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Changes in the Definition of ADHD in DSM-5: Subtle but Important

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While there were earlier descriptions of children with high levels of activity and impulsivity [1], what is now called Attention-Deficit/Hyperactivity Disorder (ADHD) first appeared in the second edition of the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders in 1968 [2]. In *DSM-II*, the disorder was termed Hyperkinetic Reaction of Childhood, which as the name implies focused primarily on symptoms of excessive motor activity. With the publication of the *DSM-III* [3] in 1980, the disorder was markedly re-conceptualized with a focus on problems with attention, impulsivity and hyperactivity, and was renamed Attention Deficit Disorder (with and without Hyperactivity). The term Attention Deficit/Hyperactivity Disorder (ADHD) was introduced in *DSM-III-R* [4], with the controversial elimination of ADD without Hyperactivity. With the publication of the *DSM-IV* [5], the term ADHD was retained along with the introduction of three specific subtypes (predominantly Inattentive, predominantly Hyperactive-Impulsive, and Combined), defined by the presence of excessive symptoms of inattention and/or hyperactivity-impulsivity.

The recent release of *DSM-5* [6] is the latest update to ADHD nosology. The *DSM-5* revisions include modifications to each of the ADHD diagnostic criteria (A-E), a terminological change in the ADHD subtype nosology, and the addition of two ADHD modifiers. Criterion A (ADHD symptoms) are unchanged from *DSM-IV* except for additional examples of how symptoms may manifest in adolescence and adulthood, and a reduction from six to five in the minimum number of symptoms in either symptom domain required for older adolescents and adults. Criterion B (age of onset) changed from *onset of symptoms and impairments* before age 7 to *onset of symptoms* before age 12. Criterion C (pervasiveness) was changed from *evidence of impairment* to *evidence of symptoms* in two or more settings. Criterion D (impairment) now requires that functional impairments only need to “reduce the quality of social, academic or occupational functioning” instead of requiring that they be “clinically significant.” Criterion E (exclusionary conditions) no longer includes Autism Spectrum Disorder as an exclusionary diagnosis. Regarding nosology, the *DSM-IV* ADHD “types” are now referred to as “presentations.” Finally, modifiers were added so that the severity of the disorder (i.e., mild, moderate, or severe) can be specified and the disorder can be coded as “in partial remission” if full diagnostic criteria are not currently met.

Overall, the revisions to ADHD in *DSM-5* are less dramatic than updates to earlier DSMs. Importantly, the *DSM-5* ADHD and Disruptive Behavior Disorders Workgroup decided

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neither to modify the core ADHD symptom domains (i.e., Inattention and Hyperactivity/Impulsivity) nor to revise the 18 core symptoms, aside from adding example behaviors to better define some of the symptoms for older adolescents and adults. The retention of the ADHD symptom domains and 18 core symptoms likely reflects a judgment that the *DSM-IV* definition of ADHD has largely withstood the test of time. *DSM-IV* ADHD criteria have proven to be quite effective at reliably identifying a population of individuals who have significant impairments across a wide range of outcomes (e.g., academic, interpersonal, occupational, personal, substance use, driving, etc. [7, 8]). Moreover, individuals identified by *DSM-IV* ADHD criteria appear to have distinct neuropsychological profiles [9, 10] identifiable neurobiological signatures (e.g., abnormalities in frontal-striatal circuitry [11, 12]) and unique genetic correlates [13]. By retaining a similar ADHD phenotype as defined in *DSM-IV*, the *DSM-5* workgroup ensured that the voluminous body of *DSM-IV* defined ADHD research accumulated over the past 2 decades will largely generalize to the new, yet highly similar, *DSM-5* ADHD phenotype.

Although more subtle than changes in prior DSMs, the changes to ADHD in *DSM-5* are important and reflect our increased knowledge about the nature of ADHD. In particular, it has become increasingly evident that the *DSM-IV* symptom domain thresholds (i.e., 6 of 9 symptoms per symptom domain), while appropriate for young children, are not effective for identifying adolescents and adults experiencing ADHD-related impairment. Prior to *DSM-5*, some researchers used lower symptom thresholds to define adolescent and/or adult ADHD samples (e.g., [14]), in discord with *DSM-IV*; many clinicians did likewise or relied on the poorly-defined ADHD Not Otherwise Specified. Research suggests that a lower symptom number threshold more accurately identifies those 17 and older who experience impairments warranting intervention [15].

Similarly, research has shown no meaningful differences in functioning, response to treatment, or outcomes in individuals who display ADHD symptoms prior to age 7 versus those who first display symptoms at an older age [16]. Both research and clinical experience indicates some ADHD patient groups (e.g., those with high intelligence, with predominantly inattentive symptoms, or in a highly structured environment) may not experience significant impairment until expectations for self-management increase in late elementary or middle school. For those individuals whose ADHD is not identified until adulthood, they often have difficulty recalling at what age they first experienced impairments, as the inherent memory problems often associated with ADHD make recall of childhood details difficult. The change to an age of onset of 12, while albeit still rather arbitrary, may reduce some of these diagnostic issues.

The change in nomenclature from “subtypes” in *DSM-IV* to “presentations” in *DSM-5* reflects increasing evidence that symptoms are often fluid within individuals across their lifespan rather than stable traits. *DSM-IV* ADHD subtypes change across development due to the heterotypic continuity of symptom trajectories over time. For example, since inattention is relatively stable across development while hyperactivity/impulsivity often wane with age, many children diagnosed with ADHD, Combined eventually transition to ADHD, Predominantly Inattentive [17]. The “presentation” terminology better reflects that the symptom profile represents the person’s current symptomatology, which may change over time. The “type” terminology implied more stable, trait-like characteristics. Finally, modifying Criteria E to allow a diagnosis of ADHD comorbid with ASD is consistent with research indicating that children with ASD can also have ADHD [18].

Besides aligning the ADHD criteria with the current state of knowledge, the modifications in *DSM-5* have the potential to make the ADHD diagnosis more reliable. In particular, the switch from requiring evidence of impairing symptoms to just symptoms for both the

pervasiveness and age of onset criteria likely improves their reliability. Symptoms tend to be more easily quantified and observed. There are numerous established measures of ADHD symptoms, whereas impairments tend to be more qualitative and subjective for which we have fewer reliable measures. However, since ADHD symptoms can exist in the absence of impairment, whereas impairments in the absence of symptoms are unlikely, focusing on symptoms without impairments may increase the number of children who meet both age of onset and pervasiveness criteria. In addition, the modification of the definition of impairment from “significant” to “interfere with, reduce the quality of...” is also a more liberal and more inclusive requirement. So, while the new *DSM-5* ADHD criteria may result in a more reliable set of criteria, ADHD prevalence rates may increase.

A couple of issues were unfortunately not addressed in the revisions to ADHD in *DSM-5*. First, there is an increasing, if not universal, acceptance that ADHD, like many psychopathologies, is a dimensional disorder [19]. That is, inattention and hyperactivity/impulsivity are behavioral traits that naturally occur on a continuum, much like intelligence. In this view, diagnostic thresholds used to define “abnormal behavior” are artificial, though useful in identifying individuals who experience significant impairment in their daily functioning. *DSM-5* continues to place everyone meeting diagnostic criteria into a single category which doesn’t capture the dimensionality of underlying constructs. While *DSM-5* does allow for a severity classification (mild, moderate, or severe), these can be applied based on either number of symptoms or magnitude of impairment. Given that both symptom counts and functional impairment can, and often do, vary across domains and across settings, it is likely that severity classifications will be unreliable and will vary considerably across diagnosticians. Preferably, some form of indication of level of global functioning might most accurately indicate severity of the disorder. The WHO Disability Assessment Scale (WHODAS) has been added to *DSM-5*, and is somewhat akin to indicating global functioning except it assesses the impact of the patient’s entire diagnostic profile on global functioning. Future revisions should consider other nosological devices to indicate both the dimensionality of the disorder and the impact of each specific disorder (e.g., ADHD) on overall functioning. Perhaps overall clinical global impressions [20], as used to assess severity of impairment in ADHD clinical trials, could be considered.

Finally, while some changes, as noted above, were made to make the ADHD criteria more applicable to older adolescents and adults, the *DSM-5* ADHD diagnostic structure fails to reflect established developmental trajectories. In particular, the “Predominantly Inattentive Presentation” includes both children who, at a younger age, met criteria for “Combined presentation” as well as those who have always had few, if any, Hyperactive/Impulsive symptoms. Pre-release correspondence from the Workgroup suggested that an “Inattentive Restrictive Type” was considered for children with consistently low numbers of hyperactive/impulsive symptoms. It is possible that segmenting out this sub-population of children with ADHD may have both addressed heterogeneity within the ADHD Predominantly Inattentive presentation and spurred research into whether specific symptom trajectories are associated with prognosis, neurobiological correlates, comorbidity patterns, etc. Hopefully, future revisions will reconsider such sub-classifications, or other strategies for capturing developmental changes over time.

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