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Elective Language in Children on the Autism Spectrum: From Neurocognitive Therapy to the Development of Receptive and Expressive Communication Skills

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ABSTRACT

This study examines the neurological, cognitive and linguistic dimensions that explain communication disorders in people with autism spectrum disorder (ASD), emphasising that their linguistic deficits are not so much due to structural grammatical deficiencies as they are to a contextual-pragmatic gap that hinders the functional use of language in social interaction. The article reviews the neurobiological foundations of the disorder, focusing on the role of the mirror neuron system (MNS) in explaining deficits in imitation and theory of mind, and drawing on explanatory cognitive models such as central coherence impairment and in executive functions. The article also details receptive and expressive language features; it refutes the common perception that expressive language is superior to receptive language, demonstrating the association of language disparities with

non-verbal cognitive abilities, neural tonality processing and event-related potentials (ERPs). The study concludes that it is important to shift from formalistic approaches to early pragmatic and functional interventions, and to integrate behavioural assessment tools (such as the VB-MAPP) to enhance communicative competence and self-awareness in natural environments.

Keywords: autism spectrum disorder, pragmatic linguistics, mirror neurons, theory of mind, receptive and expressive language, early intervention.

Introduction

Human communication and language are the cornerstones of social interaction and self-construction; language is the primary means of expressing thoughts and feelings and conveying situational and contextual requirements between individuals.[1] However, individuals diagnosed with Autism Spectrum Disorder (ASD) face severe challenges and persistent deficits in social communication and interaction across multiple contexts.[2] (American Psychiatric Association) These deficits range from difficulties in understanding language (receptive) to producing and generating it (expressive) and using it in situational and pragmatic contexts; as social cognition in autism is characterised by difficulties in moving beyond the surface-level aspects of communication, behaviour and social codes towards interpreting them and understanding their deeper semantic and pragmatic structures.[3]

In the face of this neurodevelopmental complexity, 'pragmatic linguistics'—as the study of language in use and within the context of real-life practice—emerges as a practical approach and interpretative framework that goes beyond dry formal grammatical and morphological structures, linking the linguistic system to cognitive, neurological and contextual requirements.[4]

The First Axis: Conceptual frameworks and the cognitive and neurological foundations of language on the autism spectrum

1.1. Conceptual definition of language development and its components

The American Psychological Association (APA) defines language through three main dimensions.[5]

- A system for expressing or communicating thoughts and feelings through speech sounds or written symbols.
- A specific communicative system used by a particular group of speakers, with its own vocabulary, rules and distinctive phonological system.
- Similar non-verbal means of communication, such as sign language.

Language proficiency is broadly divided into two complementary components[6] :

- Receptive Language: This is an individual's ability to correctly understand and comprehend what is said, written or signalled by others, to formulate appropriate responses, to follow instructions, and to answer questions in communicative situations.[7] This form of language relies on the sense of hearing; if this sense is intact, its activity begins as early as the foetal stage, and mothers may notice that the foetus's movements increase with loud, noisy sounds and subside in silence. Language development begins with the reception of sounds, followed by attention to them and then their comprehension, thereby forming receptive language. This develops mental and intellectual faculties and serves as the foundation for reception and learning, as it constitutes the most frequently used aspect of daily linguistic activity. This process requires the processing of auditory cues and the translation of sounds into highly focused meanings and connotations, free from mental distraction.[8] This is a process based on cognitive functions such as attention, perception and memory.

[1] Delahaie (2009:17)

[2] Vogindroukas et al. (2022:2187)

[3] Al-Honsali (2025:166)

[4] Al-Honsali (2025:231)

[5] Al-Hanawi (2024:364)

[6] Ibid. 364

[7] Al-Fa'ouri and Al-Zariqat, (2020:4)

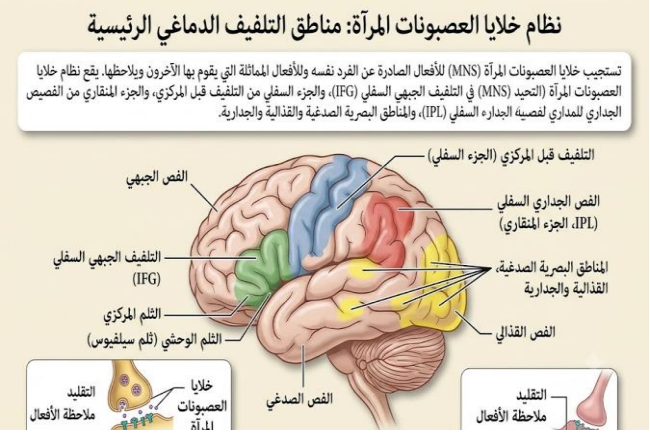
[8] Al-Ansari and Sayyah (2021:150)

- Expressive Language: This is the process involved in using spoken, symbolic or written language to effectively convey an individual's thoughts, feelings, intentions and needs between individuals, leading to mutual understanding. [9]

Deficits in social communication are a key feature of autism spectrum disorder (American Psychiatric Association). Whilst impairments in language comprehension and use vary considerably amongst individuals within this group, they are nevertheless very common. For example, Loucas and colleagues (Loucas et al) found that approximately 57 per cent of children diagnosed with autism who have normal non-verbal intelligence experience language difficulties. Although many studies have assessed receptive and expressive performance, relatively less attention has been paid to directly investigating these abilities and their interrelationships. [10] From a developmental perspective, the development of spoken language coincides with the acquisition of motor and exploratory skills during the toddler stage – the age group ranging from one to three years (and extending to five years in some studies) – which sees the child transition from tentative walking to a language explosion. [11] Receptive language precedes expressive language in the natural course of development; the child understands words and phrases before acquiring the ability to produce them verbally.[12]

1.2. The neurocognitive explanation and the 'mirror neuron' mechanism

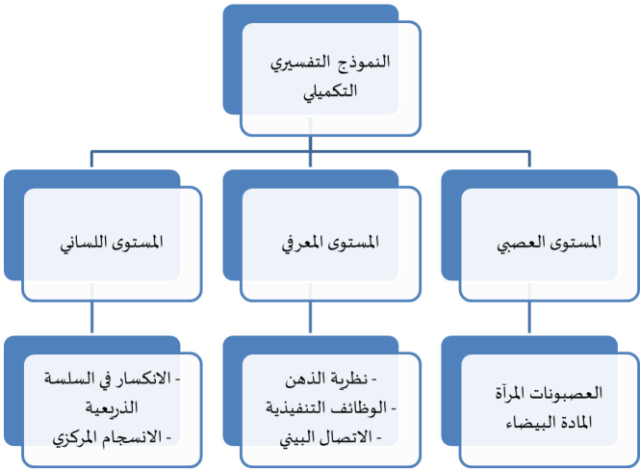
Mirror neurons respond to actions performed by the individual themselves and to similar actions performed by others that they observe. The mirror neuron system (MNS) is located in the inferior frontal gyrus (IFG), the inferior part of the precentral gyrus, the rostral part of the inferior parietal lobule (IPL), and the visual temporal, occipital and parietal regions.[13] The following image illustrates these areas of the brain:



Mirror neurons (MNS) are involved in numerous neurocognitive functions such as understanding actions, imitation, language, theory of mind (ToM), social interaction and empathy.[14]

The absence of Theory of Mind (ToM) and imitation skills is closely associated with the characteristics of autism. Some studies have found a link between atypical activation of mirror neurons and autism, suggesting that dysfunction in the MNS contributes to deficits in imitation and Theory of Mind.

Contemporary explanations of language disorders in autism go beyond monistic theories, moving towards an integrative explanatory model in which neurological, cognitive and linguistic levels intersect:



Ramachandran provides the cornerstone of the neurological explanation by linking communicative deficits to a dysfunction of the 'mirror neuron system' (MNS) as the

[9] Ibid., p. 150

[10] Tager-Flusberg et al. (2015:202)

[11] Seol et al (2014:1721)

[12] Fréchette Boyd et al (2017:1)

[13] Yuan and Zhu (2021:158) Yuan & Zhu

[14] Ibid., p. 158

infrastructure for imitation and the prediction of intentions.[15] He also highlights the motor presentation, which he sees as the key to the puzzle: the difficulty experienced by a group of children with autism in mimicking and imitating others.

These neurons play a pivotal role in complex cognitive processes, such as social interactions and the development of empathy, and are crucial for individuals to perceive the social situations occurring in their environment. In particular, advanced imaging techniques, such as functional magnetic resonance imaging (fMRI), reveal differences in social cognitive processes by measuring the levels of activation of these neurons. This provides deeper and more detailed information about the biological neural abnormalities associated with autism. Recent studies conducted on individuals diagnosed with autism have shown a marked reduction or irregularity in the activity of mirror neurons in response to eye and facial expressions. This contributes significantly to our understanding of the neurobiological mechanisms underlying difficulties with social communication skills. In addition, various neurobiological techniques, such as electroencephalography (EEG) and transcranial magnetic stimulation (TMS), are used effectively to examine the circuits and connections of these neurons in specific brain regions with precision. Electroencephalography (EEG) is a crucial tool for assessing neural transmission and the organisation of brain waves, as it can reveal the finest details of an individual's cognitive processes. Transcranial magnetic stimulation (TMS), on the other hand, involves testing the functions of mirror neurons by stimulating specific brain regions, and provides an opportunity to identify the clinical effects of disorders. Thanks to the capabilities offered by these advanced techniques, the neurobiology of impairments in social communication and empathy in individuals with autism is being studied in great detail, yielding new and fascinating insights in this field.[16]

The mirror neuron hypothesis may explain the difficulty certain individuals with autism have in understanding metaphors and proverbs; the absence of empathy, language and the mimetic abilities involved in learning is the result of abnormalities in the functioning of these neurons.[17] Scientific evidence confirms their role in learning, given that imitation is a central mechanism in psychological and mental development, emotional adaptation and the accumulation of knowledge, which is consistent with Vygotsky's socio-constructivist theory.[18]

These neurons develop a mechanism that enables individuals to understand environmental information more effectively. Furthermore, mirror neurons have the capacity to respond to forms of non-verbal communication (facial expressions, body language, hand movements, gestures, and the like);[19] this not only supports social adaptation and understanding but also contributes to positive outcomes in interpersonal interactions.

In this regard, Vivanti and Rogers identify three aspects of imitation that are crucial to the development of pedagogy for autism:

- Mechanisms that enable the mapping of implicit knowledge and learning from the behaviour of others.

- The motivation to learn from and imitate peers.

- The flexible and selective use of social learning.[20]

The motivation to learn is driven not only by the outcomes of goal-directed social experiences, but also by the pleasure of interaction and identification that accompanies the learning process; this explains why autism is a disorder of social learning and self-awareness, and is directly reflected in linguistic functions.

Dysfunction in the mirror neuron system is considered a key contributing factor to deficits in imitation skills, theory of mind and social cognition in people with autism spectrum disorder; this is known as the 'Broken Mirror Theory' ([21]). The dimensions of this model are illustrated by the following points:

Deficits in imitation and theory of mind: Mirror neurons in the human brain are involved in numerous cognitive neural functions, and some studies have found a link between atypical activation of these neurons and autism spectrum disorder.[22] This suggests that their dysfunction contributes to deficits in imitation and theory of mind.

[15] Al-Honsali (2025:115)

[16] Diril & Çimen (2025:1961)

[17] Al-Honsali (2025:119)

[18] Ibid., p. 119

[19] Diril and Çimen (2025:1961)

[20] Ibid., p. 119

[21] Yuan and Zhu (2021:154)

[22] Ibid., p. 154

Theoretical insights into mirror neuron system dysfunction lead to three propositions:

The first perspective (combining behavioural and neuroimaging evidence): This leads to the view that impairment of the mirror neuron system is a potential factor contributing to poor imitation skills in individuals diagnosed with autism.

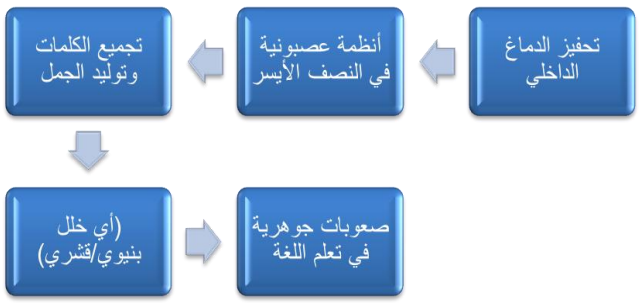
The second perspective (internal motivation mechanisms): highlights the crucial role of internal motivation mechanisms, suggesting that a disruption in the motivation of the mirror neuron system may cause deficits in imitation and theory of mind in people with autism.

The third perspective (Chaining Vision): This posits that chained neurons only fire when a specific sequence of actions is observed or performed, and that disruption of this sequence leads to difficulties in social cognition.[23]

Anatomically, Arbib and Rizzolatti (1998) demonstrate that mirror neurons contribute to language development, as the pre-motor area in macaque monkeys corresponds to Broca's area in humans.

Functional neuroimaging by Félix et al. reveals weak functional connectivity between Broca's area (production) and Wernicke's area (reception).[24]

From Damasio's biological perspective, language processing relies on a smaller number of neural systems in the left hemisphere that represent sounds, phonological combinations and the rules for assembling words and generating sentences; consequently, dysfunction in these cortical systems explains difficulties in language learning.[25]



Nadel proposes a cognitive-developmental perspective in which she identifies early mimicry—of mirror neurons—as the fundamental basis for the emergence of a 'sense of agency'; that is, the perception of the self as the primary source of actions and their effects on the external world.[26] Drawing on data from neuroimaging and experimental psychology, the researcher argues that there are shared neural and cognitive mechanisms linking the perception, generation and imitation of action. This 'innate perceptual-motor coupling' is clearly evident in the early selectivity of infants (from the age of two months) for human biological movements over other similar mechanical stimuli.

Nadel's findings show that simulation, as a neural mechanism in the interaction between infant and mother, increases simulation responses tenfold in conditioned interactive loops, thereby reinforcing the distinction between the agency of the self and that of the other.[27] Consequently, mimicry transcends mere motor imitation to become a fundamental simulation and communication system (Simulation System) that enables pre-verbal children to explore communicative intentions and role-taking. Consequently, Nadel's thesis acquires significant clinical and practical weight when applied to the psychology of children with autism spectrum disorder (ASD) and their rehabilitation mechanisms, through the stimulation of spontaneous social tendencies.

1.3. Cognitive Analysis of Autism: A Study in Theory of Mind, Executive Functions and Central Coherence

The cognitive approach is based on the assumption that human beings possess an innate cognitive framework that enables them to infer the mental states and intentions of others (such as beliefs, desires and emotions), which is a prerequisite for

[23] Ibid., p. 154

[24] Al-Hansali, p. 121

[25] Ibid., p. 221

[26] Nadel (2004:15) Nadel

[27] Ibid., p. 15

successful communication. Autism Spectrum Disorder (ASD) is significant not only for the planning of effective rehabilitation programmes, but also for identifying the neurocognitive phenotype associated with autism. The ultimate aim of this characterisation is to understand the mechanisms through which genes; the brain and behaviour interact throughout the course of development. Furthermore, identifying the characteristics of the language disorder enables the differentiation of subgroups of children diagnosed with autism, leading to the identification of the psychological factors and cognitive mechanisms underlying the disorder's phenotypes.[28]

The British researcher Simon Baron-Cohen and his colleagues established the cognitive and social dimensions of this approach; in their seminal study, they demonstrated that children diagnosed with autism face a structural deficit in representing and understanding the mental states of others (theory of mind).[29] This has a direct and functional impact on their dynamic ability to utilise language within its social and contextual frameworks.

'Ota Frith' and 'Baron-Cohen' (Baron-Cohen) from the hypothesis of 'mind-blindness'; the deficit lies in the inability to develop 'theory of mind' (ToM), which results in the child failing to establish 'common ground' with the interlocutor.[30] These propositions are consistent with the ' ' , which emphasises the inability of children with autism to pass the false belief task (the Sally–Anne Test) and to understand the perspectives of others, due to a weak connection between the mirror neuron network and the sequence of mental intentions required to perform actions.[31]

Duval argues that the theory of mind is based on an analysis of linguistic interaction; before uttering speech, the speaker has already listened and received, and is aware of what they are thinking and of what others believe. This 'private, pre-emptive internal listening' enables the verification of the content of issues and lays the foundation for referential ability as shared representations within the linguistic community.[32] The absence of this mechanism in a child with autism disrupts their communicative function and reduces language to rigid, inflexible patterns.

On the other hand, Thommen links the deficits associated with autism spectrum disorder to impairments in 'executive functions'; as a lack of cognitive flexibility, poor working memory and deficient inhibitory mechanisms hinder the processing of structures and prevent adaptation to the morphological shifts in speech.[33] Furthermore, the 'Weak Central Coherence' theory proposed by Freeth and Thommen points to the child's tendency towards fragmentary processing of words and their isolation from their overall integrative context.[34] .

The immediate cause of impaired language acquisition in autism is fundamentally biological and psycho-cognitive in nature (with underlying causes sought at the level of brain structure and/or function), and these three cognitive theories overlap to explain the communicative disorder.[35]

The Second Axis: receptive and expressive linguistic features in the light of neural processing

The linguistic reality in children with autism is characterised by a marked discrepancy between the phonological and surface syntactic levels on the one hand, and the inflectional and semantic levels on the other.

One recent study was designed to characterise the developmental trajectories of vocabulary acquisition in males diagnosed with autism spectrum disorder (ASD) compared to typical development, with a focus on the receptive domain, which is believed to be the most vulnerable to disruption in cases of autism. The study employed a cross-sectional developmental trajectory approach ( ), which elucidates age-related patterns to characterise specific aspects of language delay and enables the formulation of stronger hypotheses to guide future longitudinal research.[36] . The results showed a relative deficit in receptive vocabulary at the individual level. When receptive and expressive vocabulary trajectories were measured together in a repeated-measures model and non-verbal cognitive ability was controlled for as a mediating variable, the significant group-by-task interaction disappeared

[28] Kover et al. (2013:2697)

[29] Baron-Cohen et al (1985:37)

[30] Al-Hansali (2025:231)

[31] Yan and Zu (2021:154)

[32] Al-Hansali (2025:231)

[33] Al-Hansali (2025:112)

[34] Tager-Flusberg and Joseph (2003:448)

[35] Lancelot (2021:112) Lancelot

[36] Kover (2013:2697)

entirely, this implies that the developmental relationship between linguistic domains does not differ between those diagnosed with autism and neurotypical individuals once non-verbal intelligence is taken into account. The result did not retain its statistical significance when non-verbal cognitive ability was controlled for; this leads us to conclude that vocabulary development in children with autism does not fall outside the range of general developmental expectations associated with their cognitive level, but rather depends on the statistical effect of non-verbal intelligence.

2.1. Receptive Language and the Challenges of Contextual Interpretation

Receptive language is defined as an individual's ability to understand and interpret language, whether verbal or non-verbal, and involves the accurate processing of information to achieve effective communication.

This area constitutes a significant weakness in children with autism compared to their expressive language skills and non-verbal abilities.[37] This deficit manifests in a literal, direct interpretation of communicative intentions due to weak inferential interpretation skills that bridge the gap between the surface meaning of the words and the speaker's intended meaning.[38]

Examples of receptive language include: following instructions (e.g. 'stand up', 'sit down'); interpreting gestures and visual and auditory cues; identifying, locating and distinguishing objects and images; understanding concepts (colours, sizes, shapes, numbers); responding to questions; and understanding a story and its context.

Clinical literature has confirmed that children with autism face severe difficulties in understanding complex, multi-step instructions, grasping emotional terminology and mental states, and experience a delay in responding to their name at an early age.[39]

2.2. Expressive language and stereotyped verbal patterns

Although verbal production appears to be better in some cases – in what is known as the 'expressive language dominance' phenomenon – this expression is often formulaic and lacks the spontaneity required for social interaction.[40]

Stereotyped expressive behaviours include:

- Echolalia: observed in 75 per cent to 85 per cent of children on the spectrum. Although traditionally viewed as a mechanical behaviour, Sterponi and Shankey (Sterponi & Shankey) propose a new approach that regards echolalia as a conversational structure playing an interactive and conscious role in participating in dialogue, constructing meaning and self-regulation.[41] Grandin (Grandin) has emphasised its use as a resource for retrieving pre-formulated expressions [42].

The verbal discourse of individuals with autism spectrum disorder often includes formal words, unfamiliar sentences, new terms, or words and expressions they have invented themselves. People diagnosed with autism spectrum disorder also find it difficult to speak because their interpretation of others' speech is very literal – they may not understand metaphors or humour, and may also find it difficult to tell stories.[43] They tend to use inappropriate words in certain contexts, to speak in a stilted manner, or to speak in ways intended to impress others.

Play-based learning is one of the innovative approaches to enhancing verbal expression and developing expressive language in early intervention. Play is a natural and enjoyable way for children to explore language, develop their vocabulary and practise communication skills. Incorporating games, interactive activities and storytelling into early intervention programmes creates a dynamic environment that helps to enrich a child's vocabulary.[44]

Practical example: The use of imaginative play, such as 'doctor and his tools', encourages the child to use complex sentences and describe their feelings, thereby contributing to the development of language skills in a spontaneous and enjoyable way.

[37] Seoul et al. (2014:1721)

[38] Al-Hansali (2025:166)

[39] Tager-Flusberg & Caronna (2007:7)

[40] Tager-Flusberg and Caronna (2007:4)

[41] Al-Hansali (2025:258)

[42] Ibid., p. 259

[43] Vogindroukas et al. (2021:2370)

[44] Hollo et al. (2014:170)

2.3. Comparison between the two languages (review of classical hypotheses)

A common perception in clinical circles has been that children diagnosed with autism possess expressive language skills that surpass their receptive skills, and this perception was considered a key diagnostic marker. However, the results of a comprehensive meta-analysis conducted by Kwok and colleagues on 74 experimental studies (involving 4,067 participants) demonstrated that there is no statistical evidence to support the hypothesis of expressive superiority. On the contrary, individuals with autism exhibited equal deficits in both receptive and expressive language skills; these deficits were approximately 1.5 standard deviations lower than those of their typically developing peers across various stages and measures.[45]

With regard to the developmental studies reviewed, a study by Kover et al., involving a sample of 49 boys with autism compared with 80 typically developing boys, revealed that receptive vocabulary skills develop at a rate 20 per cent slower than expressive vocabulary skills as children get older. However, the key finding of their study showed that when non-verbal cognitive ability was statistically controlled for and neutralised, the statistically significant difference between the two groups disappeared. This demonstrates that the relative weakness in vocabulary acquisition among children with autism is not so much due to an atypical and unique linguistic pattern as it is attributable to levels of non-verbal cognitive and intellectual ability.[46]

Several studies indicate a disparity between expressive and receptive vocabulary scores, with expressive vocabulary scores being higher than receptive ones. Whilst other studies have observed no differences, or have recorded higher scores for receptive vocabulary compared to expressive vocabulary, these conflicting results appear to depend on the study measures and the ages of the participants. In addition to deficits in standardised vocabulary scores.[47]

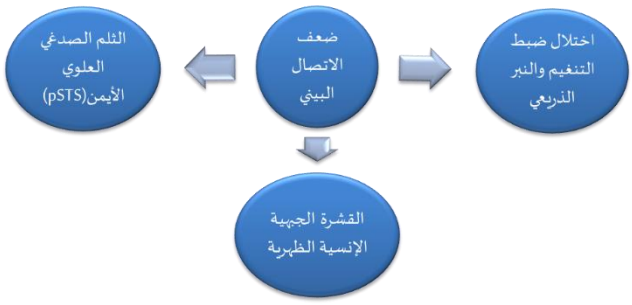
2.4. Prosody and Event-Related Potentials (ERPs)

A. Prosodic Profile

Meaning is the product of phonological, morphological, syntactic, semantic and pragmatic processes that interact with one another through various dimensions… and grammar, in its deepest and broadest sense, imposes certain limits and constraints that cause these components to harmonise and interrelate according to specific criteria.[48]

Phonology is considered the linguistic domain least affected by disruption in individuals diagnosed with autism, and their speech generally demonstrates phonological accuracy that reflects an implicit knowledge of the phonological categories of their first language.[49] However, prosodic features (rhythm, stress and intonation) are vital for conveying intent and emotional expression.

Although individuals with autism are able to distinguish fundamental auditory frequencies, they are unable to modulate their own voice intonation.[50] This is anatomically linked to impaired connectivity between the dorsal medial prefrontal cortex (dMPFC) and the right posterior superior temporal sulcus (pSTS), which are responsible for processing social intonation.[51]



B. Event-Related Potentials (ERPs) and lateral asymmetry

Studies of event-related potentials (ERPs) demonstrate the independence of surface syntax from phonological syntax; individuals with autism exhibit atypical N400 responses (reduced amplitude and prolonged latency) to this wave when

[45] Kwok et al. (2015:202)

[46] Kover et al. (2013:2697)

[47] Friedman & Sterling (2019:292)

[48] Al-Shanshani (2022:140)

[49] Boushi (2003:250)

[50] Ibid., p. 2189

[51] Tiger-Felsberg and Youssef (2003:450)

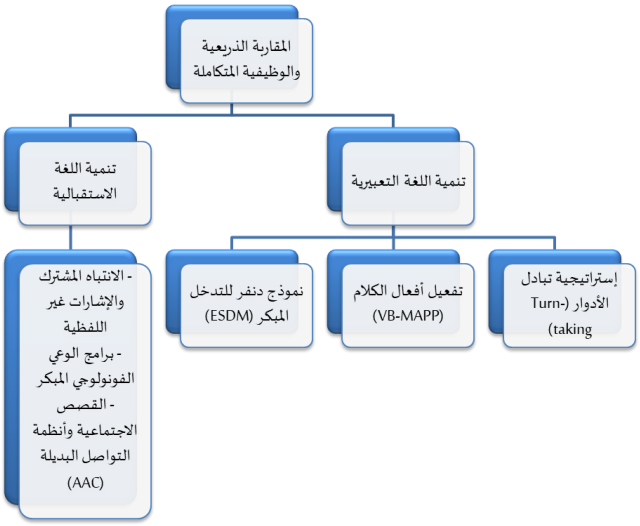
confronted with semantic and phonological incongruence. The N400 refers to a negative brainwave that appears on an electroencephalogram (EEG) and peaks approximately 400 milliseconds after the presentation of a stimulus (a word, image or sound). The amplitude of this wave ( ) reflects the difficulty of semantic processing or the effort expended by the brain to integrate a particular word into the cognitive or linguistic context, reflecting the difficulty of rapid contextual integration.[52] In contrast, they exhibit wider P600 response amplitudes and increased response times for grammatical structures. The P600 refers to a positive brainwave that appears on an electroencephalogram (EEG), which reaches its peak amplitude approximately 600 milliseconds (typically ranging from 500 to 800 milliseconds) after the onset of the linguistic stimulus. Whilst the N400 is associated with meaning and semantics, the amplitude of the P600 primarily reflects the difficulty of syntactic processing and the effort expended by the brain to reconstruct the sentence or correct a syntactic error, reflecting compensatory cognitive and attentional effort to re-analyse the sentence and update the context.[53]

Regarding the lateralisation of language processing, neurocognitive research shows that language learning in individuals with autism occurs bilaterally across the left and right hemispheres, rather than through the functional specialisation of the left hemisphere that is predominant in neurotypical individuals. This bilateral activation may lead to a drain on cognitive resources, contributing to the emergence of other language disorders such as atypical speech patterns.[54]

The Third Axis: the pragmatic and functional approach to developing communication skills

3.1. The Concept of the Pragmatic Approach

Pragmatics is defined as the conventions and rules governing the direct use of language during communication, and includes social knowledge, understanding the intentions of others, and narrative coherence.[55] Cognitive and neurological challenges necessitate a shift from formal language teaching to intervention models based on pragmatic and functional framing:



Gao et al. expanded on this interpretative perspective through a retrospective analytical study.[56] They concluded that this motor deficit is characterised by developmental continuity and extends from childhood into adulthood. This deficit manifests itself in several structural aspects, including:

- Deficit in monitoring intentions and purposes: a failure to monitor implicit intentions and to distinguish between literal and intended meaning.

- Difficulty in decoding figurative and metaphorical discourse: A study by Pouscoulous and Perovic confirms that the interpretation of metaphors is not determined solely by purely linguistic abilities, but is structurally influenced by contextual, social and economic variables.

- Self-centredness and communication difficulties: Language is performative rather than social, with difficulties in understanding facial expressions, gestures and intonation.[57]

3.2. Development of receptive language through instrumental framing

Success in developing children's communication skills depends fundamentally on their ability to understand and express thoughts and feelings, and in the context of early intervention, both receptive and expressive language play a crucial role in children's development, as they consolidate their ability to comprehend and express themselves verbally and non-verbally. This can be achieved through various

[52] Tiger-Felsberg and Youssef (2003:447)

[53] Ibid., p. 448

[54] Arnett et al. (2018:10) Arnett et al

[55] Boushi (2003:249)

[56] Gao et al (2023:1740)

[57] Pouscoulous and Perović (2023:1847)

means, such as sign language, words, gestures, drawings and symbols, and is done by:

Enhancing joint attention and non-verbal cues: incorporating facial expressions, body language and intonation during interactive reading to link words to their contextual environment.[58]

Implementing early phonological awareness programmes: training children to break down sounds and work with syllables and rhymes to enhance metalinguistic thinking and support vocabulary comprehension.[59]

Working to capitalise on implicit learning and event-related potentials (ERPs): A study by Arnett et al. [60] investigated auditory processing using brain-mapping techniques (EEG, ERP, fMRI, ME); they found a significant interaction between receptive language ability and a reduction in the amplitude of the early visual/auditory component (P1) for learned words,[61] demonstrating that individuals with autism who possess moderate or high receptive skills are capable of implicit statistical learning.

Early Behavioural and Developmental Intervention (ESDM): Intensive early intervention using the 'Denver' Early Start model – which integrates Applied Behaviour Analysis (ABA) with developmental approaches – enables children to achieve standardised gains of up to 20 points in receptive language by capitalising on critical developmental periods.[62]

3.3. Development of expressive language through speech acts and verbal behaviour: the turn-taking strategy:

This approach involves using shared reading activities and constructive play to train the child to wait for their turn and initiate communicative interaction, based on:

- The Verbal Behaviour (VB) approach: based on Applied Behaviour Analysis (ABA) to link speech to its communicative function and environmental variables, rather than focusing solely on abstract grammatical structure. [63] Skinner – author of *Verbal Behaviour* – studied language and thereby provided a robust methodology for linguistic assessment and supportive intervention. He stated on several occasions that his book *Verbal Behaviour* would prove to be his most important work.[64] In it, he presented a detailed behavioural analysis of the nature of language.

- Social stories and alternative and augmentative communication (AAC) systems: the use of picture scenarios, picture boards (such as the PECS system) and alternative electronic tools to bridge the motor-verbal gap, enable individuals to articulate their thoughts and personal reflections, and promote contextual generalisation.[65]

The Fourth Axis: Assessment approaches, influencing factors and intervention applications

4.1 Assessment Approaches: Standardised Scales versus Verbal Behaviour Programmes

A study by Hensgens (2019) compared items between the traditional language-based Preschool Language Scale (PLS-5) and the Verbal Behaviour Assessment Programme (VB-MAPP), which is based on applied behaviour analysis, in 17 children with autism:

[58] Vigindrokas et al. (2022:2188)

[59] Al-Hanawi (2024:366)

[60] Arnet et al. (2018:30)

[61] (P1) in electroencephalography (EEG P1 Wave Amplitude): a primary visual neural response that appears in the visual cortex within 80–120 milliseconds of attention to visual stimuli; it is used to measure the capacity of visual working memory and the extent to which it is affected by cognitive load.

[62] Hollo et al. (2014:169)

[63] Hensgens (2019:29)

[64] Barbara and Rasmussen (2018:13) Translated by Aya Mastour

[65] Al-Hansali (2025:164)

The results showed that the mean raw scores for expressive language on the (VB-MAPP) compared with the (PLS-5) scale. The researcher attributes this to the fact that confining expressive skills to a single formal assessment session with an unfamiliar specialist creates anxiety, which reduces the display of true expressive abilities that are clearly evident in continuous assessment within the natural environment.[66]

4.2. Systematic review of factors determining linguistic variation

In the comprehensive systematic review by Muès et al., based on 55 research articles, 56 independent factors were identified that account for the high degree of heterogeneity in receptive and expressive abilities among children with autism and their siblings. [67] The factors were categorised into three main dimensions:

Biological and neurological factors: frontal EEG power and familial genetic patterns.

Psychosocial and environmental factors: joint attention skills and the quality of generative linguistic input.

Developmental factors: non-verbal cognitive abilities and chronological age.

The review confirms that high-probability siblings (EL-siblings) show a 3- to 4-fold higher risk of language delay, making early language impairment a behavioural endophenotype of autism spectrum disorder.[68]

Conclusion and Recommendations

Comprehensive studies show that linguistic deficits and impairments in individuals with autism spectrum disorder are not merely due to structural syntactic deficits, but rather to a contextual-instrumental gap that prevents the integration of receptive comprehension and expressive production. Any approach that fails to take into account the neurological basis of theory-of-mind networks, executive functions and mirror neurons will fall short of bringing about a tangible transformation in the child's communicative life, as the issue relates to a disorder in social learning and self-awareness.

Accordingly, the study proposes:

The adoption of a multi-dimensional and integrative assessment: moving beyond dry, standardised language tests and incorporating functional behavioural assessment tools (such as the VB-MAPP) to identify true expressive abilities in natural settings.

Early intervention before the age of three: capitalising on developmental sensitive periods to bridge the receptive gap resulting from the misleading apparent superiority of typical expressive language.

Integration of phonological progression with functional analysis: Formulating treatment plans that combine phonetic treatment of syllables (phonological awareness) with training in interactive speech acts such as self-expression, requesting and refusal.

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[66] Hensgens (2019:30)

[67] Muès et al. (2024:2)

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