the ADHD REPORT

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# Improving Clinical Diagnosis Using the Executive Functioning—Self-Regulation Theory of ADHD

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The clinical diagnostic criteria for Attention-Deficit/Hyperactivity Disorder (ADHD) have been in existence in various forms since 1968. Still, all versions have emphasized—to varying degrees—problems with inattention, hyperactivity, and impulsivity as being central to the disorder or at least to its behavioral and cognitive manifestations. Like the Diagnostic and Statistical Manual of Mental Disorders (DSM), earlier historical accounts of ADHD, under numerous labels, have primarily been description. That includes the first description of an ADHD-like condition in the medical literature over 240 years ago in a chapter on disorders of attention in the German textbook by physician Melchior Adam Weikart in 1770–75 (which Helmut Peters and I translated and commented upon in 2012). But is that the best that we can do in conceptualizing this disorder and explaining what it is in typical development that goes awry to produce it? No, I think we can do better, as I summarize below (Barkley, 2022).

One exception to this historical pattern was the series of papers published by George Still in 1902. In it, he described a conceptualization of these ADHD-related symptoms as representing a defect in the moral control of behavior. By this he meant that the mental capacity to contemplate the longer-term consequences of one's actions for the long-term welfare of oneself and others and to act in a manner consistent with them. This ability as well as the behavior seemed to be clearly defective in the children manifesting those ADHD-like symptoms. I think that Still (1902) was on to something about the nature of poorly regulated behavior and the possible mental mechanisms that may be poorly functioning to produce it. (For more detail, see the History of ADHD section of my ADHD Handbook, Barkley, 2015a). The theory of executive functioning (EF) and self-regulation (SR) set forth on this topic (Barkley, 2012a) has some similarity to Still's hypothesis about the nature of ADHD. Both involve the contemplation of hypothetical futures from which goals are formulated and behavioral plans are constructed that serve to guide behavioral performance to achieve them. Of course, that EF-SR Theory is better developed, more complex, and richer in detail than that

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provided by Still, and provides for far more insight into ADHD as a disorder of EF-SR. It also makes testable predictions about what the theory involves and how it can be used in explaining the nature of ADHD. And, more important to clinical practice, that theory shows what needs to be done to treat it.

It is not my intention here to simply describe and critique current diagnostic criteria for ADHD. Instead, I hope to show how the EF-SR Theory extended to ADHD can enrich those criteria for use in clinical practice. The official criteria now emphasize the *neurodevelopmental* origins of ADHD, which was based on the prominent and indisputable roles played by genetics (and possibly epigenetics) as well as nongenetic neurological factors in its etiology. The theory of ADHD as a disorder of SR and EF is consistent with those findings regarding how various executive networks of the brain are delayed, disrupted, and dysfunctional in their connectivity in ADHD, in part as a result of polygenic factors that underly such networks.

Advances in developing diagnostic criteria over the prior editions of the DSM have certainly resulted in more precise specification of symptoms, along with two symptom lists; an emphasis on childhood or early adolescent onset of the disorder in most cases; and a requirement for both cross-setting pervasiveness of symptoms, and evidence of impairment in one or more major life activities. Even so, numerous evidence-based recommendations were made to the committee revising the ADHD criteria for improving their rigor and diagnostic accuracy, as well as better representing what was known about the core problems inherent in the disorder. (Sadly, many of them were rejected by committees higher up in this organization, perhaps partly out of fear of significantly increasing the prevalence of the disorder.) Though the few revisions that were finally accepted are commendable improvements, they are half-measures. Moreover, these criteria can be further improved and adjusted when viewed through the lens of the EF-SR Theory, as I hope to do here. By incorporating more of the recommended revisions to the old DSM criteria and improving the sampling of EF-SR deficits in the symptom lists, clinicians could be using even more rigorous and representative criteria than the DSM-5. But first, it is necessary to provide a brief summation of the EF-SR Theory and how it applies to ADHD.

## THE EF-SR THEORY

Investigators also differ markedly in explaining what makes a mental function executive in nature, if they explain it at all, and in just how many functions fall under the meta-construct of EF. I documented at least 20 definitions (Barkley, 2012a) and one survey of leading neuropsychologists documented 33 (!) EF components—far too many to help us understand EF. But when a field has no consensus operational definition of the term, anything goes. A plurality of researchers agree that there are at least seven EFs, and those are the ones that are most often cited in research papers to date. These are:

*self-awareness,*
*inhibition,*
*nonverbal and verbal working memory,*
*emotional self-regulation,*
*self-motivation, and*
*planning/problem solving.*

To this list one could adds the capacity for the mental manipulation of information to solve problems, but I include this under *planning/problem solving*. Just what do those seven components share that makes them all EFs while other mental abilities, such as long-term memory, visuo-spatial abilities and speech/language, are not? These seven core EFs are essential, in my view, for the contemplation of a hypothetical future. Furthermore, that hypothetical future is then juxtaposed against the present which can lead to the formation of a goal and behavioral plans to attain it, all of which then guide ongoing behavior. As the great neuroscientist, Joaquin Fuster (1997) so eloquently argued in his book on the prefrontal lobes of primates, the quintessential function of that brain region is *the formation of goals and the cross-temporal construction, organization and maintenance of behavior needed to attain that desired hypothetical future.* The prefrontal cortex largely


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supports EF, and EF is ultimately future directed action.

In my theory, the muddled construct of EF can be rescued by referring to its well-accepted association with self-regulation. How? Self-regulation has been usefully and operationally defined as *the self-direction of actions that are intended to modify subsequent behavior so as to alter the likelihood of a delayed (future) consequence*. In my theory, *EF is that self-directed action*. And so, we can usefully and operationally define the seven major EFs as actions-to-the-self—the things we do to change our behavior to change our future for the better. These are:

- self-directed attention (self-awareness),
- self-restraint (inhibition),
- self-directed sensory-motor actions (visual imagery or nonverbal working memory)
- self-directed speech (verbal working memory),
- the provocation and self-direction of emotions (emotional self-regulation) typically using the first 4 EFs,
- and thereby also self-motivation, and eventually
- self-directed play (for planning and problem-solving).

While many of these start out in development as publicly observable activities, their public musculo-skeletal actions become progressively inhibited over development thus permitting private (mental) actions and simulations within the brain. This EF-SR Theory further hypothesizes that the EFs contribute to the following developmental and transitional shifts in the sources of control over behavior:

➢From external events to mental representations related to how one should respond to them so as to alter present and especially future consequences

➢From the temporal now to the conjectured future

➢From control by others to control by the self

➢From largely non-cultural to cultural (shared) information

➢From immediate reinforcement to delayed gratification

With maturation, the individual progressively comes to be guided more by covert representations that permit self-control, deferred gratification, and goal-directed actions toward conjectured social futures often using social and cultural means to achieve those goals. ADHD as a disorder of EF and SR is going to delay and disrupt the development of all seven EFs and so greatly interfere with these extremely important transitions in what sources are regulating behavior—the external world or the self.

Although it does not concern clinical diagnosis, I have taken the concepts of EF and SR and developed them even further as an example of an extended phenotype, as that incredibly valuable concept was initially set forth by Richard Dawkins (1982) for its application to evolution. That phenotype takes the form of studying the various effects that adaptations can have at an increasing distance from the organism and its genes. One can think of it as a series of expanding concentric rings of effects that radiate outward from the organism, like the expanding rings in a pool of water when a pebble is dropped into it. An effect of the organism and its activities, no matter how far away from the organism it may occur in space (or time), is considered phenotypic if it feeds back to alter in any way the survival, reproductive success (fitness), and hence longer-term welfare of the organism (and its genes). Dawkins argued that such extended effects could well explain the evolution of a trait or adaptation that would be otherwise poorly understood or appreciated when only examining the most proximal aspects of that phenotype, such as the physical features of the organism or just its immediately obvious behaviors and consequences.

Utilizing this remarkable insight about phenotypes, I demonstrate how the initial, self-directed and cognitive level of the EFs discussed above may extend outward to impact important major domains (levels) of human social activity, such as self-care and adaptive functioning leading to social independence, social self-defense, reciprocity, cooperation, and eventually community participation.

What the EF-SR Theory and such an extended phenotype applied to it make obvious from an evolutionary standpoint is that the human EF system did not evolve, nor does it exist, to sort cards into categories, detect Xs from Os on computer screens (as in continuous performance tests), recite digit spans backward, or generate multiple words that begin with the letter F, as tested in neuropsychological batteries purporting to measure EF. It also makes obvious why those tests have such limited ecological validity or clinical significance (Barkley, 2019). These tested behaviors represent no important existential problems that had to be solved by humans and their adaptations. The abilities measured by such tests are also not the crucial faculties lost in people with frontal lobe disorders, such as seen in the classic case of Phineas Gage (Harlow 1948, 1968). Instead, this model views the EF system as arising for social purposes that contribute to individual survival, reproductive success and welfare. They solve adaptive problems posed in the human niche of living in groups, especially those involving non-kin, as a means of survival. But if the EF system is delayed or dysfunctional in early development, as in neurodevelopmental disorders such as ADHD, there may be a delay, deficiency in, or failure to engage in or progress on to activities at the higher levels or zones of this extended phenotype of EF-SR. I believe that problem is well represented in the myriad adverse outcomes and impairments for ADHD.

This view of EF as SR goes well beyond current views of EF as just information processing or cognition, such as computer metaphors for working memory. It views EF as having a multilevel extended phenotype whose actions at a distance have important consequences within the physical world generally and especially the social community for the individual. The EF-SR Theory gives clinicians and theorists great insight into what is being impaired by ADHD or other disorders of EF. No other competing theory of EF or ADHD comes close to providing the depth of understanding and the numerous predictions

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about EF (and ADHD) as conveyed by this model. As the model asserts, what ADHD does is place at-risk the capacities not just for self-regulation, but for adaptive functioning, self-care, and social self-defense, for self-reliance, for social reciprocity, economic exchange, and promise keeping, and for social cooperation.

Next, I go through the various DSM 5 criteria (American Psychiatric Association, 2013), noting where they can be improved, especially in the context of EF-SR Theory.

## SYMPTOMS AND DIAGNOSIS

### Symptoms vs. Impairments

ADHD symptoms represent delays and deficits in two inter-related dimensions of neuropsychological development: inattention and hyperactive-impulsive behavior. These symptoms arise largely from neuro-genetic origins interacting with certain environmental factors that culminate in the cognitive-behavioral expressions of the disorder (symptoms).

### Defining Disorder

What qualifies ADHD as a "real" or valid disorder, in my opinion, is that it meets the well-reasoned criteria for a harmful dysfunction as set forth by Jerome Wakefield (1999). Wakefield defined mental disorders as:

- *Dysfunction*(s) in one or more evolved psychological adaptations (abilities) that are universal to the species (part of the human design).
- That lead to *harm* to the individual, including increased mortality, morbidity, and impairment (ineffective functioning in major life activities).
- ADHD easily meets both criteria.

But if the dysfunction is on a continuum, as in ADHD, and not categorical, at what point does it become a disorder? When it causes harm—adverse consequences or impairment—for the individual.

### Diagnostic Criteria

The diagnostic criteria used to recognize ADHD, as in DSM-5, are the most scientifically validated to date relative to earlier editions and are based on hundreds of studies as well as expert consensus opinion. They can be summarized as follows:

- Manifests 6+ of 9 symptoms of either inattention or of hyperactive-impulsive behavior (5 for adults)
- Symptoms are developmentally inappropriate
- Have existed for at least 6 months
- Occur across settings (2 or more)
- Result in impairment in major life activities
- Developed by age 12 years
- Are not best explained by another disorder
- And can appear as three "Presentations" [Not Subtypes]: Inattentive, Hyperactive, or Combined

### Presentations, Not Subtypes

DSM-5 no longer conceptualizes ADHD as comprising three separate subtypes, as if there were qualitatively distinct categories; a change well supported by existing evidence. Instead, ADHD is now seen as a single disorder representing the extreme end of a continuum that can vary in the population in each of its two highly inter-related symptom dimensions. Variations in those relative dimensional severities can change over time, thus reflecting one of three possible "presentations" of ADHD at any particular time. It is merely a way for clinicians to note the relative severity of symptom dimensions at that moment and not a signal of qualitatively distinct and lasting types. As we saw above, EF-SR Theory argues that those ADHD symptom dimensions reflect larger ones involved in EF (executive inhibition and meta-cognition).

But a subset of cases fitting into the primarily inattentive presentation instead may not be ADHD at all but representative of a second attention disorder, known as sluggish cognitive tempo (SCT) or what is recently been labeled less offensively as Cognitive Disengagement Hypoactivity Syndrome (CDHS; Becker et al., 2022). Its primary symptoms include daydreaming, staring, mind wandering, mental fogginess or disengagement from primary tasks, hypoactivity, sluggish responding periodically, along with social passivity and other distinguishing clinical features. It may yet come to be officially recognized as a second attention disorder distinct from—yet partially overlapping with—ADHD. Regardless, extant research shows CDHS to be an important condition or transdiagnostic construct to be assessed in studies of ADHD and other disorders because of its unique explanatory power in predicting correlates, comorbidities, outcomes, and even treatment response. Meanwhile, clinicians are placing SCT cases into the Inattentive Presentation when using official diagnostic criteria. That is fine as far as documenting a diagnosis for the sake of insurance reimbursement or institutional data collection, but understand that it misrepresents/misdiagnoses SCT/CDHS as if it were ADHD (or what some clinicians call ADD) when the evidence to date shows it is certainly not. And, SCT/CDHS is not primarily a disorder of EF or SR, at least nowhere near to the extent that ADHD is, and so EF-SR Theory has little to say about it.

### Other Changes in DSM-5

A welcome change in DSM-5 was dropping the requirement in DSM-IV that ADHD could not be diagnosed in the presence of a diagnosis of autism spectrum disorder (ASD). It is now known that the comorbidity of ADHD with ASD is substantial and not just a secondary consequence of having ASD.

While the symptom lists for ADHD in DSM-5 remain the same, qualifier symptoms have been added parenthetically to assist clinicians with understanding the expression of that symptom at older ages beyond childhood. Clinicians should be forewarned that those clarifications were not developed empirically, nor tested for being clarifications of root symptoms as such. Nor were they informed by any theory of ADHD, such as that discussed above.

Recent research with adults challenges the validity of these clarifications as being significantly related to their root DSM-IV symptoms. One such study by Laura Knouse and colleagues (Knouse et al., 2021) suggested that those clarifications may actually represent newly invented and separate symptoms of the disorder. This study also implies that using the clarifications


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is like adding more symptoms to each list, and thus may broaden the eligibility for the disorder by up to 6% more—using inattention symptoms—than had just the original DSM-IV root symptoms been used. If one wants to add more symptoms to each list beyond the 9 already there, then the threshold for determining presence of disorder (6 for children, 5 for adults) needs to be reset to take that larger list into account. And it wasn't. Also, some clarifications (e.g., internally distracted) were correlated with anxiety and not just with the root symptom. That could lead to cross contamination of the ADHD criteria with those of another disorder. Until the status of the parenthetical clarifiers is better researched, *clinicians should likely ignore them* in making a diagnosis of ADHD in a teen or adult if the goal is consistency in identifying comparable cases between the new DSM-5 and the DSM-IV it replaced.

## FURTHER ADJUSTMENTS TO DSM-5 CRITERIA

From the standpoint of the EF-SR Theory of ADHD, as well as other empirical evidence, numerous other adjustments to the symptom lists and other criteria should be made by clinicians to improve diagnostic rigor.

*Too Many Hyperactive Symptoms.* All the DSMs from 1980 onward excessively weighted hyperactivity to the exclusion of more important symptoms in reflecting the nature of the disorder. Consider that 6 out of 9 symptoms reflect excessive activity. While that may be how the disorder was conceptualized in the 1960s and 70s (Hyperkinesis), and what may be evident in young children with the disorder, that is not how it is conceptualized now, especially by EF-SR Theory.

Since the '70s and '90s and the work of Virginia Douglas and many others, impulsivity has been viewed as just as much if not more involved in ADHD as hyperactivity (Barkley, 2015a). Furthermore, such an outsized representation of hyperactive behavior creates a major problem for how this list reflects the developmental changes that occur in the disorder. That is, hyperactivity is at best reflective of early childhood disinhibition of motor movement and declines so steeply over development that, by late adolescence, such symptoms are of little diagnostic value, The same is true for adulthood. This is one reason why clinicians before the 1980s thought the disorder was outgrown by adolescence. In short, by overweighting hyperactivity, the symptom list is losing its sensitivity to detecting true disorder over development. Both empirical evidence and EF-SR Theory would recommend that there be fewer such symptoms on this list, and more reflecting impulsive and poorly regulated behavior instead.

*Suggested Solutions***.** When clinically evaluating someone with ADHD, don't place so much emphasis on these symptoms for diagnostic purposes when assessing adolescents and adults. My own research on adult ADHD (Barkley et al., 2008) showed that after age 30 or so, symptoms of hyperactivity such as restlessness or fidgeting were as much or more indicative of anxiety disorders than they were of adult ADHD.

*Not Enough Disinhibition Symptoms.* Consider also that other forms of impulsive or disinhibited behavior are not represented on this symptom list—merely three verbal ones. That hardly reflects the nature of ADHD over development. Poor inhibition should be reflected not just in speech but in other domains such as motor behavior, cognition, motivation, and emotion. To some extent, the hyperactive symptoms pick up some elements of behavioral (motor) disinhibition, but the other domains are missed entirely. There is a *cognitive impulsivity* in ADHD manifested in a lack of reflection or due consideration of the consequences of the actions one may be contemplating both for oneself and others, as even Still recognized in 1902, if there is any contemplation at all. Impulsive judgments are as much a part of ADHD as impulsive speech but receive no mention in DSM-5.

*Suggested Solutions.* As a clinician evaluating someone with ADHD, one needs to ask about such symptoms of cognitive impulsivity beyond DSM-5 items.

The aversion and impatience with delayed consequences so evident in ADHD and described in the EF-SR Theory implies a *motivational impulsivity*. The decision-making in those with ADHD reflects excessively strong preferences for the choice of smaller more immediate consequences (either reward seeking or avoidance of aversive events) and self-gratification over larger but delayed rewards. Behavioral economists call this a high time preference and behaviorists call it a temporal discounting of future consequences as a function of their length of delay.

A Corollary of This Deficiency in ADHD is the Problem With Poor Self-Motivation as Described in the EF-SR Theory. Persistence toward goals and other tasks requiring sustained performance over time in the absence of immediate external consequences for doing so is a major component of EF and SR and a substantial problem for people with ADHD. Such motivational impulsivity and deficient self-motivation are not represented in the criteria.

*Suggested Solutions*. Ask patients or their parents about this difficulty with waiting for desired consequences or waiting in general, about always opting for immediate gratification as well as an inability to pursue tasks or goals involving delayed consequences. Wanting to have everything they desire *now* reflects both motivational impulsivity as much as it does time blindness and myopia toward the future. Also inquire about how much the patients struggle to accomplish tasks or pursue their own goals when these involve even moderate or longer delays and when no consequences or accountability to others is readily available for doing so. Lack of willpower, self-discipline, drive, determination, and "stick to it-tiveness" are all symptomatic variations on this theme of poor self-motivation and motivational impulsivity.

*Impulsive Emotion and Poor Emotional Self-Regulation.* Moreover, the hyperactive-impulsive symptom list lacks any mention of the *impulsive*

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*emotion and poor emotional self-regulation* now recognized as being a major feature of ADHD (Barkley, 2015b). George Still, in fact, made it a central feature of his conceptualization of ADHD over a century ago, recognizing as he did an outsized expression of the passions in those poorly regulated children in his care. Paul Wender, Dennis Cantwell and others championed poor emotional self-regulation in their conceptualizations of ADHD over 40 years ago (then called minimal brain dysfunction or hyperactive child syndrome)(see Barkley, 2015b). Hence, both empirical evidence as well as the EF-SR Theory make a compelling case for placing impulsive emotional symptoms into the DSM list.

*Suggested Solutions*. Ask patients and family members about such symptoms as being unusually impatient, easily emotionally aroused, easily frustrated and quick to anger. All as well as other such impulsive emotions occur as often in cases of ADHD as do the official inattention and hyperactive-impulsive symptoms yet receive no standing in the DSM.

*The Potential for Sex Bias in the Symptom Thresholds.* The DSM-5 criteria fail to recognize that females may be equally as impaired as males but at lower DSM symptom thresholds, thus introducing a possible sex bias in the cases likely to qualify for a diagnosis. While not so much a failure to reflect EF-SR Theory as it is an empirical and methodological problem, this male bias should be kept in mind by clinicians. Understand that the field trials for earlier versions of the DSM on which DSM-5 is based had overrepresentations of males in their samples. This creates the problem that not only the wording of symptoms, but the thresholds for the number of requisite symptoms (6 in children), is more reflective of males with the disorder and in the general population. Research suggests that females in the general population, at least in childhood and adolescence, do not show as much of these symptoms as do their malepeers. Females may also show more of the deficits in aspects of EF than are represented in the DSM-5. Using a male-biased set of symptoms and symptom threshold therefore makes it harder for a female to meet the DSM criterion for symptoms even though she may be just as impaired from her fewer symptoms as are males with ADHD.

*Suggested Solutions.* Use rating scales of ADHD symptoms that have their norms broken down by gender and not just age, as illustrated in the scale by DuPaul and colleagues (2016) for children and Barkley (2011a) for adults. This is so that women being evaluated can be compared to same age and *same gender* peers for purposes of determining their degree of developmental deviance. While these gender differences do decline with age, they do not completely disappear by adulthood thus encouraging this practice even with adult women undergoing evaluation.

*Inattention is Really Deficient EF-SR.* A further issue with the DSM-5 is that it does not explicitly acknowledge the substantial involvement of deficient working memory specifically and the other meta-cognitive deficits set forth in EF-SR Theory as being reflected in the inattentive symptom list for the disorder. Yet that symptom list is so highly correlated with the metacognitive factors on EF rating scales as to approach synonymity with it. Indeed, when I factor analyzed my own EF rating scale items along with the DSM symptoms of ADHD, those for ADHD inattention and impulsivity loaded on the EF components and did not form their own distinct factors as they should have done if they were reflecting something other than EF (Barkley, 2011a, 2012b).

*Suggested Solutions.* Clinicians should understand that when they interview patients or examine rating scale scores using the DSM inattention symptoms, they are seeing more than just simple inattention—they are getting a glimpse into the broader domain of meta-cognitive deficits and EF symptoms in daily life, particularly those reflecting working memory, self-organization, and time management.

*ADHD (and EF-SR) is Not a Category—It's a Dimension.* The DSM represents ADHD as a binary category. It implies that clinicians are simply making a dichotomous decision—disorder or no disorder. But we all know this just is not the way it works in clinical reality. Both empirical research and the EF-SR Theory assert that ADHD and EF (and the SR it permits) fall along a continuum in the general population. Hence a disorder like ADHD is not just dimensional in severity within its categorical parameters but is an extreme segment of a larger dimension in humanity. In that sense, ADHD is not so much a psychopathology, but is. instead, a developmental disorder akin to intellectual or language disability and represents more of a delay along a spectrum of the development of those traits in the population. ADHD is therefore distinguished more from others by a quantitative difference from normative behavior than as a qualitatively distinct category.

In clinical practice, therefore, one is going to see clients who place outside the category by not meeting all criteria, yet who are experiencing impairment and are seeking assistance with alleviating or at least compensating for it. Evident here is that there is another group of people (up to 9%) who place between -1 and -1.5 SDs from the mean who may not be "normal" either in their symptom severity or in their functional effectiveness in major domains of daily life. Researchers often consider such cases to be symptomatic (and usually impaired) even if not syndromal or meeting all diagnostic criteria (Faraone et al., 2015). And research shows that they do not differ much from those meeting full criteria in terms of patterns of EF-SR deficits, comorbidity, etiology, impairments, response to treatments, etc. except as reflecting somewhat milder variants of the same disorder. The people in that range of the continuum may still seek out evaluation and management. And why shouldn't they? As practitioners we are valued by society not so much because we can make diagnoses but because we relieve their suffering; the rendering of a diagnosis is a means to that end and not the end itself. Also, this could be even more of a problem for females with symptomatic ADHD than males given the apparent


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bias contained in the construction of the DSMs.

*Suggested Solutions.* If you see clients who have a high number of ADHD (and EF) symptoms (place above the 80th–84th percentile or so) *and* are reporting impairment in major life activities (experience harm), even if they fail to meet all DSM-5 criteria, then you should treat them as you would anyone else with legitimate, officially diagnosed disorder. If one must, then check a box on a billing form indicating a diagnosis of ADHD as if it met all criteria (or use ADHD NOS) and then possibly note, for future reference, in the report that the client had a milder variant of that disorder. Let the media wring its hands over the fact that clinicians may be treating more people as having ADHD, especially in using medication, than who meet DSM criteria. We can rest comfortably in our knowledge that such people are on the spectrum of ADHD, and we are doing our best to serve these people.

*The Age of Onset Criterion.* The age of onset for ADHD has been adjusted upward from age 7 to age 12 in DSM-5—a welcome but still imperfect broadening of this criterion. Nature does not respect such a hard delineation for a disorder that is on a continuum, as both empirical and theoretical arguments show it to be. Just as symptom severity is dimensional, so is recall of age of onset. Research repeatedly shows that both patients and those who know them well are not reliable nor accurate in recalling the age of onset of their symptoms and hence disorder (Barkley et al., 2008). It is a mistake to include as a criterion for diagnosis something that cannot be recalled with any degree of accuracy. And it is also a mistake to misrepresent the nature of ADHD as if there really is such a sharp demarcation that separates true from faux disorder. There is no such demarcation in nature (Barkley et al., 2008. My colleagues and I found that, by age 27 (mean age), both patients and their parents were an average of 4 or more years off, and in some cases a decade or more off, from what had been established in the childhood of those patients when they entered our longitudinal study as children. Given the marked unreliability and inaccuracy of recall of symptom onset by oneself or parents in adulthood (and probably by parents even in childhood), no age of onset should be included in such official criteria.

*Suggested Solutions.* Clinicians should ignore the specific age of onset criterion. Instead, view it as requiring a developmental onset, meaning that symptoms developed sometime during development, usually before age 21–24 or so. As long as one's cases meet all other criteria for the disorder, clinicians should be flexible in imposing an age of onset, recognizing that recall of onset is too unreliable and inaccurate to rely upon as a diagnostic criterion. Such an onset criterion is also problematic when dealing with cases of adult onset that are secondary to neurological injuries of various sorts. These can be distinguished by simply adding the term "acquired" to their diagnosis or using the DSM-5 ADHD NOS specification.

*The Lowered Symptom Threshold for Adults.* The symptom threshold for diagnosing ADHD has been reduced from 6 to 5 in DSM-5 for application in adults to retain the sensitivity of the diagnostic criteria to the detection of the disorder over development. That is commendable yet still imperfect. All available research suggested that a threshold of 4 is even better at identifying adults with the disorder at comparable levels of developmental deviance that are being used with children (+1.5 to +2 standard deviations) (Barkley, 2011a; Barkley et al., 2008).

The risk here is that one may appear to outgrow the DSM diagnosis of ADHD with age when in fact one is simply outgrowing the rather restrictive and developmentally insensitive childhood criteria. It is as if one continued to use the same vocabulary list to assess verbal intelligence in a 5-year-old child as in a 30-year-old. As long as no new symptoms for adult ADHD are going to be included in DSM, then a lowering of the symptom threshold with age will be needed to continue to capture the disorder with the same degree of sensitivity as it does in childhood.

*Suggested Solutions.* For this reason alone, rating scales of ADHD symptoms for adults may give a better indication of the level of deviance of a patient relative to same age and same sex peers than do the DSM symptom count criteria, particularly when using that HI symptom list. Also, rating scales of EF for both children and adults (Barkley, 2011b, 2012b) will demonstrate a far more pervasive pattern of deficits in daily life than will DSM symptom lists. As my colleagues and I found in our own research on adults (Barkley et al., 2008), a better set of symptoms than the DSM criteria has been identified and replicated for diagnosing ADHD in adults. The list incorporates items that reflect EF in daily life. Table 1 shows the best 9-item set we were able to develop from our research for adults with ADHD. Notice that only a few symptoms from the DSM lists were retained based on our analyses of classification accuracy using various symptoms. The rest of the items in that table reflect EF. We then rendered these new items into a comparable format as the DSM criteria for both ease of comparison and clinical application. We recommend this new list to clinicians wishing to add more rigor to their diagnostic practices with adults referred for evaluation of ADHD besides just relying on the DSM criteria alone.

*The Range of Impairments is Broader Than Shown in DSM-5.* ADHD leads to multiple forms of impairment across various domains of major life activities. This is acknowledged to some extent in the DSM5 by specifying that impairment may exist in home, educational, peer, or occupational settings. Even so, the risk of impairment goes well beyond these domains in potentially adversely impacting health, intimate cohabiting relationships, child rearing, finances, driving, and lawful behavior, among others. Moreover, evaluations of impairment should be based not just on an unreliable and arguably valid clinician judgment using a 0–100 unanchored dimension, but on normative data for the population, as was done in my own rating scales of impairment that assess 15 different

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## Table 1. A List of Proposed Criteria for ADHD in Adults

A. Has six (or more) of the following symptoms that have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

1. Often easily distracted by extraneous stimuli
2. Often make decisions impulsively
3. Often has difficulty stopping activities or behavior when they should do so
4. Often starts a project or task without reading or listening to directions carefully
5. Often shows poor follow through on promises or commitments they may make to others
6. Often has trouble doing things in their proper order or sequence
7. Often more likely to drive a motor vehicle much faster than others (Excessive speeding) (If person has no driving history, substitute: "Often has difficulty engaging in leisure activities or doing fun things quietly.")
8. Often has difficulty sustaining attention in tasks or leisure activities
9. Often has difficulty organizing tasks and activities

B. Some symptoms that caused impairment were present before age 16 years.

C. Some impairment from the symptoms is present in two or more settings (e.g., work, educational activities, home life, social functioning, community activities, etc.).

D. There must be clear evidence of clinically significant impairment in social, academic, domestic (cohabiting, financial, child-rearing, etc.), community, 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).

**Coding note:** For individuals who currently have symptoms that no longer meet full criteria, "In Partial Remission" should be specified.

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domains of functional impairment in major life activities in children and adults (Barkley, 2011c, 2012c).

*Suggested Solutions.* Clinicians need to appreciate the fact that deficits in attention or activity regulation cannot easily explain so pervasive and serious an impact of a disorder on many domains of life-functioning. That is precisely what one should expect from the EF-SR Theory of ADHD. EF and SR are ubiquitous requirements for functioning well in most domains of life. When one undertakes this broader perspective on ADHD, one can better understand why clients are struggling to function effectively in so many domains of life and health, and can better explain to them and their loved ones why that is the case. And why it is imperative that the disorder be treated on an ongoing basis.

*The Cross-Situational Criterion.* The DSM has a requirement for cross-setting occurrence of some symptoms in the diagnostic criteria. Yet, some care must be taken not to confuse that with differences in the reports of others being called upon to render information about the individual. Clinically, one often finds this to be problematic when comparing reports between parents describing home behavior and teachers reporting on school adjustment. It is well known that parent and teacher agreement on any dimension of psychopathology is notoriously low, with correlations averaging just 0.25-0.30 (Achenbach, 2014). Therefore, such measurement problems should not enter the diagnostic criteria or decision making.

The behavioral symptoms used for diagnosis are not only substantiated in parent and teacher reports of these symptoms in children and self- and other reports in adults at the group levels of analysis but were confirmed by direct observational methods that demonstrate them to be excessive in people diagnosed with the disorder. That said, at the individual level of analysis there can be substantial differences in the number and severity of symptoms reported by different observers across the different contexts they supervise. Note that, unlike in DSM-IV, DSM-5 does *not* require that symptoms producing impairment must be present in more than one setting. Just showing symptoms alone now suffices. Comorbidity is common, and disentangling which disorder creates the impairment would be a nearly impossible task at the individual level of diagnosis.

*Suggested Solutions.* To avoid conflating reporter disagreement with cross-setting occurrence, the DSM should be understood to require that only one or more symptoms need to be present in any given situation as reported by one source, while more symptoms producing impairment may be reported in other settings by other sources. In short, it is the total number of different symptoms endorsed across such reporters that needs to rise to the required symptom threshold (6 for children, 5 for adults). From my perspective, a clinician need not find 6 or 5 from *both* sources.

*The Source of Information can Pose Problems for Diagnosis.* Clinicians should take note that the correlation between self-reports and parent or others' reports of ADHD symptoms from childhood to age 21–27 are only modest, reflecting low degrees of agreement. For instance, we found differences in rates of persistence to age 21 years that were 9–10 times lower if self-report was used with the DSM criteria compared to using parent reports (Barkley et al., 2008). Just 4–5% of childhood cases endorsed sufficient criteria to be diagnosed as ADHD by age 21 using self-report whereas nearly 66% of them met such criteria based on parent report. Even by age 27, degree of agreement between

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sources, while improving, remained at only a moderate degree. It seems that the degree of agreement does not approach even typical levels for validity of adult self-reports vs. other reports until the early to mid-30s. The EF-SR Theory of ADHD explains why this should be so. A foundational EF component is self-awareness (Barkley, 2012a), or attention to oneself over time especially in the context of others. ADHD is linked to a marked diminution in self-awareness and ongoing self-monitoring particularly in social contexts. Hence it readily explains why self-reports of ADHD symptoms (and EF) and impairment cannot be trusted to be accurate until the late 20s or so, if then.

*Suggested Solutions.* For this reason, clinicians must not place too much importance on self-reports when using diagnostic criteria, especially with children, teens, and even young adults. Instead, for all cases, clinicians should adhere to the newly inserted criterion in DSM-5 to corroborate what patients are reporting through another source. If no parent, sibling, or long-term spouse/partner is available, then archival records may have to suffice, such as earlier medical/psychiatric records, educational transcripts or report cards, driving records, work history, etc.

## CONCLUSION

This paper reviews the numerous problems that remain with the current DSM-5 diagnostic criteria for ADHD and explicates how the EF-SR Theory as applied to ADHD can illuminate these issues further. It has also suggested ways in which many of these issues can be addressed in clinical practice using this theory. As illustrated above, clinicians would do well when evaluating both children and especially teens and adults to inquire about deficits in the seven EF components discussed and particularly the five dimensions of EF found on rating scales to apply to daily life besides just assessing the traditional DSM-5 symptoms and other criteria as published. Those five dimensions are self-restraint (behavioral inhibition), self-regulation of emotion, self-motivation, time management, and self-organization and problem-solving (Barkley, 2011b, 2012b). These deficits are far more likely to exist or appear across child development, are far more pervasive, and are more likely to capture the basis for the impairments in major life activities that are of concern to patients and their families than are the traditional DSM-5 symptoms that originated more than 40 years ago and were entirely based on children.

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