

Pragmatic Disorder in Children with ADHD

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Abstract

Although language disorders are not among the fundamental features or required to fulfill the diagnostic criteria for ADHD, several research studies revealed a high prevalence of communication disorders among children with ADHD. The evidence from the literature suggests that inattention, hyperactivity, and impulsivity have their effects on different speech and language skills. The American Speech-Language-Hearing Association claimed that co-occurring ADHD and speech and language disorders represent a frequently encountered challenge for school-based speech-language pathologists and other practitioners. Also, it is not uncommon to find that children with speech and language disorders are also being treated for ADHD. Language disorders are common in ADHD with accumulating evidence from several research studies on pragmatic language difficulties. Although research has examined many important aspects of language and ADHD, there have been relatively few studies that have looked at the critical aspects of the child with ADHD ability to communicate effectively. This review is an effort towards provide a description for the pragmatic disorders in children with ADHD.

Keywords: ADHA • Pragmatic Disorder • Communication Checklist-2

Introduction

Language is a socially shared code or conventional system that represents ideas through the use of arbitrary symbols and rules that govern combinations of these symbols. Language has been usefully described as having three levels: "Form", "Content" and "Use". In this approach, "Form" is described as including phonology, morphology, and syntax; "Content" describes semantics and "Use" describes pragmatics. During early child development years, if one or more of these levels does not develop properly for any reason, the language will be considered disordered. Children acquire language naturally without formal instruction however some children experience difficulties in their acquisition that vary in severity. These children are typically described as language disordered. It is important to have a clear distinction between language delays versus disordered language. Defined language delay as the failure to comprehend or produce language at the expected age that may be due to slow maturation. Regarding language disorder, it is described by Accardo P and Whitman J [1] as a developmental disorder involving disabilities of reception integration, recall and/or production of language. According to the ICD-10, language expression and comprehension disorder is described as assessed on a standardized test, within the two standard deviation limit for the child's age. Added to that, the Diagnostic and Statistical Manual of Mental Disorders describes the language disorder as defined by the scores obtained from standardized, individually administered measures of expressive language development. These will be substantially below those obtained from standardized measures of both nonverbal intellectual capacity and receptive language development. Language disorder may include impaired comprehension and/or expression in the use of spoken but also extended to, written and/or other symbol systems. The disorder may involve the form of

language phonology, morphology, and syntax, the content of language and/or the function of language in communication in any combination.

Pragmatic and Pragmatic Disorder

After reviewing the speech-language pathology journals and the conferences of the last decades the author found the words "Pragmatic" and "Pragmatic Disorders" have become increasingly important. Pragmatic issues are being increasingly addressed in clinical practice in the field of Speech-Language Pathology. This has led to a growing number of studies that are concerned with difficulties and problems some children may experience at the level of language use. However, the relationship between pragmatic theory and clinical practice is not as strong as it should be compared to practice in syntax and semantics, according to Perkins. With such heightened interest and research activity there is a great need for more and more efforts to increase our understanding of pragmatics in different diagnostic categories [2].

According to Nilsen, et al. successful communication requires more than knowledge of words and grammar it requires an understanding of how language is used for social and functional purposes. Gleason defined it as the system of rules that dictates the way language is used to accomplish social ends and Silverman to the ability of a speaker to use language for accomplishing goals or intentions while interacting with others. Add the concept of inappropriacy. Their definition of pragmatics includes who is talking to whom, in which way in what situation [where] and at what time. Pragmatics is commonly divided into three domains firstly, discourse management that includes how to initiate, maintain and end a conversation, secondly communicative intention that includes how to request and inform and thirdly presupposition that includes assumptions about the interlocutor and the context. The child's pragmatic competency is associated with a group of developing skills including eye contact, requesting information, taking turns in conversations, topic initiation, topic maintenance, speech acts, adjusting what is being said according to the listener's linguistic ability, responding to requests for clarification and cohesion. Children with poor pragmatic skills often misinterpret another person's communicative intent and have difficulty responding appropriately either verbally or nonverbally. In 1987 Prutting and Kirchner described pragmatic aspects of language as including verbal utterances, paralinguistic aspects, and nonverbal behaviors. According to Prutting and Kirchner the nonverbal aspect of pragmatic skills include eye contact, facial expression, physical proximity and gestures paralinguistic pragmatic skills are defined as the mechanics of speaking that include intensity, intelligibility, tone, and rhythm [3].

A possible exemplifying scenario for a disruption on the nonverbal level in the pragmatic domain would be when a conversation is disrupted due to the

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child's failure to give eye contact with the interlocutor during conversation which may mean the topic of the conversation is shifted to the child's inappropriate behaviors instead of the subject in hand. Verbal pragmatic deficits may include inappropriate turn taking interruptions and failure to track and respond to topic shifts. Camarata and Gibson conclude that pragmatic deficits are evident when disruptions occur at a level that significantly interferes with the child's ability to successfully converse. Pragmatic disorder is a descriptive term that refers to difficulties with using language to convey and understand intended meaning and it includes any disruptions in the social interaction that do not arise from deficits in structural aspects of language, although a lack of structural complexity can lead to pragmatic ambiguity. So pragmatic difficulties can be observed as a secondary feature of any developmental language impairment due to the limitation in communication abilities however developmental pragmatic disorders are not restricted to any particular diagnosis such as Autism Spectrum Disorder or Attention Deficit Hyperactivity Disorder. Pragmatic disorders are evident when disruptions occur at the level of language that significantly interfere with the individual's ability to successfully converse. These levels include: verbal linguistic behaviors including speech act, topic initiation, topic maintenance, topic shifting, turn taking, lexical selection and stylistic variations paralinguistic aspects including the mechanics of speaking including intelligibility, vocal quality, intensity, prosody and fluency and nonverbal aspects including eye contact and body language. Camarata and Gibson stated that "the DSM criteria appear to require pragmatic analysis for accurate diagnosis" [4].

Formalists vs. Functionalists in Speech-language Pathology

The formalists view pragmatics as one of five equal and interrelated aspects of language. These aspects are syntax, morphology, phonology, semantics and pragmatics that are organized and controlled by a set of formal systems and rules. Prutting argued that this approach is inadequate. In contrast, the functionalistic point of view is a more holistic approach that views pragmatics as an overall organization of these aspects of language [5].

Prutting discussed the shift that had taken place in speech-language pathology, as result of the focus on the pragmatic aspects of language. The discussion of the formalists and functionalists illustrated the differences in definition, function of language, competency and framework. At the level of definition, the formalist approach was described as referring to a linguistic view of language while the functionalist approach referred to the pragmatic perspective added to that the advocates of the formalist approach defined language as a set of sentences whereas the functionalists advocated defining language as an instrument for social interaction. At the level of language function, the formalists view it, as mainly the expression of thoughts, however the functionalists believe the primary function of language is communication, which the author believes is more practical for clinical purposes. At the level of competency, the formalists view it as the ability to produce, comprehend, and

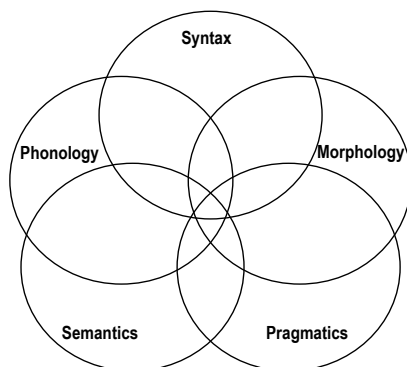


Figure 1. The formalists see pragmatics as one of five equal and interrelated aspects of language.

judge grammatical structures however, the functionalists see competency as a communicative competence, which is rooted in social interaction [6].

From a clinical perspective Owens mentioned that speech-language pathologists replaced the formalists' model with a more functionalistic approach due to the increasing recognition of the influence of pragmatics on the structure and content of verbal output. This view of language led to a different approach for intervention from the approach that covers isolated bits of language to the holistic approach that targets language within the overall communication process (Figures 1 and 2).

Pragmatic Assessment

The assessment of pragmatics is a central issue in the evaluation of children with communication disorders in general. The main objective for

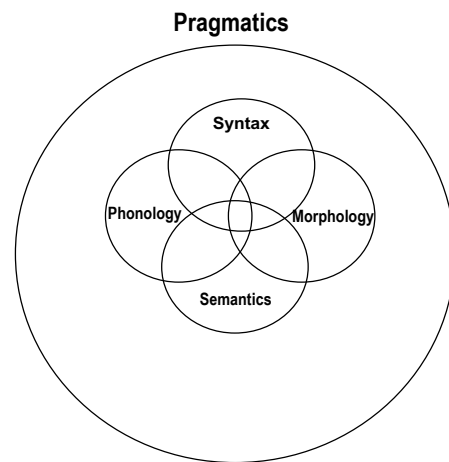


Figure 2. The functionalist sees pragmatics as the overall organizing aspect of language.

Table 1. The development of language pragmatics in typical children: A Summary of some research studies. Ages given should be considered as approximations only and not development norms.

Pragmatic Behaviors	Approximate Emergence*
Pre-verbal turn taking	8-9 months
Pre-verbal communicative intentions/proto-words	12 months
Rapid development of communicative acts	14-32 months
Turn taking	Stabilizes at 2;6-3;6
Can maintain topic in interaction with adult	From 2 years
Making clarifications	From 2 years
Adaptation of speech style to listener	From 2 years
Use of early polite forms	Variable from 2 years
Response to non-specific requests for repetition	2 years
Range of communication acts achieved	3-4 years
Infers information from story	3-4 years
Infers indirect meanings	4-6 years
Turn-taking repairs	5 years
Gaps in interaction decline	5 years
Reports thematic narrative with plot	5-7 years
Met pragmatic skills present	6-7 years
Mastery of discourse makers	7 years
Skilled use of anaphoric reference	6-7 years
Information adequacy complete	9 years
Polite forms fully developed	From 9 years
Cohesion and reference errors decrease	9-12 years
Explanation of idioms	Upto 17 years

pragmatic assessment is to identify the strengths and weaknesses of the child's pragmatic capabilities. According to Norbury pragmatic language abilities are particularly difficult to measure using standardized tests due to the nature of contextually dependent behaviours that occur in dyadic exchange. Pragmatic abilities can be assessed through description of problematic areas, compared to what is expected in typically developing children but the knowledge of developmental norms is limited, which means that only very approximate ages can be provided. It is important to mention that pragmatic performance is affected by the styles of communication, which emerge in early childhood and the pragmatic functions vary according to context and audience [7]. So pragmatic assessment is quite distinct from language assessment methods for typically developing children, in which norms can be derived from standardized tests given on one occasion (Table 1).

Pragmatic abilities can be assessed via several published standardized tests which are in common use and have pragmatic elements, such as the assessment of comprehension and expression, the clinical evaluation of language fundamentals and the test of language competence. These tests are not devoted to the assessment of pragmatics alone but they contain subtests that are devoted to pragmatic assessment. The Test of Pragmatic Language is the only test that is dedicated entirely to the assessment of pragmatic language skills [8].

The Test of Pragmatic Language is a formal norm-referenced instrument, which is targeted at language on demand, as opposed to spontaneous language. TOPL elicits functional communicative interactions by using scenarios from common settings. Participants are shown pictures and read brief stories describing a social interaction and then asked questions that involved making inferences about the story. The TOPL has been used previously in research to examine the pragmatic ability of children with and without a diagnosis of ADHD, for example the study by Kim and Kaiser revealed that there were no differences between children with ADHD and typically developing peers when assessed by the TOPL. However when the Pragmatic Protocol was used with the same subjects the results showed that the children with ADHD demonstrated less appropriate pragmatic behaviours during conversations with adult partners. The inconsistencies which resulted from the use of different assessment tests may reflect the distinction between linguistic competence and communicative competence which has been mentioned by the authors of the TOPL test. Also, Adams argues that such formal testing measures are unlikely to reveal an accurate or comprehensive picture of the child's pragmatic competence in more dynamic, context dependent communicative exchanges [9].

Furthermore, pragmatic abilities can be assessed through checklists, protocols and questionnaires of pragmatic behaviours, which are used to avoid the problem of lack of normative data. Speech-language pathologists and practitioners commonly use checklists more than tests. The Prutting's Pragmatic Protocol is a very influential work in language pragmatics assessment. The protocol is a descriptive classification of 30 pragmatic parameters that are rated according to whether they are used 'appropriately' or 'inappropriately' or 'not observed' [10].

An alternative approach is to assess the presence of language pragmatic problems via observation, as in the Children's Communication Checklist-2 CCC-2 which is perhaps the most widely used checklist in clinical practice and research. The children's communication checklist aims to differentiate children with pragmatic language impairment from other types of language impairments. The CCC-2 is a seventeen-item questionnaire designed to assess children's communication skills in various areas of language including pragmatics. CCC-2 provides standard scores for ten scales. Four of them focus on verbal and nonverbal pragmatic skills. Normative data on children aged 4 to 15 years are available on over 500 participants from UK and over 900 participants from US. Also, CCC-2 has been translated into different languages. The reliability of the CCC-2 was examined in children aged 4 to 15 years of age and parents served as informants. The internal consistency ranged from 0.66 to 0.80 and the inter-rater reliability between parents and teachers ranged from 0.16 to 0.53. It is important to highlight that the CCC-2 does not provide a diagnosis, but it can be used to 'signpost aspects of communication' as described by for further assessment decisions. Added to that, the parents and teachers may wish to

rate the child's communicative behaviour directly rather than via clinicians or researchers [11].

Formal testing of pragmatics has a limited usefulness for typical pragmatic abnormalities during interaction, however it plays a significant role in the assessment of comprehension of pragmatic intent. Using elicitation of communicative intent through a naturalistic approach is vital in the assessment of pragmatic skills of pre-school children. After reviewing the literature it is fair to say that assessment via naturalistic observation is preferred among researchers since it reflects typical contextual functioning, however it can be judged as being too time consuming. The assessment of pragmatic skills contributes heavily to communication and social intervention strategies for children with ADHD [12].

Pragmatic Disorder in ADHD

Language disorders are common in ADHD with accumulating evidence from several research studies on pragmatic language difficulties. Although research has examined many important aspects of language and ADHD, there have been relatively few studies that have looked at the critical aspects of the child with ADHD's ability to communicate effectively. Those few studies have demonstrated that children with ADHD are reported to have significantly greater pragmatic communication difficulties compared to their peers such as Bishop and Baird that found the parents of children with ADHD reported that their children demonstrate more difficulties with conversation and social relationships than TD children. Geurts et al. Provided a brief review of five questionnaire-based studies that referred to pragmatic language difficulties in ADHD and that were published by 2010. They concluded those five studies formed a small but consistent body of evidence that children with ADHD have pragmatic difficulties compared to typically developing peers [13].

According to Staikova et al. Social functioning impairment has been linked to the ADHD symptoms. In harmony with Staikova et al. Conclusion, Green et al. In their review of the research work to date claimed a consistent profile of pragmatic language impairment in children with ADHD. The nature of attention deficit hyperactivity disorder as described in the DSM5 and the ICD-10 indicates a potential association with language disorders and the DSM5 diagnostic criteria for ADHD imply that it is a pragmatic language disorder characterized by talking excessively, interrupting others, difficulty waiting on turns, not listening to what is being said and blurting out answers to questions before they have been completed. Other criteria include auditory/language processing deficits and discourse deficits e.g. Managing topic in conversation. According to Redmond, children's social difficulties may arise because of limited verbal narrative skills in the children with ADHD [14,15].

In the light of the previously discussed relationship between ADHD and pragmatic difficulties we need to discuss the potential impact of ADHD on the pragmatic aspects of language acquisition. The three main theories of language development are the behaviourist/learned theory, the psycholinguistic/innate theory and the interactionist/transactional theory [16]. The interactionist/transactional theory emphasizes the social or pragmatic function of language development. Camarata and Yoder define transaction developing interactions where it is evident the adult interlocutor and the child affect one another. Aspects of the child's productions during interacting with a parent will prompt specific classes of responses from the parent and vice versa, so that parent responses are associated with language advances in the child. For that reason the child is required to initiate, respond, and maintain adequate attention in order to activate the transactional process which may be disrupted at several points in a conversational interaction with a child with ADHD symptoms because of the importance of mutual attention. Camarata & Gibson, claim that a child with hyperactive and impulsive type may experience greater risk for disrupting language learning transactions [17].

Bignell S and Cain K [7] suggest children with ADHD may experience pragmatic difficulties because they may arise from cognitive deficits underlying behavioural symptoms of ADHD. For instance pragmatic language taps

executive skills like planning and monitoring behaviours. Executive function can be defined as high-level neurocognitive processes involved in goal-directed behaviour and it is an umbrella term to refer to such processes that maintain an appropriate problem-solving to attain delayed goals Booth JN, et al. [12] described the executive functions as the higher order processes that direct thought and action. Green BC, et al. [17] in their review concluded that the evidence for pragmatic language difficulties in children with ADHD is consistent with the executive function deficit characterizes ADHD [18,19]. They stated "As yet there is very little empirical evidence of specific relationships between particular aspects of pragmatic language and particular domains of executive function". Barkley has suggested executive functions can be split into measures of nonverbal working memory, verbal working memory, self-regulation and reconstitution. So in order to hold a coherent reciprocal conversation one needs to pay attention to and remember what one's conversational partner is saying, which relies on the executive functions of sustained attention and working memory. Inattention may lead to children missing important conversational and contextual cues, limiting their ability to learn that words may have multiple meanings according to the context in which they are used. At the same time, one needs to inhibit excessive talking and to ensure that one's contributions are relevant, which relies on the executive functions of response inhibition and planning. Green BC, et al. [17] concluded in their review that even with the theoretical relationships between pragmatic language disorder and executive function deficit, there has been very little empirical work steered towards considering these potential relationships with respect to ADHD.

It is further suggested that inattention characteristic of the ADHD could have a direct impact on the verbal aspects of pragmatics more than the nonverbal aspects of pragmatics. Verbal aspects include turn taking, amount of talk, and topic initiation, maintenance and changes these will usually impact the flow of a conversation. Research assessing the pragmatic characteristics of children with ADHD and language learning disability has indicated that these children might exhibit problems with turn taking, answering questions or requesting clarification and in initiating or maintaining a conversation. Camarata and Gibson reviewed outcomes in previous studies which suggested that pragmatic difficulties lead to behavioural and social difficulties that impeded further age appropriate language development, regardless of subtype of ADHD.

In support of this finding Kim and Kaiser investigated language characteristics of ADHD and TD ages 6-8 years in terms of semantic, syntactic and pragmatic language skills. Their results revealed that children with ADHD who produced more inappropriate pragmatic behaviours had lower abilities in spoken language during free play. Kim and Kaiser elaborated that children with ADHD often did not respond to questions or requests from the speaker, interrupted/overlapped others, gave less feedback to the speaker and they used nonspecific vocabulary [20].

More recently Bignell S and Cain K [7] studied pragmatic aspects of communication and language comprehension in relation to poor attention, high hyperactivity and a combination of poor attention and hyperactivity in non-diagnosed children. Three groups were formed children with poor attention, children with high hyperactivity and children with poor attention and high hyperactivity. Their performance as reported by their classroom teacher was compared with TD. The researchers concluded that the inattention type group and the combined type group were impaired in both their comprehension of figurative language and in pragmatic aspects of communication. The hyperactivity type group was impaired in their comprehension of figurative language, but they did not exhibit communication impairments. This research extended work with clinical populations of children with ADHD to a non-diagnosed sample of children. It showed that poor attention and elevated levels of hyperactivity are associated with pragmatic language weaknesses. Continuing with the same approach, Leonard MA, et al. [21] studied the role of pragmatic language use in mediating the relation between hyperactivity and inattention and social skills problems in a community sample of 54 children aged 9-11 years with varying levels of hyperactivity and inattention. They found that pragmatic language use fully mediated the relation between hyperactivity and social skills problems and partially mediated the relation between inattention and social skills problems. However it is important to highlight that,

these findings may be described as limited since they were based only on parent ratings to assess both pragmatic language and social skills. Another limitation in Leonard MA, et al. [21] and Bignell S and Cain K [7] studies was that they selected children with elevated levels of parent-rated inattention and hyperactivity instead of carefully diagnosed subjects with ADHD based on psychiatric assessment as in the current study [21].

Conclusion

According to Tannock and Tannock and Scharchar the pragmatic deficits that are associated with ADHD include Excessive verbal output during spontaneous conversations, during task transitions and in play settings, decreased verbal output and more dysfluencies when confronted with tasks that require planning and organization of verbal responses, as in story retelling or when giving directions, difficulties in introducing, maintaining and changing topics appropriately and in negotiating smooth interchanges or turn taking during conversation, problems in being specific, accurate and concise in the selection and use of words to convey information in an unambiguous manner, difficulties in adjusting language to the listener and specific context. Ketalaars et al. Found a high negative correlation between pragmatic competence and hyperactivity in a community sample of 4-year-old children, claiming that early assessment of pragmatic competence may lead to early detection of ADHD. Finally, based on our clinical experience, we predict that pragmatic difficulties would commonly be found in children with ADHD.

Conflict of Interest

None.

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