

Language and Speech Characteristics in Autism

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Abstract: The aim of this paper is to provide information regarding diversity in speech and language profiles of individuals with Autism Spectrum Disorders (ASD) and try to classify these profiles according to the combination of the communication difficulties. Research findings confirm the existence of heterogeneity of communication challenges in ASD across the lifespan. A lot of children with ASD experience communication challenges and strengths across all language sub-systems including pragmatics, grammar, semantics, syntax, phonology, and morphology in both oral and written language, while some children with autism demonstrate exceptional language abilities incl. linguistic creativity. Communication issues vary on a continuum of severity so that some children may be verbal, whereas others remain non-verbal or minimally-verbal. The diversity of profiles in speech and language development stem from either the presence of comorbid factors, as a core symptom of autistic behavior without comorbidity or both, with the development of complex clinical symptoms. Difficulties with the semantic aspect of language affect the individual's skills in abstract thinking, multiple meanings of words, concept categorization, and so on. Finally, the coexistence of ASD with other communication difficulties such as a Language Disorder, Apraxia of Speech, Speech Sound Disorders or/and other neurodevelopmental disorders raises the need for examining more carefully the emergence of new clinical profiles and clinical markers useful in performing differential diagnosis and different intervention.

Keywords: autism, language, speech, language profiles

Introduction

Willingness and ability for interaction with a communicative partner emerges early in human evolution as a step in social development and before language acquisition or the use of language. Joint attention, imitation and play are the first aspects of sociability that have been related to the development of language and communication skills, either in children demonstrating typical development (TD) or in children with developmental disabilities. In TD children, joint attention usually emerges around the age of 9 months and it is well developed when the child reaches the age of 12 months,^{1,2} a crucial factor in the development of joint attention is considered to be the interactions with stable and available adults. Relevant research data show that this skill increases gradually as the number of interactions increase.³ According to researchers Charman et al,⁴ joint attention skills observed in the second year of life are closely linked to higher social skills in the future. Joint attention skills hailed as a milestone of socialization by showing us how a human being transforms into an advanced social being.⁵ Research has highlighted the importance of developing joint attention skills and imitation in the development of language production,⁶ and other research⁷ suggests that children with well-developed joint attention skills end up in having better language skills by age 3–4 years. Imitation skills of motor patterns also influence the development of sociability and socialization, and has been linked to the development of language skills later in children's lives.⁸

The connection between social skills and speech and language development are strong and seems that language and speech development is a result of social developmental processes in the first year of life. One of the most common symptoms in the majority of ASD children is issues they face in social communication and the manifestation of difficulties in the integration of verbal and nonverbal communication. That particular communication impairment is a core feature of autism and one of the most frequent reasons for referral among children who are later diagnosed with autism spectrum disorder has been the focus of numerous studies. Moreover, the increasing number of evidence from

longitudinal studies of young children with and without an ASD indicates that those with impairments in verbal skills are at increased risk for less favourable outcomes later in life. Early language abilities and their development predict social functioning, academic achievement, and psychiatric outcome in late childhood and adulthood^{9–11}

Moreover, the importance of social and communication challenges in ASD was recognized as a core ASD symptom under the heading “Social Communication Difficulties and Interaction” in the Diagnostic Statistical Manual, 5th Edition (DSM 5) of the American Psychiatric Association (APA).¹² In fact, it was determined as an obligatory core symptom to receive a diagnosis of ASD.

The importance of language use in defining clinical subtypes of ASD is also noted in the International Classification of Diseases (ICD), 11th edition of World Health Organization, with the presence or absence of functional language taking center stage.¹³ ICD 11 categorizes ASD in five different types, a) ASD with disorder of intellectual development and with impaired functional language, b) ASD with disorder of intellectual development and with absence of functional language, c) ASD without disorder of intellectual development and with mild or no impairment of functional language, d) ASD with disorder of intellectual development and with mild or no impairment of functional language and e) ASD without disorder of intellectual development and with impaired functional language. The method of categorization relates to the existence or absence of disorder of intellectual development and to the existence or absence of functional language. The use of term functional language in ICD 11 and the description of symptom of social communication difficulty in DSM 5 helps the clinicians to focus not on the existence of speech and language availability, but on the appropriate use of speech and language for functional and social communication. Additionally, clinicians focus on the presence of social communication difficulties, beyond language and speech and pinpoint the communication difficulties in ASD as related to the social aspect of communication mainly, which serves as a good differentiation between language impairment and ASD with the presence of language impairment /specifier “With or without accompanying language impairment”/.

Although the hypothesis of influence of social development is a crucial cause for the language and speech difficulties in ASD children, there are other conditions which may affect speech and language development. Comorbidity conditions of ASD children with other developmental disorders such as Developmental Language Disorder (DLD), Apraxia of Speech (AS) or low Intelligent Quotient (IQ) level¹⁴ also influence language and speech abilities in ASD because development is generally seen on a continuum.

Research and knowledge about ASD in recent years has provided data that have resulted in better understanding of language specifics of children with autism. One of these concerns the widely used^{15,16} at present classification of children with autism into two large groups in terms of their language development: Normal Language development (ASD-LN) and Language Impaired (ASD-LI). ASD children with LI profile seems to experience difficulties in language development. Following the same logic, it is observed in the literature that a sub classification of the group of children with autism with typical language development is used, dividing them into children with Low Language Abilities (ASD-LL) and children with High Language Abilities (ASD-HL).¹⁷ This categorization is usually related with the scores of ASD children in standardized language tests.

The purpose of this paper is to provide information on diversity in the speech and language profiles of people with ASD. We offer a discussion of the existence of language profiles identified in individuals with ASD and a categorical approach to support ongoing diagnostic and intervention efforts.

Language and Autism Spectrum Disorder

ASD is a neurological and developmental condition characterized by lasting and important difficulties in communication and social interaction in multiple contexts. The description of the condition includes problems in social interaction and communication, as well as a restricted repertoire of interests and behaviors, difficulties in the communication abilities and difficulties in daily tasks and activities. The individuals with ASD often present limited interests, follow stereotyped behaviors and adhere to repetitive rituals.¹⁴

Nevertheless, because ASD has very broad diagnostic criteria, different ASD individuals show markedly different characteristics. Specifically, ASD children have very diverse developmental backgrounds and differ significantly in the extent to which they master, vocalize and express, language in the form of grammar and vocabulary.¹⁶ Overall, 3 out of 4

ASD children show some impaired language abilities by the time they enter kindergarten, which may be mild or extreme while 1 in 4 autistic children show typical or even exceptional language abilities by the age of 5.¹⁸

Although difficulties in the functional language are important indicator of ASD in early life, difficulties in speaking and communicating through language are not at all uniform, and this fact means that providing a prognosis and devising interventions can be particularly challenging.¹⁹ However, the level of language skills and abilities in childhood significantly predict the future outcomes of people with ASD, like academic success and living as an independent adult.^{20,21} Thus, it is particularly important for researchers to gain insight into the variables that affect and cause the heterogeneous levels of language attainment in children with ASD.²²

This research offers an extensive discussion on a list of variables such as semantics, pragmatics, phonology and morpho syntax and are discussed thoroughly in the next sections.

Semantics

Communicating with other people, verbally or not, means that the individuals know how to produce and understand morphemes with a particular meaning. Semantics is the study of how languages organize and express meanings. Semantics is also the main factor in terms of mastering the language adequately both as difficulty in understanding or/and using the language that can lead in Developmental Language Disorder.

Studies that examine the breadth of vocabulary developed in ASD children, with measures at particular points in time, find that their operating vocabulary is usually smaller than the vocabulary of same-aged TD children.^{23–25} On the other hand, there is conflicting research which has found that the development of language in young individuals with ASD does not differ from that found in TD children and adolescents.^{26–28}

Conflicting outcomes can mislead between using words in a spoken language and capability of fully understanding language in context. Following studies help us understand in a better way substantial differences in the development of semantics between ASD and TD children. Goodwin et al²⁷ for example, found that young ASD children had comparable size of expressive vocabulary with TD children. Henderson et al²⁸ found that adolescents with autism were not significantly different in word comprehension from TD adolescents.

ASD children also tend to use nonsensical or idiosyncratic colloquialisms; they may name objects abnormally or inappropriately and use nonsensical nomenclature alternatively to common sense terms. One explanation is that the abnormal or nonsense discourse could signify that ASD individuals are unable to mentally represent the actual meaning they want to communicate, or they may be unsure, or lack confidence, regarding how to respond.¹⁵

In a recent study, Viglioco et al²⁹ investigated the way children with ASD learn concepts and words in an abstract way, and how this can be a predictor for coexisting language impairment. Researchers tried to assess whether the social/emotional difficulties identified in children with ASD are associated with the existence of an uneven difficulty in their knowledge of abstract words, or whether, instead they would score as their TD peers, once language impairment is accounted for. The same pattern of generalized vocabulary impairment for concrete and abstract words is reported for language impaired children who presented comorbidity with ASD. However, children with ASD do not show abnormal performance with abstract or with valence words in this study. The researchers conclude that, these reports may be a result of different mechanisms underlining the social and emotional difficulties in ASD as well as the social communicative interactions considered to be substantial in abstract development. Nevertheless, on the basis of these findings only, they cannot exclude that emotional bootstrapping might not be the primary or main mechanism for abstract vocabulary acquisition.

In this vein, Taylor et al³⁰ in a large study with 6000 twin siblings, concluded that as a process, language development is independent from the development of other traits and characteristics of ASD – the development of language was neither observationally nor genetically related to the severity of autistic symptoms. Findings like the above illustrate that the independent way in which language and autistic traits develop underlie the conflicting research findings, and, importantly, drive the wide-ranging and diverse language developmental pathways that characterize autistic individuals.

However, thus far no single research hypothesis has been able to adequately explain all the features and difficulties found in individuals with autistic spectrum disorder, under different contexts, with varying levels of symptom severity.

Nevertheless, different parts of different theories have been shown to be useful in determining the nature of different ASD language peculiarities.³¹

As a result of the brief analysis of the semantic features of language functions in children with ASD, the following can be concluded: semantic abilities can vary from very good to limited without being necessarily related to the severity of RAS; probably other aspects of ASD also affect semantic language performance; probably in some individuals there is an overlap of the manifestation of language disorders and ASD; there is a group of children with exceptional language abilities, incl. semantic abilities.

Pragmatics

Nowadays it is accepted that there is a cognitive background involved in autism spectrum disorders.³² Most relevant psychological theories attempt to explain autism in terms of neurological and cognitive factors based on theory of mind, or their executive functions, but not in terms of language and the proper use of it. Difficulties with language, like pragmatic difficulties, very often characterize individuals with ASD,³² however these are conceptualized as a type of second-order effect of the first-order difficulties in cognition, often social, non-linguistic cognition. Pragmatic language impairment is an inability to determine the types of language that are appropriate for use during different types of social situations; difficulties like these can compound social relationships and lead to social anxiety. According to the review of Moby, Belliveau²² children with ASD exhibit inappropriate language behavior in social situations, eg, they rarely provide comments or ask for information, and this reinforces the observation of the crucial relationship that exists between linguistic and social difficulties.²²

It is not yet known whether pragmatic speech can predict the capacity of individuals with ASD and developed language abilities as well as those with TD to decode incoming messages and comprehend read material.³³ Still, regarding the organization of language, many theorists and researchers have adopted a “modular” point of view which regards cognition and language as discrete and separate entities; language organization is said to be defined by the relatively independent operation of phonological, syntactic, semantic, and pragmatic components.²⁹

Individuals with ASD also present a number of languages untypicalities such as echolalia, pedantic speech, misunderstanding of figurative language and more, due to pragmatic impairment.

Echolalia, or the repetition of words or phrases of others speech, is evident in children with ASD as well as in typical developed peers. In the case of ASD, echolalia happens more frequently and lasts longer. For some children, echolalia comprises a large part of their spoken discourse.¹⁵ While more insight is needed concerning the nature and function of echolalia, one of the main reasons for its existence is to facilitate communication. For instance, echolalia can be used when the child is unsure how to respond during verbal interactions, and repeats what has been said in order to understand what was meant or to figure out how to respond.¹⁵

Furthermore, individuals with ASD have distinctive styles of speaking which feature particular suprasegmental characteristics – relating to stress, tone, pitch, or juncture that is overlaid onto the consonants and vowels during speech. For instance, they may speak too softly, too loudly, too emotionlessly, or too hoarsely, while other aspects of speaking are conversely understated. ASD individuals’ verbal discourse also often includes formal words, unusual sentences, and neologisms, or words and expressions that they themselves have created.¹⁵ Also, ASD individuals often find it difficult to speak because their interpretation of others’ statements is too literal – they may not understand metaphors, or humor, and they may also find it difficult to tell stories.³⁴

Individuals with ASD, perhaps because they are likely to use words which are not appropriate in particular contexts, may resort to pedantic speech, or speaking in such ways so as to impress others.¹⁵ Pedantic speech could be expressed by informal prosody in speech and/or by verbal content that can be strange, philosophical and pompous.³⁵ The characteristics of this kind of speech are a) hyper- information which is not necessary, b) vocabulary and grammar used in written speech and not in oral speech, c) repetitions and corrections that are not necessary.³⁶

Finally, the tendency of children with ASD to develop special language skills in languages not apparent in the family and school environment has often been observed in recent years. A typical example is the use of the English language by Greek children with Greek as their mother tongue. This behavior results from the acquisition of the second language by computer programs, which are considered the main source of exposure of the child with ASD in the second language.

Possible explanation is the difficulties in sociability, which lead the child to learn a language from a mechanistic environment, highlighting the difficulty of learning a language being part of the social environment. This field has not been researched much and systematically, among the few researches are those of Kissine³⁷ and Francis.³⁸ Findings of Kissine³⁷ concludes that the children of the sample acquired the Common New Arabic from a non-interactive social source, driven by the social and pragmatic difficulty observed in ASD children.

Respectively, research by Francis³⁸ studies the importance of this phenomenon in distinguishing children belonging to ASD from other TD children. The results of the first phase of the survey showed that 61.5% of children who used the official Arabic language rather than their family version in their daily lives were diagnosed with ASD.

Regardless of whether they are related to difficulties in other components of language, pragmatic difficulties in children with ASD are also related to other difficulties in social performance. They could be presented together with a general difficulty in the language development, in cooperation with good skills in the other components of the language and even on the basis of very good intellectual abilities without disorders in semantics and grammar.

Phonology

Phonology related to sound structure in individual languages: the way distinctions in sound are used to differentiate linguistic items, and the ways in which the sound structure of the same element varies as a result of the other sounds in its context. Phonology studies the ways in which sounds are distributed and deployed within particular languages.

The remarkable prevalence of Speech Sound Disorders (SSD) identified in ASD speech profiles led to extensive study of phonological and articulatory skills over the past few years. More specifically, reports indicate that the prevalence of ASD comorbidity with SSD ranged between 15% and 20%.³⁹ However the existence, characteristics, and severity of SSD remain unclear within children with ASD. Although older reports on development of phonetics, phonological awareness and prosody reported age-appropriate speech profiles,⁴⁰ recent reports on younger children with autism revealed atypical speech patterns. The immature structure of syllables, restricted variety of phonetics, speech sound deformations, inconsistent production of words, inconsistent use of phonological process, late development of meaningful expressive vocabulary, and restricted use of phonological contrasts were the characteristics of these atypical speech patterns.⁴¹

Phonological processing involves the cognitive processes that are based on the phonological, or sounded, structures of language. Phonological processing is comprised of phonological awareness, or the meta-cognitive skill (being aware of one's thinking); phonological memory, or the ability to temporarily preserve information in working memory; and rapid naming, or the ability to swiftly connect visual and verbal information. On the other hand, some studies have found that individuals with good intellectual abilities and ASD exhibit persistent difficulties with phonological processing. Earlier research has proposed that ASD is connected to impairments in phonological processing and syntactic ability, since syntax and phonology, as well as semantic and pragmatic ability, are related.⁴² Furthermore, persistent difficulties with phonological processing have been found only in children who exhibit syntactic and semantic impairments.⁴³ However, more recent research questioned this assumption.

Phonological disorders will most often be seen in the context of general language impairment with and without intellectual impairment. It is highly likely that there is a group of children with ASD who would also have mild phonological disorders that are isolated and some of them could result in temporary difficulties in articulation and written language.⁴¹

Morphosyntax

Morphosyntax refers to the study of the morphological and syntactic properties of linguistic or grammatical units, the rules that determine the relation between one linguistic form and another, defined by morphological and syntactic criteria.

ASD children with language impairment involve marked difficulty with morphological aspects of language, like non-word repetition and verbal inflection.⁴⁴

In recent years a growing body of research has begun to study the morphosyntax of children with ASD with some initial studies revealing that certain aspects of it are not as intact as first believed. Roberts et al⁴⁵ investigated the production of tense morphology in children aged 5 to 15 years old with ASD. The study showed that the children with ASD who had low scores on general language tasks were identified as language impaired and more specifically had

difficulties in tense inflection because of the high rates shown in omission of tense morphemes. On the other hand, these results were not identified in children with ASD who were not language impaired. Perovic et al⁴⁶ investigated “he” citation of personal object pronouns as well as reflexive pronouns in children with ASD aged 6 to 18 years old. This study concluded that children with ASD with language impaired also presented difficulties in the interpretation of reflexive pronouns. Terzi et al⁴⁷ assess in their study the use of clitics and the corresponding noun phrases and they conclude that children with ASD without language impairments do not perform as well as TD children only in two sections assessed: 1) in the condition of asking to produce a simple pronominal direct object clitic, and 2) in the condition of a focused structure where they have to produce a noun phrase. Errors identified in the first condition suggest that they have difficulties acknowledging the prominent item in the discourse, whereas errors identified in the second condition suggest difficulties in associating a particular intonation with a particular discourse interpretation excluding clitics. They suggest that while seems to be a morphosyntactic difficulty, it is actually generated by its position at the interface of morphology-syntax, prosody, and pragmatics.

We assume that morphosyntactic disorders in children with ASD will mainly occur in the presence of a general language disorder with and without intellectual disorders. However, some morphosyntactic errors would result from general social difficulties and discourse comprehension, without underlying language impairment.

Speech and Autism Spectrum Disorder

Speech is a way of communication which includes articulation, voice and fluency. Speech motor planning is the ability to come up with an idea, plan how to say or express that idea and then finally say it. Muscle tone refers to the muscles and strength needed to move the jaw, tongue and other muscles needed to speak.

Speech symptoms in ASD children are quite common. These symptoms refer to difficulties regarding speech production, oral movement, fluency and speech programming.

Disordered prosody as a difficulty in communication, refers primarily to suprasegmental features of speech such as phrasing, intonation, and rhythm have been addressed since early research on ASD. Clinical reports have variously referred to the speech of individuals with ASD as “monotone”, “robotic”, “staccato”, “jerky”, and “sing-songy” and inconsistent prosody has been described as among the first identifiable characteristics that can create an impression of “oddness” among children with ASD.⁴⁸ Acoustic studies have confirmed such impressions, demonstrating that individuals with ASD show generally slower speech rate, greater intonational range as well as differences in prosodic phrasing and stress regarding durational cues.⁴⁹

Motor function plays substantial role for broader aspects of development, including language, social interaction, and learning.⁵⁰ Skilled motor abilities of the body and speech production area, demand a greater rate of motor dexterity and not only basic motor control. These skilled motor abilities may form a potential difficulty in ASD as well as they are shabbily imitated by participants with ASD compared to TDs. As a result, throughout the time of imitation tasks, skilled motor gestures were once suggested to form a core difficulty in ASD, along with their relation to mirror neuron theory.⁵¹ Furthermore, one of the difficulties in some cases of autism, regarding the use of language, is the absence of communicative speech, but at least in a subpopulation may instead come from motor and oral motor issues. Clinical reports between receptive and expressive speech/language abilities are closely linked with speech production addressed such a hypothesis.⁵² An association between speech fluency and oral motor movements including lips has been highlighted in ASD children as well as similar measures reported to be distinguishing factors for TD children with some ASD behaviors. Belmonte⁵² in her research indicated that many ASD children showed difficulties in gross motor, fine motor, and oral motor skills leading to substantial motor difficulties. In the majority of ASD children oral motor skills, in particular, are tightly linked to speech and language acquisition. Moreover, poor oral motor skills are correlated with the lack of expressive language skills or speech in particular, whereas receptive language skills are relatively better. To sum up, results from this research indicate that motor difficulties present a high correlation with the level of speech-language acquisition, but in addition the more severe the oral motor issues could be displayed, the more considerable challenge could be the acquisition of speech and the overall rate of learning.⁵²

Adams⁵³ indicates that ASD children had difficulty performing oral movement

and complex syllable production task which is to be included in the research profile. In particular, ASD children had difficulty to elevate their tongue as well as to alternate between a lip spread and pucker.⁵³ Most and first of all, results highlight the clinical heterogeneity of people with ASD in terms of motor function and ability to produce speech. Additionally clinical, basic researchers and therapists should be prompted to reject a one-size-fits-all approach to ASD: both therapeutic intervention and basic science must consider seriously the variability between phenotypes.⁵²

An issue that many ASD individuals experience regarding their language is linguistic fluency. Difficulties in linguistic fluency may be related to working memory. Some types of dysfluencies found in ASD individuals include stuttering, cluttering, other non-stuttering dysfluencies, as well as other atypical dysfluencies like word-final dysfluencies that involve abrupt stops in speech that affect the latter part of a word.⁵³ Research has found that stuttering, non-stuttering and atypical dysfluent behaviors occur in ASD individuals, while cluttering is usually characteristic of older ASD children.⁵⁴

The non-stuttering types of dysfluent discourse are often observed in ASD⁵³ and take place when an individual forgets what he or she was going to say next, and it can involve exclamations and self-corrections.⁵³ People who experience this often have difficulty with fluent speaking during conversation. One possibility is that excessive non-stuttering dysfluencies, which are a characteristic of cluttering,⁵⁵ are related to difficulties with working memory in autism.⁵⁶

All speech difficulties in individuals with ASD can be observed with the presence of language impairments and intellectual disorders; with the presence of language disorders without intellectual disabilities; without language disorders; and probably as primary impairments related to motor functions, which may secondarily lead to a delay in mastering the language, due to difficulties in practicing it.

Synthesizing Findings: Considerations for Language Profiles

Recent research on the language and speech characteristics of ASD individuals strongly suggests that developmental difficulties in language and speech attainment are frequent, but not absolute.

Also, there is a tendency for categorization of different language profiles in ASD as mentioned in the introduction. The language profile categorization may help for better differential diagnosis, but also help to better the understanding of the therapeutic needs of ASD individuals and leads in the appropriate intervention programs.

A possible categorization of different language profiles in ASD could be structured in 4 types:

Type 1: ASD with pragmatics language impairments without any other language difficulties. Difficulties in the development of language pragmatics are related to the manifestations of difficulties in social functioning, they are not an element of developmental language disorder and/or comorbidity. This group would also include individuals with very good and exceptional language abilities, but difficulties in the so-called functional language, and/or non-verbal behavior related to communication, and who would only have difficulty using language for social needs.

Type 2: ASD in comorbidity with DLD and other developmental disorders like SSD, or/and AS. These children will demonstrate disorders in social functioning and stereotyped behaviors together with a disorder in language and speech development.

Type 3. ASD in comorbidity with intellectual disability with a global lag in language and general intelligence. IQ has a strong influence on language development in ASD children and most of the children who do not develop phrase speech also have nonverbal IQ below 70.⁵⁷

Type 4. ASD with severe difficulties in the development of social communication and social interaction and secondary language difficulties as a result of nonuse of language as a communication tool.

This category is debatable, due to the difficulties of proving secondary language delay as a result of other factors that are related to the development of social functions and the environment, included the extreme cases of neglect as in orphanage situations or child abuse and overuse of electronic devices. We assume, however, that in the developmental process, if there are no enough opportunities to practice a skill, we can expect some delays in its development. Supporting this category is the fact that language stimulation has a positive effect in ASD therapy.⁵⁸

If we refer to the first type from the above categorization ASD with language pragmatics impairments without other language disorders, it becomes obvious that is different from the new category in the DSM-5 - Social (pragmatic) communication disorder (SPCD) and different from the pragmatic disorders in DLD as a results of language difficulties.

In this case, language pragmatics will be disrupted as a result of difficulties in social functioning and the approach to interventions would be different from that of DLD.⁵⁹ Interventions would focus on understanding social situations, using language directly in social communication, understanding the social aspects of language and their inclusion in real life situations, understanding of figurative language and socially based language constructions. In this category we must note that there are individuals with normal, good and exceptional language abilities with and without speech disorders, but in order to meet the criteria for ASD, they must also meet the condition of having “Persistent difficulty in social communication and social interaction across multiple contexts”.¹²

In the second type ASD in comorbidity with DLD and/or SSD and/or VA, a child should meet all the criteria for autism spectrum disorder and all criteria for developmental language disorder. According to CATALISE project, DLD is a diagnosis that is close to DSM-5 Language Disorder.¹² The DLD diagnosis should exclude the existence of language difficulties due to insufficient knowledge of the community language and must take into account all environmental factors that could affect language development. The situation with the comorbidity between ASD and DLD, however, presents some inconsistencies. Thus, for example, the CATALISE project⁵⁸ identifies DLD as a possible part of the broader term “Language Disorder”, further specifying the developmental feature. In the description of the CATALISE project, the existence of ASD excludes the developmental characteristic due to probable genetic or neurological causes. The need for a separate approach to ASD interventions is considered as an additional factor in separating the two diagnoses. Thus, in order to discuss comorbidity, in addition to the ASD criteria, the criteria for disordered syntax, morphology, semantics, word finding, pragmatics, discourse, verbal learning/memory and/or phonology must be met and these disorders must not be directly derivable from the more generalized ASD diagnosis. However, to what extent individual differences would affect the presence or absence of some of these symptoms remains unclear. It also remains unclear how the criteria for both disorders are proven, provided that the child has impaired social functioning and communication difficulties, as well as specific behavior in the assessment.

The third type includes children with ASD in comorbidity with Intellectual Disability at the same time. In this situation, language difficulties would be relevant to the level of intellect, but they would also be affected by social dysfunctions. It is interesting how the main symptoms of ASD /difficulties in social communication and social reciprocity and restricted and repetitive patterns of behavior, interests, or activities/ would affect language development as a result of intellectual difficulties and whether intellectual difficulties and language disorders as a result of lower intelligence would affect the core symptoms of ASD.

The last type includes the secondary delay of language and/or speech, as a result of the lack of practice of language skills and speech praxis in cases of severe ASD with behavioral disorders without disorders of nonverbal intelligence. Characteristics of this category will include lack of speech and lack of age-appropriate language comprehension and language production. The children with ASD who fail to develop speech and language before the age of 5 and do not have nonverbal intellectual difficulties are likely to be included in that group. In this sense, early interventions for language and speech development would have a key role in preventing the development of this type of difficulty. Since parental language input would affect language and speech development in the first years of a child's life,⁵⁹ a strong choice of interventions in this category would be parenting programs that target early development of language, communication, and social skills.

This group would also accounts for the cases of children with ASD who have a relatively good language comprehension, even manage to learn to read (probably due to good language input), but fail to speak because speech praxis emerges from the sensitive period in which it may develop spontaneously.

The above subtypes refer to the DSM-5 in the form of specifiers, and in the ICD-11 in the way of describing the different types of ASD in relation to language, the attempt here is the collection of these information in a type could be useful for the clinicians of different professions.

Conclusion

Recent knowledge about the ASD helps clinicians in better the understanding of the differences in the ASD field. These differences underline the therapeutic intervention choices and support the people with ASD and their families in the most appropriate way for the specific language and communication profile of each person. The current paper tries to give

a clinical glance to the recent research knowledge regarding the language profiles and in the way which this knowledge could be used for therapeutic intervention.

Disclosure

The authors report no conflict of interest in this work.

References

- Adamson LB, Chance SE. Coordinating attention to people, objects, and language. In: Wetherby AM, Warren SF, Reichle J, editors. *Transitions in Prelinguistic Communication*. Vol. 7. Paul Brookes Baltimore; 1998:15–37.
- Brooks R, Meltzoff AN. The importance of eyes: how infants interpret adult looking behaviour. *Dev Psychol*. 2002;38:958–966. doi:10.1037/0012-1649.38.6.958
- Carpenter M, Nagell K, Tomasello M. Social cognition, joint attention, and communicative competence from 9 to 15 months of age. *Monogr Soc Res Child Dev*. 1998;255(63):1–143.
- Charman T, Baron-Cohen S, Swettenham J, Baird G, Cox A, Drew A. Testing joint attention, imitation, and play as infancy precursors to language and theory of mind. *Cogn Dev*. 2000;15:481–498. doi:10.1016/S0885-2014(01)00037-5
- Schaffer HR. *Social Development*. Blackwell Publishing; 1996.
- Cochet H, Byrne R. Communication in the second and third year of life: relationships between nonverbal social skills and language. *Infant Behav Dev*. 2016;44:189–198. doi:10.1016/j.infbeh.2016.07.003
- Toth K, Munson J, Meltzoff A, Dawson G. Early predictors of communication development in young children with autism spectrum disorder: joint attention, imitation, and toy play. *J Autism Dev Disord*. 2006;36:993–1005. doi:10.1007/s10803-006-0137-7
- Bates E, Benigni L, Bretherton I, Camaioni L, Volterra V. *The Emergence of Symbols: Cognition and Communication in Infancy*. New York: Academic Press; 1999.
- Gillberg C, Steffenburg S. Outcome and prognostic factors in infantile autism and similar conditions: a population-based study of 46 cases followed through puberty. *J Autism Dev Disord*. 1987;17(2):273–287. PMID: 3610999. doi:10.1007/BF01495061
- Kobayashi R, Murata T, Yoshinaga K. A follow-up study of 201 children with autism in Kyushu and Yamaguchi areas, Japan. *J Autism Dev Disord*. 1992;22(3):395–411. doi:10.1007/BF01048242
- Venter A, Lord C, Schopler E. A follow-up study of high-functioning autistic children. *J Child Psychol Psychiatry*. 1992;33(3):489–507. PMID: 1577895. doi:10.1111/j.1469-7610.1992.tb00887.x
- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Washington, DC: American Psychiatric Association; 2013.
- World Health Organization. ICD-11 revision. Available from: <https://icd.who.int/en>. Accessed March 28, 2022.
- Hus Y, Segal O. Challenges surrounding the diagnosis of autism in children. *Neuropsychiatr Dis Treat*. 2021;17:2163–2172. doi:10.2147/NDT.S282569
- Williams D, Botting N, Boucher J. Language in autism and specific language impairment: where are the links? *Psychol Bull*. 2008;134:944–963. doi:10.1037/a0013743
- Weismer SE. Developmental language disorders: challenges and implications of cross-group comparisons. *Folia Phoniatr Logop*. 2013;65:68–77. doi:10.1159/000353896
- Peristeri E, Andreou M, Tsimpli I, Syntactic M. Story structure complexity in the narratives of highland low-language ability children with autism spectrum disorder. *Front Psychol*. 2017;8(2027):1–16. doi:10.3389/fpsyg.2017.02027
- Tafaraji YM, Kamari E. Investigating mean length of utterance (MLU) in monolingual Persian speaking children with autism spectrum disorder (ASD). *Int J Health Stud*. 2020;6(2):15–23.
- Romeo RR, Choi B, Gabard-Durnam LJ, et al. Parental language input predicts neurooscillatory patterns associated with language development in toddlers at risk of autism. *J Autism Dev Disord*. 2021;52(6):2717–2731. doi:10.1007/s10803-021-05024-6
- Tager-Flusberg H, Kasari C. Minimally verbal school-aged children with autism spectrum disorder: the neglected end of the spectrum. *Autism Res*. 2013;6(6):468–478. doi:10.1002/aur.1329
- Tager-Flusberg H, Edelson L, Luyster R. Language and communication in autism spectrum disorders. In: Amaral D, Geschwind D, Dawson G, editors. *Autism Spectrum Disorders*. Oxford University Press; 2011:172–185.
- Mody M, Belliveau JW. Speech and language impairments in autism: insights from behavior and neuroimaging. *N Am J Med*. 2013;5(3):157–161.
- Gotham K, Pickles A, Lord C. Trajectories of autism severity in children using standardized ADOS scores. *Pediatrics*. 2012;130(5):e1278–1284. doi:10.1542/peds.2011-3668
- Miller LE, Burke JD, Troyb E, Knoch K, Herlihy LE, Fein DA. Preschool predictors of school-age academic achievement in autism spectrum disorder. *Clin Neuropsychol*. 2017;31(2):382–403.
- Kenworthy L, Wallace GL, Powell K, Anselmo C, Martin A, Black DO. Early language milestones predict later language, but not autism symptoms in higher functioning children with autism spectrum disorders. *Res Autism Spectr Disord*. 2012;6:1194–1202. doi:10.1016/j.rasd.2012.03.009
- Fulton ML, D'Entremont B. Utility of the psychoeducational profile-3 for assessing cognitive and language skills of children with autism spectrum disorder. *J Autism Dev Disord*. 2013;43:2460–2471. doi:10.1007/s10803-013-1794-y
- Kover ST, McDuffie AS, Hagerman RJ, Abbeduto L. Receptive vocabulary in boys with autism spectrum disorder: cross-sectional developmental trajectories. *J Autism Dev Disord*. 2013;43:2696–2709. doi:10.1007/s10803-013-1823-x
- Miniscalco C, Franberg J, Schachinger-Lorentzon U, Gillberg C. Meaning what you say? Comprehension and word production in young children with autism. *Res Autism Spectr Disord*. 2012;6:204–211. doi:10.1016/j.rasd.2011.05.001
- Vigliocco G, Ponari M, Norbury C. Learning and processing abstract words and concepts: insights from typical and atypical development. *Top Cogn Sci*. 2018;10:533–549. doi:10.1111/tops.12347

30. Taylor MJ, Charman T, Robinson EB, et al. Language and traits of autism spectrum conditions: evidence of limited phenotypic and etiological overlap. *Am J Med Genet B*. 2014;165(7):587–595. doi:10.1002/ajmg.b.32262
31. Gernsbacher MA, Morson EM, Grace EJ. Language development in autism. *Neurobiol Lang*. 2016;70:879–886.
32. Goodwin A, Fein D, Naigles LR. Comprehension of questions precedes their production in typical development and autism spectrum disorders. *Autism Res*. 2012;5:109–123. doi:10.1002/aur.1220
33. Henderson LM, Clarke PJ, Snowling MJ. Accessing and selecting word meaning in autism spectrum disorder. *J Child Psychol Psychiatry*. 2011;52:964–973. doi:10.1111/j.1469-7610.2011.02393.x
34. Hinzen W, Rosselló J, Mattos O, Schroeder K, Vila E. The image of mind in the language of children with autism. *Front Psychol*. 2015;6:841. doi:10.3389/fpsyg.2015.00841
35. Diehl JJ, Bennetto L, Young EC. Story recall and narrative coherence of high-functioning children with autism spectrum disorders. *J Abnorm Child Psychol*. 2006;34:87–102.
36. Ghaziuddin M, Gerstein L. Pedantic speaking style differentiates Asperger syndrome from high-functioning autism. *J Autism Dev Disord*. 1996;26(6):585–595. doi:10.1007/BF02172348
37. Kissine M, Luffin X, Aiad F, Bourourou R, Deliens G, Gaddour N. Noncolloquial Arabic in tunisian children with autism spectrum disorder: a possible instance of language acquisition in a noninteractive context. *Lang Learn*. 2018;69(1):44–70. doi:10.1111/lang.12312
38. Francis K, Almahmeed H, Hashemi A, Alhassan M, Terzi A. The use of Formal Language as a sign of ASD in undiagnosed children attending typical schools. International Society for Autism Research, Montreal; 2019.
39. Shriberg LD, Paul R, Black LM, van Santen JP. The hypothesis of apraxia of speech in children with autism spectrum disorder. *J Autism Dev Disord*. 2011;41(4):405–426. doi:10.1007/s10803-010-1117-5
40. Petinou K. Promoting speech intelligibility in autism spectrum disorder through the implementation of phonologically similar stimuli. *Folia Phoniatr Logop*. 2020;73(3):174–184. doi:10.1159/000511346
41. Jacobs DW, Richdale AL. Predicting literacy in children with a high-functioning autism spectrum disorder. *Res Dev Disabil*. 2013;34(8):2379–2390. doi:10.1016/j.ridd.2013.04.007
42. Rapin I, Dunn M. Update on the language disorders of individuals on the autistic spectrum. *Brain Dev*. 2003;25:166–172. doi:10.1016/S0387-7604(02)00191-2
43. Kjelgaard MM, Tager-Flusberg H. An investigation of language impairment in autism: implications for genetic subgroups. *Lang Cogn*. 2001;16:287–308. doi:10.1080/01690960042000058
44. Tager-Flusberg H. Defining language phenotypes in autism. *Clin Neurosci Res*. 2006;6:219–224. doi:10.1016/j.cnr.2006.06.007
45. Roberts JA, Rice ML, Tager-Flusberg H. Tense marking in children with autism. *Appl Psycholinguist*. 2004;25(3):429–448. doi:10.1017/S0142716404001201
46. Perovic A, Modyanova N, Wexler K. Comprehension of reflexive and personal pronouns in children with autism: a syntactic or pragmatic deficit? *Appl Psycholinguist*. 2013;34(4):813–835. doi:10.1017/S0142716412000033
47. Terzi A, Marinis T, Francis K. The interface of syntax with pragmatics and prosody in children with autism spectrum disorders. *J Autism Dev Disord*. 2016;46:2692–2706. doi:10.1007/s10803-016-2811-8
48. Van Bourgondien M, Woods A. Vocational possibilities for high-functioning adults with autism. In: Schopler E, Mesibov G, editors. *High-Functioning Individuals with Autism*. New York: Plenum Press; 1992:227–242.
49. Paul R. Interventions to improve communication in autism. *Child Adolesc Psychiatr Clin N Am*. 2008;17(4):835–856. doi:10.1016/j.chc.2008.06.011
50. Maski KP, Jeste SS, Spence SJ. Common neurological co-morbidities in autism spectrum disorders. *Curr Opin Pediatr*. 2011;23(6):609–615. doi:10.1097/MOP.0b013e32834c9282
51. Perkins T, Stokes M, McGillivray J, Bittar R. Mirror neuron dysfunction in autism spectrum disorders. *J Clin Neurosci*. 2010;17(10):1239–1243. doi:10.1016/j.jocn.2010.01.026
52. Belmonte MK, Saxena-Chandhok T, Cherian R, Muneer R, George L, Karanth P. Oral motor deficits in speech-impaired children with autism. *Front Integr Neurosci*. 2013;7(47):1–8. doi:10.3389/fnint.2013.00047
53. Scaler Scott K. Dysfluency in autism spectrum disorders. *Procedia*. 2015;193:239–245. doi:10.1016/j.sbspro.2015.03.266
54. Adams L. Oral-motor and motor-speech characteristics of children with autism. *Focus Autism Other Devel Disabil*. 1998;13(2):108–112. doi:10.1177/108835769801300207
55. Scaler Scott K, Tetnowski JA, Flaitz J, Yaruss JS. Preliminary study of dysfluency in school-age children with Autism. *Int J Lang Commun*. 2014;49(1):75–89. doi:10.1111/1460-6984.12048
56. St. Louis KO, Schulte K. Defining cluttering: the lowest common denominator. In: Ward D, Scaler Scott K, editors. *Cluttering: Research, Intervention and Education*. Psychology Press; 2011:233–253.
57. Norrelgen F, Fernell E, Eriksson M, et al. Children with autism spectrum disorders who do not develop phrase speech in the preschool years. *Autism*. 2015;19:934–943. doi:10.1177/1362361314556782
58. Swanson MR, Donovan K, Paterson S, et al. Early language exposure supports later language skills in infants with and without autism. *Autism Res*. 2019;12(12):1784–1795. doi:10.1002/aur.2163
59. Bishop DV, Snowling MJ, Thompson PA, Greenhalgh T; CATALISE-2 consortium. CATALISE: a multinational and multidisciplinary Delphi consensus study of problems with language development. Phase 2. Terminology. *PeerJ Preprints*. 2017;5:e2484v2. doi:10.7287/peerj.preprints.2484v2

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