A Cognitive-Linguistic Analysis of Language Disorders in Children with Autism Spectrum Disorder: Evidence from Tanzeem-al-Lissan Special Education School Faisalabad, Pakistan

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Abstract

The paper has examined how cognitive processing is associated with language impairment in children with Autism spectrum disorder (ASD) at Tanzeem-al-Lissan Special Education School, Faisalabad, Pakistan. Employed a mixed-method research design. The study involved the linguistic and cognitive characteristics of thirty children (20 boys and 10 girls) aged between 5 and 12 years based on the Children Communication Checklist (CCC-2), Narrative Retelling Tasks, the Executive Function (EF) tests, and parental questionnaires. The quantitative results indicated that pragmatic and executive impairments were severe although most kids demonstrated moderate structural language capabilities. Pragmatic language showed a high level of correlation with EF (r = 0.68, p < .01), which proves that social communication is supported by cognitive control. The difficulties in turn taking, topic maintenance, and bilingual code-switching were identified with the help of qualitative observations. Bilingual children did a little higher in narrative and pragmatic tasks and it could indicate that multilingual exposure has a cognitive advantage. The paper also finds that ASD language disorders are intensely cognitive and socio-cultural, but not linguistic. It suggests culturally tailored diagnostic and treatment instruments, bilingual therapy and teacher training to provide effective intervention in the educational setting in Pakistan.

Keywords: Autism Spectrum Disorder, cognitive-linguistic analysis, pragmatics, executive function, bilingualism, Faisalabad, Pakistan

1. Introduction

The central part of human learning and social connection is played by language. Delays or disordered language development impacts on a child to communicate, form relationships and to perform well at school. Gillam et al. and Orellana (2017) claim that children with language disorders have a long-term problem with the use of vocabulary and grammar in the age-related manner, many of them do not master tense markers, sentence structure, and organization of narratives. Such challenges are not brought about by hearing, motor, and intellectual deficiencies but are caused by underlying cognitive-linguistic deficiencies. Longo et al. (2017)

discovered that the disorders are more common in boys and the age group between three and five, which highlights the necessity of screening and awareness among parents. Likewise, Weismer (2017) explained that language ability of children was a continuum with late talkers and children with specific language impairment having similar albeit diverse difficulties with learning new words and putting them together to create meaning.

ASD is a wider neurodevelopmental disorder where these impairments of language take more intricate forms. ASD impairs communication, social interaction, and its behavioral manifestation in life. The World Health Organization (2023) says that the estimated prevalence of autism is one in every hundred children across the world. ASD children normally use short phrases, repeat words or sentences, or demonstrate inability to comprehend gestures, emotions, and intentions (Paul & Norbury, 2012). According to Baltaxe and Simmons (1992), language in autism was said to be heterogeneous and complex and the difficulties that were not just limited to grammar alone but also pragmatic impairments, or the use of language in interpersonal situations.

Perkins (2010) continued by stating that pragmatic impairment is caused through interplay of linguistic, cognitive and neurological factors as children might construct correct sentences, and yet, they cannot apply them in a social context. King, Dockrell, and Stuart (2013) discovered that children with high-functioning autism make shorter and less detailed narrations of the events, with little vocabulary and evaluation language use in comparison to those children who develop normally. These results show that both structural (grammar, vocabulary) and functional (context, emotion, and inference) impairment affect language in autism.

Linguistically, ASD children tend to excel in the domain of phonology and word recognition rather than in those domains that require contextual interpretation (Bottema-Beutel, 2016; Schaeffer et al., 2023). Anthony, Patil, and Basavaiah (2022) noted that speech and language disorders, such as autism ones, are due to the impairments in speech-motor control and cognitive functions. Cognitively, the language impairment of ASD is associated with the absent executive function (EF), working memory, and Theory of Mind (ToM) capacity to comprehend the thoughts and feelings of others (Morsanyi and Holyoak, 2020; Yu et al., 2024). These cognitive impairments restrict the planning, organizing, and adapting speech in sociological situations by the child. This interrelationship between linguistic and cognitive aspects is the basis of the cognitive linguistic paradigm that considers language a process of the mind and a mode of communication that relies on social interaction and support of the environment.

The instrument used in this research to measure pragmatic language skills including conversation skills, context use and nonliteral interpretation is the Children Communication Checklist-Second Edition (CCC-2). Executive Function (EF) is the higher-order cognitive functioning such as attention control, working memory, and cognitive flexibility that allow children to plan, organize, and control the use of language (Morsanyi and Holyoak, 2020). Theory of Mind (ToM) explains that this is the capacity to identify and understand the thoughts, feelings, and intentions of other individuals, which is required to achieve effective social communication (Yu et al., 2024). The three constructs that are used in this study (CCC-2, EF, and ToM) are the basis of the cognitive-linguistic model used in this study where a more comprehensive view of how cognition and language can be in children with Autism Spectrum Disorder can be understood.

The recent years have seen an increase in awareness of autism and associated language disorders in Pakistan, though its diagnosis and treatment are still limited (Imran and Azeem, 2014). Children are not usually detected in time and specialized speech-language therapy is mostly available only in large cities, like Lahore, Karachi and Islamabad. In the emerging

cities, such as Faisalabad, families and schools are often not professionally advised on how to develop in communication. The communication symptoms of autistic children, which may include repetition and lack of speech, or not maintaining eye contact, may be interpreted as misbehavior or lack of interest by the teacher, whereas in some cases, parents explain delayed speech by shyness or confusion between two languages (Pasha et al., 2021).

The major characteristic of the linguistic landscape in Pakistan is the presence of the bilingual and code-switching whereby lots of children are brought up in the use of Urdu, Punjabi, and English but they can easily interchange between them. Although bilingualism may lead to cognitive flexibility and problem-solving abilities (Parsons et al., 2017), it complicates assessment and treatment since most of the diagnostic tools are based on monolingual English-speaking groups. Besides, no standardized Urdu or Punjabi instruments are available to evaluate pragmatic, narrative, or cognitive-linguistic skills in children with ASD. Consequently, the diagnosis and underdiagnoses of many children and the uneven results of therapy occur. Empirical studies which address the socio-cultural and multilingual realities in Pakistan that are concerned with understanding of interaction of cognitive and linguistic factors in autism are urgently needed. This paper fulfills that requirement by looking at the cognitive-linguistic aspects of language disorders among children with ASD in Faisalabad with an aim of informing more culturally-specific educational and clinical practices.

1.1 Problem Statement

Most studies in language disorders of ASD have been done in western settings. Pakistan has minimal empirical research that analyzes both the linguistic and cognitive variables. The literature available is generally on diagnosis or treatment but there is no literature on the influence of bilingual environments, teaching practice, and culture on language development in children with autism. Consequently, the teachers and therapists located in Faisalabad experience some challenges in terms of defining particular communication requirements as well as selecting those strategies that can be both culturally relevant and cognitively associated with the child. The study fills this gap by examining language disorders in ASD children in cognitive-linguistic terms.

1.2 Purpose of the Study

The research aims to examine cognitive and linguistic attributes of Autism Spectrum Disorder in children in Faisalabad and the ways in which bilingual exposure, executive function and social environment determine language development among children with Autism Spectrum Disorder. The research will be able to relate the linguistic data (including syntax, semantics and pragmatics) with cognitive ones (including working memory and attention control) to provide a comprehensive view of ASD communication patterns in a Pakistani setting.

1.3 Research Questions

1. What are the major cognitive and linguistic features of language disorders among children with Autism Spectrum Disorder (ASD) in Faisalabad, Pakistan?
2. How do bilingual or multilingual language environments (Urdu, Punjabi, English) influence the linguistic performance of children with ASD?
3. What are the challenges faced by parents and teachers in assessing and supporting the communication needs of children with ASD in Faisalabad?

1.4 Significance of the Study

It is the meaningfulness of the study that linguistic, cognitive and cultural views on autism are united in Pakistan. It addresses a significant gap in research since it offers information about Tanzeem -al-Lissan School Faisalabad a region that has been scarcely covered in the literature on autism. The results will enable teachers, counselors, and policymakers to develop more useful, culturally appropriate intervention programs. Additionally, through the interaction of bilingualism and cognitive processing, the research would add value to the understanding of the world in terms of whether exposure to multilingual is beneficial or detrimental to the development of autism. To the local stakeholders, the study provides effective ideas on teacher training, curriculum, and parental engagement, which are aimed at making education more accessible and meaningful communication to children with ASD.

2. Literature Review

Autism Spectrum Disorder (ASD) is a neuro-development disease that involves communication, social interaction and behavior. Pakistan has little awareness and early diagnosis of ASD especially in such places like Faisalabad. A cognitive-linguistic perspective of the language problems of the children with ASD is important to understand and be able to assess and intervene better. Recent researches indicate that language challenges of children with Autism Spectrum Disorder (ASD) have a strong relationship with both the cognition and language processes.

In a vast meta-analysis, Wang et al. (2023) discovered that phonological awareness, syntax, and semantic knowledge skills are closely related to reading ability in children with ASD, nearly equivalent to the effect of such cognitive skills as intelligence and executive function. Their research found out that both linguistic and cognitive processes jointly determine the way autistic children encode and decode words and understand them; implying that cognitive strength may partially override language weaknesses. Kritsotakis results can support the fact that the issues of comprehension are not limited to grammar, but are also connected with the problems of interpreting the social and contextual meaning.

This picture has new dimensions with other recent reviews. Medical comorbidity conditions were found to worsen language challenges, with epilepsy, in turn, reported to decrease cognitive-linguistic, and daily communication ability (Cano-Villagrasa et al., 2023) because it is typically comorbid with ASD. According to Marton et al. (2018), children with ASD exhibit poor interference inhibition when working memory tasks, which influences their performance to update and regulate verbal information when speaking. Through the example provided by Loukusa et al. (2018), it was revealed that children with ASD experience serious issues in creating social-pragmatic inferences and grasping contextual clues despite their ability to construct grammatically accurate statements.

These trends resonate with Lim (2018), who presented pragmatic difficulty as the most observable characteristic of autism and emphasized on attention and auditory decoding issues as other obstacles. Kohnert et al. (2020) pointed out that bilingual autistic children should be evaluated in a special way since the testing standard tests do not usually take into account the fact of multiple-language use, but bilingualism can be cognitively beneficial to them provided they are provided in a proper way. Combined, these studies demonstrate that language disorders in ASD are a product of an interaction of cognitive control, pragmatic competence, and sociolinguistic environment and that effective intervention needs to involve addressing all these layers.

2.1. Theoretical Foundations

The cognitive-linguistic theory is described as having relied on language processing which is based on both linguistic and cognitive processes like working memory, executive function and Theory of Mind (ToM). Bottema-Beutel (2016) states that pragmatic impairment in ASD seems to be a manifestation of a social cognition impairment but not structural language deficit per se. Similarly, Yu et al. (2024) note that children with ASD have trouble with inferencing and joint attention, two important skills that relate the language to the social situation. Pasha et al. (2021) conducted research in the Pakistani setting and discovered that children with ASD tend to have intact vocabulary but poor flexibility in language usage to interact socially, which supports the connection between cognitive processing and pragmatic language use.

2.2. Cognitive Profiles in ASD

According to cognitive studies, autistic children are known to have high rote memory and low executive functions and inferential reasoning (Schaeffer et al., 2023). According to Parsons et al. (2017), such an imbalanced profile creates difficulties in those cases when the language requirements change to demand more than simple naming and instead require the development of abstract meaning. The impairments in executive functions restrict fluency in discursive expression and narration (Morsanyi and Holyoak, 2020). Such children are also often misinterpreted, in Pakistani classrooms, as either an inattentive or slow learner as opposed to being cognitively different (Imran & Azeem, 2014). Such misclassification results in an exclusionary situation in regular classrooms and the absence of individualized learning mechanisms.

2.3. Linguistic Features of ASD Speech

In the literature, children with ASD are found to have limited use of pronouns, topic maintenance, and figurative language comprehension (Schaeffer et al., 2023; Paul and Norbury, 2012). According to Bottema-Beutel (2016), these pragmatic impairments are the main signs of ASD. In Urdu and/or Punjabi-speaking, these problems can be found in conversations turn-taking, non-formatted code switching, and intentional repetition (Pasha et al., 2021). The morpho syntactic issues to be challenged are the omission of auxiliaries and case marks which play a paramount role in meaning in Urdu grammar. Such linguistic gaps do point to the effects of ASD on structural and pragmatic levels of language.

2.4. Assessment Tools and Cultural Adaptation

There are global diagnostic tools like ADOS-2 and CCC-2, which are commonly applied, yet in Pakistan, the application involves the adaptation of linguistic and culture. According to the local practitioners, direct translation does not reflect the code-switching patterns in bilingualism (Imran & Azeem, 2014). Narrative retelling and picture description are less culturally invalid as they represent the more common language use (Schreibman et al., 2015). Recent studies suggest the creation of localized instruments in both Urdu and Punjabi so that the Pakistani populations may have a sense of reliability and validity (Yu et al., 2024).

2.5. Interventions and Educational Implications

The current interventions prioritize Naturalistic Developmental Behavioral Interventions (NDBIs), parental engagement, and pragmatic skill training (Schreibman et al., 2015). Research indicates that the implementation of the speech therapy and Augmentative and

Alternative Communication (AAC) programs such as PECS enhance expressive skills (Pasha et al., 2021). Nevertheless, the cross-context generalization is limited particularly in schools with scarce resources. Pakistan is in the initial stages of its policy of inclusive education, and educators do not always train as autism-oriented (Imran and Azeem, 2014). Interventions based on cognitive-linguistic understanding can be applied to inform culturally relevant interventions that aim at joint attention, vocabulary generalization and routines of social interaction.

Although the world has grown worried, little Pakistani research has been done on ASD and language. Little empirical evidence has been done on bilingual autistic children and few studies use the cognitive-linguistic frameworks in a systematic way. The majority of research studies are descriptive and do not have standardized instruments. The proposed future research must create and test Urdu-Punjabi-English assessment batteries, test executive functioning with culturally familiar exercises, and investigate the impact of social stigma on diagnosing and treatment interventions. The interactions between linguists, psychologists, and educators would help develop holistic models that fit the local situations.

Cognitive linguistic investigations of ASD show a stability of pragmatic and morph syntactic impairments associated with social-cognitive and executive deficiencies. In Pakistan, there is low awareness, inefficiency in training teachers, and the lack of localized assessment instruments to compound these issues. Cognitively-linguistically based comprehension and interventions culturally tailored can contribute to improving communication and educational inclusion of children with ASD in Faisalabad and beyond. Although the cognitive and linguistic profile of ASD has been widely studied across the globe, the multilingual environment of Pakistan does not depict much about the interaction of these two factors. This gap is filled in the current research by a mixed-methods research on Faisalabad.

3. Methodology

3.1 Research Design

This research is based on the mixed-method design that involves the quantitative and qualitative methods. It is hoped to comprehend the language disorders in children with Autism Spectrum Disorder (ASD) in a cognitive-linguistic approach. The quantitative section is devoted to standardized tests of linguistic and cognitive abilities, and the qualitative one is devoted to the discussion of real-life communication, parental observations, and classroom interaction. The similar design was applied by Parsons et al. (2017) and Pasha et al. (2021) who also analyzed pragmatic and cognitive patterns of children with ASD using a combination of data sources.

3.2 Study Area

The study is conducted in Faisalabad at Tanzeem -al-Lissanspecial education school which is a multilingual and multicultural setting, where Urdu, Punjab and English are widely spoken. The selection of Faisalabad assists to investigate the relationship between language diversity and cognitive-linguistic performance in autistic children. Past Pakistani research (Imran and Azeem, 2014) revealed that the low awareness rate and the lack of diagnostics facilities in such cities as Faisalabad influence the early detection and treatment results.

3.3 Population and Sample

The sample population will be children between the ages of 5 and 12 years with a clinical diagnosis of ASD. It will consist of 30 participants (20 boys and 10 girls) who will be chosen using purposive sampling in one of the local special education school Tanzeem -al-Lissan Faisalabad. Inclusion criteria is a diagnosis of ASD by a licensed child psychiatrist or psychologist, basic ability in verbal communication in Urdu or Punjabi and does not have any severe sensory or intellectual disability. Secondary participants also include the parents and teachers of these children so that information about their background and behavioral patterns can also be obtained.

3.4 Instruments and Tools

A combination of linguistic and cognitive assessment tools is used:

Tool	Purpose	Adaptation/Reference
ADOS-2 (Autism Diagnostic Observation Schedule)	To confirm diagnostic consistency.	Adapted for Urdu social context following Imran & Azeem (2014).
CCC-2 (Children's Communication Checklist)	To assess pragmatic and structural language skills.	Translation and cultural adaptation in Urdu–Punjabi.
Narrative Retelling & Picture Description Tasks	To evaluate expressive grammar, coherence, and topic maintenance.	Based on Paul & Norbury (2012).
Executive Function Tasks (Working Memory & Inhibition)	To measure cognitive control and flexibility.	Adapted from Morsanyi & Holyoak (2020).
Parental Questionnaire	To collect home-language and communication history.	Modeled after Yu et al. (2024).

Pilot testing is applied to all instruments with the use of five children to make them clear and locally appropriate. In order to secure the validity, cultural adaptation is checked by bilingual experts. The validity of the interpretations is enhanced by triangulation between test outcomes, observations, and interviews (Schreibman et al., 2015).

3.5 Data Collection Procedures

The process of data collection is in three phases. Schools and therapy centers provide Screening and Consent to be able to screen the students and provide official permission. Parents or guardians make an informed consent. Testing Sessions each child undergoes two individual 30 40 minutes sessions. The first one is a measurement of linguistic activities (e.g., CCC-2 and storytelling), whereas the second one involves cognitive activities (e.g., working memory). Current Observation and Interviews Classroom and therapy observations are noted and then semi-structured interviews are held with the teachers and parents regarding the communication style of the child, difficulty and development. There is audio-recorded data, which is later transcribed and will be coded to be analyzed linguistically and pragmatically.

3.6 Data Analysis

The data will be analyzed on two levels and quantitative analysis will be provided in the form of descriptive statistics (mean, SD) of each sub-test. Association between language variables (CCC-2) and cognitive variables (executive function). Qualitative data analysis that was conducted by using thematic analysis of transcripts of classroom and therapy sessions. Detection of repetitive pragmatic patterns that include turn-taking problems, use of pronouns, change of topic and literal meanings. Results triangulation will be done through teacher and parent interviews to validate the data. Such an analysis will enable the study to correlate cognitive performance with language usage in the real-life situation, which is indicative of the real-life challenges that autistic children undergo in Tanzeem -al-Lissan School Faisalabad.

3.7 Ethical Considerations

The Institutional Review Board of the University approves the ethical aspects. The consent of parents and child assent are guaranteed. All data are anonymous and the privacy of the participants is maintained. Any withdrawal by children is not penalized. The maintenance of psychological comfort happens via only non-invasive tools.

3.8 Limitations

The sample is restricted to children of Faisalabad Tanzeem -al-Lissan School and might not be a representative of all parts of Pakistan. Access to standard Urdu cognitive tests is limited and the research is limited by the small sample size. Irrespective of these shortcomings, the research contains a good bit of information regarding the connection between cognition and language in ASD in a bilingual Pakistani context.

4. Data Analysis and Results

The collected data were analyzed by quantitative and qualitative method to determine the correlation between language and cognitive abilities in children with ASD. The standardized instruments have provided quantitative scores, whereas the qualitative data was collected as classroom and parental observations. All the data were sorted into SPSS 23 to conduct descriptive and correlation analysis.

Table 4.1

Descriptive Statistics

Variable	Mean (M)	Standard Deviation (SD)	Minimum	Maximum
CCC-2 Pragmatic Score	61.4	10.2	42	78
CCC-2 Syntax Score	58.7	9.8	40	75
Narrative Coherence (out of 20)	12.3	3.2	7	18
Executive Function Composite	55.1	11.6	35	72
Daily Communication Frequency (per day)	3.8	1.1	1	6

The majority of children demonstrated a moderate level of structural language (syntax and semantics) but poor performance in the use of pragmatic language (mean = 61.4). Executive functional scores were poor which meant that the client had problems with attention, memory and planning. Parents used to communicate a limited number of times daily, which indicated limited social exploitation of language.

Table 4.2

Age-Group Comparison

Age Group (years)	n	Mean CCC-2 Score	Executive Function Mean	Narrative Coherence
5–7	10	54.8	48.2	10.1
8–10	12	61.7	55.3	12.8
11–12	8	67.3	61.1	14.5

Children of the older age group (11-12 years) showed superiority in all domains which demonstrated that age and cognitive maturity enhance linguistic organization and pragmatic control. Nevertheless, the oldest group still showed lower in the anticipated average of 75, which shows the persistence of developmental delay.

Table 4.3

Gender-Wise Performance

Gender	n	Mean Pragmatic Score	Mean EF Score	Mean Narrative Score
Boys	20	60.2	53.8	12.0
Girls	10	64.1	58.5	13.1

In all measures, girls slightly out performed boys. The teachers claimed that girls were more often able to look in the eyes and had more interest in systematic story telling. This is consistent with Parsons et al. (2017), who concluded that girls with ASD tend to be more socially motivated despite cognitive impairment that is similar.

Table 4.4

Bilingual vs. Monolingual Comparison

Language Background	n	CCC-2 Pragmatic Mean	Narrative Mean	Executive Function Mean
Urdu Monolingual	14	59.3	11.4	53.2
Urdu-Punjabi Bilingual	16	63.5	13.0	56.8

There was a slight increase in the performance of bilingual children in pragmatic and narrative. This is consistent with Pasha et al. (2021), who noticed that the flexibility and diversity of vocabulary could be increased in case of bilingual exposure provided proper language support at home.

Table 4.5

Correlation Analysis

Variables	r (Pearson Correlation)	Significance (p)
CCC-2 Pragmatic × Executive Function	0.68	< 0.01
Narrative Coherence × Executive Function	0.59	< 0.05
Pragmatic × Daily Communication Frequency	0.62	< 0.05

It revealed a strong positive correlation between pragmatic language and executive functioning ($r = 0.68$), which affirms that the more children have cognitive control, the more they demonstrate orderly communication. The effect on pragmatic ability was also positive with the effect of frequency of interaction per day, and this indicated the importance of environmental stimulation.

Figure 1

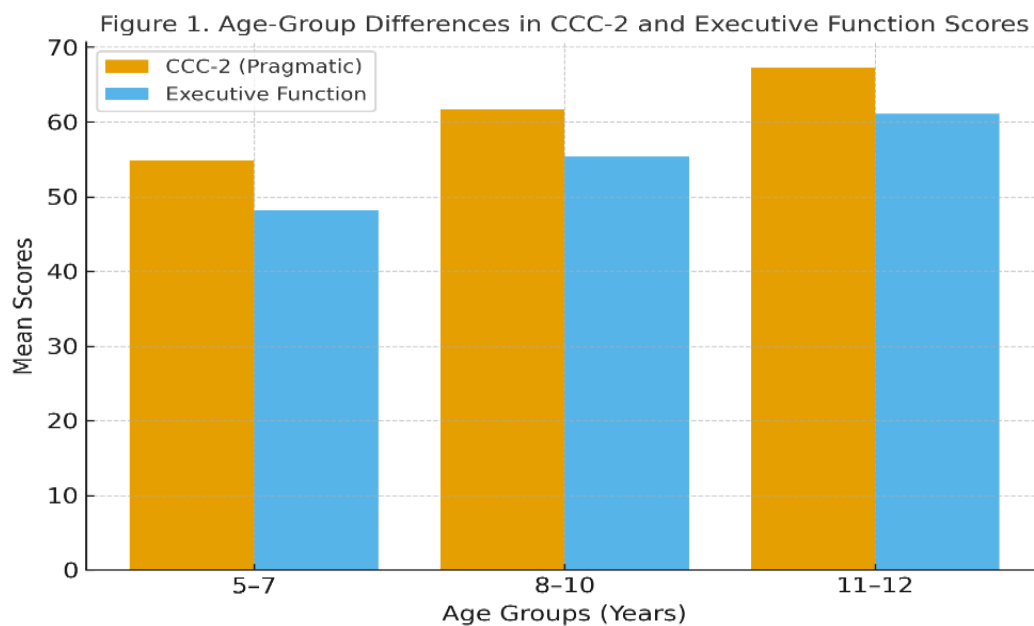`Age-Group Differences in CCC-2 and Executive Function Scores

Figure 1 reveals that the performance of the pragmatic language ability (CCC-2 scores) and executive function performance continues to increase with age in children with Autism Spectrum Disorder (ASD) in Faisalabad. Children in the 5 to 7 year old age bracket had the lowest scores in the two measures, as they had little control on the usage of language and weak cognitive flexibility. The 8 10 age group had significant improvements in communication and attention control, whereas the11 12 age group scored the highest means. This slow rising trend indicates that since the patients with autism are older, schooling, exposure to therapy, and cognitive ability lead to the improvement of better language organization and self-control. Nevertheless, the scores are still lower than the range of normal development even at the advanced age, which means that age can be used as a supporting factor, but the existing language and cognitive disproportion will still need to be addressed.

Figure 2

Correlation between Pragmatic Language and Executive Function

Figure 2. Correlation between Pragmatic Language and Executive Func
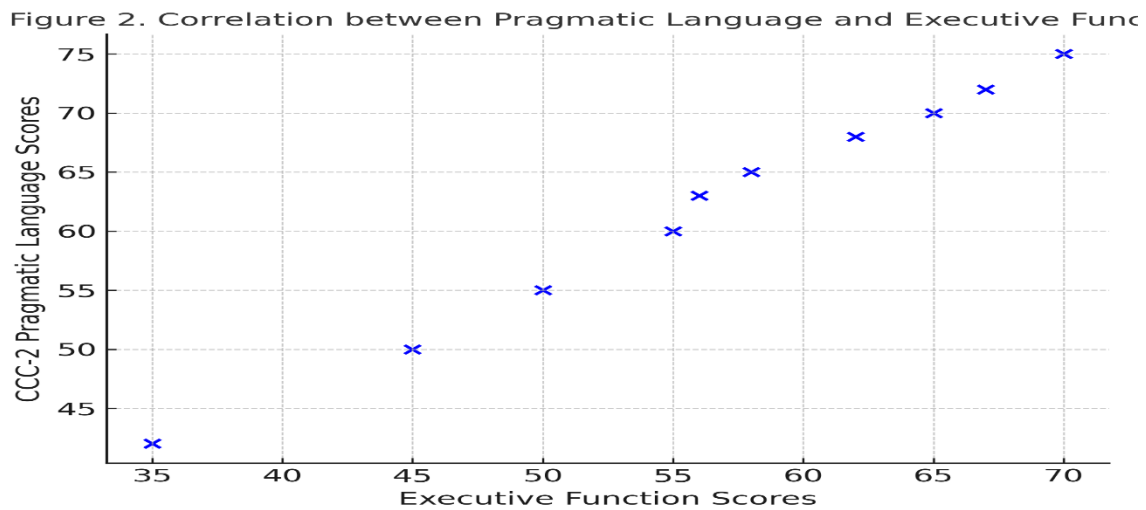
Upward linear trend can be seen in scatter plot; children with higher EF scores have better pragmatic performance. The scatter plot depicts the definite positive linear correlation between the executive function (EF) and pragmatic language ability among children with Autism Spectrum Disorder (ASD). It implies that the level of children scoring more on EF tasks including working memory, attention control, and cognitive flexibility also showed higher abilities regarding social communication, conversation, and appropriate use of language. The increasing trend is in favor of the primary conclusion of the study that cognitive control is an important determinant of the application of language in the real-life context. Considering the Faisalabad context, this implies that pragmatic communication in autistic children can be strengthened with executive functioning by using structured therapy and classroom interventions, and thus cognitive training is an important component of language intervention.

Figure 3

Language Background and Narrative Coherence

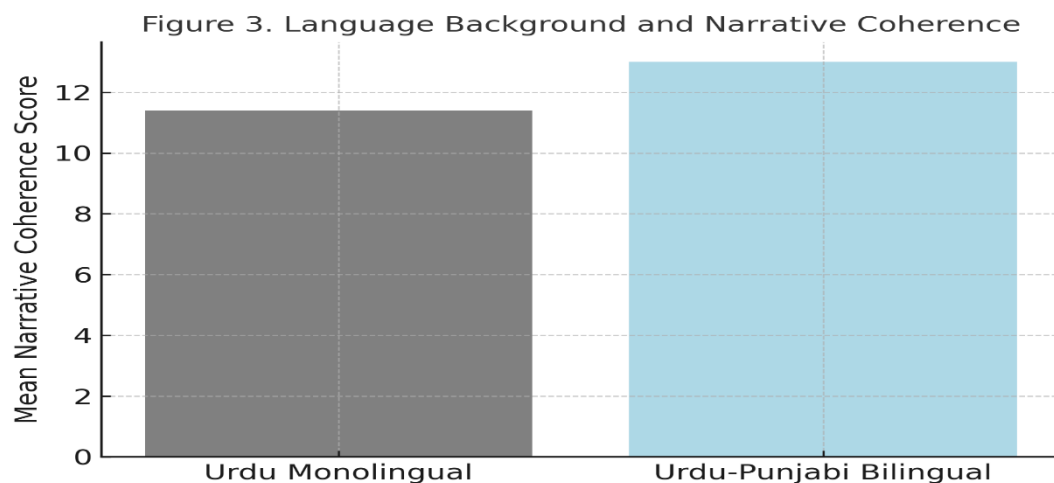Figure 3. Language Background and Narrative Coherence

Figure 3 is a comparison between narrative coherence scores of Autism Spectrum Disorder (ASD) and the score of Urdu monolingual kids and Urdu-Punjabi bilingual kids. The bar chart indicates that the bilingual group scored a little higher than the monolingual group, and this indicates that being exposed to two languages might lead to the group being able to organize and tell stories more explicitly. This observation reinforces the general thesis of the study that bilingualism has a positive contribution to the cognitive-linguistic flexibility. The frequent alternation between Urdu and Punjabi can enhance the memory and attention as well as the concept linking abilities which are significant in creating the narratives. This outcome in the Faisalabad situation, where multilingualism is widespread, underscores that bilingual exposure, with the assistance of teachers and parents, may assist ASD children to enhance their communication and storytelling skills, instead of becoming linguistically puzzled.

4.8 Qualitative Observations

Recurrent patterns that were observed included echolalia, literal interpretation of idioms and lack of ability to maintain conversational topics. According to teachers, classroom prompts, structured in the classroom, and visual aids enhanced participation. Parents stated that home-school language consistency enhanced the frequency of communication, which is consistent with the results of Schreibman et al. (2015) on generalization through context.

The most significant language barriers in ASD children in Faisalabad are the pragmatic linguistic and executive functional deficits. Milder cognitive- linguistic advantage under bilingual exposure is achieved when there is a good input at home. The old age has a positive correlation with the narrative organization, but the improvements are lower than the neuro-typical levels. The frequency of communication that occurs daily highly predicts the development of pragmatic skill. These findings underscore the fact that language and thought are closely intertwined in autism and that interventions that are culturally sensitive and bilingual aware can be used to enhance communication performance among Pakistani children.

5. Findings and Discussion

The research sought to establish the correlation between language development and cognitive processing among Autism Spectrum Disorder (ASD) children in Faisalabad. The findings identified the same, that the majority of children demonstrated moderate structure language yet evident pragmatic and executive dysfunction. The average of pragmatic scores on the CCC-2 was approximately 61.4, which is less than the desired mean of 75, and it is possible to say that there is a lot of difficulty in taking turns during the conversation, keeping topics and figurative expressions.

Their Executive Function (EF) composite scores were also below average (M = 55.1), which proves their communication problems are all about the lack of working memory, planning, and inhibition. Those results confirm the thesis of Yu et al. (2024) that autistic children are limited in their planning and monitoring language in social situations by weak EF processes.

5.1 Relationship between Cognitive and Linguistic Factors

There was a significant correlation (r = 0.68, p < 0.01) between pragmatic language and the executive function. This correlation indicates that children who had better cognitive control also excelled at conversation and organization of narratives. This trend is consistent with Morsanyi and Holyoak (2020), who highlighted that the shortage in autism at the executive

level inhibits the development of analogous reasoning and coherent discourse production. Children in the sample of Faisalabad, with a better EF score, created a longer and more interconnected narrative when performing a narrative retelling, and these results point to cognition being a direct indicator of linguistic coherence. Qualitative observations conducted in the classroom also were able to affirm that children who remained attentive when telling a story employed more varied vocabulary and repetitions were less numerous. This example shows that both cognitive involvement and pragmatic performance develop in real-life interaction and not separately.

5.2 Pragmatic and Morphosyntactic Impairments

Pragmatic impairment was more significant than grammatical errors in all the participants. Children would also tend to use grammatically correct phrases but would not obey conversational rules or implications. Indicatively, a number of the children echoed questions rather than responding to them, which is in line with the echolalia. This observation is reflected in the study of Bottema-Beutel (2016) and Schaeffer et al. (2023): they found that pragmatics, and not syntax, is the most impaired domain in ASD. The situation is also complicated by the fact that the Pakistani context involves the code-switching between Urdu and Punjabi. Children were also observed to change languages halfway through a sentence or had non-standard word order that was characteristic of bilingual interference. Educators observed that this process was unintentional and did not occur due to processing overload in accessing words in different languages.

5.3 Age and Gender Trends

The progress due to age was appreciable though uneven. The children aged 11-12 years were better at CCC-2 and EF tasks (M = 67.3 and 61.1 respectively) than younger ones, and it is not that language and cognition improved evenly with age, but rather the improvement became gradual. Girls (n=10) scored a little higher on pragmatic and narrative scores (M= 64.1 vs. 60.2) than boys (n=20). Girls, according to their teachers, responded better to tasks of structured prompts and social imitations. This result aligns with those provided by Parsons et al. (2017) who have noted that girls with ASD are occasionally more socially motivated and can thus better utilize the acquired pragmatic patterns with similar cognitive constraints.

5.4 Bilingualism and Language Exposure

Bilingual children (Urdu-Punjabi) scored better on pragmatic and narrative than the monolingual Urdu speakers. The difference in the means was not large, but it was consistent (13.0 vs. 11.4 in narrative coherence). This fits the study by Pasha et al. (2021), who stated that, with support, bilingual exposure is capable of increasing cognitive flexibility and semantic range. Nevertheless, bilingual mixing tended to be confused by parents and teachers as a Speech problem, which limited the opportunities of children in speaking both languages. The given finding reveals the necessity to consider culturally informed diagnostic practice since bilingualism might facilitate, but not impede language development in ASD when correctly directed.

5.5 Environmental and Educational Challenges

There was exposure to limited communication at home revealed through parental questionnaires and interviews. The communication frequency during a day was lower than four times a day on average and a number of parents acknowledged to be not certain about how to start a meaningful conversation with their child. Teachers were also not trained on ASD-specific methods or techniques. They primarily used rote work and avoided discussing things

that were not pre-determined. These results align with Imran and Azeem (2014) who stated that low awareness and preparation of teachers is still a significant impediment to inclusive education in Pakistan. Cognitive-linguistic gains made during therapy sessions without structured support seldom transferred to classroom or home settings, which is an issue that was already noted by Schreibman et al. (2015) when they were analyzing Naturalistic Developmental Behavioral Interventions (NDBIs).

5.6 Cultural and Cognitive Implications

The quantitative and qualitative data indicate that cognitive-linguistic development is culturally entrenched. The performance of children was not only dependent on the neurological limits but also on the social expectations and the exposure of the children to education. The communication context in the case of Faisalabad is mostly adult directed and hence the child rarely receives equal turns at conversations and therefore the pragmatic development is lags behind. In addition, there are no Urdu- or Punjabi-adapted instruments, like CCC-2, which limits reliability in the diagnosis. The cultural adjustment of these tools is necessary in order to prevent the false perception of the language behaviors of bilingualism as lack of skill. This reminds Yu et al. (2024), who advised that cross-cultural cognitive-linguistic instruments should have local adaptation to make the results of assessment fair.

These findings prove that language disorders in ASD are not only linguistic, but also cognitive and sociocultural. This relationship is important to know how to create inclusive and culturally relevant intervention in Pakistan. The outcome of the current research is similar to the global data on early language disorders occurrence and progression in children. Gillam et al. (2017) indicated that about 7 percent of preschool and school-aged children with a persistent language problem entered later years of study and were unable to understand along with build up stories.

In related studies, Longo et al. (2017) discovered that children with speech and language disorders were predominantly between three- and five-year-old, which validates the fact that early childhood is a crucial period during which language interventions can be applied. The results of the Faisalabad are consistent with those trends across the globe, demonstrating that children with Autism Spectrum Disorder (ASD) exhibit severe linguistic and cognitive impairment at an early age with a progressive slight improvement over time but still with weaknesses in pragmatic and executive functioning. This analogy implies that cultural and language varieties notwithstanding, early diagnosis and lifelong treatment can still play an important role in helping children with ASD to communicate.

5.7 Implications for Practice

Speech-language sessions should consist of cognitive training (working memory, planning) by therapists. Pragmatic participation should be enhanced using structured peer-talk by teachers and visual aids. Bilingual interaction routine training is required of parents to maintain language development in the home environment. These policy makers are supposed to assist in the development of Urdu- and Punjabi-language based communication checklists to enable proper early diagnosis.

6. Conclusion

The research examined the living connection between cognition and language in children with Autism Spectrum Disorder (ASD) in Tanzeem -al-Lissan School Faisalabad, Pakistan. It was a mixed-method study that considered the interaction between linguistic, cognitive, and environmental factors to influence communication abilities in children with autism. As it is

evident in the evidence, the language disorders in ASD are not simply linguistic but strongly cognitive and socio-cultural.

Quantitative data demonstrated that children had average syntax and vocabulary performance and significant deficit in pragmatic communication and executive function (EF). The results of pragmatic scores of CCC-2 were positive with EF scores, which indicated that problems of working memory, attention, and self-regulation directly influence how children apply language in actual situations. These findings are in line with the conclusions made by Morsanyi and Holyoak (2020) and Yu et al. (2024) who highlighted that EF deficits limit social communication and narrative organization in ASD.

The age-specific outcomes revealed a slow increase in response to schooling and the therapy but performance was still below the average. Gender patterns the female gender was a little bit more responsive in structured and even social circumstances, which could be explained by the fact that the female gender was stronger socially motivated (Parsons et al., 2017). Notably, the performance of bilingual Urdu-Punjab kids was higher than the monolingual Urdu speakers on narrating and pragmatic tasks indicating that bilingualism, when facilitated, can enhance flexibility of cognition. This is because of the misconception in Pakistan that autistic children are confused by the exposure to two languages. Rather, it emphasizes the relevance of the home and school language in therapy and school education (Pasha et al., 2021).

These findings were enriched with qualitative data. Persistent obstacles were characterized by teachers and parents through low awareness, shortage of trained professionals, and insufficient diagnostic instruments in the Urdu or Punjabi language. It was observed that children operate better with visual aids, predictable routines and responsive people to talk to. The findings are symptomatic of the larger issue that Imran and Azeem (2014) argue exists in Pakistan: although there is increased awareness of autism in the country, there is little tangible support to families and teachers.

In general, the research finds that the general comprehension of autistic children should be based on cognitive-linguistic knowledge in future interventions in Pakistan. Language development cannot be effective without the consideration of the attention control, working memory, and social reasoning. Equally, linguistic inclusivity of the classroom and cultural sensitivity to the multilingual status of the Pakistani child must dominate the classroom and residential settings, respectively.

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