DOI: 10.21554/hrr.042408

The Intersection of Language Impairment and Rehabilitative Language Immersion in Autism: A Comprehensive Analysis

Professional paper

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Received: 2023/9/01
Accepted: 2023/12/25

Abstract

This paper discusses the literature on language acquisition in individuals with autism spectrum disorders (ASD), highlighting rapid changes in the field. Researchers in psycholinguistics are exploring language acquisition theories due to ASD's significant differences across language, social, and cognitive domains. The study highlights areas where knowledge is lacking and explores potential future directions. While pragmatic deficits are commonly associated with ASD, clinicians and researchers should consider phonological, morph syntactic differences and rehabilitation to change the condition of phonological errors, which impact language comprehension and production.

***Keywords**: Autism Spectrum Disorder, Behaviours, Language Acquisition, Language Impairment, Social cognition.*

Language skills development is a unique milestone with a uniform course across children, despite differences in structure, intelligence, sociability, and culture. However, not everyone acquires functional language skills. Language delays or deficits indicate developmental impairments, aiding in understanding the process and highlighting the developmental trajectory of language acquisition (Pierce & Bartolucci, 1977). For both theoretical and practical reasons, it is essential to look into the atypical pattern of language acquisition in children with autism spectrum disorders (ASD). This knowledge can be used to create interventions and treatments for these kids. Determine the prerequisites for language development in kids with typical development by understanding the atypical course of language development in ASD (TD). When researching childhood disorders, researchers should take a developmental approach and look at how the disorder develops over time (Curtiss et al., 1992).

The history of language development research is replete with debates between nativist and constructionist perspectives. Learners with language impairments are an essential source of information regarding the cognitive domains that influence language acquisition and the constraints on language acquisition. Important issues about domain-specific predispositions for language learners and domain-general mechanisms that may underlie language acquisition can be addressed by looking at language deficits, their causes, and the related strengths and weaknesses in non-language domains. Social cognition, attentional and learning mechanisms, the understanding of cause-and-effect relationships, and met representational abilities are some of the

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associated mechanisms and processes (Katz et al., 1992). The two main objectives of this article are to examine the evidence regarding language acquisition in the areas of pragmatics and discourse functions, phonology, the lexicon, morphology, and syntax in individuals with autism spectrum disorders, as well as what these findings suggest about language acquisition in the general population.

Autism is a group of diseases that affect how a person interacts with other people, how they talk, and how they understand what other people say. A third sign was that the person had limited and very regular motor behaviours and strange and persistent mental interests. ASD probably doesn't have a single cause, but there does seem to be a clear effect of hereditary differences and a large neural element (Landa et al., 1991). Language studies have utilized the "broader autism phenotype" to understand ASD and its impact on the brain. Infant siblings of individuals with ASD have been particularly helpful in identifying early signs and describing the autism phenotype. Research has shown that first-degree relatives of ASD may have less complex speech than those with other psychiatric disorders. Additionally, young brothers of children with ASD have a high rate of language delay, emphasizing the importance of speaking skills in presenting ASD in the real world (Kjelgaard & Tager-Flusberg, 2001).

ASD is primarily a condition affecting language and communication skills, with language milestones, particularly by age five, being highly linked to a long-term prognosis. However, there is a lack of research on the causes of communication problems and delays. Experts argue that language delays are mainly caused by a lack of social interest or reciprocity, and many early language studies were conducted before reliable diagnostic methods were available. This lack of empirical attention may be due to the fact that early language studies were conducted before there were strict, reliable diagnostic methods, potentially involving individuals who were not strictly "autistic" (Dahlgren & Gillberg, 1989).

The high-level deficiencies in pragmatics, discourse, prosody, morphology, syntax, phonology, and phonetics that are present in ASD are discussed in this paper. It examines studies on language development in ASD and its implications for language learning. Reviews are organised by topic in a different sequence.

Linguistic Forms in Asd

Language difficulties in individuals with Asperger's syndrome (ASD) are often linked to deficits in social motivation, while fundamental language skills like phonology and morphology remain intact. Research indicates that language impairments are present in the majority of individuals with ASD, including deficits in pragmatics and discourse processes. Early studies suggested that around 50% of affected individuals never acquire functional speech, while more recent estimates reveal a smaller proportion of non-verbal individuals. The average age at which children with ASD generate their first words is 38 months, compared to 8-14 months for children with TD. Recent studies suggest that children with autism exhibit a greater degree of developmental scatter, producing less predictable grammatical structures based on previous productions. Differences may be due to methodological factors, such as the use of spontaneous versus structured tasks (Eigsti et al., 2007).

Atypical traits and domain-specific deficiencies in language output are hallmarks of ASD. Echolalia, or the immediate or delayed imitation of language from conversational partners or media like cartoons or television, is a common behaviour among young children (Tager-Flusberg & Calkins, 1990). In a longitudinal study of children with ASD, Down syndrome, and TD, Tager-Flusberg and Calkins (1990) found that spontaneous utterances of children with ASD were longer and contained more advanced grammatical constructions than imitated utterances. Echolalia, which may not aid in grammatical development, appears to have some communicative function. Over 33% of echolalic utterances generated by children in Prizant and Duchan's sample had a turn-taking function, and 25% had a declarative function. Additionally, individuals with ASD frequently create novel words (neologisms), often with idiosyncratic meanings. This suggests that individuals with ASD exhibit linguistic forms (echolalia, neologisms) that are not observed in children with typical development, at least not with the same

frequency or late in acquisition.

Less Exposure In Pragmatic Functions

The study of language in its social context, or "pragmatics", is central to the study of communication and human interaction. Pragmatics includes both linguistic and non-linguistic functions, including register (changing one's speech depending on whom one is speaking to), turn-taking negotiation, and referential expression choice ("a" versus "the"). The term "discourse", which refers to more extensive chains of thought in a speaker's words, is similar. The development of language skills in children is long, with an asymptote around age five. Pragmatics and discourse are socially motivated domains, requiring speakers to respond to the listener's social status, knowledge, interest, and motivation. Children with ASD who no longer fit the criteria for a diagnosis still face difficulties in speech and pragmatics (Kelley et al., 2006). Studies indicate that individuals with autism use formal language and odd phrasing, known as "Little Professor" communication, for precise and precise communication (Rutter & Schopler, 1992). A lack of expertise in peer relations may account, at least in part, for pragmatic deficiencies. Children who prefer to connect with adults may develop speech patterns and vocabulary more characteristic of adults than those of their own age if they lack exposure to peers.

Both discourse and pragmatics require familiarity with language structure and an awareness of how to put that knowledge to use in conversation. Tager-Flusberg and Anderson found that six children with ASD were less receptive to discourse than their counterparts with Down syndrome (Tager-Flusberg & Anderson, 1991). This deficit lasted for an entire year. Cohesive connections of reference, in which different portions of a sentence point to the same object, were utilised less frequently by children with ASD compared to those with SLI and TD, whose mean utterance length was comparable (Baltaxe & 'sAngiola, 1996). When a conversation breaks down due to a misinterpretation or a lack of clarity on the referent, the participants will engage in conversational repair to get back on track. The repair process typically begins with a request for explanation from the listener; the original speaker must utilise both linguistic and social skills when responding to a request. Typically, children with MR develop this skill by age 5, with older children demonstrating a wider variety of repair procedures and generating more data. However, children on the spectrum struggle frequently to correct misconceptions. Compared to language-matched control children, Volden discovered that the ASD group was able to respond to communication failures using a variety of strategies and by adding more information. The ASD group, however, made more inappropriate remarks (Volden, 2004).

Multiple studies have shown that people with ASD have significant issues with speech, particularly in their ability to react to inquiries and remarks. These impairments persist throughout adulthood (Eales, 1993). Ozonoff and Miller compared the levels of spontaneous speech in 17 Asperger's (AS) and 13 high-functioning autism (HFA) children (mean age, 16 years). There was no correlation between age, narrow interests, or IQ and the prevalence of pedantic speech, which was present in about 76% of the AS and 31% of the HFA group. Comparatively to their peers of similar age and IQ, people with ASD have difficulty understanding indirect requests, laughing, and drawing conclusions (Ozonoff & Miller, 1996). Several studies point to difficulties with narrative discourse, an extension of conversational discourse. Capps, Losh, and Thurber found that 13 children with autism spectrum disorder (ASD) and a developmentally delayed control group were less likely to identify the causes of characters' internal states during a story-telling task compared to TD controls. The study also found that discourse skills were more strongly linked to the ability to recognize different mental representations and identify the motivations and causes of another person's emotional or mental state (Capps et al., 2000). Children with ASD were also less able to construct clear, explicit links across story events, and story connectedness was not significantly related to recall of the story's "gist". Even high-functioning children with ASD struggled to explain the story's causal structure, discuss characters' motivations, and misunderstand what was happening. Narrative ability is

vital for communication and the structure of one's own thinking. Research has shown that autistic people have difficulties with pragmatics, and cognitive limitations may be as limiting as social delays for language development.

Why do people with ASD often struggle at higher levels of pragmatics and discourse? In the research, two main hypotheses have emerged. The "Theory of Mind" approach has had a significant impact on how we think about autism spectrum disorder (ASD), with some suggesting that difficulties in imagining what other people are thinking are at the heart of the disorder and may place a severe limit on a person's ability to use pragmatic language (Baron-Cohen, 1988). An additional factor may contribute to functional limitations in pragmatics and conversation. It is the goal of the "executive functions" (EF) hypothesis to shed light on the underlying difficulties associated with ASD. In a nutshell, the EF hypothesis proposes that deficits in a group of mental operations linked largely to the frontal lobes' functional circuits underlie ASD. Symptoms of autism spectrum disorder (ASD), such as social deficits, communication delays, and repetitive behaviours, may be explained by impairments in executive functioning (EF), which includes processes like working memory, inhibition, set-shifting, goal-maintenance, and cognitive control. The inability to process information from many sources (self and others, for example) or to suppress incorrect, powerful, or prominent emotions may explain why children with autism struggle with pragmatic and conversational tasks. Despite the theory's plausibility, research on the function of EF in pragmatic abilities is mixed.
ASD individuals with high or low functioning tend to struggle with pragmatics. Research on social skills, communication, and repetitive behaviors has not yet supported the Mind or EF hypotheses, leaving the question of their explanation open.

Prosodic Abnormalities

Prosody, which includes things like rhythm, stress, and intonation, is closely related to pragmatic skills in both production and understanding. Research indicates that prosodic deficits are prevalent in children with ASD (Rutter & Schopler, 1992). A matched sample of children with language difficulties, including HFA or AS, was analyzed by Shriberg. Misplaced lexical emphasis, slower phrasing, and reduced resonance characteristics were some of the indicators suggesting the ASD group utilised less acceptable prosodic phrasing. While the ASD group did have more utterances classified as "loud", the average pitch and loudness of their speech were within normal limits (Shriberg et al., 2001).

According to a study comparing 31 high-functioning ASD children with 72 typically developing children, the ASD group performed worse on 11 out of 12 prosody subtests. Diehl examined prosodic understanding in ASD by contrasting 22 TD controls of the same age, IQ, and PPVT scores with 21 adolescents with ASD. The ability to employ prosody to clarify grammatical meaning was significantly reduced in those with ASD. Prosodic production and understanding have both been shown to be challenging for people with ASD, although further study is needed to determine why this is the case (Diehl & Paul, 2013).

Syntactic Development In Asd

Syntax is the study of how sentences are constructed from individual words. As such, it's possible that it's the most difficult of the four primary areas of language study. Despite some delays in learning, people with ASD had rather normal syntax. In the 1970s, research showed that children with ASD struggled with learning syntax. Three verbal children with autism, compared to MR and younger TD controls, had poorer production of past-tense verb forms, indicating a deficit in "deictic" syntactic categories. Children with ASD had a harder time understanding transitive verb sentences and relied less on word meanings. They also had a reduced capacity to use syntactic information in their speech, producing fewer transformations, and generalized transformations and having a higher mean mistake rate than control groups. Additionally, they had worse overall scores on a syntactic complexity test (Pierce & Bartolucci, 1977).

The abnormal syntactic development in ASD has been repeatedly demonstrated

in studies, but conclusions must be qualified by the wide range of autism diagnoses at the time. Due to the fact that their performance is at the level predicted by IQ or other mental age measures, research suggests that syntax damage in autistic children with ASD is not unique to these individuals. Similar to typically developing children (TD) who have similar core language scores, they might use syntactic knowledge to create original verbs. Children with ASD have a smaller syntactic repertoire and fewer closed-class words than children with Down syndrome. When comparing children with autism, schizophrenia, or other emotional issues, no appreciable differences were found in their capacity to narrate stories, repeat sentences, or finish stories.

When compared to mentally age-matched TD controls, clinically impaired people speak less complexly, but ASD participants speak as complexly as dysphasic people (Waterhouse & Fein, 1982).

Individuals with ASD suffer from syntactic deficits. A study compared high-functioning children with ASD to typically developing controls, finding that younger participants had a longer mean length of utterance. Roberts, Rice, and Tager-Flusberg found that those with lower IQs were just as disadvantaged as those with SLI, and performance was connected with non-word repetition abilities. They concluded that there are likely two distinct forms of ASD, one with features similar to SLI, and the other without (Roberts et al., 2004).

Research indicates that children with ASD produce language with a rigid grammatical structure and fewer syntactic structures. In a study by Eigsti, older children with autism showed decreased ability to determine sentence grammaticality compared to TD controls. When it comes to the third-person singular and present progressive marking, Eigsti and Bennetto found a link between executive function skills and syntactic distinction knowledge in kids with autism spectrum disorder (Eigsti & Bennetto, 2009). Despite varying opinions on the degree of this delay, the majority of research points to a noticeable lag in syntactic development in children with ASD. A study found that reciprocal attention accounts for 89% of monthly syntactic complexity growth rates, indicating that social and cognitive aspects significantly impact developmental progress. Cognitive ability in preschool accounts for the largest proportion of variability in language and social skills at school age. However, abilities at school age were not strongly predicted by preschool social abnormalities or the severity of symptoms (Stevens et al., 2000).

Limited Morphological Development

Morphemes are the fundamental building blocks of language, and morphological development is the study of how and why these smallest meaningful units of language are constructed into words. The morpheme ‘‘jump’’ is used in many ways to create new words and modify existing ones; for instance, in the words jumper, jumped, jumps, jumpy, and long jump. Children with TD are significantly impacted by probabilistic and rule-based restrictions on the integration of morphemes into words, including neighborhood restrictions, phonological characteristics, and item frequency. Despite the paucity of research on morphological development in ASD children, it appears that they acquire morphological rules in a manner similar to that of typically developing kids. Twelve autistic boys were found to use the same nine morphemes in their spontaneous speech as dysphasic controls but with more aberrant and echolalic speech (Cantweil et al., 1978).

In contrast, 10 children with ASD (mean age 10), when compared to typically developing and developmentally delayed control groups of similar mental age, were more likely to omit obligatory morphemes. Bartolucci, Pierce, and Streiner interpreted this finding as possibly reflecting a specific delay in morpheme production (rather than a general language delay). These contradictory results may highlight the value of control groups; while an ASD group may seem to have syntactic deficiencies when compared to a sample matched on total mental age, these deficits are not noticeable when compared to a population with language impairment (Bartolucci et al., 1980). Churchill hypothesised that youngsters on the autism spectrum have trouble understanding functors like prepositions, conjunctions, and pronouns. As a result, investigations of morphological development in children with ASD have produced conflicting results and might benefit from more investigation,

especially given that they were all undertaken before the introduction of the present diagnostic system (Churchill, 1972).

Semantic Processing in ASD

Knowing the meanings of words and how they map onto the real world is just as important as understanding the structure of language, which is what studies of syntax focus on. That's what we call the science of words. Research into ASD people's semantic processing has shown wildly divergent findings.

Research has shown that children with ASD benefit less from syntactic relatedness and coherent sentences compared to their typically developing (TD) control group. They can use word order to enact passive and active sentences and are less affected by the semantic probability of real-world events. Autistic children incorporate syntactic information into their enactments of spoken phrases but are less influenced by semantics than controls. This is consistent with a study by Hermelin and O'Connor that children with ASD did not outperform a typically developing (TD) group on memory tests using sentences or word lists. Further study is needed to understand if people with autism use semantic information to interpret syntactic structure differently than normally developing individuals (Hermelin & O'Connor, 1970). According to recent studies, young children with ASD (mean age 33 months) can learn new words and associate them with new objects at the same rate as typically developing (TD) kids who were matched on language at the first appointment. By the age of 24 months, the TD group had a strong bias against learning new words through form. In word learning for older kids and teenagers, it was discovered that both ASD and TD groups frequently used the mutual exclusivity bias. Children with ASD demonstrated the bias that category labels apply to sets of objects that are mutually exclusive, enabling them to effectively map novel terms onto novel and unnamed objects. The reason why children of school age exhibit a mutual exclusivity bias while toddlers do not exhibit a shape bias may be due to the domain-specificity of these biases as opposed to their linguistic nature or the delayed and extended developmental trajectory of ASD (Tek et al., 2008).

According to the Peabody Picture Vocabulary Test, it has been discovered that receptive vocabulary strength is higher in children with autism, particularly when compared to standardised syntactic tests. Research indicates that children with ASD struggle with understanding the meanings of verbs, implying their interior mental state. They are more likely to use non-standard vocabulary on word fluency tasks, such as "aardvark", compared to children aged 4 to 9. Visual priming effects remain unaffected in ASD. Children with ASD have a different understanding of mental state verbs and semantic organization compared to their typically developing peers, despite performing at or above their mental age on standardized vocabulary tests and appearing age-typical in their lexicon size (Kamio et al., 2007).

Articulatory Problems

Phonology, which describes how a speaker arranges the sounds of a language to encode meaning, intersects with phonetics, which deals with the actual production and articulation of speech. Since it has been demonstrated in numerous clinical investigations that phonology is sensitive to neurological abnormalities, phonology is an excellent area of study for ASD (Culbertson & Tanner, 2001).

Several studies have demonstrated that autism spectrum disorder (ASD) in children of various ages has no impact on phonology. In both structured and unstructured speech contexts, Bartak, Rutter, and Cox discovered that ASD children had fewer articulatory difficulties. In comparison to controls with SLI, 89 children with high-functioning ASD showed comparable findings. The Goldman-Fristoe Test of Articulation findings for both groups fell within the normal range. On the GFTA, those with the lowest PPVT scores performed the worst, but this was not true when groups were separated based on IQ into impaired and non-impaired individuals. The area of language development least impacted by ASD in children is phonology (Bartak et al., 1975).

Research has shown that individuals with Autism Spectrum Disorder (ASD) have significant phonological difficulties. A study of 9 children with ASD found lower scores on the Edinburgh Articulatory Scale

compared to typically developing children and children with MR. A study comparing 80 children with ASD between the ages of 9 and 10 showed higher phonological impairments. A study comparing 30 people with HFA or Asperger's to 53 age-matched controls showed a higher prevalence of articulatory and speech impairments in the ASD group. About 23% of school-aged children with autism demonstrated substantial impairments in expressive phonology (Rapin et al., 2009).

Studies reveal that while most people with ASD do not have any particular deficits, low-functioning individuals with autism often experience difficulties with phonology and/or articulation, especially in early childhood. On the other hand, it's possible that just a subset of people on the autism spectrum have difficulties with phonology, while the remainder follow a more or less conventional course of development in phonology.

Motivational And Attentional Issues

Due to challenges with motivation and attention, persistence, and computer-administered testing, it is difficult to generalise linguistic and communicative skills in autism. Children with ASD might perform better in computer-assisted tests, although findings from standardised tests and spontaneous speech samples might vary. Children who are not receptive may not accurately reflect their underlying talents. The challenge of selecting appropriate variables and control groups makes ASD research tough. In the past, researchers frequently contrasted homogenous control groups with heterogeneous ASD groups using mean IQ. However, researchers are now in favour of a higher cutoff of group differences that are no more than 20 points and similar ability ranges. Also, it can be helpful to choose several control groups, such as one that is matched on verbal IQ and age.

Examining people with PDD, high-functioning autism, or Asperger's syndrome raises questions about differences on the autism spectrum. Researchers must describe their samples and offer thorough diagnostic details about the ASD population. To study how IQ, language, and social deficits interact, a homogeneous sample may be preferred. Current research has tried to distinguish between people with ASD who have noticeable language problems and those who don't. Understanding the origin or phenotype of certain autism-related illnesses can be aided by taking into account the generalizability of findings across the full spectrum. By taking a broad view of abilities, the "individual differences" perspective enables the investigation of skills' correlations, predictors, and precursors (Dörnyei & Skehan, 2003).

Pragmatic Functions and Discourse Functions in Language Acquisition

In contrast to earlier studies in ASD, which revealed abnormalities across several language domains, most recent analyses concentrate on deficiencies in discourse and pragmatic processes. Inadequacies in many facets of language use are increasingly being discovered by researchers, exposing a pattern of strength and weakness in social and cognitive processes. Understanding the effects of these processes can be aided by identifying these patterns.

Facilitating the Mind and Skill

The decoupling of language, social, and cognitive skills in ASD is challenging to understand. It is possible that one process influences another, which then reinforces or promotes the development of the first. For example, cognitive level influences initial language input, with higher-functioning children having greater attentional capacity. Verbal skills may facilitate the growth of theory of mind capacity, which in turn promotes effective social interactions and language skill development. Separating individual contributions from these interdependent processes presents a challenge (de Villiers et al., 2021).

Working memory, attention, inhibition, theory of mind, and low-level perceptual abilities are just a few of the capacities that will need to be carefully broken down into their most basic (and operationalizable) parts in order to address these issues. Additionally, large enough sample sizes will need to be collected in order to determine the relative contributions of different factors to variance. Also, this strategy requires strong analytical methods that can assess development over time.

Impaired Performance on the Implicit Learning Task

There is a lot of curiosity about how statistical regularities in language could aid in learning a new language right now. Little is known at this time regarding whether or not children with autism may employ statistical characteristics of language differently than typically developing youngsters. People with autism had considerable difficulties with an implicit learning test; however, Barnes observed no changes in implicit learning using functional neuroimaging (Barnes et al., 2008). One such area where this type of learning system might be put to use in language acquisition is in the study of the interplay between linguistic competence, implicit learning, and the recognition of linguistic regularities.

Autism In Nonverbal Children

Approximately half of those diagnosed with autism will not acquire any usable verbal language abilities, according to earlier estimates. However, recent advances in diagnosis and early intervention have increased the likelihood that more children will go on to develop verbal abilities, but precise numbers are not yet available. The potential exists to dramatically advance our understanding of the probable hurdles to acquisition by studying this cohort of children who can learn language only with rigorous early therapy.
This can be accomplished through intervention studies, in which targeted abilities are systematically taught with their potential ripple effects. More generally, intervention studies allow researchers to evaluate the effect of improvement in one (perhaps non-linguistic) area, like executive functioning, on another (possibly linguistic) domain, like language acquisition. Fisher and Happe say that some early work in this area has been very encouraging (Fisher & Happé, 2005). The rehabilitation model can be applied not only to change the condition of phonological errors but also to maintain communication awareness and acquire a language.

Conclusion

To conclude, the domain of autism spectrum research is a rapidly-evolving and stimulating area within the fields of psychology and education, characterised by advancements in fundamental scientific knowledge and practical clinical applications. Language acquisition researchers have increasingly focused on Autism Spectrum Disorder (ASD) as a subject of study. This is due to the potential for investigating significant variations in language, social, and cognitive abilities across a broad spectrum of domains associated with this disorder and related conditions. Consequently, it has functioned as a type of "inherent laboratory" to investigate various hypotheses of language acquisition by applying the rehabilitation model not only to change the condition of phonological errors but also to maintain communication awareness. Simultaneously, there exists a temptation to disregard certain nuances in performance and aptitude that are inherent in dealing with a developmental disorder, which may not always manifest in a tidy and predictable manner. The manuscript analyses current research on language development in people with autism spectrum disorders, examines potential developmental ramifications and outlines promising research directions.

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