

## THE HISTORY AND DIAGNOSIS OF ATTENTION-DEFICIT/ HYPERACTIVITY DISORDER

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### **Abstract:**

This paper briefly discusses the history of attention-deficit/hyperactivity disorder (ADHD) before proceeding to review and critique the recently published DSM-IV criteria for ADHD as well as the draft ICD-10 criteria proposed for its counterpart, the hyperkinetic disorder. In addition to covering the similarities and differences between these two systems, this paper critically discusses continuing limitations in these approaches to clinical diagnosis. Despite these ongoing diagnostic limitations, substantial research in both Great Britain and North America exists to show that ADHD is a valid condition that is separable from yet often associated with conduct disorder and hostile-defiant behaviour. Further research will no doubt help to resolve the current problems with diagnostic criteria to yield even greater separation of the construct of ADHD from other childhood psychological disorders.

### **Article:**

Within the United States and Canada, clinicians and researchers typically use the term, Attention-Deficit Hyperactivity Disorder (ADHD), to describe individuals who display developmentally excessive levels of inattention, impulsivity, and/or hyperactivity. In Europe and in many other parts of the world, individuals who display many of these same symptoms might instead receive a diagnosis of Hyperkinetic Disorder, or more likely conduct problems or Conduct Disorder. Such differences in diagnostic labelling, of course, stem from the use of different diagnostic classification systems, with the former terminology emanating from the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; American Psychiatric Association, 1994), and the latter coming from the tenth edition of the *International Classification of Diseases* (ICD-10; World Health Organization, 1990).

In view of the recent changes that have occurred within the DSM system, a major purpose of this paper is to outline the new criteria for establishing a diagnosis of ADHD. Following up on a previous publication (Barkley, 1990a), this paper will also compare and contrast the DSM IV criteria with those currently available from the draft version of the ICD-10 system. A critique of both systems will then ensue, followed by a discussion of the implications that these criteria have for clinical practice and research. Prior to discussing such matters, however, a brief review of the history of this disorder will be presented in order to provide a more meaningful context for appraising the current diagnostic criteria.

### **History**

The first published reports of children exhibiting behavioural characteristics similar to ADHD or hyperkinetic disorder seemed to have appeared in the middle of the 19th century' and were wholly unscientific accounts of cases, such as that of "Fidgety Phil" (Heinrich Hoffman, cited in Stewart, 1970). Not until the turn of the century (Still, 1902), however, was any attempt made to describe a collection of such cases, deduce their common characteristics, and place such problems within a theoretical framework.

As conceptualized by Still, problems of this sort reflected serious deficiencies in the "volitional inhibition" of behaviour, presumably arising from "defects in moral control."

Still's insight unfortunately did not spark a great deal of immediate interest in this disorder. When such interest rekindled many years later, in part because of the altered personalities evident in children surviving the great encephalitis epidemics that swept Europe and North America in the interim, the motor restlessness component was of primary concern (Childers, 1939; Levin, 1938). Also prevalent at that time was the belief that these behavioural deficits stemmed from brain-injury or other types of neurologic impairment (Strauss & Lehtinen, 1947). Reflecting this line of thinking, the diagnostic term, Brain-Injured Child Syndrome, was employed. This was subsequently modified to the concept of Minimal Brain Damage and, later, to Minimal Brain Dysfunction (MBD), when evidence of gross neurological damage could not be demonstrated in many of these children (See Kessler, 1980, for a more thorough discussion of the history of MBD).

The notion that excessive motor activity was the *sine qua non* of this disorder became even more prominent during the 1950s and 1960s. Some investigations attributed this to neurologic factors (Laufer, Denhoff Solomons, 1957), while others argued that it simply represented the extreme end of the normal variability that occurs within child populations (Chess, 1960). Such assumptions about the casual role played by brain damage eventually became less influential. This was initially reflected in the change in terminology from Minimal Brain Damage to Minimal Brain Dysfunction (Wender, 1971). Thereafter, all references to its presumed organic etiology were dropped, in favour of terminology reflecting what was believed to be the disorder's hallmark feature, namely its motor restlessness component. Hence, terms such as Hyperactive Child Syndrome and Hyperkinetic Reaction of Childhood (Chess, 1960; American Psychiatric Association, 1968) came into usage.

Rutter's (1977) highly influential findings represented yet another serious challenge to the assumption that brain damage was a major cause of the disorder. At about the same time, Douglas (1972) convincingly argued that hyperactive children exhibited deficits with sustained attention and impulse control, equal to or greater in severity than their motor restlessness problems. So influential was this shift in thinking that the American Psychiatric Association (1980) renamed the disorder, Attention Deficit Disorder, with (ADHD) or without Hyperactivity (ADD).

Soon thereafter, however, investigators began to question whether attentional deficits were truly core problems. The impetus for this stemmed in part from the failure of the attention deficit hypothesis to account for why ADHD/ADD children displayed appropriate levels of attention in some situations and not others. In an effort to address this concern, investigators put forth alternative explanations, implicating core deficiencies in the regulation of behaviour to situational demands (Routh, 1978), in self-directed instruction (Kendall & Braswell, 1985), in the self-regulation of arousal to environmental demands (Douglas, 1983), and in rule-governed behaviour (Barkley, 1981). Though differing somewhat, each of these alternative views shared the belief that poor executive functioning was central problem.

Amidst this ongoing discussion, the motor restlessness component once again emerged as one of the primary features of the disorder. Reflecting this change in thinking, the American Psychiatric Association re-labelled this condition, Attention-Deficit Hyperactivity Disorder (1987). Although the subtyping scheme, "without Hyperactivity," was relegated to a relatively undefined category, called Undifferentiated Attention Deficit Disorder, this change was not intended to suggest that such a condition did not exist. On the contrary, most investigators agreed that something akin to this did indeed exist. However, because question remained as to whether it represented a true subtype of this disorder or a separate diagnostic entity altogether (Carlson, 1986), any further refinements in its classification were deferred until more

research could be done that would guide the construction of diagnostic criteria. And so the definition and the criteria for ADD were left to the DSM-IV committee to resolve.

Presently in North America, ADHD is viewed by clinical professionals as consisting of three primary characteristics: inattention, impulsivity, and hyperactivity. The symptoms often arise early in childhood, typically by age 3 – 4 years, and are relatively persistent in most, though not all, children. The symptoms are relatively pervasive across settings but are recognized as fluctuating in severity as a function of various features associated with the context. Its causes are not definitively established but are strongly suspected to lie within the realm of neurology and brain development rather than arising from purely psychosocial cause, such as poor parent management of children. Chief among these causes is heredity in that the behaviour pattern typifying ADHD has been repeatedly shown to have a strong hereditary contribution in twin studies of heritability and to significantly cluster within biologically related individuals (Biederman et al., 1986; Goodman & Stevenson, 1989; Edlbrock, Rende, Plomin, & Thompson, 1991). Yet the behavioural characteristics comprising ADHD are also associated with prenatal exposure to alcohol and tobacco (Streissguth et al, 1984), post-natal body lead burden (Needleman et al., 1979), and brain injuries (Gratton & Eslinger, 1991). Societally, ADHD is coming to be recognized as a developmental disability entitled to the rights and protections granted to other disabled groups (Latham & Latham, 1993).

### **Diagnostic Criteria**

A summary of the recently released DSM-IV (American Psychiatric Association, 1994) criteria for making an ADHD diagnosis appears in Table 1.

**Table 1**  
**DSM-IV Criteria for ADHD\***

A. Either (1) or (2):

- 1) six (or more) of the following symptoms of inattention have persisted for at least six 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 work place (not due to oppositional behaviour 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 (such as school work or homework)
- (g) often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)
- (h) is often easily distracted by extraneous stimuli
- (i) is often forgetful in daily activities

- 2) six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least six 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 often "on the go" or often acts as if "driven by a motor"
- (f) often talks excessively

**Impulsivity:**

- (g) often blurts out answers before the 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-impulse or inattentive symptoms that caused impairment were present before age 7 years.
- 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).

Code based on type:

314.01 **Attention-Deficit/Hyperactivity Disorder, Combined Type:** if both Criteria A1 and A2 are met for the past six months.

314.00 **Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type:** if Criterion A1 is met but Criterion A2 is not met for the past six months.

314.01 **Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulse Type:** if Criterion A2 is met but Criterion A1 is not met for the past six months.

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

\*From the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders*. Washington, DC: American Psychiatric Association, 1994. Copyright y American Psychiatric Association. Reprinted with permission.

An especially key feature of this new approach is its utilization of separate symptom lists: one for items pertaining to inattention, the other for items concerning hyperactivity/impulsivity. This division parallels the results of studies employing factor analysis and other statistical methods with parent-and teacher-reported ratings of ADHD symptoms. In other words, the behavioural characteristics associated with ADHD do not represent three primary symptoms or dimensions but only two, with symptoms of hyperactivity and impulsivity forming a single symptom group or dimension. A direct consequence of listing ADHD symptoms in this way is that it allows for subtyping. Thus, for those individuals who display all both primary features, the term ADM), Combined Type is used, similar to the ADHD labelling that was employed in DSM III-R (American Psychiatric Association, 1987) What had been known as ADD or LADD has re-emerged as ADHD, Predominantly Inattentive Type, representing those who have

only problems with inattention but no significant degree of hyperactive-impulse behaviour. Individuals who do not have major inattention problems but who do exhibit clinically significant levels of hyperactivity/impulsivity are now recognized as having ADHD, Predominantly Hyperactive/Impulse Type. The inclusion of this new subgrouping is consistent with recent research findings suggesting that hyperactivity and impulsivity symptoms are typically the earliest to arise in the developmental course of the disorder (Loeber, Keenan, Lahey, Green, & Thomas, 1993), usually during the preschool years, represent the hallmark feature of the disorder (Barkley, 1990b, 1994), and are of critical importance in determining current and future psychosocial functioning (Barkley, Fischer, Edelbrock, & Smallish, 1990).

In order to be considered present, the symptoms within each of these DSM-IV listings must have an onset prior to seven years of age, a duration of at least six months, and be evident to a degree that is developmentally deviant. There must also be clear evidence that these symptoms cause functional impairment across two or more settings in which the individual functions. Above and beyond these inclusionary criteria, the DSM-IV guidelines also require ruling out certain conditions (e.g., Pervasive Developmental Disorder [autism], Mood Disorder) that might better account for the presence of such symptomatology.

Appearing in Table 2 is a summary of the ICD-10 draft criteria for establishing a diagnosis of Hyperkinetic Disorder. Somewhat akin to DSM-IV, ICD-10 uses a two-dimensional listing of symptoms – one for attention problems, the other for activity problems. Such symptoms must occur both at home and at school. Their presence, however, must not be determined solely on the basis of parent and teacher report; instead, there must also be evidence of their existence through direct observation. As does DSM-IV, ICD-10 further requires that these symptoms have an early onset, be developmentally deviant, have a duration of at least six months, and not be due to Pervasive Developmental Disorder or certain other psychiatric conditions (e.g., Mood Disorder). An additional exclusionary criteria is that a hyperkinetic disorder diagnosis is not made for individuals with IQ levels under 50.

**Table 2**  
**Draft ICD-10 Criteria for Hyperkinetic Disorder\***

- A. Demonstrate abnormality of attention and activity at HOME, for the age and developmental level of the child, as evidenced by at least three of the following attention problems:
- 1) short duration of spontaneous activities
  - 2) often leaving play activities unfinished
  - 3) over-frequent changes between activities undue lack of persistence at tasks set by adults
  - 4) unduly high distractibility- during study, e.g., homework or reading assignment and by at least two of the following activity problems:
    - 5) continuous motor restlessness (running, jumping, etc.)
    - 6) markedly excessive fidgeting & wriggling during spontaneous activities
    - 7) markedly excessive activity in situations expecting relative stillness (e.g., mealtimes, travel, visiting, church)
    - 8) difficulty in remaining seated when required
- B. Demonstrate abnormality of attention and activity at SCHOOL or NURSERY (if applicable), for the age and developmental level of the child, as evidence by at least two of the following attention problems:
- 1) undue lack of persistence at tasks
  - 2) unduly high distractibility, i.e., often orienting towards extrinsic stimuli

- 3) over-frequent changes between activities when choice is allowed
- 4) excessively short duration of play activities and by at least two of the following activity problems:
- 5) continuous and excessive motor restlessness (running, jumping, etc.) in school
- 6) markedly, excessive fidgeting and wriggling in structured situations.
- 7) excessive levels of off-task activity during tasks
- 8) unduly often out of seat when required to be sitting

C. Directly observed abnormality of attention or activity. This must be excessive for the child's age and developmental level. The evidence may be any of the following:

- 1) direct observation of the criteria in A or B above, i.e., not solely the report of parent and/or teacher
- 2) observation of abnormal levels of motor activity, or off-task behaviour, or lack of persistence in activities, in a setting outside home or school (e.g., clinic or laboratory)
- 3) significant impairment of performance on psychometric tests of attention

D. Does not meet criteria for pervasive developmental disorder, mania, depressive or anxiety disorder.

E. Onset before the AGE OF SIX YEARS.

F. Duration of AT LEAST SIX MONTHS.

G. IQ above 50.

NOTE: The research diagnosis of hyperkinetic disorder requires the definite presence of abnormal levels of inattention and restlessness that are pervasive across situations and persistent over time, that can be demonstrated by direct observation, and that are not caused by other disorders such as autism or affective disorders. Eventually, assessment instruments should develop to the point where it is possible to take a quantitative cut-off score on reliable, valid, and standardized measures of hyperactive behaviour in the home and classroom, corresponding to the 95th percentile on both measures. Such criteria would then replace A and B above.

\* From the draft of the *International Classification of Diseases* (10th Ed.). Geneva: World Health Organization, 1990. Copyright by World Health Organization. Reprinted with permission.

What should be readily apparent from the above discussion is that the DSM-IV and ICD-10 diagnostic guidelines are similar in a number of ways. This is not coincidental. There was a systematic effort during the construction to DSM-IV to design it such that its criteria could be directly translatable into equivalent ICD-10 disorders. For example, although worded somewhat differently, their symptom lists have many items in common. Their criteria for onset and duration, as well as their exclusionary criteria, are essentially identical. Both systems also require clear evidence of the pervasiveness of symptoms across multiple settings.

Such similarities notwithstanding, there are also several important differences across these two classification systems. Perhaps the most important of these is that ICD-10 does not include any items pertaining to behavioural disinhibition or impulsivity, which may actually represent its most distinctive feature from other childhood psychiatric disorders (Barkley, 1990b, 1994). The symptom clusters and cut-off-points for DSM-IV were derived empirically from clinical field trials, whereas those in ICD-10 were determined primarily on the basis of committee consensus. In contrast with DSM-IV, ICD-10 does not allow for any subtyping along the hyperkinetic dimension. Although both systems require evidence of cross-situational pervasiveness, the ICD-10 criteria are far more explicit and stringent about this matter. Another important distinction is that ICD-10 provides symptom descriptions that are specific to the setting in which they occur.

## **Critique**

While the DSM-IV and draft ICD-10 criteria certainly do represent significant improvements over earlier versions of these classification systems, further improvements can be made in order to achieve even greater diagnostic rigor.

One particularly important area requiring further refinement in both systems is the extent to which impulsivity, or behavioural disinhibition, is addressed. Only three such items appear within the DSM-IV criteria, and none exists in ICD-10. In view of recent findings attesting to the importance of such symptoms in distinguishing ADHD from other psychiatric disorders, it would seem to be of utmost importance to give them an even greater role in the process of determining whether an ADHD or hyperkinetic disorder diagnosis might be present.

A continuing problem that will need to be addressed in subsequent revisions is the phrasing of the items in both systems. Apart from one hyperactivity item in DSM-IV, all other DSM-IV and ICD-10 symptoms contain wording better suited to children than to adolescents or adults. For instance, while an item such as "often has difficulty playing or engaging in leisure activities quietly" (DSM-IV) might be quite helpful in identifying preschoolers and older children, it would seem to be of relatively little value in evaluating adolescents or adults. Either greater care must go into the wording of the items so that the symptom is more broadly defined, or more explicit examples must be provided as to how each item applies at different developmental periods (e.g., preschool, middle childhood, adolescence, adulthood). Possibly separate sets of items may be needed for adults, and even 'adolescents, than those currently employed for children.

Another difficulty in both approaches rests in the use of a fixed cut-off score across so wide an age range of children, adolescents, and adults. It is well recognized that the symptoms of ADHD are present to a considerably greater degree in all preschool children and decline significantly over development into young adulthood (Achenbach & Edelbrock, 1981). If the goal of a cut-off score is to restrict the diagnosis to a standard level of prevalence, say the 95th percentile, then a single cut-off score simply will not achieve this aim across development. It will prove overly inclusive at young ages and overly restrictive or exclusive in adolescence and adulthood. While the ICD-10 acknowledges that some objective measure of hyperkinetic behaviour should be used with a cut-off score of the 95th percentile, it does not yet apply this cut-off score to its own item listing nor recommend using well-standardized behaviour rating scales to assist in this task. Both DSM and ICD criteria should begin to acknowledge what researchers in this field have recognized for nearly two decades; that is the useful role of well-standardized rating scales in the diagnosis of this disorder. Both approaches to diagnosis should stipulate the use of rating scales as a formal part of the diagnostic criteria.

A further problem with the DSM-IV and ICD-10 criteria is their failure to distinguish different cut-off scores for girls and boys. Research on rating scales and in developmental psychopathology has repeatedly shown that the prevalence of these symptoms is strongly related to the sex of the child, with girls showing considerably less of these characteristics than boys within community samples (Achenbach & Edelbrock, 1981). Applying a fixed cut-off score, therefore, may over-identify ADHD in boys and under-identify it in girls.

The requirement that the children's symptoms have lasted at least 6 months would also seem to require some refinement, especially for use with preschool children. Ample evidence is now available that 3 years olds with significant symptoms of inattention and hyperactivity have a high likelihood of remission of these concerns within 12 months (Campbell, 1990). Those, however, whose problems last at least 12 months, or beyond 4 years of age, appear to have a very stable set of behavioural features that is

predictive of ongoing ADHD in the later school years. Consequently, the duration of symptoms should be extended to 12 months for this segment of the population.

A related difficulty with both sets of diagnostic criteria is their failure to consider a lower age limit below which the diagnosis probably should not be made. Research (Campbell, 1990) clearly indicates that distinct factors or dimension pertaining to hyperactive behaviour do not emerge in studies of early childhood (below age 3 years) behavioural problems apart from a general dimension of behavioural immaturity or oppositionality. Such research implies that whatever behaviours may distinguish young ADHD children from other groups of conduct problems have not yet sufficiently emerged or have not had an adequate developmental time span over which to observe their occurrence. Nor is it apparent, as noted above, that such behavioural problems are sufficiently developmentally stable within this tender age group to be characterized as a "disorder." For this reason, it seems that diagnosing ADHD in children 3 or younger is likely to be quite unreliable, unstable over time, and uncertain as to its true deviance from normal child behaviour during this developmental period. Clinicians should, therefore, be extremely cautious in rendering a diagnosis of ADHD before age 3 years, perhaps using the term "at risk for ADHD" in place of a confident diagnosis.

To their credit, both classification systems require documentation of the pervasiveness of symptoms across multiple settings. Too stringent an application of this particular criteria, however, could lead to diagnostic under-identification, as research has shown that insistence on symptom agreement across the home, school, and clinic settings can restrict the diagnosis to approximately 1% or less of the child population (Szatmari, Offord, & Boyle, 1989). Presumably, an even snitcher incidence would be found among adolescent and adult populations, were these same criteria applied.

Yet to their discredit, both systems perpetuate what we believe is a major misconception in the clinical field and that is that children with predominantly attention deficits (ADHD - Inattentive Type, ADD without hyperactivity, or Undifferentiated ADD) are either a subtype of ADHD (DSM-IV) or simply do not exist (ICD-10). Accumulating research findings appear to indicate that children who are not hyperactive-impulsive yet have impairments in attention may actually represent a distinct disorder from ADHD; one in which a qualitatively different deficit in attention exists, that being in focused or selective attention (Barkley, 1990b; Carlson, 1986; Barkley, Grodzinsky, & DuPaul, 1992; Goodyear & Hynd, 1992). Such children: (1) do not show the high association with oppositional and conduct disorders; (2) consequently are unlikely to have the same high risk for later delinquency and substance abuse; (3) may have cognitive impairments in perceptual-motor speed and memory retrieval; (4) are distinctly less socially impaired; (5) and do not show as dramatic or positive a response to stimulant medications as children with ADHD (Hyperactive-Impulsive or Combined Types) or Hyperkinetic Disorder (Barkley, 1990b). In our opinion, these chiefly inattentive children warrant a separate diagnostic category, criteria, and symptom lists apart from ADHD and should not continue to be viewed as a subtype of the same underlying disturbance as in the latter disorders.

And finally, neither set of criteria formally acknowledge that those with impulsive-hyperactive behaviour appear to have a larger, more significant impairment that is developmentally linked to this behaviour and that is in the development of those executive functions which undergird human self-regulation (Barkley, 1994). While clinical descriptions often cite impairments in self-control as key features of those with ADHD, the nature of these impairments, the specific executive functions involved, and their developmental emergence go undiscussed in the clinical guidelines for diagnosis. While this, in large part, reflects the limited status of research into the impairments in executive functions in ADHD that are dependent upon impulse control for their proficient utilization, it also bespeaks a lack of genuine conceptual theory about the nature of ADHD that is more than just a description of numerous "symptom"

lists. Further progress in the differentiation of ADHD from other psychiatric and psychological disorders, and so in the refinement of diagnostic criteria, is not likely to come until this major issue is addressed.

## Conclusion

The notion that a distinct group of children exist manifesting problems principally in hyperactive-impulsive behaviour dates back over a century. The huge volume of research generated on this disorder continues to support this view, has increasingly clarified its major components, has revealed the major social and personal risks associated with the developmental course of this disorder, and is progressively elaborating a neuro-developmental origin to most cases afflicted with the condition. The diagnostic guidelines used in North America and Europe, once quite distinct, are, thankfully, now converging on a common view and set of criteria for this disorder. While further improvements in the rigor of diagnosis can be made, there is no doubt that the current guidelines are a marked improvement over those in use even a decade ago. In the future, research must focus upon the executive functions which are linked to behavioural inhibition, how they are impaired in ADHD, the staging of their emergence over development, and how they account for the myriad difficulties those with ADHD have in daily adaptive functioning in society as adolescents and adults. What will then need to be publicly discussed and resolved at a societal level is just how well we, as a society, will accept, accommodate, and support those among us with developmental deficiencies in impulse control and, more generally, self-regulation.

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