A Comparative Study of the Sensitivity of Evaluation Tools for Pragmatic Deficits in Individuals With ADHD

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Abstract
Adults with Attention Deficit Hyperactivity Disorder (ADHD) face various specific challenges, including difficulties with figurative comprehension. Among the most prevalent issues are significant pragmatic and social difficulties, which usually lead to functional impairments. ADHD is one of the most frequently diagnosed disorders in children, yet in many cases the diagnosis is not made until adulthood due to numerous factors, such as an educational background, under-resourced familial environments, high intelligence masking stress-related difficulties and additional comorbidities. Consequently, these individuals miss out on early treatment, leading to significant social and pragmatic challenges that affect their lifestyle, education and occupational functioning. This study presents a comparative analysis of the pragmatic difficulties, faced by adults with varying severities of ADHD symptoms and it evaluates the validity of incorporating a pragmatic domain into diagnostic tools to identify ADHD-related pragmatic deficits for developing more effective intervention programs focused on enhancing individuals' social and pragmatic skills.

Keywords: ADHD, Pragmatic Deficits, Assessment Tool, Intervention Programs

Introduction

Attention deficit/hyperactivity disorder (ADHD) is frequently identified as one of the predominant neurodevelopmental disorders in children (Wolraich et al., 2019). However, a significant number of ADHD diagnoses occurs in adulthood, attributable to several factors: a). the structure of their environments and the minimal demands (Adler et al., 2015); and b). various obstacles, such as compensatory mechanisms linked to high intelligence or socioeconomic constraints (Fleischmann & Fleischmann, 2012). Notably, the diagnostic process for females tends to be delayed due to the predominance of internalized symptoms and the prolonged development of coping mechanisms that mask the core symptoms of ADHD (Katzman et al., 2017). Importantly, the individuals undiagnosed in childhood are more likely to encounter substantial challenges in marital relationships, parenting, financial management, occupational functioning, academic achievements and healthy lifestyle (Barkley et al., 2008; Ernst et al., 2003; Fleichmann & Miller, 2013). As a result, these challenges often precipitate stress, feelings of guilt and diminished self-confidence (Fleischmann & Fleischmann, 2012). For instance, college students with ADHD have been shown to achieve lower grade point averages and exhibit a lower graduation rate compared to their non-ADHD peers (DuPaul et al., 2009; Katzman et al., 2017). Thus, the lack of timely diagnosis and subsequent early intervention may result in persistent and severe pragmatic, social and functional difficulties.

Nowadays, despite the existence of several tests that provide a discourse and conversation assessment, such as the Pragmatic Protocol (Prutting and Kirchner, 1987), the Profile of Communicative Appropriateness (Penn 1985); and the ADHD symptom rating scales, like Adult ADHD Clinical Diagnostic Scale version 1.2 (Brown, 1996), Adult ADHD Self-Report Scale (ASRS) v1.1 (Adler et al., 2006; Kessler et al., 2005), Swanson, Nolan and Pelham IV Questionnaire (SNAP-IV) (Swanson et al., 1981; Swanson, 1992) and Conners' Rating Scale-IV (Conners, 1997, 2008; Conners et al., 2012), the pragmatic assessment tool most often is not included in the clinical practice. However, pragmatic language skills are crucial for facilitating daily social interactions and establishing bonds, as well as for conveying intentions relevant to the context. Indeed, according to the American Speech-Language-Hearing Association (ASHA), pragmatics encompasses a comprehensive array of the communicative domains, both linguistic and non-linguistic.

Despite the importance of the diagnosing the pragmatic skills, in general, and in ADHD population, in particular, there is a long debate concerning the diagnostic procedure of the linguistically based communicative pragmatic disorder in a most appropriate and efficient way. The pragmatic assessment in ADHD population is particularly important since adults with ADHD experience various specific difficulties with figurative comprehension, like reaching the intended meaning of metaphors and non-literal language in general (Segal et al., 2015). Moreover, significant pragmatic and social difficulties, which usually lead to functional problems, are among the most common difficulties experienced by individuals with ADHD (Cordier et al., 2010; Cordier et al., 2017; Green et al., 2014). But the pragmatic language skills are difficult to measure since the social use of language – the dimension of pragmatics – substantially depends on situational context, cultural norms and speakers themselves (Young et al., 2005; Adams et al., 2002). Furthermore, the pragmatic language skills assessment is considered to be rather complex as far as communicative deviations at the pragmatic level are assigned to cognitive or social deficits and the available pragmatic tests are too long to include them into clinical setting (Arcara & Bambini, 2016).

The aim of the current research is to evaluate the validity of the inclusion of the pragmatic domain into the diagnostic tool for the identification of ADHD by comparing different diagnostic tools for ADHD symptoms in the clinical settings. This comparative study provides a systematic and a standardized evaluation of the pragmatic difficulties in the individuals who were divided into three groups according to the various degrees of ADHD symptoms severity. That is, the goal of the current study is to evaluate the sensitivity of the novel method for the assessment of the pragmatic skills, that is, APACS-Heb tool, in the assessment of the pragmatic deficits in the population with different degrees of severity of ADHD symptoms, thus, expanding the inventory of tools for assessing the pragmatic abilities in the Hebrew-speaking clinical population diagnosed with ADHD. APACS-Heb version is based on an original translation from Italian by Mashal (2017, version 2.1), subsequently revised and modified by Even-Simkin in a collaborative effort with Mashal in 2019. Assessment of Pragmatic Abilities and Cognitive Substrates (APACS), which originally was developed for Neuro-Typical population in Italian by Arcara and Bambini (2016) was also found to be a reliable measure for assessing pragmatic abilities in neuro-typical Hebrew-speaking individuals. That is, the normative data collected for the APACS-Heb battery validated and showed a high reliability of this tool in providing a comprehensive measure of pragmatic skills in adolescents and young adults (Fussman & Mashal, 2022). The preliminary results of the pragmatic profile of ADHD revealed an attenuated functioning in inference of a non-literal meaning and a non-complete development of figurative language comprehension in adults with ADHD (Even-Simkin & Mashal, manuscript submitted for publication). The findings that were supported by the results obtained in the further study of the psychometric properties of the systematic and standardized evaluation tool of the pragmatic abilities in adults with ADHD, based on a comprehensive approach introduced by Arcara and Bambini (2016) for the assessment of pragmatic abilities in neuro-typical individuals (Even-Simkin, in press).

Methods and Results

This study presents a comparative analysis of the sensitivity of the APACS-Heb assessment tool for the evaluation of the pragmatic deficits in ADHD population by comparing three groups of participants whose ADHD Sensitivity Rate was evaluated following the different assessment methods. The first group included 47 participants, females and males with a mean age of 24.51 years who were clinically diagnosed with ADHD following the DSM-V (APA, 2013) diagnostic criteria. The second group included 41 participants, females and males with a mean age of 24.15 years who were without a history of any neurodevelopmental or psychiatric disorders, but who were classified with severe ADHD symptoms following the Hebrew version of the WHO adult ADHD self-report eighteen screen scale (Zohar & Konfortes, 2010). The third group included 31 participants, females and males with a mean age of 24.35 years, who were clinically diagnosed with ADHD following the DSMV diagnostic criteria and were identified with severe ADHD symptoms following the WHO adult ADHD self-report eighteen screen scale. Control groups were matched to the studied group following those parameters. All the participants were native speakers of Hebrew language with IQ $\geq$ 80 with a mean age of 24.15-24.51 years. The research was provided after it has been approved by the Institutional Research Ethics Committee and the individuals' written consent was obtained prior to their participation in the study.

To provide a detailed comparison of the pragmatic deficits among adults with different severity of ADHD, the APACS-Heb tool was exploited for the assessment of the pragmatic deficits in the ADHD population. The APACS-Heb tool had been chosen since it did not

involve a role play approach which was considered to be a controversial one in the clinical settings (Crockford & Lesser, 1994). Moreover, APACS is built up to focus on the verbal pragmatic abilities in social communication and on the use of functional communication scale which is the most efficient measure of communicative skills in social situations (Acara & Bambini 2016). This APACS test includes two pragmatic domains, that is, discourse and literal language, which assess the PRODUCTION and COMPREHENSION in 6 tasks: interview; description; narratives; figurative language 1 (familiar idioms, novel metaphors and common proverbs presented in a minimal context); humor; and figurative language 2 (verbal explanation of familiar idioms, novel metaphors and common proverbs) (Acara & Bambini, 2016). Moreover, a total duration of the assessment procedure is rather short, i.e., it is about 35-45 minutes and the assessment tool materials include an everyday language and photographs instead of drawings to shape pragmatic skills used in the daily communication (Acara & Bambini, 2016). In addition, an easy administration and scoring system do not require an effortful training of clinicians. Beside the DSMV diagnostic tool, the complete scale for scoring the full range of the response categories in the Hebrew version of the Adult ADHD self-report eighteen screen scale has been adopted to assess the severity of the ADHD symptoms, since it has been found to be the most appropriate for the clinical practice (Zohar & Konfortes, 2010).

The comparative analysis of the sensitivity rates for detecting pragmatic deficits among adults with varying severity of ADHD symptoms, utilizing different assessment methods and their combinations, demonstrated varied sensitivity across the participants in three groups differentiated by their symptom severity. Figure 1 illustrates the percentages of individuals with ADHD who scored below the 5th percentile to their matched control group across various tasks. The findings indicate that the highest sensitivity rate in the third group was observed in the total APACS score at 19.4%, followed by a notably lower sensitivity of 16.1% in Pragmatic Comprehension. In contrast, the second group exhibited the greatest sensitivity in the Pragmatic Comprehension Task, specifically in Narratives, at 17%. Sensitivity was substantially lower in the first group, where the highest rate was found in the Pragmatic Production Task, specifically in Description, and in a composite score of Pragmatic Production and Total APACS at 15%.

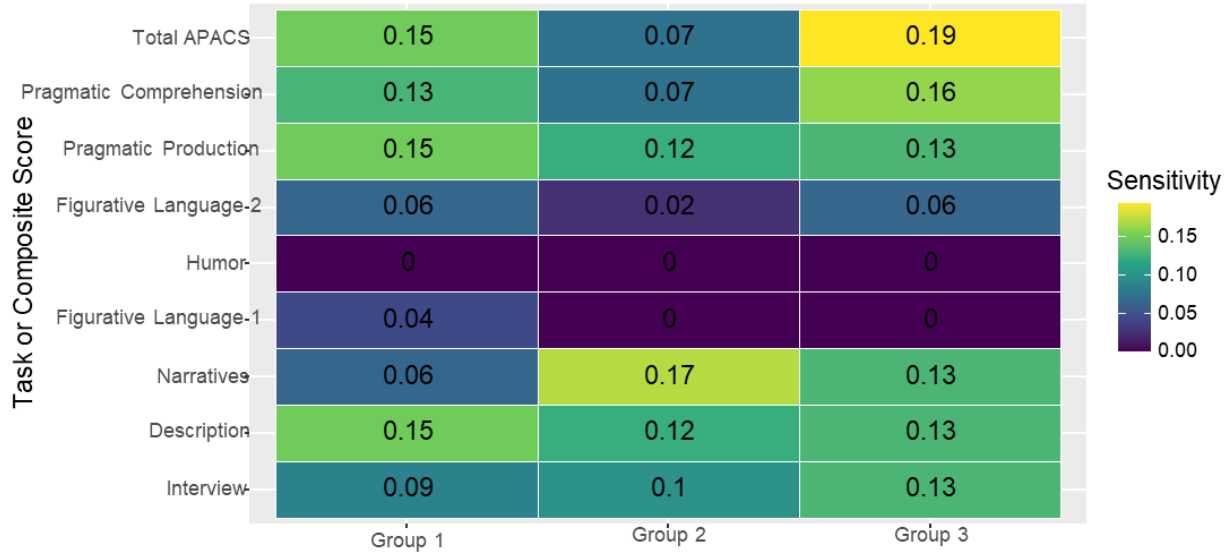

Figure 1: Cut-offs for ADHD sensitivity for APACS-Heb Scores.

Consequently, the highest sensitivity for pragmatic deficits in adults with ADHD was found in the individuals who were clinically diagnosed with ADHD following the DSMV diagnostic criteria and were identified with severe ADHD symptoms following the WHO adult ADHD self-report scale.

Furthermore, it is essential to highlight the significant findings obtained at the group level, which reveal the distinct characteristics of the pragmatic deficits across the groups. That is, individuals in the first group exhibited significant deficits in the pragmatic comprehension task, particularly in understanding figurative language (Figurative Language 2). In the second group, participants displayed the significant deficit in the pragmatic comprehension task, notably in Narratives. Conversely, those in the third group demonstrated the significant deficit not only in Figurative Language 2 and Narratives but also in the APACS total score. These variations emphasize the differential impact of ADHD severity on the pragmatic language processing among the groups.

The above-presented comparison of the pragmatic deficits among adults with varying severity rate of ADHD symptoms offers the preliminary results that underscore the significant utility of the Hebrew version of the APACS compact test kit. This study presents a marked efficiency of this tool in identifying specific impairments in pragmatic competence, which is essential for the effective communication. However, a further study is needed to gain a deeper insight into this area and to maintain the psychometric properties of this tool, particularly for its integration into clinical diagnostic settings.

Conclusion

This study presents a comparative analysis of the sensitivity rates of the pragmatic deficits among adults with varying severity degrees of ADHD symptoms, utilizing the APACS-Heb version, the tool which is based on the comprehensive approach developed by Arcara and Bambini (2016). Additionally, this research offers an expanded perspective on the pragmatic disorders within the ADHD population.

The study highlights the psychometric properties of the APACS-Heb version and suggests its potential utility in incorporating pragmatic skills into the cognitive profiling within ADHD diagnostic practices. The obtained results point to the potential input of this tool in the diagnostic settings, since it can facilitate the identification of the pragmatic deficits across different severity levels of ADHD symptoms and it can also be potentially adopted for the targeted intervention programs focused on enhancing the pragmatic skills. Integrating this assessment tool into the clinical settings could advance the development of customized intervention programs, optimizing social communication, academic performance and employment outcomes for individuals with diverse levels of the pragmatic deficits.

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