

Unlocking Language: Role of ABA therapy to improve language in a four year old child with Socio-Pragmatic Language Disorder

Abstract

Background: Socio-pragmatic language disorder is a complex developmental challenge characterized by communication deficits, social interaction difficulties, and repetitive behaviors. This case study addresses a significant gap in the literature by showcasing a child's remarkable transformation from language and communication difficulties to neurotypical status within just 13 months.

Methods: This case report outlines the assessment, intervention, and progress of a 4-year-old child referred for Applied Behavior Analysis (ABA) therapy due to behavior issues and communication deficits. The child's comprehensive assessment, using the Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP), identified multiple learning barriers. A 13-month ABA intervention program was initiated to address these barriers.

Results: Over 13 months, the child showed substantial progress, with reduced problem behaviors and improved communication skills. Progress was observed in manding skills, listener responses, play skills, social interactions, intraverbal abilities, generalization, and emotional understanding. The higher language and social skills emerged without intervention. The child's total VB-MAPP score increased from 45 to 162.5, indicating significant improvement.

Conclusion: This case underscores the effectiveness of early and intensive ABA therapy in addressing behavior and communication challenges in children with developmental delays.

Keywords:

Socio-pragmatic language disorder, Behavioral Intervention, VB-MAPP, ABA.

Introduction:

Effective communication is a cornerstone of human interaction and development, playing a pivotal role in building relationships and navigating the complexities of social life.¹ However, for children with socio-pragmatic language disorders, this fundamental skill can remain elusive, hindering their ability to engage with the world around them.² These challenges encompass deficits in social interactions, communication skills, and recurring behavioral patterns.¹

Understanding the cognitive abilities of these children is vital for effective interventions. Cognitive processes like memory, attention, and problem-solving significantly influence language acquisition and social functioning in early childhood.³ By age four, children typically show diverse cognitive skills, marking substantial progress in language, memory, and problem-solving. These abilities form the basis for learning language, social understanding, and adaptive behavior.⁴

Addressing socio-pragmatic language disorders, therefore, requires not only targeted language interventions but also a holistic approach that considers the intricate interplay between language and cognitive development.⁵

Despite their critical impact on a child's development, there is a notable scarcity in the literature of comprehensive case studies that illustrate the transformation of such children from language and communication difficulties to achieving neurotypical status.⁶ Existing research has touched upon the importance of early intervention and tailored behavioral approaches, such as Applied Behavior Analysis (ABA), in addressing socio-pragmatic language disorders.⁷ However, the field lacks in-depth insights into the practical application of specific assessment tools, such as the Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP), and their real-world

impact.⁸ This paper aims to bridge this gap by presenting a case report, unveiling the role of ABA therapy in verbal behaviour training in a child with socio-pragmatic language disorder.

Case Presentation:

A) Background

A 4-year-old child, was referred to Applied Behavior Analysis (ABA) therapy due to concerning behavior issues, including scratching, pinching, whining, and crying. Communication limitations including improper requesting and limited verbal clarity were also evident. A pediatric neurologist and Board-Certified Behavior Analyst (BCBA), conducted the initial assessment, which unveiled a multifaceted profile indicative of socio-pragmatic language disorder. The pre-therapy assessment included comprehensive interviews with parents and caregivers, along with observations in clinical and natural settings to understand the child's behavior, social interactions, and communication patterns.

B) Methodology and Pre-Therapy Assessment

The child's therapy regimen, spanning over 13 months, was guided by the principles of ABA under the supervision of BCBA. The therapy was initiated on 14th July 2022 and concluded on 31st July 2023, with three sessions weekly. A comprehensive assessment was performed prior to the initiation of therapy, followed by ongoing data collection to monitor progress.

The Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP) served as the primary assessment tool, covering communication, social play, vocalization, and academic milestones⁹ The assessment also identified various barriers to learning which is explained in detail in the following table (Table 1). Overall barrier score in the child's initial assessment was 47.

Barrier Areas	Initial Assessment Score
Behavior Problems	3 points
Lack of Instructional Control	2 points
Defective Mands	3 points
Defective Tact	2 points
Defective Imitation	1 point
Defective Echoic	2 points
Defective VP-MTS	2 points
Defective Listener Behavior	3 points
Defective Intraverbal Behavior	4 points
Defective Social Skills	4 points
Prompt Dependence	2 points
Scrolling	3 points
Defective Scanning	2 points
Defective Conditional Discrimination	2 points
Failure to Generalize	2 points
Response Requirement	3 points
Reinforcer Dependence	4 points
Defective articulation	3 points
Total Score = 47	

Table 1: Pre-Therapy Barrier score assessment

The child's progress was assessed using pre- and post-therapy data collection, which involved observing problem behaviors and the child's responses to therapeutic interventions. Various therapeutic strategies, including reinforcement-based techniques, were applied in a structured, individualized manner during therapy sessions to address identified communication, social interaction, and behavior deficits. The approach prioritized skill acquisition and problem behavior management.

C) Intervention

The intervention employed in this case was a strategically designed amalgamation of Naturalistic and Discrete Trial Training (DTT) techniques.

Naturalistic Intervention: Naturalistic intervention emphasizes the incorporation of therapeutic strategies into the child's daily routines. During these sessions, therapists facilitated social play and interactions, encouraging child to initiate conversations and engage with peers. This intervention method provided opportunities for spontaneous language development and fostered social interactions with minimal disruptions to his routine.¹⁰

Discrete Trial Training (DTT): DTT, on the other hand, provided structured sessions to target specific language and cognitive skills systematically, including labeling nouns and verbs, WH-question responses, and cognitive development practice.¹¹

D) Results

The thirteen-month intervention yielded substantial progress in child's skill acquisition and behavior management. One of the most remarkable outcomes was the significant reduction in the barrier grid score, which decreased from 47 to 9 (Table 2). This reduction indicated that child was effectively overcoming several barriers that initially interfered with his learning and development.

Barrier Areas	Subsequent Assessment Score
Behavior Problems	1 point
Lack of Instructional Control	1 point
Defective Mand	0 points
Defective Tact	0 points
Defective Imitation	0 points
Defective Echoic	0 points
Defective VP-MTS	0 points

Barrier Areas	Subsequent Assessment Score
Defective Listener Behavior	0 points
Defective Intraverbal Behavior	0 points
Defective Social Skills	0 points
Prompt Dependence	0 points
Scrolling	0 points
Defective Scanning	1 point
Defective Conditional Discrimination	1 point
Failure to Generalize	0 points
Response Requirement	0 points
Reinforcer Dependence	3 points
Defective articulation	2 points
Total Score = 9	

Table 2: Post-Therapy Barrier score assessment

The progress observed during the intervention was notable across multiple domains (Table 3):

Skill Category	Description	Initial Score	Final Score
Requesting Skills	Improved requesting skills, initiation, and involvement	4	15
Labeling and Language	Growth in labeling complete sentences with adjectives	4	15
Listener Response	Improvement in responding to instructions and cues	3	15
Matching Skills	Improved item matching and pattern recognition	5	15
Manding Skills	Significant improvement in requesting skills	5	14.5
Play Skills	Significant improvement in play skills	0	15
Social Skills	Improved social skills and competence	3	15
Reading Skills	Growth in reading skills, word-picture matching	0	15
LRFFC Skills	Understanding objects and answering 'wh' questions	7	15
Intraverbal Skills	Significant improvements in describing and answering	4	15
Group Skills	Improved performance in group settings	6	10

Skill Category	Description	Initial Score	Final Score
Linguistic Skills	Gained ability in noun-verb phrases and functional	4	10

Table: 3 Child's skill development progress report

The above table provides a comprehensive overview of a child's skill development progress. It highlights the initial and final scores for various skill categories, including improvements in requesting, language, social, and cognitive skills. The child's substantial growth is evident, particularly in areas such as requesting, listener response, LRFFC skills (Fig 1) and generalization, reflecting significant advancements in their overall development.

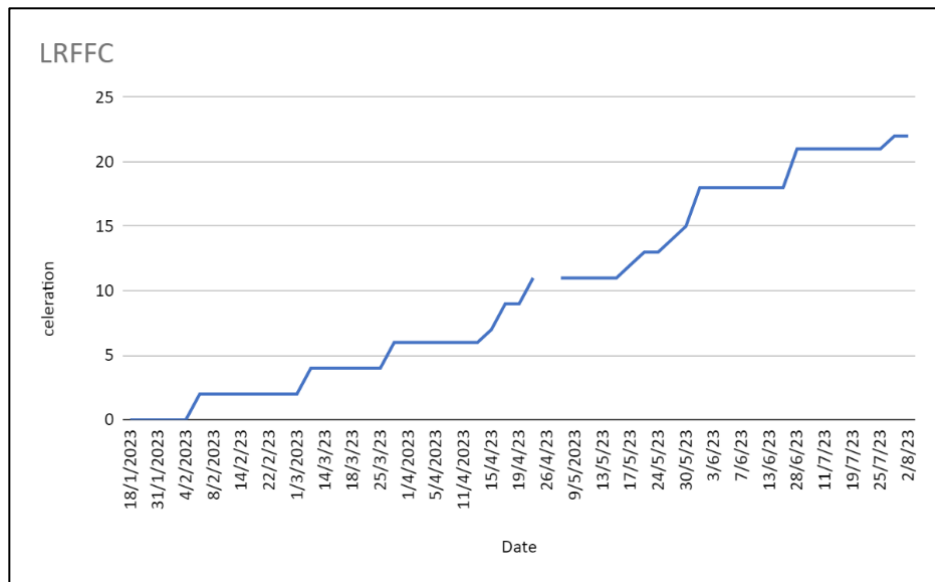


Fig 1: Graph showing LRFFC target score

Generalization: Significant progress was noted in generalization and social skills (Fig 2, Fig 3 and Fig 4) particularly in areas related to requesting, following instructions, greeting others, and engaging with peers. The child exhibited an increased understanding and expression of emotions and perspectives.

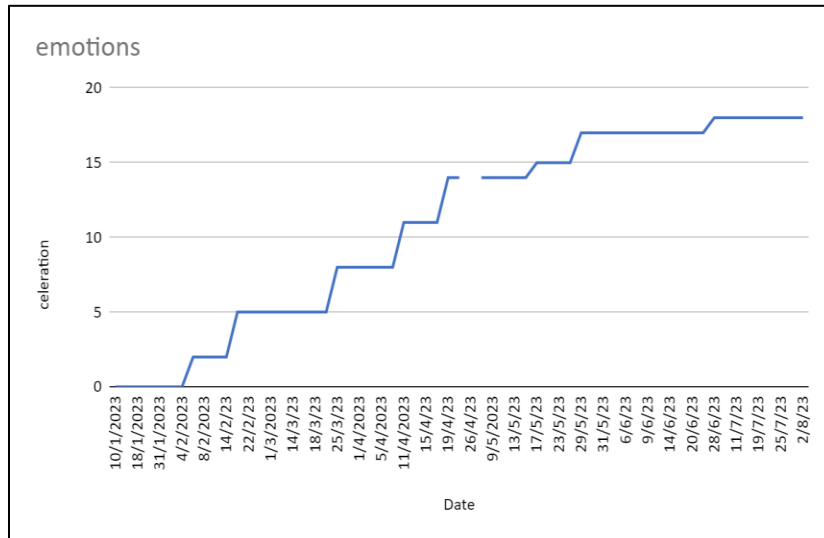


Fig 2: Graph showing expression of emotions which has improved from 0 to 17

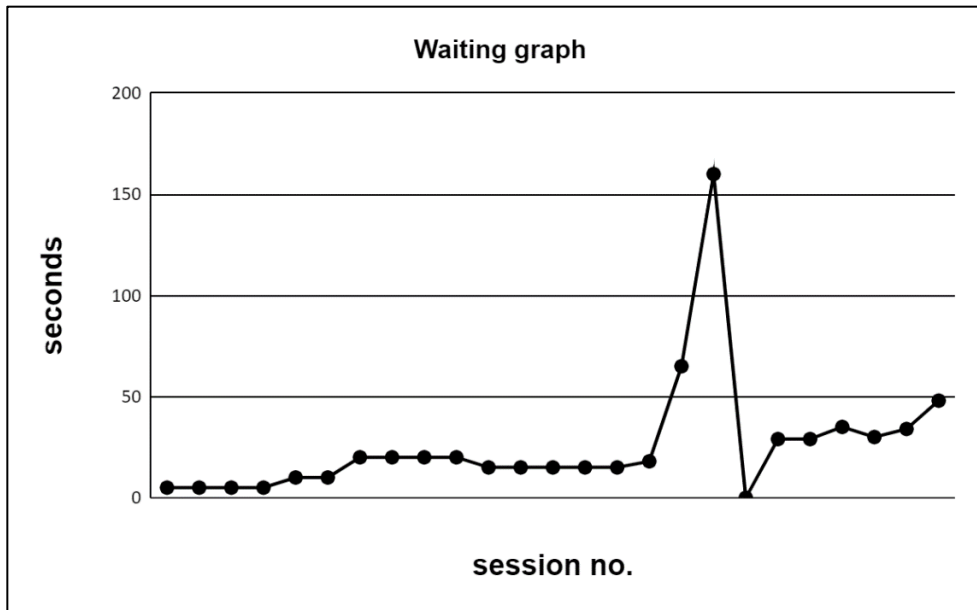


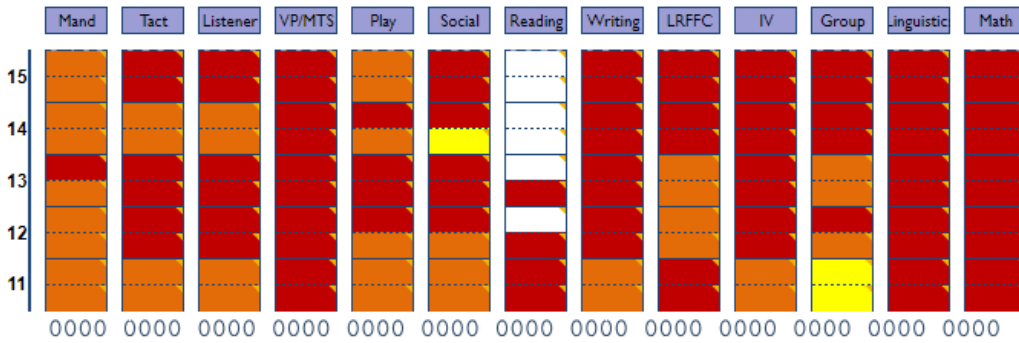
Fig 4: Waiting graph

VB-MAPP Milestones Master Scoring Form

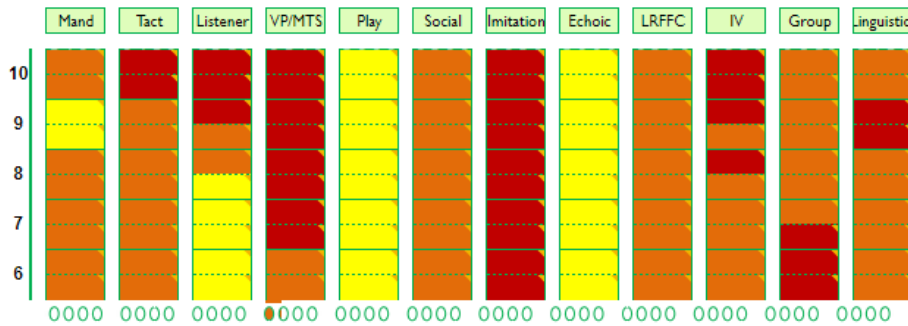
Child's name								
Date of birth	01/11/2019							
Age at testing	<table style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td style="width: 12.5%; border: 1px solid black;">1</td> <td style="width: 12.5%; border: 1px solid black;">3 y, 9 m</td> <td style="width: 12.5%; border: 1px solid black;">2</td> <td style="width: 12.5%; border: 1px solid black;">3 y, 3 m</td> <td style="width: 12.5%; border: 1px solid black;">3</td> <td style="width: 12.5%; border: 1px solid black;">3 y, 10 m</td> <td style="width: 12.5%; border: 1px solid black;">4</td> </tr> </table>	1	3 y, 9 m	2	3 y, 3 m	3	3 y, 10 m	4
1	3 y, 9 m	2	3 y, 3 m	3	3 y, 10 m	4		

Key:	Score	Date	Color	Tester
1st test	47	Jul/22		
2nd test	104 1/2	Feb/23		
3rd test	162 1/2	Sep/23		
4th test				

LEVEL 3



LEVEL 2



LEVEL 1

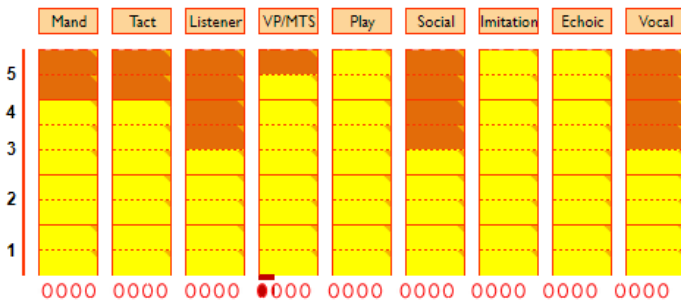


Fig 5: VB -MAPP milestone progress summary

Total VB-MAPP Score: The total VB-MAPP score (Fig 5) exhibited a remarkable increase from an initial score of 45 to a final score of 162.5, highlighting the therapy's effectiveness in addressing barriers to learning and development. Specific areas of improvement contributed to the overall score increase.

E) Outcome of Intervention:

The progress observed during and following the intervention was marked by substantial improvements in child's behavior, communication, and overall development. Behavior problems reduced significantly. The child's communication skills improved notably. He exhibited progress in social skills, including engaging with peers in social play. The child's ability to follow instructions, display listener responses, and exhibit manding skills showed significant enhancements. Child started learning from the environment. He was started with Skating classes and performed exceptionally well with selection in state level of his age group.

Discussion:

This case report highlights significant progress in a four-year-old diagnosed with socio-pragmatic language disorder, referred for behavioral concerns and severe language delays. With a VB-MAPP score of 45 and limited communication to single words, the child received ABA interventions three days a week for 13 months (105 minutes per session). Upon the completion of the comprehensive program, the child was discharged, exhibiting age-appropriate language and communication abilities without any delays.

Initially, Autism Spectrum Disorder (ASD) was suspected, prompting a comprehensive screening. The screening process ruled out ASD, leading to the confirmed diagnosis of socio-pragmatic language disorder. The confirmation of this diagnosis took into account various factors, including detailed assessments of social interactions, communication skills, and behavioral patterns, collectively affirming the nuanced nature of socio-pragmatic language challenges in the child.

The new diagnosis of Social Pragmatic Communication Disorder (SPCD) will more accurately recognize individuals who have significant problems using verbal and nonverbal communication for social purposes, leading to impairments in their ability to effectively communicate, participate socially, maintain social relationships, or otherwise perform academically or occupationally.¹²

The findings suggest that SPCD may not represent a distinct qualitative entity from ASD but rather resides within the borderlands of the autism spectrum. It delineates individuals with autistic traits slightly below the diagnostic threshold for ASD, implying that SPCD could serve as a clinically useful category for identifying those with milder autistic traits who may not meet the criteria for ASD but still require support.¹³

In the current scenario, the Verbal Behavior technique, based on ABA principles and B.F. Skinner's theories, replaced conventional speech therapy. Focusing on cultivating a robust vocabulary through the Verbal Behavior technique and VB-MAPP protocols facilitated memory-based communication.¹⁴

Advancing through the stages of VB-MAPP, the child's memory and higher-order verbal skills naturally progressed. This success underscores ABA's efficacy, integrated with VB-MAPP principles, guiding children toward neurotypical communication, marking the culmination of their therapeutic journey with enduring impact. This study demonstrates that the effectiveness of

Applied Behavior Analysis (ABA) extends beyond autism. It showcases the applicability of ABA in addressing various language and communication issues, along with conditions like developmental challenges.⁸

A similar study was done by **Rekha Thyagarajan et al. (2023)** to know the Effects of a Developmental, Social–Pragmatic Language Intervention on the Production of Expressive Language Skills in Young Children with ASD and concluded that ABA therapy incorporating Developmental social-pragmatic (DSP) language intervention is more effective for children with ASD to improve general development, language and adaptive behaviour.¹⁵

Ross R. K. (2007) conducted a study to know the application of ABA in the treatment of emotional and psychological disorders and concluded that ABA can be incorporated in the treatment of autism in young children.¹⁶

Harris et. al (2002) conducted a study to evaluate the effect of ABA in the treatment of autism and related disorders in young children and concluded that early, intensive treatment using the methods of ABA enables a significant number of children to enter the educational mainstream and achieve normal intellectual functioning.¹⁷

In the present study, the improvement in child's manding skills underscores the effectiveness of the targeted interventions. The VB-MAPP provided a structured framework for tracking his progress in this critical area. In a study conducted by **Mark R. Dixon et al. (2018)** to know the effectiveness of the PEAK Relational Training System and corresponding changes on the VB-MAPP for young adults with autism, the author concluded that participants has shown improvements in untargeted verbal skills and manding skills during the follow-up phase.¹⁸

In the current study, the VB-MAPP guided the child's development in tacting, enabling him to label complete sentences using adjectives and prepositions. This skill is pivotal for expressive communication and represents a significant achievement. This finding is in comparison with a study conducted by **Barnes CS et al. (2014)** where the author implemented VB-MAPP teaching assessment techniques and concluded that the BST (behavioral skills training) intervention resulted in immediate increases in the participants' performance.⁸

A similar study was conducted by **Smith et al. (2021)** where VB-MAPP was used to assess and plan interventions for children with ASD. The results demonstrated significant improvements in manding, tacting, and listener responding skills, mirroring the outcomes observed in present case.¹⁹

In the present study, the child's significant progress in intraverbal and listener responding skills underscores the effectiveness of VB-MAPP-guided interventions. This aligns with the findings of **Fisher et al. (2015)**, which highlighted the efficacy of individualized intervention strategies based on VB-MAPP assessments and reported substantial advancements in intraverbal and listener responding skills along with reduced barrier scores.²⁰

The present case report stands out as unique and exceptional due to its holistic and comprehensive approach to addressing socio-pragmatic language disorder using ABA intervention technique. Unlike many previous studies, this report not only showcases remarkable improvements in the child's manding and intraverbal skills but also emphasizes the substantial reduction in various barrier scores. This multifaceted improvement, spanning both skill development and barrier reduction, sets this case apart, making it an exceptional and rare illustration of the potential for comprehensive intervention strategies to significantly enhance language and communication skills in individuals with socio-pragmatic language disorders.

Conclusion:

In conclusion, this case report not only celebrates child's remarkable progress but also emphasizes the importance of early intervention, individualized treatment plans, and the collaborative effort of caregivers and professionals in the context of ASD therapy. It reinforces the idea that with the right tools and strategies, children with ASD can achieve significant milestones and lead fulfilling lives.

Limitations of the study:

Limitations of this study include its single-case focus and the absence of neuroimaging or physiological measures. Future research should involve larger sample sizes, explore long-term maintenance of progress, and compare alternative therapeutic approaches to enhance understanding and treatment of socio-pragmatic language disorders.

References:

- 1) Hodges H, Fealko C, Soares N. Autism spectrum disorder: definition, epidemiology, causes, and clinical evaluation. *Transl Pediatr.* 2020 Feb;9(Suppl 1):S55-S65. doi: 10.21037/tp.2019.09.09. PMID: 32206584; PMCID: PMC7082249.
- 2) Hage SVR, Sawasaki LY, Hyter Y, Fernandes FDM. Social Communication and pragmatic skills of children with Autism Spectrum Disorder and Developmental Language Disorder. *Codas.* 2021;34(2):e20210075. Published 2021 Dec 17. doi:10.1590/2317-1782/20212021075
- 3) National Research Council (US) Panel to Review the Status of Basic Research on School-Age Children; Collins WA, editor. *Development During Middle Childhood: The Years*

From Six to Twelve. Washington (DC): National Academies Press (US); 1984. Chapter 3, Cognitive Development In School-Age Children: Conclusions And New Directions. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK216774/>

- 4) Committee on the Science of Children Birth to Age 8: Deepening and Broadening the Foundation for Success; Board on Children, Youth, and Families; Institute of Medicine; National Research Council; Allen LR, Kelly BB, editors. Transforming the Workforce for Children Birth Through Age 8: A Unifying Foundation. Washington (DC): National Academies Press (US); 2015 Jul 23. 4, Child Development and Early Learning. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK310550/>
- 5) Ellis Weismer S, Tomblin JB, Durkin MS, Bolt D, Palta M. A preliminary epidemiologic study of social (pragmatic) communication disorder in the context of developmental language disorder. *Int J Lang Commun Disord*. 2021 Nov;56(6):1235-1248. doi: 10.1111/1460-6984.12664. Epub 2021 Aug 12. PMID: 34383380; PMCID: PMC8890438.
- 6) Lord C, Brugha TS, Charman T, et al. Autism spectrum disorder. *Nat Rev Dis Primers*. 2020;6(1):5. Published 2020 Jan 16. doi:10.1038/s41572-019-0138-4
- 7) Parsons L, Cordier R, Munro N, Joosten A, Speyer R. A systematic review of pragmatic language interventions for children with autism spectrum disorder. *PLoS One*. 2017;12(4):e0172242. Published 2017 Apr 20. doi:10.1371/journal.pone.0172242
- 8) Barnes CS, Mellor JR, Rehfeldt RA. Implementing the Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP): Teaching Assessment Techniques. *Anal Verbal Behav*. 2014;30(1):36-47. Published 2014 Jan 1. doi:10.1007/s40616-013-0004-5
- 9) Dixon MR, Belisle J, Stanley C, Rowsey K, Daar JH, Szekely S. Toward a behavior analysis of complex language for children with autism: Evaluating the relationship between

PEAK and the VB-MAPP. *Journal of Developmental and Physical Disabilities*. 2015 Apr;27:223-33.

- 10) Schreibman L, Dawson G, Stahmer AC, et al. Naturalistic Developmental Behavioral Interventions: Empirically Validated Treatments for Autism Spectrum Disorder. *J Autism Dev Disord*. 2015;45(8):2411-2428. doi:10.1007/s10803-015-2407-8
- 11) Geiger KB, Carr JE, Leblanc LA, Hanney NM, Polick AS, Heinicke MR. Teaching receptive discriminations to children with autism: a comparison of traditional and embedded discrete trial teaching. *Behav Anal Pract*. 2012;5(2):49-59. doi:10.1007/BF03391823
- 12) American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Arlington, VA: American Psychiatric Publishing; 2013.
- 13) Mandy W, Wang A, Lee I, Skuse D. Evaluating social (pragmatic) communication disorder. *J Child Psychol Psychiatry*. 2017 Oct;58(10):1166-1175. doi: 10.1111/jcpp.12785. Epub 2017 Jul 25. PMID: 28741680.
- 14) Leblanc LA, Esch J, Sidener TM, Firth AM. Behavioral language interventions for children with autism: comparing applied verbal behavior and naturalistic teaching approaches. *Anal Verbal Behav*. 2006;22(1):49-60. doi: 10.1007/BF03393026. PMID: 22477343; PMCID: PMC2774588.
- 15) Thyagarajan R, Mone AS. The Effects of a Developmental, Social–Pragmatic Language Intervention on the Production of Expressive Language Skills in Young Children with Autistic Spectrum Disorders. *International Journal of Indian Psychology*. 2023;11(2).

- 16) Ross RK. Beyond autism treatment: The application of applied behavior analysis in the treatment of emotional and psychological disorders. *International Journal of Behavioral Consultation and Therapy*. 2007;3(4):528.
- 17) Harris SL, Delmolino L. Applied behavior analysis: Its application in the treatment of autism and related disorders in young children. *Infants & Young Children*. 2002 Jan 1;14(3):11-7.
- 18) Dixon MR, Wiggins SH, Belisle J. The effectiveness of the peak relational training system and corresponding changes on the VB-MAPP for young adults with autism. *J Appl Behav Anal*. 2018 Apr;51(2):321-334. doi: 10.1002/jaba.448. Epub 2018 Mar 6. PMID: 29509278.
- 19) Smith EG, Smith J. Verbal Apraxia. *Encyclopedia of Autism Spectrum Disorders*. 2021:5011-6.
- 20) Fisher WW, Zangrillo AN. Applied behavior analytic assessment and treatment of autism spectrum disorder. In *Clinical and organizational applications of applied behavior analysis* 2015 Jan 1 (pp. 19-45). Academic Press.

