

Implicit Meaning Comprehension in Autism Spectrum Disorders

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By

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To

V, C, and K

My Safety Net

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PREFACE

This book is addressed to practitioners from two main fields. First, to clinical linguists, and more specifically clinical pragmatists, conducting research on Autism Spectrum Disorders and, secondly, to neuropsychiatrists, psychologists, and language therapists who both study this condition and work with people on the spectrum. This being a book addressed mainly to these experts from two different fields, I chose to include very general notions from both fields so as to provide a basis to everyone to follow and understand the theoretical notions underlying the research. Thus, if you are a linguist, you probably will not need to go through the first part of Chapter Two, which illustrates some basic pragmatic notions. Similarly, if you are a neuropsychiatrist, a psychologist, and/or a language therapist, you may not need to read the first part of Chapter One, which provides some general background knowledge on ASD.

I also have to specify that the research was conducted in 2011. This means that the diagnostic manuals in use at the time were ICD-10 (still in use today), and DSM-IV. The latter currently has a new edition, but I chose to present the fourth edition considering that it was the one in use at the time of the research.

Clinical pragmatics is a young discipline and involves the cooperation of people with different expertise. I am a linguist, and I knew I needed the help of medical doctors to conduct this research. Achieving this was not always easy but, once managed, it proved to be very fruitful. Recognizing one's own limits and understanding the necessity of collaboration for research in boundary-crossing disciplines is fundamental for scientific improvement and progress.

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This research would not have been possible without the precious collaboration of the people tested; thus the first acknowledgement is for the 58 people who patiently sat the test and answered all my questions.

I would not have been able to recruit the people in the ASD group without the help of several people who deserve to be mentioned here: Doctor Petrillo from Ospedale San Donato–Arezzo; Doctor Radice from Ospedale Le Scotte–Siena; Doctor Grittani from Centro Autismo e Disturbi dello Sviluppo–Rimini; Doctor Gallo and Speech Therapist Reverberi from Centro Autismo–Reggio Emilia; Doctor Giusti from Istituto Medaglia Miracolosa–Arezzo; Vice-President of the Asperger Group Lazio Mrs. Adami. I owe the possibility of conducting this research to you, your foresight, open-mindedness, and patience.

The associations and/or structures that provided the facilities for the test administrations were: Association *Gruppo Asperger Lazio*–Rome; *Centro Autismo*, Ward of Child Neuropsychiatry, Azienda Unità Sanitaria Locale–Rimini; *Centro Diagnosi, Cura e Ricerca sull’Autismo e i Disturbi Pervasivi dello Sviluppo*, Azienda Unità Sanitaria Locale–Reggio Emilia; Istituto di Riabilitazione *Medaglia Miracolosa*, Viciomaggio–Arezzo; Ward of Child Neuropsychiatry of the Hospital *Santa Maria delle Scotte*, Siena; Ward of Child Neuropsychiatry of the Hospital *San Donato*, Arezzo.

As for the devising of the test, I am grateful to Professor Vergaro (University of Perugia) and Professor Sbisà (University of Trieste) for having ascertained its pragmatic adequacy, and to Doctor Petrillo (ASL 8 Arezzo) for having ascertained its psycho-neurological adequacy. I also thank Professor Cummings (Nottingham Trent University) for her insightful inputs.

My gratitude goes to Professor Vergaro and Professor Sandford (University of Perugia), for having read the manuscript, for their helpful comments and suggestions, and for their support.

INTRODUCTION

This book presents the results of a research project focusing upon implicit meaning comprehension in people along the spectrum of autistic disorders. The rationale for such an investigation is based on the fact that, although research on the topic abounds and a general agreement is emerging about the fact that autistic people are characterized by a ‘pragmatic impairment’, even in cases in which all other levels of linguistic competence are not affected by this medical condition, the patients still have problems in the use of language, not recognizing communication as a social act. Consequently, autistic people are reported to have problems with metaphors, emotional language expression and comprehension, prosody and inferential language. The cause of this impairment of pragmatic skills *in toto* is still unknown.

A possible explanation for such a discrepancy may be due to the fact that researchers appear to be carrying out their research with the aim of demonstrating that the theory on which their work is based is *the* definitive explanation for such a phenomenon. Taking a critical stand towards this type of approach, the present research is based on a solid theoretical basis, but does not try to demonstrate the superiority of one theoretical hypothesis over another. It starts from the assumption—based on previous research—of an inferential language impairment in Autistic Spectrum Disorder (hereafter ASD) patients and analyzes data with no theoretical bias. Only after the analysis does it attempt to identify which theory best accounts for the data collected.

As the First Chapter illustrates, there are three main theories that account for pragmatic impairment in people with ASD: weak central coherence (WCC), executive functions (EEF), and theory of mind (ToM)¹. Crucially, they have all been developed by psychologists who, in their attempt to identify the causes of autism, analyze not only the social and psychological dysfunctions of these patients, but also the linguistic ones. This type of approach seems to be flawed in that the study of language functions and dysfunctions, being based on linguistic data, are the privileged object of investigation of linguistics, which, of course, interacts with other disciplines such as psychology or neurology. Nonetheless, when it comes to analyzing linguistic data, the pivotal role of linguistics can be neither ignored nor played down.

After having dealt with what pragmatic competence actually is and how it develops and functions in neurotypical individuals, Chapter Two presents previous research about pragmatic impairment in ASD patients, pointing out its strong and weak points. Faced with the need to test pragmatic skills in these patients, the existing material was analyzed, and what was found out is that there are only two tests available for Italian professionals to analyze pragmatic competence: Prove per la valutazione della Comunicazione Referenziale² (PCR) (Camaioni *et al.*, 1995), and Abilità Pragmatiche nel Linguaggio³ (APL) Medea (Lorusso, 2009). They both utilize written material, even if in APL there are some visual aspects like pictures and comics⁴.

It seems difficult to test pragmatic skills using only written materials, given that by definition pragmatic skills refer to the ability to use language in communicative contexts. Even tests devised for English professionals (see §2.6) are characterized by this underestimation of the role of context in communicative exchanges. Presenting people with transcripts of conversations does not give them the necessary tools to interpret the exchange. Thus, this kind of approach appeared to be flawed because it seems unnatural and inauthentic.

Based on these observations, I decided to devise a test that would recreate more authentic communicative exchanges. The test and the methodology are illustrated in Chapter Three. The participants tested were required to watch short videos of conversational exchanges containing some kind of implicit meaning, and were then asked questions about it. Videos create a scene which allows for inclusion of all of the contextual clues necessary for interpretation and, also, for analysis of the extent to which the inability to interpret implicit meaning depends on testing modality. The test devised for this research differs from the previous ones mainly because of this feature, in that it gives context its due importance, thereby allowing for interactions to be as natural and realistic as possible. Furthermore, I was present during the test administration and not only did I record the answers and the physical responses to the testing items presented, but I also intervened by asking questions about the choices being made by the participants.

As for methodology, the study follows the ‘case-control’ design in that the same test was administered to an experimental group of 29 people along the autistic spectrum and to a control group of neurotypical individuals matched for age and sex. The results of both groups were then compared and analyzed to establish the extent of implicit meaning comprehension in people with ASD and its divergence from the norm.

As Chapters Four and Five discuss, providing the appropriate context fostered the inferential process. In other words it allowed these participants to select the most relevant interpretation of an utterance, even if it was not the literal one. The results of the study would seem to go against the predictions and the results of previous research as far as the severity of the impairment is concerned, in that ASD patients demonstrate an ability, of course at different levels, to disambiguate sentences and assign a non-literal meaning to utterances.

CHAPTER ONE

BACKGROUND ON AUTISM SPECTRUM DISORDERS

This chapter presents an overview on autism and autistic spectrum disorders. It firstly presents this condition; secondly, it discusses the means available for its classification and diagnosis; then, it describes this condition from a medical perspective presenting its etiology and pathogenesis; lastly, it presents the most accredited cognitive theories that account for it.

1. 1 Introduction

When the term *autistic* (from the Greek *αὐτός*) was coined by the Swiss psychiatrist Eugen Bleuler in 1911, it was used to describe schizophrenic patients who isolated themselves from the outside world and social relationships, withdrawing into themselves. In 1943, Leo Kanner hypothesized that some schizophrenic patients, described until then as *autistic*, could actually be considered as affected by a syndrome that was different from schizophrenia and from the other mental disorders known at that time. For this reason, he named this syndrome *autism*. After the observation of 11 children, Kanner (in Rutter 1978:139) described nine symptoms characteristic of this newly identified syndrome:

“[...] inability to develop relationships with people, a delay in speech acquisition, the non-communicative use of speech after it developed, delayed echolalia, pronominal reversal, repetitive and stereotyped play activities, an obsessive insistence on the maintenance of sameness, a lack of imagination, a good rote memory and a normal physical appearance”.

Autism is today defined as a pervasive developmental disorder that persists throughout life. The term ‘pervasive’ refers to the fact that it affects several areas of cognitive and behavioral functioning. ‘Developmental’ refers instead to the fact that it usually manifests itself in the first years of life. Even if not all of the symptoms described by Kanner are recognized

today as being systematically associated with autism, he had the considerable merit of having identified three main features characteristic of this disorder. According to the World Health Organization (1992) and the American Psychiatric Association (2000), these are:

- Impairment in social interaction
- Communication deficits
- Restricted interests and activities, and stereotyped, repetitive behaviors.⁵

The pediatrician Hans Asperger was conducting research on a syndrome similar to autism in Austria, at the same time as Kanner was working in the United States. The syndrome today bears his name and is characterized by the same core features as autism. Asperger patients, though, do not present mental retardation or delay in language acquisition. However, given that Asperger wrote in German, his work became known only in the 1980s thanks to the British psychiatrist Lorna Wing, who was the first to use the term 'Asperger's Syndrome'⁶. She also conducted research that led her to put forward the idea of quantitative and not qualitative differences among autistic patients. In her 1979 article she coined the term 'Autism Spectrum Disorders'⁷ which refers to and includes autistic-like conditions that vary from severe classical autism at one end, to High Functioning Autism (hereafter HFA) and Asperger's Syndrome (hereafter AS) at the other.

1.2 Autism Spectrum Disorders

Autism and Asperger's Syndrome are classified by two manuals: the International Statistic Classification of Diseases and Related Health Problems (hereafter ICD), and the Diagnostic and Statistical Manual of Mental Disorders (hereafter DSM). The two manuals identify criteria that are substantially the same. Nevertheless, both will be presented for the sake of completeness. It is important to point out, as underlined in Cummings (2009:118), that there are no biological markers for autism yet, and thus clinicians rely on behavioral criteria for the diagnosis of this disorder.

1.2.1 ICD-10

The World Health Organization provides a description of the symptoms that characterize autism spectrum disorders in the classification of diseases

known as ICD. In this classification, the autistic spectrum is assigned the code F84 and includes: classical autism, atypical autism, Rett's Syndrome, Other Childhood disintegrative disorder, Overactive Disorder Associated with Mental Retardation and Stereotyped Movements, Asperger's Syndrome, Other Pervasive Developmental Disorder and Pervasive Developmental Disorder Not Otherwise Specified (hereafter PDD-NOS). The ICD is currently in its tenth edition⁸, which was published for the first time in 1992, and lists the following diagnostic criteria for childhood autism⁹:

A. Abnormal or impaired development is evident before the age of 3 years in at least one of the following areas:

1. receptive or expressive language as used in social communication;
2. the development of selective social attachments or of reciprocal social interaction;
3. functional or symbolic play.

B. A total of at least six symptoms from (1), (2) and (3) must be present, with at least two from (1) and at least one from each of (2) and (3):

1. Qualitative impairments in social interaction are manifest in at least two of the following areas:

a. failure to use adequately eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction;

b. failure to develop (in a manner appropriate to mental age, and despite ample opportunities) peer relationships that involve a mutual sharing of interests, activities and emotions;

c. lack of socio-emotional reciprocity as shown by an impaired or deviant response to other people's emotions; or lack of modulation of behavior according to social context; or a weak integration of social, emotional, and communicative behaviors;

d. lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., a lack of showing, bringing, or pointing out to other people objects of interest to the individual).

2. Qualitative abnormalities in communication are manifest in at least one of the following areas:

a. delay in or total lack of development of spoken language that is not accompanied by an attempt to compensate through the use of gestures or mime as an alternative mode of communication (often preceded by a lack of communicative babbling);

b. relative failure to initiate or sustain conversational interchange (at whatever level of language skill is present), in which there is reciprocal responsiveness to the communications of the other person;

c. stereotyped and repetitive use of language or idiosyncratic use of words or phrases;

d. lack of varied spontaneous make-believe play or (when young) social imitative play.

3. Restricted, repetitive, and stereotyped patterns of behavior, interests, and activities are manifested in at least one of the following:

a. an encompassing preoccupation with one or more stereotyped and restricted patterns of interest that are abnormal in content or focus; or one or more interests that are abnormal in their intensity and circumscribed nature though not in their content or focus;

b. apparently compulsive adherence to specific, non-functional routines or rituals;

c. stereotyped and repetitive motor mannerisms that involve either hand or finger flapping or twisting or complex whole-body movements;

d. preoccupations with part-objects of non-functional elements of play materials (such as their odor, the feel of their surface, or the noise or vibration they generate).

C. The clinical picture is not attributable to the other varieties of pervasive developmental disorders; specific development disorder of receptive language (F80.2) with secondary socio-emotional problems,

reactive attachment disorder (F94.1) or disinhibited attachment disorder (F94.2); mental retardation (F70-F72) with some associated emotional or behavioral disorders; schizophrenia (F20.-) of unusually early onset; and Rett's Syndrome (F84.12).

The diagnostic criteria for Asperger's Syndrome¹⁰ on the other hand, are the following:

A. A lack of any clinically significant general delay in spoken or receptive language or cognitive development. Diagnosis requires that single words should have developed by two years of age or earlier, and that communicative phrases be used by three years of age or earlier. Self-help skills, adaptive behavior, and curiosity about the environment during the first three years should be at a level consistent with intellectual development. However, motor milestones may be somewhat delayed and motor clumsiness is usual (although not a necessary diagnostic feature). Isolated special skills, often related to abnormal preoccupations, are common, but are not required for diagnosis.

B. Qualitative abnormalities in reciprocal social interaction (criteria as for autism).

C. An unusually intense circumscribed interest or restrictive, repetitive, and stereotyped patterns of behavior, interests and activities (criteria as for autism; however, it would be less usual for these to include either motor mannerisms or preoccupations with part-objects or non-functional elements of play materials).

D. The disorder is not attributable to other varieties of pervasive developmental disorder; schizotypal disorder (F21); simple schizophrenia (F20.6); reactive and disinhibited attachment disorder of childhood (F94.1 and .2); obsessive personality disorder (F60.5); obsessive-compulsive disorder (F42).¹¹

1.2.2 DSM IV¹²

The American Psychiatric Association (APA), which periodically publishes the Diagnostic and Statistical Manual of Mental Disorders (DSM), provides another classification tool. The edition in use at the time of the research was the fourth. It was published in 1994, and revised in 2000. Its criteria for diagnosing an autistic disorder are:

A. A total of six (or more) items from (1), (2), and (3), with at least two from (1), and one each from (2) and (3):

1. Qualitative impairment in social interaction, as manifested by at least two of the following:

a. marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction;

b. failure to develop peer relationships appropriate to developmental level;

c. a lack of spontaneous seeking to share enjoyment, interests or achievements with other people (e.g., by a lack of showing, bringing or pointing out objects of interest);

d. lack of social or emotional reciprocity.

2. Qualitative impairments in communication as manifested by at least one of the following:

a. delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime);

b. in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others;

c. stereotyped and repetitive use of language or idiosyncratic language;

d. lack of varied, spontaneous, make-believe play or social imitative play appropriate to developmental level.

3. Restricted, repetitive, and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following:

a. encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus;

b. apparently inflexible adherence to specific non-functional routines or rituals;

c. stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements);

d. persistent preoccupation with parts of objects.

B. Delays or abnormal functioning in at least one of the following areas, with onset prior to age three: (1) social interaction, (2) language as used in social communication, or (3) symbolic or imaginative play.

C. The disturbance is not better accounted for by Rett's Disorder or Childhood Disintegrative Disorder.

Asperger's Syndrome diagnostic criteria are:

A. Qualitative impairment in social interaction, as manifested by at least two of the following:

1. marked impairments in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction;

2. failure to develop peer relationships appropriate to developmental level;

3. lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest to other people);

4. lack of social or emotional reciprocity.

B. Restricted repetitive and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following:

1. encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus;

2. apparently inflexible adherence to specific, non-functional routines or rituals;

3. stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements);

4. persistent preoccupation with parts of objects.

C. The disturbance causes clinically significant impairment in social, occupational, or other important areas of functioning.

D. There is no clinically significant general delay in language (e.g., single words used by age 2 years, communicative phrases used by age 3 years).

E. There is no clinically significant delay in cognitive development or in the development of age-appropriate self-help skills, adaptive behavior (other than social interaction), and curiosity about the environment in childhood.

F. Criteria are not met for another specific Pervasive Developmental Disorder or Schizophrenia.¹³

1.2.3 ADI-R, ADOS and M-Chat

The Autism Diagnostic Interview-Revised (ADI-R) and the Autism Diagnostic Observation Schedule (ADOS) are the two main tools used to diagnose and assess autism. ADI-R is a structured interview with parents of individuals suspected of having an ASD, and, on the basis of their answers, the clinician can reach the diagnosis. ADOS consists of a series of semi-structured activities in which the clinician and the individual suspected of an ASD are engaged. It allows the observation of social and communicative behaviors related to a possible diagnosis of an autistic condition.

It is important to point out that diagnosis of autism spectrum disorder is traditionally accepted to be possible by the age of three; however, early diagnosis has been proven to be fundamental for early intervention, which is key to a more fruitful treatment of these people. The tool currently used for early diagnosis is the Modified Checklist for Autism in Toddlers (M-CHAT) that allows clinicians to hypothesize ASD diagnosis around the age of one.

1.3 Clinical Picture, Etiology, and Pathogenesis

The clinical picture of a disease is a description of all the features that are observable in a patient. In autism, these features are mainly behavioral, even if there are also a few observable phenotypic manifestations of this condition. On the one hand, the term ‘etiology’ refers to the causes of a disease, while on the other hand ‘pathogenesis’ describes the origins of the

clinical picture. In the case of autism causes are still unknown, but there is no longer any doubt (see §1.3.2) that this condition has a biological origin. Thus, even if the biological marker responsible for autism has not been identified yet, the research in this field has been intensified.

1.3.1 Clinical Picture

As anticipated in §1, summarizing the diagnostic criteria of ICD and DSM, the impairments caused by ASD affect three macro-areas of cognitive and behavioral development: social interaction, communication, and interests and behaviors.

People on the autistic spectrum are characterized by an inability or extreme difficulty in establishing social relationships; they are reluctant to share experiences or interests, and to express their attachment to people. The difficulty in engaging in social interaction is only partially explainable in terms of a lack of interest in other individuals, and a self-withdrawal. These people find human interaction puzzling and confusing because of their inability to decode the non-verbal expressions and behaviors that regulate and pervade it. They fail to establish eye contact, make scarce use of body language, and ignore culturally established constraints on proxemic distance. Moreover, they do not feel the need to share their emotions or their interests with their peers, and this contributes to their social isolation. In addition, they do not seem to understand others' emotions. According to Baron-Cohen (2003, 2008) this failure in emotional sharing and understanding is explainable in terms of an extremely low empathy quotient.

Following an original intuition by Asperger (1944), Baron-Cohen (2003, 2008) proposes that the brain of autistic patients has the characteristics of an extreme male brain¹⁴. He elaborated a theory to account for gender differences in brain functioning according to which two main forces guide cerebral functioning: empathizing and systemizing. 'Empathizing' refers to the ability to recognize others' emotions, while 'systemizing' is the ability to analyze and construct systems, to identify the patterns of their functioning and the rules that govern them. In the broad sense of the word, a system is to be understood as anything that is governed by rules. If these two forces are considered the two extremes of a continuum, it appears that women's brains are on average more towards the empathizing end, and men's are on average towards the systemizing end. Baron-Cohen explains that this is also plausible from a phylogenetic perspective. Women had to be able to understand others' intentions in order to protect their offspring and so their empathy levels increased,

while men, being the ones who were out hunting, developed the visuo-spatial skills necessary for their purposes.

The autistic brain would be at the extreme systemizing end. People with ASD in fact perform very poorly in communication and social tasks based on empathy, whereas they obtain excellent results in logic, physics, and mechanics. Baron-Cohen *et al.* (1997) and Rutherford *et al.* (2002) conducted the same kind of experiment that required autistic people to infer the emotion of a person just by looking at his/her eyes, or listening to his/her voice. Autistic patients performed significantly worse in both tasks compared to typically developing people, corroborating the researchers' hypothesis of an impairment in people with ASD to "read the mind in the eyes" (1997:813) and "in the voice" (2002:189).

This hypothesis is also supported by biological data according to which autism is explainable in terms of testosterone levels during pregnancy. I will return to this point in §1.3.2 dealing with the causes of autism.

Another great difficulty that prevents these people from establishing social relationships is in the sphere of communication. As already stated, their impairment affects non-verbal communication, but also, and crucially, verbal communication. People on the autistic spectrum are all characterized by language impairments. The emergence of language is delayed for the majority of these people (though not for AS) and some of them remain completely or selectively mute¹⁵. It is important to point out that people with ASD are physically able to articulate language. The fact that they do not speak is sometimes explainable in terms of a hypersensitivity to sensory stimuli, which makes communication harder. This is because auditory stimuli might be perceived as too loud and, thus, exceptionally bothering. Even the touch of the tongue in different parts of the mouth can destabilize these people's sensibility and render communication painful to them. In other cases, they do not speak because they do not feel the need to do so. Apart from possibly communicating basic needs, they do not recognize the socio-affective component of communicative exchanges, and prefer to withdraw into themselves and their world.

Usually people with ASD who do speak are the ones in the highest levels of functioning, and their language can be characterized by extreme verbosity and erudition, delayed echolalia, pronoun reversal, use of non words, atypical prosody, difficulties in initiating and sustaining a conversation, difficulties in turn-taking, and impairment of pragmatic skills, such as failure in the use of politeness and in understanding non-literal language (see §2.6).