polite acceptance and rejections.

4.2.15 Intelligibility:

Moving to speech intelligibility or how ASD children understand messages, ASDs are a cluster of developmental disorders characterized by deficits in communication and social interactions as well as cognitive processing deficits. most children with ASD acquire at least some spoken language, with approximately 80% producing more than five words. Thus, the expression of words for ASDs may be stronger than understanding, their utterances do not seem to have any connection to the situation in which they are voiced. In general, individuals with autism tend to focus attention on details, or single words, rather than global coherence, Nation (1999). They have coherence impairment or a processing style that focuses on details or individual words, making it difficult for them to understand speech at a global level.

ASDs in our study were found intelligible with speakers with 66.66% a fact which hypothesize that our subjects do not have profound impairments in the structure and fluency of language. These findings were supported by many studies that assert that ASDs show normal semantic priming and therefore do understand speaker's speech, Lord et al (2004); Loveland and Landry (1988); Prutting and Kirchner (1987). These findings will never exclude the fact that people with autism have difficulties in language comprehension and social cues.

4.2.16 Vocal Intensity and Vocal Quality:

Using a rising intonational contour at the end of a declarative syntactic construction to signal that it is to be interpreted as a question rather than as an assertion, Landa (2007), is achieved through the intensity and the quality of speech.

Variations in prosody distinguish declaratory statements form interrogatories. It gives clues to the speaker's emotional tone of voice and indicates when words or statements begin and end. The vocal intensity and quality also influence listeners' perceptions of a speaker's competence, personality, and level of ability, which may in turn either facilitate or hinder social and vocational integration. According to Landa (2007), Many individuals with ASD have problems with prosody in speech, including the perception of pitch and production. The speech of verbal children with ASD is often monotonous, echolalic or stereotypic, inappropriately stressed, or emotionless. Researchers in verbal production, such as Leder et al. (1987) ; Perkell et al. (1992) ; Svirsky et al. (1992) ; Lane et al. (1997) ; Monini et al. (1997) ; Higgins et al. (1999) ; Hamzavi et al. (2000) ; Campisi et al. (2005) cited in Russo et al. (2008), make a strong relationship between auditory feedback and speech production in children with ASD. They indicate the necessity of auditory feedback for vocal control of loudness and pitch.

Under the hypothesis that subjects with ASD give feedback to those who are more familiar with, vocal production might be also depending on familiarity as it was observed by the researcher. The vocal intensity and vocal quality are always appropriate in children who are conversing with their parents since there are no constraints with family members. However, these aspects were inappropriate in those subjects who were talking to teachers. Both vocal intensity and vocal quality were presented in Prutting and Kirchner's study with 81%.

4.2.16 Prosody:

Prosody is the description of the suprasegmental aspects of language that we use to communicate, modify, or highlight the meaning of spoken messages (Couper-Kuhlen, 1986). It plays an important role in a range of communicative functions (pragmatic functions, grammatical functions, and affective functions) needed to convey focus and meanings.

Some of the major characteristics of autism are abnormal speech patterns. The speech of many children with autism appears abnormal and is often described as machine-like, "monotonic," or "sing-song." As a feature of impaired communication in autism, individuals often display disordered prosody, Baltaxe, and Simmons (1985). They often use idiosyncratic speech that makes sometimes no sense. These individuals also use odd tones, where the speeches are characterized by rises at the end of sentences and rather monotonous. They may also use irregular intonation, pitch, pace, rhythm, and articulation. The researcher noticed that the speech of ASD subjects participated in this study was different from typical children including exaggerations, loudness, and odd-sounding. These findings are supported by Hargrove (1997) who argues: "…*the speech of a child with autism is often characterized by poor inflection and excessive or misassigned stress*". Cited in McCann and Peppé (2003).

4.2.17 Fluency

One of the most important aspects of language maturation is fluency. According to Turner (1999), Fluency performance is usually determined by the total number of correct words. As far as language development is concerned, verbal fluency is the most important aspect of the mastery of language. It is defined as the capacity to produce spontaneous verbal responses without excessive pauses or errors in searching for words (Drayna, 2011).

It is well confirmed that autism is a neurodevelopmental disorder characterized by persistent deficits in social communication and social interaction across multiple contexts, and the presence of restricted, repetitive patterns of behavior, interests or activities. Verbal fluency deficits are related to autism spectrum disorder, it represents deficits in generativity, flexibility/inhibition, organization, strategic lexical search, and monitoring (Turner, 1999). This disfluency usually causes problems with the flow, the rhythm, and the speed of speech. A fluency disorder is characterized by two aspects: (1) stuttering, which is the most common fluency disorder. It is an interruption in the flow of speaking characterized by repetitions (sounds, syllables, words, phrases), sound prolongations, blocks, interjections, and revisions, as a result, the rate and the rhythm of speech is affected (Drayna and Kang, 2011); and (2) cluttering, which is characterized by a perceived rapid and/or irregular speech rate, which results in breakdowns in speech clarity and/or fluency (Drayna, 2011).

These deficits are explained through the executive functioning hypothesis. Executive functions are a collection of abilities required for executing and controlling effective, purposive, future-oriented behavior in a constantly changing environment. Consistent with our hypotheses, the ASD group demonstrated reduced activity during fluency. They were impaired in their performance of semantic and phonemic fluency

4.2.18 Physical proximity, Physical Contacts, and Body Posture:

Body posture, physical contact, and physical proximity occurred with the same percentage as voice production 75%. People appropriately adjust the distance between themselves and others during social interaction, and they may feel discomfort and move away when another person intrudes on their personal space. Recent studies show that social distance problems may be related to a region of the brain called Amygdala that is involved in social and emotional behaviours, a bilateral Amygdala damage causes problems in physical proximity in individuals,

Kennedy and Adolphs (2014). Autism is a neurodevelopmental disorder characterized by marked and enduring deficits of interpersonal interaction. Autistic children do not maintain social distances, they may stand too close or too far.

The researcher noticed that the ASD subjects involved in the study are divided into three groups: 4 children from 12 were standing in normal distance, they respect to distance between themselves and the experimenter; 5 children were standing "nose to nose", they were too close to the experimenter, and 3 children were standing too far. Trying to explain these differences, it was found that those children who are manipulating personal space regulation already have experienced the outside world, (they go to school) so they have relationships with outsiders. Those 5 children who prefer to stand nose to nose, are those children who were conversing with their parents. However, those children who prefer to stand too far were conversing with their teachers. Accordingly, it is reported that ASD children are less tolerant of close proximity to an unfamiliar adult and prefer farther interpersonal distance. Moreover, it was mentioned before that the amygdala plays a key role in underpinning personal space regulation, either by triggering innate emotional reactions in response to personal space violations or learning the association between close distance and aversive outcomes, Kennedy et al (2009).

Linking these previous results to the present findings, we suggest that reduced tolerance of physical closeness with a stranger and lack of flexibility of personal space in ASD children may result from impairment of an amygdala-based mechanism. This hypothesis is supported by several data. Recent studies indicate that the amygdala is enlarged in children with autism and could contribute to the abnormalities of fear and anxiety that appear to be a common feature of autism, Schumann et al (2009); Markram et al (2008); Corbett et al (2006). Furthermore,

our findings agree with Prutting's findings that were appropriate and occurred at 95%.

4.2.19 Body Movements

Body movements, in general, is a well-documented red flag for autism. In pediatric, these movements are known as "Dystonia" which refers to a brain disorder that causes loss of muscle control. In fact, having autism is having a "movement disorder", which means that these movements are strongly associated with an autism spectrum disorder. In some children, only one part of the body is affected; in other children, several or many parts are affected. On the other hand, body movement can be a first sign for predicting autism disorder in children.

According to Teitalbum et al (1998), movement analysis in infancy may be useful for early diagnosis of autism. He argues*: "It is important that the abnormalities in a movement that we have described here can be seen very early in infancy, long before the behaviors in social settings that currently form the basis for the diagnosis of autism".* Therefore, body movements in children with autism spectrum disorder are considered as a physiologic stereotype.

Taking the children under the actual study, the researcher noticed that all subjects, without exception, are suffering from what is called Dystonia. It is worthy to mention that not all children do the same movements. There are some children who are acting in different ways: some children move their legs and arms, others move their heads, some children also flap their arms, and there are also those who touch parts of the body or their clothes. In this respect, body movement is an appropriate pragmatic parameter that exists in every autistic child. The findings concerning foot/leg and hand/arm movements agree strongly with the findings presented by Prutting and Kirchner (1987) when assessing 42 children with a language disorder. Their findings revealed that this physiologic stereotype

was marked appropriate with 99%. (41 children from this language disorder group suffered from body movements).

4.2.20 Gestures:

Using gestures in communication is very useful. In fact, there is a strong link between gestures and speech in communication development. In our study, this skill was absent in 91% of children. Communication development in ASDs is delayed and characterized by the existence of deficits. ASD participants in our study showed poor performance in speech acts and turn-taking, as a result, poor performance in terms of gestures appeared in conversations. These findings are supported by Lambrechts et al (2014); Tantam et al (1993) and Prutting and Kirchner (1987).

4.2.21 Facial Expression:

Facial expressions, as a part of this study, plays an indispensable role in social interaction. It is defined by Landa (2007) as the act of rolling the eyes to indicate that comment was intended as sarcasm or smiling as criticism is given to convey tenderness and sincerity so that the listener knows that the comment was made out of concern rather than merely to criticize. Normal children usually have a high performance in showing different facial expressions. However, expressions done by ASDs don't usually mirror their actual emotions.

The findings of this study revealed that expressions appeared in ASD subjects were sometimes appropriate with 66.66% which means that more than 30% expressions were inappropriate. In fact, ASD children don't lack emotions but often have difficulty in identifying them, it is believed that the reason behind this impairment is that ASDs usually suffer from symptoms of anxiety and depression that significantly compromise their quality of life.

4.2.22 Eye Gaze

Detecting where communicators direct their gaze is an important aspect of social interaction. It directly provides information about interests and dangers in the environment. What others look at also provides cues about their inner states: what they know, what they desire, and what they attend to. Eye gaze is defined as the ability to trace a line of sight to discern the object/target of someone else's eyes' fixation and, most likely, their owner's attention, is an extremely adaptive behavior (Argyle and Cook, 1976; Emery, 2000).

Abnormal eye contact is one of the defining features of ASD (American Psychiatric Association, 2013). Children with autism are impaired in their ability to use others' gaze cues in word learning tasks (Baron-Cohen et al., 1997) and are considered as one of the earliest predictors of autism. Looking for the reasons behind this deficit, one claim holds that people with autism perceive eye contact during social interactions as unimportant, they may avoid eye contact because it is uncomfortable or aversive. People on the spectrum have described looking into someone's eyes as a terrifying experience (Williams, 1994). Moreover, it is known that the Amygdala, the brain part that is responsible for fear and anxiety, is bigger in individuals with autism this explain the abnormality of eye gaze in autism as a result of anxiety, stress, and fears. In addition, it is hypothesized that individuals with autism are less interested in social material and interaction. Therefore, they do not show enough interest in making eye contact.

The present results reinforce previous findings (Leekam et al., 1997; Webster and Potter, 2008), suggesting that individuals with an ASD discriminate gaze direction. Although it is reported by the researcher that some children were using normal eye contact, the majority of the children contributed in the study have problems in maintaining social interaction through eye gaze.

4.3 The Occurrence of Pragmatic Skills Following Prutting and Kirshner (1987):

4.3.1 Verbal Acts:

The following table shows the results of children's verbal acts:

Table 11.

Occurrence of Pragmatic Parameters (VERBAL ACTS) Following Prutting and Kirshner (1987).

Verbal Acts	Mean	Std. Deviation	Degree of assessment
Speech Acts			
Speech act pair analysis	2.75	0.75	SOMETIMES APPROPRIATE
Variety of speech acts	2.83	0.58	SOMETIMES APPROPRIATE
Topic			
Selection	2.17	0.39	ABSENT
Introduction	2.25	0.45	ABSENT
Maintenance	2.42	0.51	ABSENT
Change	3.58	0.90	ALWAYS APPROPRIATE
Turn-Taking			
Initiation	2.25	0.45	ABSENT
Response	3.00	0.74	SOMETIMES APPROPRIATE
Repair / revision	**2.00**	**0.00**	ABSENT
Pause time	**4.00**	**0.00**	ALWAYS APPROPRIATE
Interruption/ overlap	3.50	0.52	ALWAYS APPROPRIATE
Feedback to speakers	2.92	0.51	SOMETIMES APPROPRIATE
Adjacency	2.58	0.51	SOMETIMES APPROPRIATE

Contingency	2.25	0.45	ABSENT
Quantity/ conciseness	2.33	0.49	ABSENT
Lexical Selection/Use Across Speech Acts			
Specificity / accuracy	2.75	0.87	SOMETIMES APPROPRIATE
Cohesion	2.25	0.45	ABSENT
Stylistic Variations			
The varying of communicative styles	2.70	0.30	SOMETIMES APPROPRIATE

With respect to speech acts, the above table shows:

- All pragmatic parameters are ranged between (M:2.00-4.00/Std:0.00), whereas the degree of assessment is ranged between always appropriate, sometimes appropriate and absent.
- The highest mean is for turn-taking "pause time" with (M:4.00/Std:0.00), assessed as always appropriate.
- The lowest level is for turn-taking "repair/revision" that arrived at (M: 2.00/Std:0.00) and assessed as absent.

Generally speaking, groups of verbal acts are assessed with different degrees:

- Speech acts, topic and stylistic variations are assessed as sometimes appropriate with mean ranged between (M: 2.79-2.60-2.67/Std:0.62-0.20-0.78).
- Turn-Taking is assessed as absent with mean (M:2.42/Std:2.38).

4.3.2 Paralinguistic Aspects:

Children's results in terms of the paralinguistic aspects are presented in the following table:

Table 12.

Occurrence of Pragmatic Parameters (PARALINGUISTIC ACTS). Following Prutting and Kirshner (1987).

Pragmatic Aspect	**Mean**	**Std. Deviation**	**Degree of assessment**
Intelligibility and Prosodics			
Intelligibility	**3.00**	**0.60**	SOMETIMES APPROPRIATE
Vocal intensity	2.92	0.51	SOMETIMES APPROPRIATE
Vocal quality	3.00	0.43	SOMETIMES APPROPRIATE
Prosody	2.67	0.65	SOMETIMES APPROPRIATE
Fluency	**2.33**	**0.49**	ABSENT

Taking the paralinguistic aspects into account, the above table shows:

- Intelligibility and prosodics are assessed as sometimes appropriate with a mean (M:2.78/Std:0.45).
- The pragmatic parameters under the group of intelligibility and prosodics are ranged between different means (M: 3.00-2.33/Std: 0.60-0.49), all these parameters are assessed as sometimes appropriate except for fluency which is assessed as absent in all participants.

4.3.3 Non-Verbal Aspects:

Results in terms of the non-verbal aspects are presented in this table:

Table 13.

Occurrence of Pragmatic Parameters (NON-VERBAL ACTS) Following Prutting and Kirshner (1987).

	Mean	***Std. Deviation***	**Degree of assessment**
Kinesics and Proxemics			
Physical proximity	2.75	0.45	SOMETIMES APPROPRIATE
Physical contacts	2.75	0.45	SOMETIMES APPROPRIATE
Body posture	2.75	0.45	SOMETIMES APPROPRIATE
Foot/leg and hand/arm movements	**4.00**	**0.00**	ALWAYS APPROPRIATE
Gestures	**2.08**	**0.29**	ABSENT
Facial expression	2.83	0.58	SOMETIMES APPROPRIATE
Eye gaze	2.75	0.62	SOMETIMES APPROPRIATE

The non-verbal aspect is the third and the last group in the pragmatic protocol, results concerning this group are presented in the above group as follow:

- Kinesics and proxemics, in general, are demonstrated with a mean (M:2.85/Std:0.33) and assessed as sometimes appropriate.
- The pragmatic parameters under this group are ranged between means (M: 4.00-2.08/Std: 0.00-0.62) and assessed as sometimes appropriate, except for gestures which are assessed as absent and foot/leg hand/arm movement which is assessed as always appropriate.

4.4 Autistic Children Pragmatic Development and the Variables: Age, Gender, Education and MLU.

In this section, children's pragmatic development against four variables: age, gender, attending school and MLU is examined.

4.4.1 The Pragmatic Parameters in Relation to Age:

Table 14.

Result of (Independent Samples T-Test) Due to Age.

Pragmatic Parameters	Age Groups	Mean	Std. Deviation	T	Sig.
Speech act pair analysis	Less than 10 years	2.75	0.50	0.00	1.00
	10 years and over	2.75	0.89		
Variety of speech acts	Less than 10 years	3.00	0.00	0.69	0.51
	10 years and over	2.75	0.71		
Selection	Less than 10 years	2.00	0.00	1.05	0.32
	10 years and over	2.25	0.46		
Introduction	Less than 10 years	2.25	0.50	0.00	1.00
	10 years and over	2.25	0.46		
Maintenance	Less than 10 years	2.25	0.50	0.78	0.45
	10 years and over	2.50	0.53		
Change	Less than 10 years	4.00	0.00	1.15	0.28
	10 years and over	3.38	1.06		
Initiation	Less than 10 years	2.00	0.00	1.41	0.19
	10 years and over	2.38	0.52		
Response	Less than 10 years	2.75	0.50	0.82	0.43
	10 years and over	3.13	0.83		
Repair / revision	Less than 10 years	2.00	0.00	-	-
	10 years and over	2.00	0.00		
Pause time	Less than 10 years	4.00	0.00	-	-
	10 years and over	4.00	0.00		
Interruption/ overlap	Less than 10 years	3.50	0.58	0.00	1.00
	10 years and over	3.50	0.53		
Feedback to speakers	Less than 10 years	3.00	0.00	0.38	0.71
	10 years and over	2.88	0.64		
Adjacency	Less than 10 years	2.50	0.58	0.38	0.71
	10 years and over	2.63	0.52		
Contingency	Less than 10 years	2.25	0.50	0.00	1.00
	10 years and over	2.25	0.46		
Quantity/ conciseness	Less than 10 years	2.00	0.00	1.83	0.10
	10 years and over	2.50	0.53		
Specificity / accuracy	Less than 10 years	2.75	0.50	0.00	1.00
	10 years and over	2.75	1.04		
Cohesion	Less than 10 years	2.00	0.00	1.41	0.19

	10 years and over	2.38	0.52		
The varying of communicative styles	Less than 10 years	2.50	0.58	0.51	0.62
	10 years and over	2.75	0.89		
Intelligibility	Less than 10 years	3.00	0.00	0.00	1.00
	10 years and over	3.00	0.76		
Vocal intensity	Less than 10 years	2.75	0.50	0.78	0.45
	10 years and over	3.00	0.53		
Vocal quality	Less than 10 years	3.00	0.00	0.00	1.00
	10 years and over	3.00	0.53		
Prosody	Less than 10 years	2.50	0.58	0.61	0.56
	10 years and over	2.75	0.71		
Fluency	Less than 10 years	2.25	0.50	0.40	0.70
	10 years and over	2.38	0.52		
Physical proximity	Less than 10 years	2.75	0.50	0.00	1.00
	10 years and over	2.75	0.46		
Physical contacts	Less than 10 years	2.75	0.50	0.00	1.00
	10 years and over	2.75	0.46		
Body posture	Less than 10 years	2.75	0.50	0.00	1.00
	10 years and over	2.75	0.46		
Foot/leg and hand/arm movements	Less than 10 years	4.00	0.00	-	-
	10 years and over	4.00	0.00		
Gestures	Less than 10 years	2.00	0.00	0.69	0.51
	10 years and over	2.13	0.35		
Facial expression	Less than 10 years	2.75	0.50	0.34	0.74
	10 years and over	2.88	0.64		
Eye gaze	Less than 10 years	2.75	0.50	0.00	1.00
	10 years and over	2.75	0.71		

* statistically significant value at level ($\alpha \leq 0.05$).

For more details, ASD participants were divided into two groups according to their ages: (see Appendix 2)

- Less than 10
- 10 years and over

In *t-test*, if sig value is ≤ (0.05), this means that the statistical differences are significant. Accordingly, the above table shows that there are no statistically significant differences at the level of significance ($\alpha \leq 0.05$) between the pragmatic aspects in relation to age. In both groups, the statistical significance appears ≥0.05 Where (T) values are not statistically significant. As a result, no differences

between children's pragmatic performance in relation to age are demonstrated. This means that age as a dependent variable has no effect on ASD children's performance and conversations.

However, during the assessment, the researcher noticed that there are some pragmatic aspects that were produced with different degrees when comparing age groups. These skills are:

- ✓ *Variety of speech*: assessed as *absent* in children under 10 years with (M:3.00/ Std:0.00) and as *sometimes appropriate* in ASD participants over 10 years with (M: 2.75/Std: 0.71);
- ✓ *Topic selection*: assessed as *absent* in ASD children under 10 years with (M:2.00/Std:0.00) and as *sometimes appropriate* in children over 10 years with (M:2.25/Std:0.46);
- ✓ *Topic Maintenance*: assessed as *absent* in ASD children under 10 years with (M:2.25/Std:0.50) and as *sometimes appropriate* in children over 10 years with (M:2.50/Std:0.53);
- ✓ *Topic change*: assessed as *always appropriate* in children under 10 years with (M:4.00/Std:0.00) and as *sometimes appropriate* in children over 10 years with (M:3.38/Std:1.06);
- ✓ *Initiation*: assessed ad *absent* in children under 10 years with (M:2.00/Std:0.00) and as *sometimes appropriate* in children over 10 years with (M:2.38/Std:0.52);
- ✓ *Response:* assessed as *absent* in children under 10 years with (M:2.75/Std:0.50) and as *sometimes appropriate* in children over 10 years with (M:3.13/Std:0.83);
- ✓ *Feedback to Speakers*: assessed as *absent* in children under 10 years with (M:3.00/Std:0.00) and as *sometimes appropriate* in children over 10 years with (M:2.88/Std:0.64);

- ✓ *Adjacency*: assessed as *absent* in children under 10 years with (M:2.50/Std:0.58) and as *sometimes appropriate* in children over 10 years with (M:2.63/Std:0.52);
- ✓ *Quantity/Conciseness*: assessed as *absent* in participants under 10 years with (M:2.00/Std:0.00) and as *sometimes appropriate* in children over 10 years with (M:2.50/Std:0.53);
- ✓ *Cohesion*: assessed as *absent* in children under 10 years with (M:2.00/Std:0.00) and as *sometimes appropriate* in children over 10 years with (M:2.38/Std:0.52);
- ✓ *The varying of communicative styles*: assessed as *absent* in participants under 10 years with (M:2.50/Std:0.58) and as *sometimes appropriate* in participants over 10 years with (M:2.75/Std:0.89);
- ✓ *Prosody*: assessed as *absent* in ASDs under 10 years with (M:2.50/Std:0.58) and as *sometimes appropriate* in children over 10 years with (M:2.75/Std:0.71);
- ✓ *Fluency*: assessed as *absent* in children under 10 years with (M:2.25/Std:0.50) and as *sometimes appropriate* in participants over 10 years with (M:2.38/Std:0.58);
- ✓ *Gestures:* assessed as *absent* in the ASD children who are under 10 years with (M:2.00/Std:0.00) and as *sometimes appropriate* in children over 10 years with (M:2.13/Std:0.53).

To sum up, although there are some slight differences between age groups in terms of producing pragmatic skills these findings are not sufficient to tell that age plays an important role in identifying differences between subjects' performance. The present study indicates that age is not an effective variable in determining differences between ASD children in developing pragmatic communicative skills. Therefore, one explanation for this study can be attributed to the nature of the disorder "Autism". It is known that autism is a pervasive

disorder that prevents all diagnosed children from achieving a good performance in pragmatic development since it's a delay.

Indeed, these findings are compatible with those of Baron-Cohen's (1992) when he conducted a study of four autistic subjects of different ages. Children in that study passed the false belief task and where age was an independent variable to measure out their performance. He concluded that a relatively high age was necessary but not sufficient for autistic subjects to pass the Smarties task. Nevertheless, the findings of this study disagreed with those of Eisenmajer & Prior (1991) who have found a relationship between the theory of mind task success and verbal mental age (VMA).

4.4.2 Pragmatic Parameters in Relation to Gender:

Table 15.

Result of (Independent Samples T-Test) Due to Gender.

Pragmatic Parameters	Gender	Mean	Std. Deviation	T	Sig.
Speech act pair analysis	Male	3.00	0.82	1.42	0.19
	Female	2.40	0.55		
Variety of speech acts	Male	2.86	0.69	0.16	0.88
	Female	2.80	0.45		
Selection	Male	2.29	0.49	1.29	0.23
	Female	2.00	0.00		
Introduction	Male	2.29	0.49	0.31	0.76
	Female	2.20	0.45		
Maintenance	Male	2.57	0.53	1.27	0.24
	Female	2.20	0.45		
Change	Male	3.29	1.11	1.42	0.19
	Female	4.00	0.00		
Initiation	Male	2.43	0.53	1.77	0.11
	Female	2.00	0.00		
Response	Male	3.29	0.76	1.72	0.12
	Female	2.60	0.55		
Repair / revision	Male	2.00	0.00	-	-
	Female	2.00	0.00		
Pause time	Male	4.00	0.00	-	-
	Female	4.00	0.00		
Interruption/ overlap	Male	3.43	0.53	0.54	0.60
	Female	3.60	0.55		
Feedback to speakers	Male	3.00	0.58	0.65	0.53
	Female	2.80	0.45		
Adjacency	Male	2.71	0.49	1.05	0.32
	Female	2.40	0.55		
Contingency	Male	2.29	0.49	0.31	0.76
	Female	2.20	0.45		
Quantity/ conciseness	Male	2.43	0.53	0.78	0.45
	Female	2.20	0.45		
Specificity / accuracy	Male	3.14	0.90	2.14	0.06
	Female	2.20	0.45		
Cohesion	Male	2.29	0.49	0.31	0.76
	Female	2.20	0.45		

The varying of communicative styles	Male	2.86	0.90	1.00	0.34
	Female	2.40	0.55		
Intelligibility	Male	3.14	0.69	0.97	0.36
	Female	2.80	0.45		
Vocal intensity	Male	3.14	0.38	2.04	0.07
	Female	2.60	0.55		
Vocal quality	Male	3.14	0.38	1.44	0.18
	Female	2.80	0.45		
Prosody	Male	**3.00**	**0.58**	**2.58***	**0.03**
	Female	2.20	0.45		
Fluency	Male	**2.57**	**0.53**	**2.36***	**0.04**
	Female	2.00	0.00		
Physical proximity	Male	2.86	0.38	0.97	0.36
	Female	2.60	0.55		
Physical contacts	Male	2.86	0.38	0.97	0.36
	Female	2.60	0.55		
Body posture	Male	2.86	0.38	0.97	0.36
	Female	2.60	0.55		
Foot/leg and hand/arm movements	Male	4.00	0.00	-	-
	Female	4.00	0.00		
Gestures	Male	2.14	0.38	0.83	0.42
	Female	2.00	0.00		
Facial expression	Male	3.00	0.58	1.21	0.26
	Female	2.60	0.55		
Eye gaze	Male	2.86	0.69	0.69	0.51
	Female	2.60	0.55		

* statistically significant value at level ($\alpha \leq 0.05$).

In language development, it is known that there is a difference between typical males and females in developing their communicative skills. Talking about ASD children, the above table shows that "*t-value*" was significant two times in prosody and fluency in favor to males. *"t-value"* is demonstrated significant in the following parameters:

- *Prosody*: when assessing prosody, it is found that this parameter is significant since $t \leq 0.03$. The difference is in favor of males who showed

prosody production with (M:3.00/Std:0.58), evaluated as *sometimes appropriate*. However, prosody production for females was assessed as *absent* and demonstrated with (M:2.20/Std:045);

- *Fluency*: *"t-value"* for fluency is also demonstrated significant in ($\alpha \leq 0.04$) with (M:2.57/Std:0.53) in favor of males and evaluated as *sometimes appropriate* for males compared to an *absent* fluency with (M:2.00/Std:0.00) for females.

During the observation, the researcher noticed that there are other differences between ASD males and females in terms of producing pragmatic parameters. These differences were shown mostly in the following skills:

- *Maintenance:* During the assessment, this parameter was evaluated in ASD boys as *sometimes appropriate* with (M:2.57/Std:0.53). on the other hand, the same parameter was *absent* in ASD girls with (M:2.20/Std:0.45);
- *Adjacency*: it was assessed as *sometimes appropriate* in males with (M:2.71/Std:0.49) and as *absent* in females with (M:2.40/Std:0.55);
- *Specificity/accuracy*: it was assessed as *sometimes appropriate* with (M:3.14/Std:0.90) in males and *absent* in female participants with (M:2.20/Std:0.45);
- *The varying of communicative styles:* it was assessed *sometimes appropriate* in male participants with (M:2.86/Std:0.90) and in females *absent* with (M:2.40/Std:0.55);
- *Vocal intensity:* it was assessed as *sometimes appropriate* in males with (M:3.14/Std:0.38), and in females, it was *absent* with (M:2.60/Std:0.55);
- *Vocal quality:* it appeared *sometimes appropriate* in males with (M:3.14/Std:0.38), and in females, it was *absent* with (M:2.80/Std:0.45);

- *Eye Gaze*: it was demonstrated as *sometimes appropriate* in males with (M:2.86/Std:0.69), and in female participants, it was *absent* with (M:2.60/Std0.55).

It is well established that the disorder has a male predominance by about 4 to 1 (Fombonne 2003). It is also often stated that when females are affected by autism, they exhibit a more ‘‘severe" form of the disorder, especially, in terms of IQ where female ASDs show lower performance than males (Volkmar et al. 1993). Although the researcher noticed many differences between gender groups during the observation, the t-value was statistically significant in two parameters *prosody* and *fluency*.

Therefore, this study indicates that gender as a variable is effective in indicating differences between males and females in the development of pragmatic communicative skills in ASD children. Moreover, the findings revealed that ASD female children show greater pragmatic impairment in comparison to male children. According to Ottman (1987), one possible explanation of these findings of greater severity among females is to hypothesize that the genetic liability for autism is normally distributed in the population and that males and females have a different genetic threshold.

Gender findings of the actual study are consistent with those of Carter et al (2007) who have shown that for very young children with ASD, boys show better language and motor skills and more advanced social development, while girls show better visual receptive skills. Moreover, Begeer et al. (2012) found that lower social, communicative, and cognitive functioning in females than in males with autism. Frazier et al. (2014) also found that females had greater social communication impairment compared with males, in addition to weaker adaptive skills. Furthermore, Ryder (2017) found that female ASD reported difficulty engaging in social conversation.

4.4.3 Pragmatic Parameters in Relation to Attending School

Table 16.

Result of (Independent Samples T-Test) Due to Attending Schools.

Pragmatic Parameters	**Education**	**Mean**	**Standard. Deviation**	**T-test**	**Sig.**
Speech act pair analysis	No	2.00	0.00	**5.81***	**0.00**
	Yes	3.29	0.49		
Variety of speech acts	No	2.40	0.55	**2.80***	**0.02**
	Yes	3.14	0.38		
Selection	No	2.00	0.00	1.29	0.23
	Yes	2.29	0.49		
Introduction	No	2.20	0.45	0.31	0.76
	Yes	2.29	0.49		
Maintenance	No	2.00	0.00	**3.23***	**0.01**
	Yes	2.71	0.49		
Change	No	4.00	0.00	1.42	0.19
	Yes	3.29	1.11		
Initiation	No	2.00	0.00	1.77	0.11
	Yes	2.43	0.53		
Response	No	2.40	0.55	**3.25***	**0.01**
	Yes	3.43	0.53		
Repair / revision	No	2.00	0.00	-	-
	Yes	2.00	0.00		
Pause time	No	4.00	0.00	-	-
	Yes	4.00	0.00		
Interruption/ overlap	No	3.60	0.55	0.54	0.60
	Yes	3.43	0.53		
Feedback to speakers	No	2.60	0.55	2.04	0.07
	Yes	3.14	0.38		
Adjacency	No	2.20	0.45	**2.76***	**0.02**
	Yes	2.86	0.38		
Contingency	No	2.00	0.00	1.77	0.11
	Yes	2.43	0.53		
Quantity/ conciseness	No	2.00	0.00	**2.36***	**0.04**
	Yes	2.57	0.53		
Specificity / accuracy	No	2.00	0.00	**3.75***	**0.00**
	Yes	3.29	0.76		
Cohesion	No	2.00	0.00	1.77	0.11
	Yes	2.43	0.53		
The varying of communicative styles	No	2.40	0.55	1.00	0.34
	Yes	2.86	0.90		
Intelligibility	No	2.60	0.55	2.28	0.05
	Yes	3.29	0.49		

Vocal intensity	No	2.60	0.55	2.04	0.07
	Yes	3.14	0.38		
Vocal quality	No	2.80	0.45	1.44	0.18
	Yes	3.14	0.38		
Prosody	No	2.20	0.45	**2.58***	**0.03**
	Yes	3.00	0.58		
Fluency	No	2.00	0.00	**2.36***	**0.04**
	Yes	2.57	0.53		
Physical proximity	No	2.60	0.55	0.97	0.36
	Yes	2.86	0.38		
Physical contacts	No	2.60	0.55	0.97	0.36
	Yes	2.86	0.38		
Body posture	No	2.60	0.55	0.97	0.36
	Yes	2.86	0.38		
Foot/leg and hand/arm movements	No	4.00	0.00	-	-
	Yes	4.00	0.00		
Gestures	No	2.00	0.00	0.83	0.42
	Yes	2.14	0.38		
Facial expression	No	2.60	0.55	1.21	0.26
	Yes	3.00	0.58		
Eye gaze	No	2.20	0.45	**3.96***	**0.00**
	Yes	3.14	0.38		

It is worth mentioning that attending school in this table means that the analysis will be based on those ASD participants who are integrated into schools and care centers. In this respect, 7 participants attend schools and autistic centers regularly; (only 2 children attend academic schools whereas 5 children attend care centers).

Taking this as a variable, the table above shows that the t-value is significant in 10 pragmatic parameters t-value ($a \leq 05$). This means that regular attending of schools is an effective variable in determining differences in ASD children when developing pragmatic communicative skills. These parameters are:

- Speech Act Pair Analysis: this parameter is significant with 5.81 (a=0.00), the significance is in favor of the educated participants in which speech acts

pair analysis is assessed as sometimes appropriate with (M: 3.29/Std:0.49). whereas, this parameter is assessed in non-educated children as absent with (M:2.00/Std:0.00);

- Variety of speech acts: t-value=0.02, assessed as absent in non-educated children with (M: 2.40/Std:0.55), and as sometimes appropriate in educated children with (M: 3.29/Std:0.49);
- Maintenance: t-value=0.01, assessed as absent in non-educated children with (M:2.40/0.55), and as sometimes appropriate in educated participants with (M:2.71/Std:0.49);
- Response: t-value=0.01, assessed as absent in non-educated ASD participants with (M:2.40/Std:0.55), and as sometimes appropriate in educated ASDs with (M:3.43/Std:0.53);
- Adjacency: t-value=0.02, assessed as absent in non-educated children with (M:2.40/Std:0.45), and as sometimes appropriate in educated children with (M:2.86/Std:0.38);
- Quantity/conciseness: t-value=0.04, assessed as absent in ono-educated children with (M:2.00/Std:0.00), and as sometimes appropriate in educated participants with (M:2.57/Std:0.53);
- Specificity/accuracy: t-value =0.00, assessed as absent in non-educated children with (M:2.00/Std:0.00), and as sometimes appropriate with (M: 3.29/Std:0.76) in educated participants;
- Prosody: t-value=0.03, assessed as absent in non-educated children with (M:2.20/Std:0.45), and as sometimes appropriate in educated children with (M:3.00/Std:0.58);
- Fluency: t-value=0.04, assessed as absent in non-educated children with (M:2.00/Std:0.00), and as sometimes appropriate in educated children with (M:2.57/Std:0.53);

- Eye Gaze: t-value=0.00, assessed as absent in non-educated children with (M:2.20/Std:0.45), and as sometimes appropriate in educated children with (M:3.14/Std:0.38).

In general, the actual study revealed that there is a big difference between children who attend schools and centers and those who are non-educated in producing pragmatic skills. The educated participants showed a great performance in the majority of the parameters in comparison to the non-educated ASDs. Thus, education is an effective variable in identifying pragmatic differences in children with an autism spectrum disorder.

These findings are compatible with Barnard-Brak et al (2014) who sees that teachers, professionals, peers, and other adults can be very effective in promoting the social engagement of individuals with ASD by using specific intervention strategies. Furthermore, Williams et al (2005) claimed that attending schools for ASDs is very important and effective. According to him, a primary reason cited for placing students on the spectrum in mainstream classes is to improve their opportunity to interact with typical peers. Moreover, these findings agree with (Robertson et al., 2003) who argue that children with ASDs have been found to be more socially involved with peers when placed in mainstream classes. Matson et al (2009) also claimed that schools or care centers, in general, are places where children can promote their social and pragmatic skills.

4.4.4 Pragmatic Parameters in Relation to Mean Length of Utterance (MLU):

For more details MLU scores of ASD children are divided into 5 groups:

1- First Group: from 1.5 to 2.5
2- Second Group: from 2.5 to 3.5
3- Third Group: from 3.5 to 4.5
4- Forth Group: from 4.5 to 5.5
5- Fifth Group: from 5.5 to 6.5. (see Appendix 3)

Taking MLU as a variable, appendix 3 shows that t-value is significant in eight pragmatic parameters, t-value (a≤05). This confirms the researcher's hypothesis that MLU is an effective variable in determining differences in ASD children when developing pragmatic communicative skills. Furthermore, all differences marked between ASDs in terms of their pragmatic performance were in favor of the fifth group. (the fifth group include ASDs with advanced MLU scores).

- Speech Act Pair Analysis: this parameter is significant with 2.20 (a=0.03), the significance is in favor of the fifth group with (M: 2.75/Std:0.04). Concerning the other four groups, Mean and Standard Deviation are scored between (M:2.30-3.00/Std:0.01-0.87)

- Contingency: concerning this aspect, the t-value is significant with (a=0.02) in favor of group five with (M: 2.40/Std:0.55). For the other four groups, Mean and Standard Deviation are scored between (M:2.40-3.00/Std:0.12-0.45).

- Cohesion: t-value, in terms of cohesion is scored as (a=0.01) in favor of those participants with advanced MLU by Mean and Standard Deviation (M:2.10/Std:0.32). However, the other groups 'performance appeared with different scores (M:2.20-3.10/Std:2.26-2.84).

- Lexical Selection/Use across Speech Acts: in this parameter, the t-value is scored as (a=0.01) in favor of the fifth group. Besides, Mean and Standard Deviation are demonstrated with (M:2.10/Std:0.12). Nevertheless, the other groups show no significant differences in their scores which appeared between (M:2.10-2.50/Std:0.54-0.98);

- Intelligibility: concerning the t-value of this parameter, it is significant with (a=0.02) in favor of the MLU advanced group. In addition, Mean and Standard Deviation are presented with (M:2.20/Std:0.16). the t-value of the

other groups shows no significant differences with (M:2.50-3.00/Std:0.12-0.54);

- Vocal Intensity: in the analysis of vocal intensity, t-value is significant with (a=0.01) in favor of the fifth group with Mean and Standard Deviation scores (M:2.10/Std:0.45). Concerning the other groups, the t-value is scored between (M:2.10-3.20/Std:0.04-0.98);

- Fluency: speech fluency is significant in favor of MLU advanced participants by (a=0.03). Besides, Mean and Standard Deviation appear with (M:2.10/Std:0.21). the less advanced group disfluency is showed between (M:3.00/Std:0.14-0.35);

- Eye Gaze: concerning eye gaze, the fifth group shows more maintenance, as a result, t-value (a=0.02). In terms of Mean and Standard Deviation, the scores are demonstrated with (M:2.10/Std:0.02). However, the other groups appeared between (M:2.10-3.00/Std:0.05-0.69).

Mean Length of Utterance has been widely used as a reference to linguistic maturation (Miller, 1981). A morpheme is the basic unit of speech. As child ages and learns, the lengths of his patterns of speech increase. In typical children, the increase in morpheme patterns and language acquisition is shaped by the age of the child. As much as the child is growing, as much as the MLU of the child is ameliorated and increased. However, children with autism follow a different pattern in acquiring language. Since it is a delay, autism prevents the growth of normal MLU. In this study, the researcher adopted MLU as a control variable because it is considered as an important measure in identifying different differences between children. In this respect, Rice et al, (2006, p.794) claimed:

> MLU-based comparisons appear to be particularly important for studies of morphosyntactic and syntactic development.

> Opportunities for children to produce key grammatical forms such as inflectional affixes, relative clauses, and question forms would logically be influenced by the extent to which children produce utterances that are sufficiently long enough to support such structures. Thus, utterance length represents an important confound that should be addressed experimentally—and MLU equivalency is one way to accomplish this.

As far as the actual study is concerned, ASD participants were divided into 5 groups according to their MLU scores. Accordingly, the findings reveal that most differences in performance are in favor of participants of the fifth group whose MLU is the highest. The concerned parameters are speech act pair analysis; contingency; cohesion; Lexical Selection/Use across Speech Acts; intelligibility; vocal intensity; fluency; and eye gaze. These findings confirm the researcher's hypothesis that MLU is effective in determining differences between ASD children in terms of pragmatic performance.

These results agree with those of Rice et al (2010). Based on their results, the authors support the reliability and validity of MLU as an index of normative language acquisition and a marker of language impairment. Moreover, Eisenberg et al., (2001) see MLU as a valuable index in investigations of children with language impairments. According to them, MLU is used in clinical applications to diagnose language impairments in young children, often defined as an MLU level one standard deviation or more below the mean for the child's age level. Furthermore, Tager-Flusberg et al., (2009) recommended that MLU should be used as a benchmark for cross-study comparisons of language intervention outcomes for children with autism, as one of several potential outcome measures.

4.5 The Correlation between Children's Performance on Pragmatic Behaviours and their Corresponding MLU:

In the following, the correlation between MLU and the other variables is measured by the use of the Pearson Correlation Measurement so as to show the show to what extent MLU is correlated with age, gender, and attending schools.

Table 17.

Pearson's Correlation between Children's Performance on Pragmatic Behaviours and Their Corresponding Age, Attending Schools and Gender.

		MLU	**Pragmatic Parameters**
MLU	Pearson Correlation		**0.686****
	Sig. (2-tailed)		**0.0039**
	Number	30	**30**
Age	Pearson Correlation	0.161	0.054
	Sig. (2-tailed)	0.617	0.978
	Number		30
Attending Schools	Pearson Correlation	**0.647****	**0.806****
	Sig. (2-tailed)	**0.0023**	**0.0019**
	Number	**30**	**30**
Gender	Pearson Correlation	-0.083-	**0.466****
	Sig. (2-tailed)	0.797	**0.0076**
	Number	30	**30**

****. Correlation is significant at the 0.01 level (2-tailed).**

Table (19) shows:

1. There is no correlation between MLU and age, the correlation coefficient value is demonstrated by: (r=0.161, sig.2 tailed=0.671). This indicates that the increase in age in ASD children does not affect the development of MLU.

2. There is a strong correlation between attending schools and MLU, the correlation coefficient value is demonstrated by: (r=0.647**, sig. 2 tailed=0.0023). This indicates that attending a school or care centers has a great effect on developing MLU in ASD children.

3. There is no correlation between MLU and gender, the correlation coefficient value is demonstrated by: (r=-0.083, sig. 2 tailed= 0.797). This indicates that the differences between ASD males and females do not affect the development of MLU.

4. There is a strong positive correlation between pragmatic parameters and MLU, the correlation coefficient value is demonstrated by: (r=0.686**, sig. 2 tailed= 0.0039). this indicates that as MLU of the ASD child increases, children's overall performance on pragmatic parameters increases as well.

5. There is no correlation between pragmatic parameters and age, the correlation coefficient value is demonstrated by: (r=0.54, sig. 2 tailed=0.978). This indicates that as the age of ASD child increases, this later does not affect the overall performance on pragmatic parameters.

6. There is a strong positive correlation between pragmatic parameters and education, the correlation coefficient value is demonstrated by: (r=0.806**, sig. 2 tailed=0.0019). This indicates that attending schools and care centers play a great role in children's overall performance on pragmatic parameters.

7. There is a correlation also between pragmatic parameters and gender, the correlation coefficient value is demonstrated by: (r=0.466**, sig. 2

tailed=0.0076). This indicates that gender differences between males and females affect the children's overall performance on pragmatic parameters.

To sum up, the above results show that the increase in children MLU is strongly associated with the possibility of attending schools. This confirms the researcher's hypothesis that attending schools regularly for ASD children gives them the opportunity to promote and enhance their social and pragmatic skills. Children will be engaged in different types of conversations (adult/child conversation; peer's conversations). As a result, MLU patterns will be enriched and increased. Besides, ASDs ameliorate their pragmatic performance through the increase of MLU.

4.6 Children's Results after the Introduction of Speech Generative Device:

Based on the obtained results concerning the effect of attending schools in the development of pragmatic skills in children with autism, it was claimed that ASD participants who attend schools regularly exhibit a great performance in the majority of the parameters in comparison to the five non-educated ASDs. Thus, attending schools is an effective variable in identifying pragmatic differences in children with an autism spectrum disorder. Therefore, a new intervention known as Augmentative and Alternative Communication (AAC) is introduced as an alternative method of attending schools. AAC is used to test its reliability in helping children with ASD disorder to enhance their language abilities in general, and the pragmatic skills in particular. There exist many forms of AAC that can be used to help persons with communicative disorders. In this study, Speech Generating Device is used as an aided system of AAC. It is a sort of mobile application speaking in Arabic.

After the introduction of a speech-generating device, the following results are demonstrated (see Appendix 4):

- Topic change, Turn-taking pause time and foot/leg and hand/arm appear with a *(mean=4; Std Deviation= 0.00;* these aspects are always Appropriate in the five ASD participants.
- Interruption/Overlap is demonstrated with *(mean=3.60; Std Deviation=0.55)*. This pragmatic parameter is also always appropriate in 4 ASD children from 5.
- Variety of speech acts, introduction, response, feedback to speakers, adjacency, the varying of communicative styles, intelligibility, vocal intensity, vocal quality, prosody, physical proximity, physical contacts, body posture, facial expression, and eye gaze ranged between *(mean=2.80-2.20; Std Deviation =0.55-0.45)*. these parameters are marked sometimes appropriate in all the five children.
- Topic selection, topic introduction, topic maintenance, turn-taking initiation, turn-taking repair revision, turn-taking contingency, turn-taking quantity/conciseness, turn-taking cohesion, fluency, gestures do never appear in the 5 children, all the tenth parameters are marked absent with *(mean=2.00; Std Deviation=0.00).*

4.7 The Comparison between the Overall Results before and after Introducing SGD in Children Communication:

By comparing the results obtained after the introduction of SGD with the previous results (the overall performance of ASD participants in terms of pragmatic parameters), the following results are demonstrated: (see appendix 5)

- Topic selection is improved after the use of SGD, the comparison is significant with 4.00 (a=0.00), the significance is in favor of the educated participants in which the selection of topic is assessed as

sometimes appropriate with (M: 3.29/Std:0.49). whereas, it is assessed in non-educated children as absent with (M:2.00/Std:0.00);

- Topic change is also improved after the use of SGD, the comparison is significant with 1.61 (a=0.00), the significance is in favor of the educated participants in which the change of topic is assessed as sometimes appropriate with (M: 1.40/Std:0.55). however, it is assessed in non-educated children as absent with (M:4.00/Std:0.00);
- Turn-taking interruption/overlap is improved after the use of SGD, the comparison is significant with 6.35 (a=0.00), the significance is in favor of the educated participants in which the parameter is assessed as always appropriate with (M: 1.40/Std:0.55). However, it is assessed in non-educated children as always appropriate with (M:3.60/Std:0.55);
- Turn-taking feedback to speakers is improved after the use of SGD, the comparison is significant with 2.45 (a=0.04), the significance is in favor of the educated participants in which the parameter is assessed as sometimes appropriate with (M: 2.00/Std:0.00). However, it is assessed in non-educated children as absent with (M:2.60/Std:0.55);
- Turn-taking quantity/conciseness is improved after the use of SGD, the comparison is significant with 4.00 (a=0.00), the significance is in favor of the educated participants in which the parameter is assessed as sometimes appropriate with (M: 2.80/Std:0.45). However, it is assessed in non-educated children as absent with (M:2.00/Std:0.00);
- Intelligibility is improved after the use of SGD, the comparison is significant with 2.45 (a=0.04), the significance is in favor of the educated participants in which the parameter is assessed as sometimes appropriate with (M: 2.00/Std:0.00). However, it is assessed in non-educated children as absent with (M:2.60/Std:0.55);
- Vocal intensity is improved after the use of SGD, the comparison is significant with 4.00 (a=0.00), the significance is in favor of the

educated participants in which the parameter is assessed as sometimes appropriate with (M: 2.00/Std:0.00). However, it is assessed in non-educated children as sometimes appropriate with (M:2.60/Std:0.55);

- Prosody is improved after the use of SGD, the comparison is significant with 3.64 (a=0.01), the significance is in favor of the educated participants in which the parameter is assessed as sometimes appropriate with (M: 2.80/Std:0.45). However, it is assessed in non-educated children as absent with (M:2.20/Std:0.45);
- Physical proximity is improved after the use of SGD, the comparison is significant with 2.45 (a=0.04), the significance is in favor of the educated participants in which the parameter is assessed as sometimes appropriate with (M: 2.00/Std:0.00). However, it is assessed in non-educated children as absent with (M:2.60/Std:0.45);
- Physical contact is improved after the use of SGD, the comparison is significant with 2.45 (a=0.04), the significance is in favor of the educated participants in which the parameter is assessed as sometimes appropriate with (M: 2.00/Std:0.00). However, it is assessed in non-educated children as absent with (M:2.60/Std:0.45);

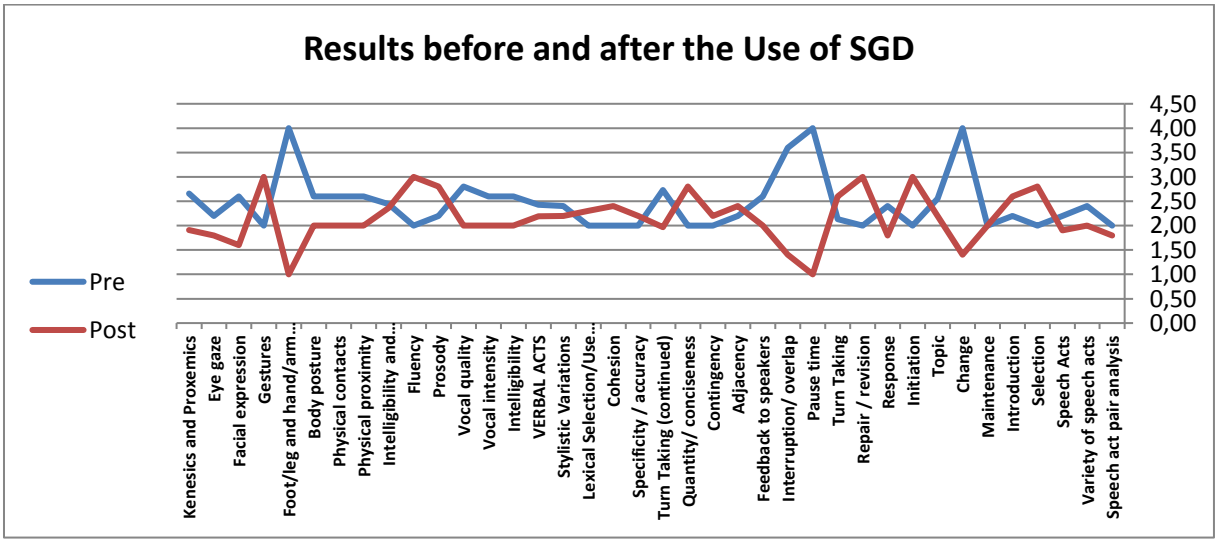

Figure 10: The Representation of the Comparison between Children's Performance before and after the Introduction of SGD.

The overall results obtained from the comparison suggest that speech output can play a significant role in improving pragmatic skills in ASD children. It is demonstrated from the findings that 10 parameters are improved after the intervention of SGD, these are topic selection; topic change; interruption/overlap; feedback to speakers; conciseness; intelligibility; vocal intensity; prosody, physical proximity; and physical contact.

These findings are compatible with many studies who have supported the use of AAC and SGD at any age. The first of these studies is a study carried by Schlosser et al., (1995). They compared the acquisition of visual–graphic symbols paired with voice output with the acquisition of visual–graphic symbols alone by 3 adults with severe intellectual disabilities through the use of SGD. They found that the voice output visual–graphic symbols resulted in more efficient learning, with fewer errors than the visual–graphic symbols alone. Romsky et al., (2010) noticed that children involved in SGD groups used more targeted augmented words. Brker et al., (2013) also supported the use of AAC in preschool, and growth in Language Skills, for young children with developmental disabilities. They argue that the use of AAC by peers to provide augmented input was associated with stronger language growth. In 2016, Luke examined the impact of speech-generating devices on the language development of a child with childhood apraxia of speech. He found that the use of SGDs led to an immediate increase in the communicative development of the child. According to him, an increase in all linguistic variables was observed, with a latency effect of eight to nine treatment sessions.

Furthermore, many studies suggest that the use of SGD is helpful for adults with intellectual disabilities. By the use of this synthetic speech output, disordered adults can continue to develop their communication skills. Besides, an adult may benefit from services and supports of SGD, directed toward communication even

though he or she is past the typical developmental window for language development (Cheslock e al., 2008). In another study carried by Schepis and Reid (1995), the researchers also examined the effects of an SGD on the communicative partners of a 23-year-old woman with severe disabilities. Results indicated that residential staff members interacted with the woman more frequently when she had access to her device than when the device was not available for her use.

To sum up, children with autism often experience substantial impairments in the domain of language and communication. Speech generating device (SGD) is one of the widely used augmentative communication systems with this population. From its first use, AAC in general and SGD, in particular, are proved to be important components that can contribute to the success of the intervention. Additionally, the overall outcome suggests that non-verbal children with autism can successfully learn to use the SGDs at their own pace with the support of proper prompting strategies and instructional procedures. This category can use speech outputs regularly to explain their needs to others. The best example of this is the famous theoretical physicist Stephen Hawking (1942, 2018) who talked to the world through the computer, using a speech-generating device.

4.8 Conclusion:

This chapter seeks to analyze the data gathered through the use of a set of research instruments mainly; pragmatic protocol (1987), recording observation provides direct observation of the ASD children. Based on both quantitative and qualitative approaches, this research unveils the development of pragmatic communicative skills in Algerian children speakers with an autism spectrum disorder.

It also endeavors at exploring the effect of the independent variables such as age, gender, attending school and Mean Length of Utterance in the pragmatic

communicative skills in autistic participants. As well as, how speech generative devices can play a great role in enhancing communicative skills in this category.

The results revealed that the performance of children in the 30 pragmatic parameters is poor and strongly affected by the variables "attending schools, MLU scores, and gender". Furthermore, the findings indicate a strong correlation between the development of MLU scores and attending school. Moreover, speech-generating devices prove its positive contribution in promoting and maintaining pragmatic skills as well as speech devices in children with an autism spectrum disorder.

General Conclusion

Every person with autism is different from others, ASD children have varying degrees of difficulty acquiring language since autism is a developmental disability characterized by atypical social interaction, interests or body movements, and communication. The study of pragmatic as one component of language development is very important in psycholinguistics and neurolinguistics studies to identify the communication deficits in children with autism. Indeed, the study at hands has looked over communicative skills in general and pragmatic skills in particular. Therefore, its central objectives are approaching Algerian speaker children with autism spectrum disorder and their communicative skills as well as the way they develop the pragmatic competence and portraying the ways that independent variables such as age, gender, attending schools, and Mean Length of Utterance (MLU), also generalizing a comprehensive theory concerning the universality of ASD child's pragmatic development and the developmental link between pragmatic skills and grammatical competence. Furthermore, the aim of the study is approached also to understand the contribution of speech generative devices in developing the pragmatic communicative skills in children with autism.

The study's main purpose is to approach the phenomenon of pragmatic with the Algerian ASD context and inspect the major factors which are undoubtedly relevant in its deficits and developments. It also sheds light on the role of attending school plays in the development of communicative skills as well as pragmatic competence. Moreover, the purpose of the study is to assess the role of speech generative devices in the development of pragmatic skills in children who have no opportunity to attend schools or care centers. In order to reach these objectives, a designed methodology has been followed. Yet, three instruments of investigation namely pragmatic protocol, video recordings, and participant observation have been relied on so as to gather the required data for the research.

The sample population was picked up from two Algerian Wilayas to be the case study that categorizes the Algerian autistic speech communities as a whole. Hence, the following research questions have been put forward:

1- What are the pragmatic parameters and devices that are always appropriate, sometimes appropriate and which ones are absent in children with autism spectrum disorder?
2- How do variables like age, gender, attending school and MLU affect children's pragmatic development in autism communication?
3- To what extent does MLU correlate positively with attending school in autistic children?
4- To what extent can speech generative devices replace schools and enhance pragmatic communicative skills in autistic children?

The study consists of four main chapters, and each aims at tackling particular issues relevant to the work. Yet, the first chapter reports the relevant literature about autism spectrum disorder including the main characteristics of this disorder and the main theories which were set up to explain this phenomenon, while the second embraces the pragmatics of language and the relationship between autism and pragmatic deficits. The third chapter, however, contemplates the steps of research and its ethics in general and the methodology pursued in this survey in particular. The fourth chapter represents the practical side of the study where the collected data from the employed tools of the investigation were analyzed and discussed.

So, the combination of the four chapters aims at investigating pragmatic deficits that appear in Algerian autistic children's performances. First, the phenomenon of autism spectrum disorder relationship between autism and language development is discerned in an overall course. Second, a relationship between autism and pragmatic is investigated from the angle of how autism as a disorder is able to restrict or permit the use of different aspects of pragmatic

development. Third, the way independent variables (age, gender, attending school and MLU) differ in affecting the development of pragmatic communicative skills, in addition to the positive contribution of speech generative devices in enhancing pragmatic development in ASD children. Finally, analyses and interpretation of results are done to approve or disapprove the hypotheses.

This study provided new and important information concerning the typical development of pragmatic skills in children with an autism spectrum disorder. Compared to the work of Prutting and Kirshner (1987), in the present study, we have information about the pragmatic development of ASD children from 6 to 14 years. On the other hand, earlier studies examined English speaking autistic children, whereas, we have now obtained information about children from a different language and cultural background.

On account of the retrieved results and regarding each hypothesis aside, the following conclusions have been drawn:

First of all, we hypothesized that ASD children have pragmatic deficits, thereupon, Algerian ASD participants showed a poor performance regarding communicative behaviors. The same findings were revealed by the study of Prutting and Kirshner (1987) when assessing the pragmatic skills in a group of disordered children. From this, we can conclude that the pragmatic impairment in children with autism is not a process linked to a specific language despite the existence of some differences concerning those cultural conventionalized skills, which proved to be developing according to social and cultural stimulation. Therefore, pragmatic disorders caused by autism is a result of a cognitive process rather than a cultural one.

Regarding the second hypothesis i.e. pragmatic development in children with autism spectrum disorders, may be affected by some external variables such as age, gender, attending school and Mean Length of Utterance (MLU). Consequently, when examining the effect of these variables, it was found that in

ASD children, the abilities to use different pragmatic skills are ameliorated with attending school and the increase of MLU.

Autistic children who are attending schools and care centers regularly showed better performance than those who do not attend schools. In general, the actual study revealed that there is a big difference between children who attend schools and centers and those who are non-educated in producing pragmatic skills. The educated participants showed a great performance in the majority of the parameters in comparison to the non-educated ASDs. Thus, education is an effective variable in identifying pragmatic differences in children with an autism spectrum disorder. Our findings are consistent with Barnard-Brak et al (2014) who sees that teachers, professionals, peers, and other adults can be very effective in promoting the social engagement of individuals with ASD by using specific intervention strategies. Moreover, there is a claim that schools or care centers, in general, are places where children can promote their social and pragmatic skills, Matson et al (2009). The findings of the actual study agree strongly with this claim.

Concerning the MLU as a variable, the finding of this study indicates that pragmatic development goes in parallel with grammatical development as suggested by the increase in MLU scores. It agrees with a number of studies, (Bates, et al., 1979; Bruner., 1983; Evrin-Tripp., 2012) which claim that pragmatic development and grammatical competence develop together within the whole language system. On the other hand, the present study weakens the claims made by Schaffer, Hacohen & Bernstein (2003) in that pragmatic development can be considered separately from syntactic development, and that grammatical and pragmatic systems are distinct independent modules from each other since these two domains of language have different developmental pathways.

Gender as a variable is effective in indicating differences between males and females in the development of pragmatic communicative skills in ASD children.

Moreover, the findings revealed that ASD female children show greater pragmatic impairment in comparison to male children. The findings of this study are consistent with Begeer et al. (2012) who found lower social, communicative, and cognitive functioning in females with ASD than in males with ASD. Frazier et al. (2014) also found that females had greater social communication impairment compared with males, in addition to weaker adaptive skills. Furthermore, Ryder (2017) found that female ASD reported difficulty engaging in social conversation.

Third, the researcher hypothesized that the development of grammatical skills MLU in ASD children is associated with attending school and care centers. Children's MLUs were correlated with age, gender and education and the obtained results support the mentioned hypothesis. Children's MLU scores are found to be strongly correlated with attending schools. Participants who attend schools regularly showed higher MLU scores.

Ultimately, the fourth hypothesis is sustained by the fact that the non- educated participants will develop their pragmatic communicative skills through the use of speech generative devices (SGD) after a particular period of time. So, a kind of SGD was introduced to enhance communication among those participants. After a period of 8 months, the same participants were re-assessed through the same pragmatic protocol (1987) and the results revealed that ASD participants using SGD showed an improved performance in comparison to their first performance.

To summarize, the present study highlights some conclusions concerning autistic children's pragmatic development in relation to four variables: age, gender, MLU, and education. Also, it contributes to generalizing a comprehensive theory concerning the developmental trends of pragmatic skills in autism and its relation to grammatical development as indexed by ASD children's MLU scores as well as the role of education in enhancing pragmatic communicative abilities in this category. Moreover, this study supports the use of speech generative device as a new technological method that can help both ASD children who cannot attend

schools or care centers and parents in promoting their communicative skills in general and the pragmatic ones in particular.

In the light of the previous discussion, the methodology of the study, and the review of related literature, the following recommendations are proposed to help parents, teachers, and people working in autism childcare as well as researchers interested in understanding autistic children's pragmatic development.

First, a number of observations are made on ASD children's development of pragmatic communicative skills. Therefore, psychologists, pathologists, speech therapists, neurologists are recommended to make use of these observations when comparing the pragmatic abilities of autistic children to those of hearing impaired, maltreated, and mentally disordered children. The results from the study are of help in deciding when development is within the normal range, delayed or deviant.

Second, the present study limits its investigation to Algerian autistic children between 6 and 14 years. Consequently, future research on Arab autistic pragmatic development is to be devoted to investigate the following groups: adolescents, adults, and children who are bilingual or exposed to more than one culture.

Third, the present study limits itself to the study of development in only 30 pragmatic parameters (verbal acts, paralinguistic aspects, and nonverbal aspects). Future research, therefore, is to be directed to the following topics of developmental pragmatics: autistic children's communicative intent and conversational devices, their development of narrative skills, their mastery of politeness conventions and their pragmatic comprehension.

Fourth, the present study investigates children's pragmatic development in relation to four variables: age, gender, MLU, and education. Therefore, future studies are invited to explore children's pragmatic development in relation to the

following variables: academic achievement, gender of the partner, language impairment, socioeconomic status, context, and cultural differences.

Fifth, future researchers are invited to explore the same goals of this study with other methods, for example, using Children Communication Checklist (CCC), which is to be administered to parents or caregivers who can provide further information about aspects of autistic children's pragmatic development which are difficult to assess by language sampling or planned elicitation tests.

Sixth, since Mean Length of Utterance (MLU) has proved to be a good indicator of pragmatic and grammatical development in autistic children, the researcher recommends its use, rather than age, for grouping autistic children when investigating general language development.

Seventh, since speech generative devices, have proved to be a good method in promoting pragmatic development in autistic children. Therefore, parents, speech therapists and people who work in care centers are recommended to adopt the use of these devices as an alternative way for autistic children who cannot attend schools or care centers due to the severity of autism degree they are suffering from.

Finally, future researchers are invited to test the reliability of SGD in investigating the development of pragmatic communicative skills in other categories of mentally disordered children.

In this sense, the present analysis constitutes a step towards clarifying the communicative symptoms that are presented in the oral speech of persons with an autism spectrum disorder.

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Appendices

Appendices

Appendix 1

Coding Systems for Naturalistic Assessment of Interaction

Types of Coding System	Function	Methodology
Communicative intent: the purpose or the expected effect of the communicative act	Taxonomies of communicative intent have been used in research studies and are undoubtedly one of the most frequently used types of coding system for use with pre-school children.	Assessment of communicative intent in the early years is based on detailed observational longitudinal research studies representing a synthesis of developmental work by: Bates, Begnini, Bretherton, Camaioni, and Volterra (1979), Coggins and Carpenter (1981), Dore (1979) and Halliday (1975).
Speech acts: the act which is done or performed by speaking.	Speech act analysis has been employed in the assessment of language pragmatics with older children in order to profile the child's use of communicative functions in terms of variety and to indicate how the acts are used in specific contexts. Speech acts which are typically targeted in assessment are: *request, command, question (or requesting information), challenge, denial, negation, statements, and greetings*.	Fey (1986) describes a system of coding in which speech acts are subdivided into requestives (request for information, request for action, request for clarification), assertive acts (comments, statements, disagreements) and performatives (teasing, exclamations). This system has the advantage of being able to characterise the child as, for instance, an assertive, or a non-responsive communicator.
Responsiveness and initiation : exchange structure	Initiations and responses have been used in studies to assess the talkativeness and responsiveness of children with communication impairments	As an index of conversational dominance, these assessments enable the practitioner not only to investigate problematic strategies or behaviours such as non-responding but also to

		identify problems of responsiveness across verbal and non-verbal domains
Repairs: a set of behaviours which attempt to mend exchanges where information has been inadequate, the message poorly planned or misunderstood because of external factors such as noise.	children with specific language impairments tended to leave problematic utterances unrepaired as compared to language- and age-matched peers. These behaviours should be assessed in naturalistic contexts	Observation and coding of repairs provides an important measure of how problematic the interaction is on both sides. A system for coding breakdowns in conversations (Breakdown Coding System) with young children, described by Yont, Howard, and Miccio (2000) holds considerable potential for a focused practical assessment of repair strategies.
Turn Taking: a skilled behaviour dependent on the recognition and synthesis by participants of a series of cues (prosodic, linguistic, non-verbal and visual) which indicate a speaker's intention to finish talking.	Children with receptive language problems appear to be at more risk for turn-taking clashes than children with pure expressive language problems. These problems may be dependent on monitoring comprehension in the interaction too.	The assessment of turn-taking is therefore likely to be redundant except in planning and monitoring intervention for individuals with significant problems in this area.
Cohesion: a number of linguistic devices which set up links between different utterances in an interchange	The use of cohesive devices sets up a series of inferences to be made by the interlocutor and reduces redundancy in communication. In order to interpret or use cohesive devices shared and mutual knowledge must exist between the interlocutors,	There are no published assessments of cohesion .Studies have established simple assessment systems such as : 1- referent recoverable from linguistic context (anaphora= referring back or cataphora = referring ahead);

	implying a strong cognitive dimension to cohesion.	2- referent recoverable from the situation (exophoric reference); 3- ambiguous or unrecoverable referent (Adams & Bishop, 1989).
Topic: 'a clause or noun phrase that identifies the question of immediate concern and that provides a global description of the content of a sequence or utterance', Mentis & Prutting, (1991) quoted in Adams (2002:978)	Topic analysis considers whether each utterance 1-contains information; 2-is pertinent to the overall topic; 3-maintains or introduces a new subtopic; 4-contains no new information; 5- is a side sequence (not contributing to topic maintenance but not a different topic); 6- is problematic (ambiguous, incomplete or unrelated information).	The best reference for assessing topic is the work of Brinton and Fujiki (1989) which provides a checklist of topic management and a consideration of the development and variability of topic. The usual manner of assessment is via a series of categories included in a checklist, such as topic introduction, topic continuation, topic shift, topic chain (where topics are linked together), topic recycling (where previous topics are reused) and topic reintroduction.
Coherence: refers to the way in which a theme is built into discourse or interaction.	In studies, judgements of whether events are retold logically with adequate reference for the interlocutor to follow the 'thread' are usually made. Irrelevance, topic drifting, lack of elaboration and omission of events in sequences are noted	The assessment of coherence has the potential to address pragmatic problems in the older verbal child

Appendix 2

Children Overall Performance on the 30 Elicited Pragmatic Skills:

Pragmatic Parameters	**Degree of Assessment**					
	Always Appro		**Sometimes Appro**		**Absent**	
	Freq	**Per %**	**Freq**	**Per %**	**Freq**	**Per %**
Speech Acts						
Speech act pair analysis	02	16.66	05	41.66	05	41.66
Variety of speech acts	01	08.33	08	66.66	03	25.00
Topic						
Selection	00	00.00	02	16.66	10	83.33
Introduction	00	00.00	03	25.00	09	75.00
Maintenance	00	00.00	05	41.66	07	58.33
Change	09	75.00	03	25.00	00	00.00
Turn Taking						
Initiation	00	00.00	03	25.00	09	75.00
Response	03	25.00	06	50.00	03	25.00
Repair / revision	00	00.00	00	00.00	12	100.00
Pause time	00	00.00	00	00.00	12	100.00
Interruption/ overlap	06	50.00	06	50.00	00	00.00
Feedback to speakers	01	08.33	10	83.00	01	08.33
Adjacency	00	00.00	07	58.33	05	41.66
Contingency	00	00.00	03	25.00	09	75.00
Quantity/ conciseness	00	00.00	04	33.33	08	66.66
Lexical Selection/Use Across Speech Acts						

Specificity / accuracy	03	25.00	04	33.33	05	41.66
Cohesion	00	00.00	02	16.66	10	83.33
Stylistic Variations						
The varying of communicative styles	02	16.66	05	41.66	05	41.66
Intelligibility and Prosodics						
Intelligibility	02	16.66	08	66.66	02	16.66
Vocal intensity	01	08.33	09	75.00	02	16.66
Vocal quality	02	16.66	09	75.00	01	08.33
Prosody	01	08.33	06	50.00	05	41.66
Fluency	00	00.00	04	33.33	08	66.66
Kinesics and Proxemics						
Physical proximity	00	00.00	09	75.00	03	25.00
Physical contacts	00	00.00	09	75.00	03	25.00
Body posture	00	00.00	09	75.00	03	25.00
Foot/leg and hand/arm movements	12	100.00	00	00.00	00	00.00
Gestures	00	00.00	01	08.33	11	91.66
Facial expression	01	08.33	08	66.66	03	25.00
Eye gaze	01	08.33	07	58.33	04	33.33

Appendix 3

Children's Pragmatic Results in Relation to MLU

Pragmatic parameters	MLU	Mean	Std. Deviation	t	Sig.
Speech act pair analysis	1.5-2.5	2.30	0.25	1.11	0.21
	2.5-3.5	2.54	0.15	1.58	0.32
	3.5-4.5	2.70	0.87	3.24	0.54
	4.5-5.5	3.00	0.01	3.21	0.10
	5.5-6.5	**2.75**	**0.04**	**2.20**	**0.08**
Variety of Speech Act	1.5-2.5	2.60	0.04	2.14	0.33
	2.5-3.5	2.80	0.45	3.25	0.35
	3.5-4.5	2.20	0.24	2.19	0.19
	4.5-5.5	3.20	0.21	2.68	0.21
	5.5-6.5	2.10	0.65	0.22	0.21
Selection	1.5-2.5	2.60	0.22	2.61	0.33
	2.5-3.5	2.40	0.30	3.32	0.21
	3.5-4.5	2.70	0.66	1.56	0.65
	4.5-5.5	3.00	0.12	2.33	0.45
	5.5-6.5	2.20	0.48	2.51	0.12
Introduction	1.5-2.5	2.40	0.69	0.54	0.13
	2.5-3.5	2.10	0.12	3.00	0.17
	3.5-4.5	2.60	0.14	0.22	0.15
	4.5-5.5	2.60	0.52	3.15	0.26
	5.5-6.5	3.00	0.25	3.98	0.54
Maintenance	1.5-2.5	3.20	0.13	3.14	0.33
	2.5-3.5	3.00	0.94	2.66	0.19

	3.5-4.5	2.90	0.19	2.58	0.45
	4.5-5.5	2.10	0.12	2.12	0.26
	5.5-6.5	2.32	0.09	3.21	0.21
Change	1.5-2.5	4.00	0.00	-	-
	2.5-3.5	4.00	0.00	-	-
	3.5-4.5	4.00	0.00	-	-
	4.5-5.5	4.00	0.00	-	-
	5.5-6.5	4.00	0.00	-	-
Initiation	1.5-2.5	2.30	0.12	2.10	0.45
	2.5-3.5	2.10	0.45	3.66	0.45
	3.5-4.5	3.00	0.65	0.42	0.24
	4.5-5.5	3.10	0.20	2.32	0.21
	5.5-6.5	2.50	0.20	0.32	0.33
Response	1.5-2.5	2.90	0.25	2.44	0.11
	2.5-3.5	2.10	0.45	3.41	0.32
	3.5-4.5	2.60	0.14	0.66	0.12
	4.5-5.5	3.10	0.41	0.21	0.45
	5.5-6.5	3.20	0.18	2.33	0.45
Repair/Revision	1.5-2.5	4.00	0.00	-	-
	2.5-3.5	4.00	0.00	-	-
	3.5-4.5	4.00	0.00	-	-
	4.5-5.5	4.00	0.00	-	-
	5.5-6.5	400	0.00	-	-
Pause Time	1.5-2.5	4.00	0.00	-	-
	2.5-3.5	4.00	0.00	-	-
	3.5-4.5	4.00	0.00	-	-

	4.5-5.5	4.00	0.00	-	-
	5.5-6.5	4.00	0.00	-	-
Interruption/Overlap	1.5-2.5	4.00	0.00	-	-
	2.5-3.5	4.00	0.00	-	-
	3.5-4.5	4.00	0.00	-	-
	4.5-5.5	4.00	0.00	-	-
	5.5-6.5	4.00	0.00	-	-
Feedback to Speakers	1.5-2.5	2.30	0.23	0.58	0.21
	2.5-3.5	2.30	0.10	0.33	0.24
	3.5-4.5	2.60	0.96	0.54	0.19
	4.5-5.5	2.10	0.58	1.25	0.15
	5.5-6.5	2.50	0.30	2.15	0.31
Adjacency	1.5-2.5	2.10	0.25	2.29	0.19
	2.5-3.5	2.10	0.48	1.25	0.13
	3.5-4.5	2.10	0.79	3.65	0.43
	4.5-5.5	3.00	0.98	0.33	0.25
	5.5-6.5	2.00	0.64	0.14	0.22
Contingency	1.5-2.5	2.40	0.42	0.98	0.33
	2.5-3.5	2.40	0.45	3.21	0.54
	3.5-4.5	2.40	0.12	3.58	0.15
	4.5-5.5	3.00	0.44	2.22	0.12
	5.5-6.5	**2.10**	**0.64**	**3.12**	**0.02**
Quantity/Conciseness	1.5-2.5	2.60	0.45	2.05	0.10
	2.5-3.5	2.10	0.94	2.64	0.19
	3.5-4.5	2.80	0.74	1.10	0.32
	4.5-5.5	2.00	0.84	1.88	0.21

	5.5-6.5	3.10	0.95	1.25	0.44
Specificity	1.5-2.5	2.50	0.85	3.12	0.20
	2.5-3.5	2.30	0.48	0.58	0.33
	3.5-4.5	2.10	0.84	0.25	0.35
	4.5-5.5	2.00	0.25	2.65	0.18
	5.5-6.5	3.00	0.12	2.12	0.21
Cohesion	1.5-2.5	3.10	0.26	1.44	0.34
	2.5-3.5	2.20	0.65	3.22	0.11
	3.5-4.5	2.90	0.97	3.65	0.45
	4.5-5.5	2.70	0.84	2.58	0.54
	5.5-6.5	**2.10**	**0.32**	**2.14**	**0.05**
Lexical Selection/Use across Speech Acts	1.5-2.5	2.20	0.69	2.25	0.31
	2.5-3.5	2.20	0.58	0.11	0.21
	3.5-4.5	2.50	0.54	3.25	0.54
	4.5-5.5	2.10	0.98	3.58	0.14
	5.5-6.5	**2.10**	**0.12**	**0.22**	**0.01**
Stylistic Variations	1.5-2.5	3.00	0.45	2.22	0.33
	2.5-3.5	3.00	0.10	2.23	0.12
	3.5-4.5	2.50	0.14	3.12	0.45
	4.5-5.5	2.40	0.20	0.22	0.45
	5.5-6.5	2.10	0.58		0.35
Intelligibility	1.5-2.5	3.00	0.12	0.33	0.54
	2.5-3.5	3.00	0.13	3.69	0.34
	3.5-4.5	2.50	0.19	0.58	0.54
	4.5-5.5	2.80	0.54	0.11	0.10
	5.5-6.5	**2.20**	**0.16**	**0.12**	**0.09**

Vocal Intensity	1.5-2.5	2.70	0.98	3.33	0.13
	2.5-3.5	2.10	0.12	2.55	0.54
	3.5-4.5	3.00	0.58	2.14	0.31
	4.5-5.5	3.20	0.14	2.36	0.12
	5.5-6.5	**2.10**	**0.45**	**3.47**	**0.01**
Vocal Quality	1.5-2.5	2.60	0.00	0.17	0.24
	2.5-3.5	2.60	0.00	0.41	0.36
	3.5-4.5	3.00	0.00	2.98	0.31
	4.5-5.5	3.20	0.00	2.10	0.45
	5.5-6.5	2.00	0.00	3.14	0.11
Prosody	1.5-2.5	2.10	0.23	3.65	0.33
	2.5-3.5	2.70	0.27	0.18	0.41
	3.5-4.5	2.30	0.55	2.58	0.22
	4.5-5.5	2.10	0.69	0.48	0.41
	5.5-6.5	2.10	0.03	3.25	0.35
Fluency	1.5-2.5	3.00	0.15	2.54	0.15
	2.5-3.5	3.00	0.14	0.36	0.65
	3.5-4.5	3.00	0.54	1.25	0.54
	4.5-5.5	3.00	0.35	3.25	0.23
	5.5-6.5	**2.10**	**0.21**	**3.21**	**0.03**
Physical Proximity	1.5-2.5	3.00	0.52	2.35	0.10
	2.5-3.5	3.00	0.15	0.84	0.65
	3.5-4.5	2.50	0.45	0.14	0.25

	4.5-5.5	2.60	0.85	0.42	0.21
	5.5-6.5	2.80	0.67	0.12	0.54
Physical Contacts	1.5-2.5	3.00	0.72	3.54	0.45
	2.5-3.5	3.00	0.47	2.22	0.21
	3.5-4.5	2.40	0.84	3.98	0.14
	4.5-5.5	2.10	0.85	3.30	0.33
	5.5-6.5	2.10	0.89	2.54	0.54
Body Posture	1.5-2.5	2.00	0.21	2.10	0.12
	2.5-3.5	2.00	0.88	3.21	0.36
	3.5-4.5	2.00	0.45	0.50	0.45
	4.5-5.5	2.10	0.65	1.20	0.27
	5.5-6.5	2.40	0.48	0.15	0.45
Foot/leg and hand/arm movements	1.5-2.5	4.00	0.00	-	-
	2.5-3.5	4.00	0.00	-	-
	3.5-4.5	4.00	0.00	-	-
	4.5-5.5	4.00	0.00	-	-
	5.5-6.5	4.00	0.00	-	-
Gestures	1.5-2.5	2.00	0.48	2.58	1.98
	2.5-3.5	2.00	0.12	0.45	0.89
	3.5-4.5	2.60	0.54	1.58	0.84
	4.5-5.5	2.30	0.21	2.45	0.79
	5.5-6.5	2.90	0.54	3.21	0.75
Facial Expressions	1.5-2.5	2.10	0.20	3.25	1.82
	2.5-3.5	3.00	0.98	0.54	1.50
	3.5-4.5	3.00	0.25	0.32	0.41
	4.5-5.5	2.50	0.20	3.21	0.32

	5.5-6.5	2.70	0.20	2.60	0.12
Eye Gaze	1.5-2.5	3.00	0.69	1.47	0.79
	2.5-3.5	3.00	0.54	2.25	0.69
	3.5-4.5	2.10	0.32	1.25	0.54
	4.5-5.5	2.50	0.05	3.25	0.56
	5.5-6.5	**2.10**	**0.02**	**2.62**	**0.02**

Appendix 4

Children's Results after the Introduction of Speech Generative Device:

No.	Pragmatic Aspects	Mean	Std. Deviation	Degree of Assessment
Verbal acts				
		Speech Acts		
1	Speech act pair analysis	2.00	0.00	Sometimes Appropriate
2	Variety of speech acts	2.40	0.55	Sometimes Appropriate
		Topic		
3	Selection	2.00	0.00	Absent
4	Introduction	2.20	0.45	Absent
5	Maintenance	2.00	0.00	Absent
6	Change	4.00	0.00	Always Appropriate
		Turn Taking		
7	Initiation	2.00	0.00	Absent
8	Response	2.40	0.55	Sometimes Appropriate
9	Repair / revision	2.00	0.00	Absent
10	Pause time	4.00	0.00	Always Appropriate
11	Interruption/ overlap	3.60	0.55	Always Appropriate
12	Feedback to speakers	2.60	0.55	Sometimes Appropriate

13	Adjacency	2.20	0.45	Sometimes Appropriate
14	Contingency	2.00	0.00	Absent
15	Quantity/ conciseness	2.00	0.00	Absent
Lexical Selection/Use Across Speech Acts				
16	Specificity / accuracy	2.00	0.00	Sometimes Appropriate
17	Cohesion	2.00	0.00	Absent
Stylistic Variations				
18	The varying of communicative styles	2.40	0.55	Sometimes Appropriate
Paralinguistic Aspects				
Intelligibility and Prosodics				
19	Intelligibility	2.60	0.55	Sometimes Appropriate
20	Vocal intensity	2.60	0.55	Sometimes Appropriate
21	Vocal quality	2.80	0.45	Sometimes Appropriate
22	Prosody	2.20	0.45	Sometimes Appropriate
23	Fluency	2.00	0.00	Absent
Non-verbal Aspects				
Kinesics and Proxemics				
24	Physical proximity	2.60	0.55	Sometimes Appropriate

25	Physical contacts	2.60	0.55	Sometimes Appropriate
26	Body posture	2.60	0.55	Sometimes Appropriate
27	Foot/leg and hand/arm movements	4.00	0.00	Always Appropriate
28	Gestures	2.00	0.00	Absent
29	Facial expression	2.60	0.55	Sometimes Appropriate
30	Eye gaze	2.20	0.45	Sometimes Appropriate

Appendix 5

Children's Result before and after the Use of SGD

Pragmatic Aspects	Pre		Post		*T*	sig
	Mean	**Std. Deviation**	**Mean**	**Std. Deviation**		
Speech Act Pair Analysis	2.00	0.00	1.80	0.45	1.00	0.35
Variety of speech acts	2.40	0.55	2.00	0.00	1.63	0.14
Selection	2.00	0.00	2.80	0.45	**4.00***	**0.00**
Introduction	2.20	0.45	2.60	0.55	1.26	0.24
Maintenance	2.00	0.00	2.00	0.00	-	-
Change	4.00	0.00	1.40	0.55	**1.61***	**0.00**
Initiation	2.00	0.00	3.00	0.00	-	-
Response	2.40	0.55	1.80	0.45	1.90	0.09
Repair / revision	2.00	0.00	3.00	0.00	-	-
Pause time	4.00	0.00	1.00	0.00	-	-
Interruption/ overlap	3.60	0.55	1.40	0.55	**6.35***	**0.00**
Feedback to speakers	2.60	0.55	2.00	0.00	**2.45***	**0.04**
Adjacency	2.20	0.45	2.40	0.55	0.63	0.54
Contingency	2.00	0.00	2.20	0.45	1.00	0.35
Quantity/ conciseness	2.00	0.00	2.80	0.45	**4.00***	**0.00**
Specificity / accuracy	2.00	0.00	2.20	0.45	1.00	0.35
Cohesion	2.00	0.00	2.40	0.55	1.63	0.14
The varying of communicative styles	2.40	0.55	2.20	0.45	0.63	0.54

Intelligibility	2.60	0.55	2.00	0.00	**2.45***	**0.04**
Vocal intensity	2.60	0.55	2.00	0.00	**4.00***	**0.00**
Vocal quality	2.80	0.45	2.00	0.00	2.12	0.07
Prosody	2.20	0.45	2.80	0.45	**3.64***	**0.01**
Fluency	2.00	0.00	3.00	0.00	-	-
Physical proximity	2.60	0.55	2.00	0.00	**2.45***	**0.04**
Physical contacts	2.60	0.55	2.00	0.00	**2.45***	**0.04**
Body posture	2.60	0.55	2.00	0.00	2.89*	0.02
Foot/leg and hand/arm movements	4.00	0.00	1.00	0.00	-	-
Gestures	2.00	0.00	3.00	0.00	-	-
Facial expression	2.60	0.55	1.60	0.55	-	-
Eye gaze	2.20	0.45	1.80	0.45	1.41	0.20

Appendix 6

Pragmatic Protocol
Adapted from Prutting & Kirchner: Pragmatic Aspects of Language (1987)

Date:

Name: / Age: / Gender: /
Attending School:

COMMUNICATIVE ACT	DEFINITION	ALWAYS APPROPRIATE	SOMETIMES APPROPRIATE	ABSENT	NO OPPORTUNITY	
VERBAL ACTS						
Speech Acts						
• Speech act pair analysis	The ability to take both speaker and listener role appropriate to the context		/			
• Variety of speech acts	The variety of speech acts or what one can do with language such as comment, assert, request, promise, and so forth		/			
Topic						
• Selection	The selection of a topic appropriate to the multidimensional aspects of context			/		
• Introduction	Introduction of a new topic in the discourse	/				
• Maintenance	Coherent maintenance of topic across the discourse		/			
• Change	Change of topic in the discourse	/				
Turn Taking						
• Initiation	Initiation of speech acts		/			
• Response	Responding as a listener to speech acts		/			

• Repair / revision	The ability to repair a conversation when a breakdown occurs, and the ability to ask for a repair when misunderstanding or ambiguity has occurred			/		
VERBAL ACTS						
Turn Taking (continued)						
• Pause time	Pause time that is too short or too long between words, in response to a question, or between sentences	/				
• Interruption/ overlap	Interruptions between speaker and listener; overlap refers to two people talking at once		/			
• Feedback to speakers	Verbal behavior to give the listener feedback such as *yeah* and *really*; nonverbal behavior such as head nods to show positive reactions and side to side to express negative effects or disbelief			/		
• Adjacency	Utterances that occur immediately after the partner's utterance				/	
• Contingency	Utterances that share the same topic with a preceding utterance and that add information to the prior communicative act				/	
• Quantity/ conciseness	The contribution should be as informative as required but not too informative			/		
Lexical Selection/Use Across Speech Acts						
• Specificity / accuracy	Lexical items of best fit considering the text		/			
• Cohesion	The recognizable unity or connectedness of text			/		
Stylistic Variations						
• The varying of communicative styles	Adaptations used by the speaker under various dyadic conditions (e.g., polite forms, different syntax, changes in vocal quality)		/			

PARALINGUISTIC ASPECTS						
Intelligibility and Prosodics						
• Intelligibility	The extent to which the message is understood		/			
• Vocal intensity	The loudness or softness of the message		/			

• Vocal quality	The resonance and/or laryngeal characteristics of the vocal tract		/			
• Prosody	The intonation and stress patterns of the message; variations of loudness, pitch, and duration			/		
• Fluency	The smoothness, consistency, and rate of the message			/		
NONVERBAL ASPECTS						
Kenesics and Proxemics						
• Physical proximity	The distance that the speaker and listener sit or stand from one another		/			
• Physical contacts	The number of times and placement of contacts between speaker and listener		/			
• Body posture	Forward lean is when the speaker or listener moves away from a 90-degree angle toward the other person; recline is slouching down from waist and moving away from the partner; side to side is when a person moves to the right or left			/		
• Foot/leg and hand/arm movements	Any movement of the foot/leg or hand/arm (touching self or moving an object or touching part of the body, clothing, or self)	/				
• Gestures	Any movements that support, complement, or replace verbal behavior			/		
• Facial expression	A positive expression as in the corners of the mouth turned upward; a negative expression is a downward turn; a neutral expression is the face in resting position		/			
• Eye gaze	One looks directly at the other's face; mutual gaze is when both members of the dyad look at the other		/			

Appendix 7

Rules for Calculating MLU in Arabic Adapted from Dormi & Berman (1982, p. 410-414)

Nouns and Adjectives:

1. Count as one morpheme all inanimate nouns in the singular: كتاب. باب. حيط

2. Count as two morpheme animate nouns and all adjectives in the feminine : طبيبة. معلمة. ورقة

3. Count as two morphemes all nouns and adjectives that appear in dual or plural form: ألعاب. معلمات

4. Count as one morpheme all plural forms which:

a) have no singular counterpart:ماء. نساء

b) are clearly unanalyzed: مقص

5. Count as one morpheme all clearly formulaic or un-segmented expressions:

a) Compound Nouns: خمسة عشر

b) Proper Nouns: عبد الاله. نور اليقين

c) Ritualistic Formulas: عيد ميلاد

e) Other expressions: من بعداك

Verbs:

1. Count as one morpheme all imperatives: (اذهب)روح.(تكلم)أهدر

2. Count as one morpheme tensed forms that occur in 3rd person masculine singular, irrespective of whether they are present, past or future tense: راح. راه يزقي. دوك يجي. No additional points are given for the use of the same verb in different tenses: راح. غادي يروح- راه رايح

3. Add an additional point to any change in the tensed forms with respect to number, gender, or person (any change in vowel infixes and in the addition of a suffix or prefix): راهم يلعبو. جاو.

4. Do not assign additional points for the use of a given verb root according to the different 15 patterns: كتاب. كتب. تكاتب. انكتب. اكتتب

Function Words:

1. Count all the pronouns in the normative as one morpheme disregarding gender, person, or number: هوما. حنا. نتوما

2. Count all inflected pronouns as two morpheme : عليه. فيه

3. Count as one morpheme all prepositions: . في. على. تحت

4. Count as one morpheme the following functors:

a) Demonstratives: هذا. هاذوك

b) Time Adverbs: البارح. اليوم. من بعداك

c) Floating Operators: (ولكن) بصح

d) Question Words: شكون. وين. علاه

e) Numerals and Quantifiers:واحد. زوج. بزاف

f) Frozen or Formualic expressions: ماعلابالیش

5. Count as one morpheme the following functors which are prefixed to the next word:

a) The Definite Article: ال التعريف

b) Conjunction Markers: و

c) Subordinator: أن

Miscellaneous:

1. Repetitions of the same word are counted only once except where a modifier is produced two or more times for emphasis (بزاف بزافcounts as two).

2. Meaningful vocalizations such as onomatopoeic (میاو. عاو) are counted as one morpheme.

3. Fillers and exclamations (اهاا. اه. یاك) are not counted unless they convey some semantic content.

4. Diminutives forms are given an extra point when they appear to be used productively in the sample: (رضیع) مومو. صغیرون. بنوتة. Unlike English, diminutives are given credit.

Summary

Autism is a complex set of disorders in the brain. It is characterized by difficulties that face the autistic person to interact with the community. The main objective of this thesis is to study the development of the pragmatic communicative skills of autistic children in Algeria with regard to age, gender and mean length of utterance (MLU) in addition to attending school. For this purpose, A longitudinal case study was conducted. Data collected from a set of tools were analyzed statistically. The results showed a disorder in the development of communication skills in children with autism. In addition to a strong relationship between the development of communicative skills and development of (MLU) as well as attending schools. In the latter, SGD has proven successful in the development of pragmatic skills and grammatical abilities in autistic children who are unable to attend school or care centers.

Key Words:

Autism, pragmatic communicative skills, mean length.

ملخص:

يعتبر التوحد مجموعة من الاضطرابات المعقدة في نمو الدماغ، وتتجلى في مواجهة الفرد المصاب لصعوبات في التفاعل مع المجتمع والتواصل معه. الهدف الرئيسي من هذه الأطروحة هو دراسة تطور مهارات التواصل البراغماتية لدى الأطفال المتحدثين المصابين بالتوحد في الجزائر، من خلال متغيرات العمر والجنس ومعدل طول الجملة (MLU) بالإضافة الى التمدرس. لهذا الغرض أجريت دراسة بحثية ميدانية في فترة مطولة وقد تم تحليل البيانات التي تم جمعها عبر أدوات التقييم من خلال المنهج الإحصائي. وقد دلت النتائج على وجود اضطراب في نمو مهارات التواصل لدى أطفال التوحد، بالإضافة الى وجود علاقة قوية بين تطور مهارات التواصل وتطور القدرات النحوية للطفل، كما أن تطور القدرات النحوية مقرون بإمكانية التمدرس، كما أثبت جهاز توليد الكلام (SGD)نجاحه في تطور المهارات البراغماتية والقدرات النحوية لدى أطفال التوحد الغير قادرين على الالتحاق بالمدارس أو مؤسسات الرعاية.

الكلمات المفتاحية:

التوحد، المهارات البراغماتية، معدل طول الجملة، التمدرس، جهاز توليد الكلام.