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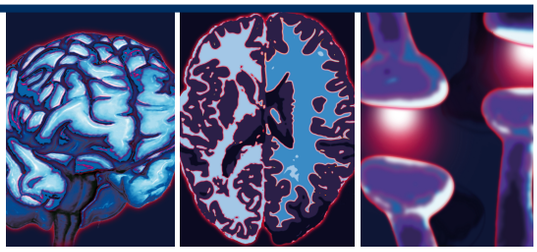

# Diagnosing ADHD in adults: limitations to DSM-IV and DSM-V proposals and challenges ahead

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## Practice points

- Be aware of the limitations of the DSM-IV criteria for the diagnosis of adults with ADHD.
- These limitations of the DSM-IV criteria for adults with ADHD include:
  - Type of symptoms required;
  - Number of symptoms required;
  - Age of onset requirement;
  - Settings in which symptoms may be evident;
  - How impairment is measured.
- Some of these limitations will be addressed in the DSM-V.
- Differential diagnosis is key and requires careful assessment of:
  - History of symptoms;
  - Onset in childhood;
  - Constant versus episodic course;
  - Affective components.
- Comorbidities need to be identified and treated.

**SUMMARY** ADHD is increasingly being diagnosed in adulthood. The current criteria for diagnosis of ADHD (DSM-IV) have been developed and validated for children and are inappropriate for adults. However, since DSM-IV criteria are currently the main recognized diagnostic criteria in use, clinicians are left with little alternative. This review explores the issues that complicate the diagnosis of ADHD in adulthood. It outlines the limitations of the DSM-IV regarding the diagnosis of ADHD in adults, describes how DSM-V proposes to address some of these limitations and discusses the challenges of differential diagnosis and comorbidity. Suggestions for dealing with these challenges and future perspective for improving the diagnostic validity of ADHD in adults are provided.

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ADHD is a disorder with a childhood onset. However, symptoms often persist into adolescence and adulthood [1], with approximately 4% of the adult population worldwide meeting ADHD diagnostic criteria [2,3]. In adulthood, ADHD is associated with poor functional outcomes, including lower rates of professional employment, more frequent job changes and more difficulties at work, lower socioeconomic status, higher rates of separation and divorce, more traffic violations and accidents, more convictions and incarcerations, more risky sexual behavior and unwanted pregnancies and higher rates of psychiatric comorbidity [4–12]. The poor functional outcomes underscore the importance of the identification and treatment of adults with ADHD. However, the diagnosis of ADHD in adulthood is complicated by a number of factors. The DSM-IV criteria were derived from field trials of children and adolescents (aged 4–17 years) with ADHD and are thus not appropriate for adults [13]. In addition, symptom presentation changes from childhood to adulthood [14,15], and the rates of comorbidity tend to increase with age, reaching the lifetime prevalence of 65–89% in adults with ADHD [16]. These factors further complicate the diagnosis. Furthermore, the necessity for retrospective evaluation, given the requirement of symptom onset in childhood, further adds to the problem of diagnosing ADHD in adults. This review explores the current diagnostic criteria for ADHD in adults as per DSM-IV, points out the limitations to these criteria, reviews the DSM-V proposals and attempts to outline some of the challenges in making this diagnosis in adults. Suggestions for dealing with some of these challenges are also addressed.

## Current criteria (DSM-IV) for diagnosing ADHD in adults

The DSM-IV criteria for the diagnosis of ADHD are given in **Box 1** [17]. The diagnosis requires that criteria A, B, C, D and E be met. If the criteria are met for six out of nine inattention symptoms (criterion A), a diagnosis of the predominantly inattentive subtype is given. If six out of nine hyperactive–impulsive symptoms are present, predominantly hyperactive–impulsive subtype is diagnosed. If the criteria are met for both the inattentive and the hyperactive–impulsive subtypes, the diagnosis of ADHD combined subtype is given. For individuals (especially adolescents and adults) who currently have symptoms that no longer meet full criteria, 'in partial remission' is specified.

## Limitations of the DSM-IV criteria for diagnosing ADHD in adults

The use of DSM-IV criteria in diagnosing ADHD in adults has a number of significant limitations, which are outlined in the sections below.

### ■ Symptoms listed in DSM-IV are not appropriate for adults

The current diagnostic criteria have never been validated in adults, yet are required by the DSM-IV to be used in diagnosing adult ADHD. The DSM criteria were derived from the field trials of children and adolescents with ADHD [18]. Therefore, when used in their current form, some symptoms are inappropriate for adults (e.g., 'has difficulty playing quietly') [19].

#### Developmental course of ADHD symptoms

The DSM does not adequately highlight the fact that clinical and symptom profiles change with age [20,21]. ADHD symptoms are not stable across time [13–15]; impulsivity and hyperactivity decline, while the symptoms of inattention become more prominent in adulthood due to increasing task demands. This evolution in symptom presentation is not addressed in sufficient detail in the DSM-IV.

Furthermore, a number of symptoms that are not currently included in the DSM have been proposed to be typical of adults with ADHD and found to be highly predictive of the adult ADHD diagnosis [22–24] and impairments in occupational function [25,26]. These symptoms include difficulties with planning, organization and self-regulation and have been collectively described as deficits in executive functioning [22–24]. It has been suggested that these symptoms be included as DSM criteria for adults given their predictive value [24]. It is important to note, however, that 'executive function' symptoms measured via self-report do not necessarily reflect neuropsychological executive function deficits; in fact, the two have been found to be largely nonoverlapping [27,28]. The specific construct measured by the self-reported 'executive function' deficit symptom cluster remains to be elucidated. Furthermore, such deficits may not be specific to ADHD.

Emotional impulsiveness is another symptom domain not currently included in the DSM that was reported by Barkley *et al.* to be associated with persistence of ADHD into adulthood and

**Box 1. DSM-IV criteria for the diagnosis of ADHD.**

A. Either (1) or (2):

- (1) Six (or more) of the following symptoms of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:
  - Inattention:
  - a) Often fails to give close attention to details or makes careless mistakes in schoolwork, work or other activities
  - b) Often has difficulty sustaining attention in tasks or play activities
  - c) Often does not seem to listen when spoken to directly
  - d) Often does not follow through on instructions and fails to finish schoolwork, chores or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
  - e) Often has difficulty organizing tasks and activities
  - f) Often avoids, dislikes or is reluctant to engage in tasks that require sustained mental effort (e.g., schoolwork or homework)
  - g) Often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books or tools)
  - h) Is easily distracted by extraneous stimuli
  - i) Is forgetful in daily activities
- (2) Six (or more) of the following symptoms of hyperactivity–impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:
  - Hyperactivity:
  - a) Often fidgets with hands or feet or squirms in seat
  - b) Often leaves seat in classroom or in other situations in which remaining seated is expected
  - c) Often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
  - d) Often has difficulty playing or engaging in leisure activities quietly
  - e) Is 'on the go' or often acts as if 'driven by a motor'
  - f) Often talks excessively
  - Impulsivity:
  - g) Often blurts out answers before questions have been completed
  - h) Often has difficulty awaiting turn
  - i) Often interrupts or intrudes on others (e.g., butts into conversations or games)

B. Some hyperactive–impulsive or inattentive symptoms that caused impairment were present before 7 years of age

C. Some impairment from the symptoms is present in two or more settings (e.g., at school [or work] and at home)

D. There must be clear evidence of clinically significant impairment in social, academic or occupational functioning

E. The symptoms do not occur exclusively during the course of a pervasive developmental disorder, schizophrenia or other psychotic disorder, and are not better accounted for by another mental disorder (e.g., mood disorder, anxiety disorder, dissociative disorder or a personality disorder)

Adapted from [17].

to predict the degree of functional impairment [29]. However, the persistent cases of ADHD in that study were identified using looser diagnostic criteria than those in the DSM-IV (see [30]). Further, emotional impulsiveness might not be specific to ADHD, as it can be observed in other conditions, such as bipolar disorder, borderline personality disorder, conduct/antisocial personality disorder and substance abuse; the latter two disorders were prevalent in the persistent ADHD cases in the Barkley *et al.* study, but were not controlled for statistically. In summary, self-reported executive function deficits and emotional impulsiveness are promising new symptom domains that may prove useful for identifying ADHD in adults. Although it is premature to consider these symptom clusters as diagnostic criteria, further research on them would be an important step towards developing criteria that are sensitive to the phenomenology of symptom presentation across the lifespan.

### Number of symptoms required

Six out of nine symptoms of inattention and/or six out of nine symptoms of hyperactivity/impulsivity are required for a diagnosis of ADHD as per the current criteria. It has been suggested that this requirement, while appropriate for childhood diagnosis, is too stringent for adults. Murphy and Barkley reported that only adults scoring 2.5–3 standard deviations above the community sample's mean (i.e., in the 99th percentile) surpassed the threshold of six out of nine symptoms [30]. Yet the accepted statistical threshold for clinical

deviance used in research on childhood psychiatric disorders [31], and ADHD in particular [30], is 1.5 standard deviations above the mean (~93rd percentile). It was therefore argued that the diagnostic threshold for ADHD is not developmentally referenced, considering that it appears to shift from 93rd percentile in childhood to the 99th in adulthood. Developmentally referenced criteria (e.g., for IQ) ensure that an individual is defined as having a disorder as long as they hold their relatively deviant position in a distribution across development. It was thereby proposed that decreasing the number of symptoms required to diagnose (to between three and five) would make the criteria developmentally referenced, putting the diagnosed adults at ≥1.5 standard deviations above the mean.

## ■ Age of onset

The age of onset criterion (onset of symptoms before or at 7 years of age) is difficult for adults to meet, since many do not recall their functioning before 7 [32], and parent retrospective recall has limited accuracy and may not be available. Furthermore, this required age of onset is not based on empirical evidence [18,101] and was brought into DSM based on committee consensus. There are currently no data supporting its validity.

This criterion is therefore questioned by clinicians and researchers alike, and suggestions have been made to change the age of onset to 12 or 14 years [33]. Although this new age of onset appears equally arbitrary [33], the proposals for an older age of onset find support in the following evidence. Applegate *et al.* noted that a number of children included in the DSM-IV field trial did not report onset of symptoms before 7 years of age, yet manifested symptoms substantial enough for a diagnosis of ADHD by 14 years of age [32]. Hence, Applegate *et al.* suggested that the requirement of age of onset at 7 years of age reduces the interjudge reliability of the diagnosis. Furthermore, children with onset before or at 7 years of age were found to resemble those with onset after 7 years of age in terms of neurocognitive function, comorbidity, personality traits and impairment [34]. In fact, Faraone *et al.* recently suggested that the late-onset subgroup is representative of ADHD due to a similar pattern of functional impairment, comorbidity and familial transmission [35], and that the impairments of these late-onset patients require treatment [36]. However, this evidence is insufficient for determining the specific age of onset criterion that is appropriate for the diagnosis. A valid and reasonable age of onset would need to be determined empirically through field trials.

### Retrospective recall of childhood information

Retrospective diagnosis of childhood ADHD is often attempted using diagnostic interviews relying on the patient's recall of childhood information. These strategies may not be appropriate considering that diagnostic interviews for children with ADHD were never meant to be used with adults, albeit in slightly modified or adapted forms [19], and that retrospective diagnosis may be biased or unreliable. Furthermore, adults may have limited recall of their childhood symptoms [19,22]. As most adults visit the clinics alone, the information they provide may not be substantiated by parents or close others who knew them in childhood. Problems with retrospective recall add to the controversy of the age of onset criterion and argue in favor of extending it to preadolescence or adolescence [19,34].

## ■ Symptoms required in at least two settings

The DSM-IV criteria have been criticized for requiring evidence of impairment in two or more settings, for example school (work) and home. Although the DSM-IV allows a substitution of school for work in the case of adults, it does not reference the full range of adult impairments, such as marital/relationship issues, parenting practices, driving, money management, legal issues, organization and time management [19]. Further, adults with ADHD may adopt lifestyles that minimize impairment by avoiding certain domains (e.g., no longer attending school) [19]. It has therefore been argued that strict adherence to the requirement of impairment in multiple settings could preclude the diagnosis and treatment of adults who experience significant difficulties in an important area of their lives. However, given that there is a wide range of settings in which adults with ADHD could show impairments (listed above), requiring significant impairment in only one setting (e.g., motor vehicle operation) might be overly inclusive and not sufficiently specific for ADHD diagnosis.

## ■ Impairment

The term 'impairment' has not been adequately defined in the DSM-IV [37] and needs to be defined with more precision in the DSM-V [19]. Impairment can be interpreted variably by

clinicians. Some may define it based on deficits in functioning relative to one's intellectual level, while others may define it based on deficits relative to the individual's specific peer group. Still others have argued that impairment constitutes a major dysfunction in performance of major life activities required by society (e.g., family, social or occupational functioning) [19]. In addition, DSM-IV neither provides a description of specific impairments typical of adults with ADHD nor distinguishes between different domains of impairment (e.g., work, marriage, time management and money management) that are important for informing treatment. Since impairment in adult ADHD is poorly defined in DSM-IV, it is difficult to gauge, which presents a limitation to the diagnosis. Given the current recognition in the field of the diagnostic importance of impairment over and above symptom count [19], a consensus regarding the definition of impairment is critical.

## Addressing limitations via proposed revisions to DSM

DSM-V proposes to address several of the limitations of DSM-IV in assessing for ADHD in adulthood. First, subtypes of ADHD (i.e., predominately inattentive, predominately hyperactive–impulsive and combined) will be retained, as they remain relevant in adulthood even if rates of each subtype tend to change over the course of development (i.e., with hyperactivity decreasing and inattention maintained or becoming more evident). However, 'subtype' will be termed 'current presentation'. The list of possible presentations will include combined presentation, predominately inattentive presentation, predominately hyperactive/impulsive presentation and the new inattentive presentation (restrictive). This last presentation describes those who meet criterion A1 (inattention), but two or fewer symptoms in criterion A2 (hyperactivity; see **Box 1**) – a presentation that is commonly observed in adolescents and adults.

Second, the wording of some symptoms will be changed in DSM-V. For example, within the hyperactive/impulsive subtype, the criterion regarding having trouble waiting for one's turn will be changed to "is often impatient, as shown by feeling restless when waiting for others and wanting to move faster than others, wanting people to get to the point, speeding while driving and cutting into traffic to go faster than others."

Additional proposed criteria include:

- "Tending to act without thinking, such as starting tasks without adequate preparation or avoiding reading or listening to instructions. [The individual] may speak out without considering consequences or make important decisions on the spur of the moment, such as impulsively buying items, suddenly quitting a job, or breaking up with a friend."
- "Being uncomfortable doing things slowly and systematically and often rushing through activities or tasks."
- "Finding it difficult to resist temptations or opportunities, even if it means taking risks" [101].

Additional examples of criteria as they manifest in adulthood will also be offered in DSM-V. For example, regarding the third bullet point given above, whereas "a child may grab toys off a store shelf or play with dangerous objects, adults may commit to a relationship after only a brief acquaintance or take a job or enter into a business arrangement without doing due diligence" [101].

Third, to bring symptom cut-offs to the 1.5 standard deviations above the mean for adults, only four symptoms will be required to arrive at a diagnosis for older adolescents and adults (aged 17 years and older) using DSM-V. Finally, the age of onset criterion would change to symptoms having been present by 12 years of age, rather than before 7 years of age. This is especially helpful in the diagnosis of adults without corroborating sources (e.g., parents) because recall of specific symptoms earlier in childhood is generally poor.

## Addressing the remaining challenges in clinical practice

Although the proposals of DSM-V address some important limitations of DSM-IV, a number of limitations and diagnostic challenges remain. Clinicians can tackle the lingering challenges of diagnostic accuracy and comprehensiveness by adhering to the guidelines of the American Academy of Pediatrics Committee on Quality Improvement, Subcommittee on Attention-Deficit/Hyperactivity Disorder in 2000, which are still relevant today. According to these guidelines, assessing for ADHD should include "1) using standard (DSM-IV) diagnostic criteria, 2) documenting core ADHD symptoms in various settings and functional impairment and

3) evaluating differential diagnosis and/or associated conditions" [38]. Moreover, evidence-based assessment of ADHD requires that multiple informants and a variety of assessment methods are used [38]. Below, we provide recommendations for addressing a number of the remaining diagnostic challenges in clinical practice.

## ■ Self-report

Collecting past and current data regarding symptom presentation from self-report has its limitations. Patients sometimes have difficulty maintaining objectivity regarding their symptomatic presentation or the level of impairment they experience; under-reporting of one's own symptoms is common, as longstanding symptoms are often ego syntonic. Generally, the accuracy of reported symptoms increases with age and may be more accurate in adulthood than in childhood, adolescence or early adulthood [22,39]. Certainly, one's personal experience of symptoms is integral to the diagnostic process, but other-report is helpful as corroborating evidence. Such evidence can include information from spouses and significant others, past performance reports at school and performance reports from work. These sources are crucial for children, adolescents and younger adults and somewhat less so for older adults.

## ■ Differential diagnosis

Differentiating ADHD from other psychiatric conditions such as mood, anxiety, substance abuse and personality disorders, as well as learning disabilities, is essential to properly inform subsequent treatment. ADHD and these other disorders share several common attributes, most notably difficulty concentrating is a hallmark sign of ADHD, anxiety and depression. However, anxiety and depression tend to be episodic and have a strong affective component. ADHD is not episodic and is not persistently characterized by depressive and anxiety symptoms. Given that ADHD often co-occurs with depression and anxiety, it needs to be established that attention difficulties are not present exclusively during the course of a mood or an anxiety disorder in order for ADHD to be diagnosed.

Likewise, ADHD can confound assessment of learning disabilities, as encoding difficulties [40] and certain types of memory problems [41] are found in both. However, the inattention seen in ADHD is often present over and above these learning disabilities. Impulsivity, a hallmark sign of ADHD, is also characteristic of certain personality disorders, such as borderline personality disorder. A careful, thorough history, which documents symptom onset and characterizes symptom presentation and impairment, accompanied by a physical examination to rule out physical conditions that could mimic ADHD symptoms (e.g. hyper- and hypo-thyroidism, hypoglycemia, and sensory deficits), will often reveal physical and psychiatric conditions that may better explain symptoms than ADHD.

## ■ Comorbidity

Comorbid disorders are disorders that co-occur with ADHD; they are either causally related or independent and coexisting with ADHD. A total of 65–89% of adults with ADHD meet criteria for at least one comorbid condition during their lifetime [16]. Comorbidity presents an obstacle to the accurate diagnosis of ADHD in adults and must be evaluated concurrently with ADHD. Furthermore, the presence of comorbidities leads to poorer outcomes in adults with ADHD, with greater social, emotional and psychological difficulties [16]. It is therefore crucial to determine if comorbid conditions are present so that not only the ADHD but also the comorbid conditions can be treated. Adult ADHD has been found to be particularly comorbid with mood, anxiety, substance use and personality disorders. Proposed explanations for this comorbidity include shared genetic risk and increased psychopathology secondary to the social, academic and occupational impairment experienced by those with ADHD [42].

Whatever the origin, disorders that are comorbid with ADHD may be difficult to distinguish due to overlapping symptoms [42]. DSM-IV does not adequately highlight the differences between independent ADHD symptoms and similar symptoms in other disorders, and does not shed light on how ADHD symptoms may manifest when co-occurring with other disorders [19]. DSM-V shares this limitation.

Furthermore, ADHD subtypes and associated comorbid disorders change over time and by developmental stage. Given the limitations of the DSM, it is up to the trained clinician to conduct systematic differential diagnoses and/or determinations of comorbidity, if for no other reason than to properly – and ethically – inform treatment recommendations. For example, doing one's best to tease apart ADHD and anxiety is

necessary, as cognitive–behavioral therapy is an empirically validated treatment for anxiety and a promising treatment for ADHD in adults, but cognitive–behavioral therapy is tailored specifically according to the presenting issue, necessitating clarity of diagnosis. Stimulant medications, which are often recommended for individuals with ADHD, need to be used with caution for individuals with anxiety as they can exacerbate feelings of nervousness. Generally, when treating comorbid conditions, it is recommended that the most disabling condition be treated first with the most effective treatment available. Then, the second condition should be treated with the most effective treatment for this second condition, and so on. In summary,

**Table 1. A selection of ADHD and comorbidity rating scales for adults.**

| Scale; author (year) | Description | Format | Psychometric properties | Ref. |
|---|---|---|---|---|
| Wender Utah Rating Scale (WURS); Wender (1995) | ▪ Self-report scale for adults to make retrospective diagnosis of ADHD in childhood based on the Utah criteria<br>▪ Patients asked about their symptoms at the age of 8–10 years<br>▪ Contains questions pertaining to inattention, hyperactivity, impulsivity, emotional dysregulation and conduct problems | ▪ Long version: 61 items<br>▪ Short version: 25 items<br>▪ Items scored 0–4<br>▪ Time to administer: 10–20 min<br>▪ Available in English, Spanish, Italian and German | ▪ American and German version validated on national samples of patients and on controls<br>▪ Cut-off 1.5 SD above the mean or 30 points on 61-item version<br>▪ Established internal consistency, reliability and validity | [46] |
| Conners' Adult ADHD Rating Scales (CAARS); Conners (1996) | ▪ Self-report scale assessing current symptoms of inattention, hyperactivity, impulsivity, emotional lability and problems with self concept in adults (aged 18 years and older)<br>▪ Focuses of the DSM-IV criteria<br>▪ Self-, observer- and investigator-report forms available | ▪ Long version: 66 items<br>▪ Short screening version: 18 items<br>▪ Items scored 0–3<br>▪ Time to administer: 10–15 min<br>▪ Available in English and German | ▪ Gender and age norms available<br>▪ Established internal consistency, test–retest reliability, concurrent and criterion validity | [47] |
| WHO Adult ADHD Self-Report Scale (ASRS); Adler *et al.* (2003) and Kessler *et al.* (2005) | ▪ Self-report scale for adults assessing current DSM-IV symptoms of ADHD<br>▪ Focus on symptoms, impairments and history | ▪ Full-length version: 18 items representing the DSM-IV criteria<br>▪ Screener: six items (four inattention and two hyperactivity)<br>▪ Items scored 0–4<br>▪ Time to administer: ~5 min<br>▪ Available in a number of languages (e.g., Spanish, Chinese, French and German) | ▪ Established internal consistency, convergent validity, inter-rater reliability<br>▪ Cut-off based on DSM-IV rules; four items positive for screener<br>▪ Screener outperforms the full-length versions in terms of sensitivity, specificity and classification accuracy | [48,49] |
| Barkley Current Symptoms Scale (CSS); Barkley and Murphy (1998) | ▪ Self-report scale for adults assessing current DSM-IV symptoms of ADHD<br>▪ Self- and other-report forms available<br>▪ Requires patients to report the age of onset for ADHD symptoms and how often symptoms interfere with school, relationships, work and home | ▪ 18 items representing the DSM-IV criteria<br>▪ Additional ten items for impairment<br>▪ Items scored 0–3<br>▪ Time to administer: ~15 min<br>▪ Available in English and German | ▪ Gender- and age-specific norms available<br>▪ Cut-off 1.5 SD above the mean | [50] |
| Childhood Symptoms Scale (ChSS); Barkley and Murphy (1998) | ▪ Self-report scale for adults assessing childhood DSM-IV symptoms of ADHD retrospectively<br>▪ Also includes items addressing functional disabilities (eight items), ODD (eight items) and CD (15 items) | ▪ 18 items representing the DSM-IV criteria<br>▪ Additional items assessing functional disabilities (eight), ODD (eight) and CD (15)<br>▪ Items scored 0–3<br>▪ Time to administer: ~15 min<br>▪ Available in English and German | ▪ Gender- and age-specific norms available<br>▪ Cut-off 1.5 SD above the mean | [50] |

CD: Conduct disorder; ODD: Oppositional defiant disorder; SD: Standard deviation.

**Table 1. A selection of ADHD and comorbidity rating scales for adults (cont.).**

| Scale; author (year) | Description | Format | Psychometric properties | Ref. |
|---|---|---|---|---|
| The Brown ADD Rating Scale (Brown-RS); Brown (1996) | ▪ Clinician-rated or self-report scale for children, adolescents and adults focusing on current symptoms of inattention<br>▪ Does not assess hyperactivity or impulsivity<br>▪ Also taps into aspects of executive functioning associated with ADHD such as working memory, organizing work, sustenance of energy and effort and managing affective interference | ▪ 40 items<br>▪ Items scored 0–3<br>▪ Time to administer: ~15 min<br>▪ Available in English and German | ▪ Different population norms and t-norms<br>▪ Established internal consistency<br>▪ Good specificity, but poor sensitivity | [51] |
| ADHD Rating Scale IV (ADHD-RS-IV); DuPaul *et al.* (1998) | ▪ Informant-rated scale originally designed for children and adolescents focusing of DSM-IV criteria<br>▪ Has been used in adults, especially in pharmacological trials | ▪ 18 items assessing DSM-IV symptoms<br>▪ Items scored 0–3<br>▪ Time to administer: ~8 min<br>▪ Available in English and Spanish | ▪ Age- and gender-specific norms for children and adolescents<br>▪ Cut-off based on DSM-IV rules | [52] |
| Weiss Symptom Record (WSR) | ▪ Self- and informant-rated scale that screens for symptoms of various disorders, including ADHD, behavioral, learning, developmental, mood and anxiety disorders, psychotic symptoms and substance abuse, among others, based on DSM-IV criteria | ▪ 140 items<br>▪ Items scored 0–3<br>▪ Time to administer: ~60 min | ▪ Psychometric evaluation and validation in progress<br>▪ Cut-offs based on DSM-IV criteria | [102] |
| Weiss Functional Impairment Rating Scale (WFIRS) | ▪ Evaluates the degree to which the behavior and emotional problems of an individual with ADHD have impacted various clinically relevant domains of functioning | ▪ 69 items<br>▪ Items scored 0–3<br>▪ Time to administer: ~30 min | ▪ Psychometric properties have been evaluated, but the data are not yet published<br>▪ Scores of 2–3 SD outside the clinical norms for ADHD, indicating impairment | [102] |

CD: Conduct disorder; ODD: Oppositional defiant disorder; SD: Standard deviation.

identifying and treating comorbid conditions as well as ADHD is crucial to improve patients' condition and functioning.

## Conclusion

A number of limitations have been noted in the current criteria for diagnosing ADHD in adults. A diagnosis made purely on the basis of the currently available diagnostic criteria may not be appropriate. As more knowledge is being accumulated about ADHD presentation in adults, it is evident that the existing criteria need modification. Ideally, field trials should be carried out with adults with ADHD to determine appropriate and valid diagnostic criteria for adults, including the specific symptoms to be included, the number of symptoms required and the appropriate age of onset.

Even though the DSM-V addresses some of the limitations of the DSM-IV via increasing the age of onset to 12 years, contextualizing the criteria to make them more suited to adults, including four new criteria for impulsivity and reducing the number of required symptoms to four for adolescents and adults, other challenges remain. These include problems with self-report, diagnostic heterogeneity, assessment of impairment and difficulties with differential diagnosis and comorbidity.

Clinicians can use the available guidelines, some of which address ADHD diagnosis in adulthood [102], to help them carry out a comprehensive diagnostic assessment. Multiple sources of information and various structured interviews and rating scales **(Tables 1 & 2)**, which focus on a careful history of all symptoms, their onset and development and accompanying impairment, are useful in making the diagnosis of ADHD and its comorbidities. Only such comprehensive evaluation will lead to adequate treatment

of adults with ADHD and ensure their improved functioning.

## Future perspective

In addition to being dealt with through best available clinical practices, some remaining challenges will need to be resolved through future research. Although the continuing reliance of the diagnostic process almost exclusively on self-report can be in part addressed through the use of collaborative input, ideally this limitation will eventually be addressed by having an objective test for ADHD. For example, it may be possible to develop an executive functions battery that reliably distinguishes between adults with ADHD and controls. Such a battery could be used as an adjunct diagnostic tool by clinicians. However, no such battery currently exists. Although a number of neurocognitive tests, most notably those of inhibition and working memory, have been found to produce reliable differences in scores between ADHD patients and controls [43,44], these tests are only able to classify a minority of cases as having ADHD [45]. Our group is currently attempting to develop a battery of neurocognitive tests that would reliably distinguish adults with ADHD from healthy controls. As the field's understanding of the neural basis of ADHD advances, it may also eventually become possible to use neuroimaging methodologies, such as functional MRI, to help diagnose ADHD. However, at present, the field is far from being able to make diagnostic use of these methodologies.

Another lingering challenge to be addressed by future research is the considerable heterogeneity

**Table 2. Selection of diagnostic interviews for adult ADHD.**

| Scale; author (year) | Description | Format | Psychometric properties | Ref. |
|---|---|---|---|---|
| Wender–Reimherr Interview (WRI); Wender (1995) | ▪ Assesses the severity of ADHD symptoms in adults according to the Utah criteria<br>▪ Contains only items pertaining to adult symptoms<br>▪ Seven symptom domains: attention difficulties, hyperactivity or restlessness, temper, affective lability, emotional over-reactivity, disorganization and impulsivity | ▪ 28 items<br>▪ Time to administer: 30 min<br>▪ Available in English and German | ▪ American and German versions factor structure on national samples<br>▪ Cut-off based on the Utah criteria<br>▪ Different aspects of reliability and validity established | [46] |
| Conners' Adult ADHD Diagnostic Interview for DSM-IV (CAADID) Parts 1 and 2; Epstein *et al.* (2001) | ▪ Part 1 assesses risk factors and school, family, occupational, psychiatric and interpersonal history<br>▪ Part 2 assesses DSM-IV symptoms of ADHD in adulthood and in childhood, as well as age of onset, impairment and pervasiveness | ▪ History and 18 DSM-IV symptom items<br>▪ Time to administer: 90 min for each part<br>▪ Available in English and German | ▪ No published psychometric data or norms<br>▪ Cut-off based on DSM-IV rules and degree of impairment | [53] |
| Adult Interview – Barkley and Murphy; Barkley and Murphy (1998) | ▪ Evaluates childhood and current DSM-IV ADHD symptoms in adults, as well as social functioning, ODD, CD and ASPD symptoms, history and mood disorder comorbidity | ▪ 18 DSM-IV items<br>▪ Ten social functioning and 16 ODD, CD, ASPD, history and mood disorder items<br>▪ Time to administer: ~90 min<br>▪ Available in English and German | ▪ No published psychometric data or norms<br>▪ Cut-off based on DSM-IV rules and degree of functional impairment | [50] |
| Brown ADD Scale Diagnostic Form; Brown (1996) | ▪ Multirater instrument assessing DSM-IV ADHD symptoms and impact of symptoms on work, school, leisure, peer relationships and self image; also assesses family history, health, sleep, comorbidity and IQ | ▪ 18 DSM-IV items, plus additional items assessing family history and health, for example<br>▪ Time to administer: ~90 min<br>▪ Available in English | ▪ Population norms available<br>▪ Cut-off based on DSM-IV rules, as well as psychopathological and function scores | [51] |

ASPD: Antisocial personality disorder; CD: Conduct disorder; ODD: Oppositional defiant disorder.

of the ADHD diagnosis, which may become even more apparent as DSM-V lowers the diagnostic threshold from six to four symptoms, includes additional criteria for adults, and introduces another subtype or presentation. While these measures might render the diagnostic criteria better suited to adults, they may add variability to an already heterogeneous presentation, such that different people sharing the diagnosis (even with the same subtype) may have no symptoms in common. This increased heterogeneity may also result in a diminished diagnostic agreement among clinicians, which would threaten the validity of the diagnosis. Field trials in adults are urgently needed to establish appropriate and valid diagnostic criteria empirically.

Likewise, although the age of onset criterion has been modified, it remains arbitrary and unsupported empirically. It is necessary to establish a valid age of onset criterion through field trials.

Finally, the proposals for DSM-V do not address the lack of a definition of impairment in the DSM. Yet given the lower diagnostic threshold combined with inclusion of additional criteria, a consensus regarding what impairment signifies is even more crucial. Given the substantial heterogeneity of the adult ADHD diagnosis that is likely to result from these proposed modifications, continuing to also allow for a significant heterogeneity in the definition of impairment might make the diagnosis unreliable. The field needs to arrive at a reasonable consensus as to what constitutes impairment, which would be used consistently in making this diagnosis.

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- ▪▪ of considerable interest

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