

## Update of Adult ADHD. Special Reference to Mind Wandering and ADHD

**Luis Javier Irastorza Egusquiza\***

*Mental Health Centre Arganda del Rey, The Hospital Universitario del Sureste Monographic Consult Adult ADHD, Madrid, Spain*

**\*Corresponding Author:** Luis Javier Irastorza Egusquiza, Mental Health Centre Arganda del Rey, The Hospital Universitario del Sureste Monographic Consult Adult ADHD, Madrid, Spain.

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### Abstract

A review is made of some of the hot topics surrounding ADHD and how it is approached in primary care, theories, symptoms, and differential diagnoses and treatment. Finally, the author examines the bibliography on mind wandering and its implications in ADHD.

**Keywords:** ADHD Diagnosis; Theories on ADHD; ADHD Treatment; Mind Wandering

### Introduction

At least 15% of those diagnosed with ADHD in childhood continue to meet the full diagnostic [1] criteria for ADHD into their mid-20s and another 50% experience subclinical symptoms.

This article points out some novelties or issues in the diagnosis and current approach to ADHD in adults.

Another objective is to delve deeper into the state of the issue of mind-wandering (MW), both in controls as well as ADHD patients. This topic is observed in several disorders, one of them ADHD. For the latter, we conducted a bibliographic search for references in the last 10 years in Pub Med and Google Scholar, that included the words "mind wandering" and "mind wandering AND ADHD". For additional information about chosen articles, please contact author.

### Update on adult ADHD

#### How to detect and diagnose ADHD in primary care?

ADHD can be screened for using the ASRS-V1.1. Moreover, the family must be interviewed for two purposes: to specify what the patient was like during childhood and adolescence, as well as the difficulties they may be currently exhibiting in different spheres (academic, occupational, social, self-esteem, etc.):

1. Look for false positives (searching for academic benefits from treatment with stimulants, restless children) and false negatives (borderline or antisocial personality disorders, substance use disorders).
2. Improve training in Primary Care and coordination with mental health services specialized in ADHD and neuropsychiatry.
3. Efforts to develop and evaluate services and optimize outcomes:
  - Including mapping primary care prescribing practice and shared-care arrangements for adults with ADHD;

- Case studies of service models;
  - A systematic review of training and interventions;
  - Linked dataset analyses to gather more information on pathways between primary and secondary care [2].
4. Evaluation of transition models: the extent to which young people are prepared for transition and their ability to manage their ADHD by themselves [3,4].
  5. Continued ADHD medication into early adulthood is associated with substantially reduced levels of suicidal behavior [5], depression [6], substance misuse [7], traffic accidents [8], criminal convictions, and violent reoffending [9]. If these findings were to be replicated and modelled in a cost-benefit analysis, adult ADHD service provision could lower costs to health and social care [2].

### Theories regarding the origin of ADHD

- Starting from the assumption that there is a genetic basis, in addition to environmental influences, we must know why ADHD occurs, how to marry the neurodevelopmental disorder with a deficit of self-regulation and Barkley's evolutionary perspective on executive functioning [10], with MW [11], and Becker's sluggish cognitive tempo (SCT) syndrome [12]?
- Excessive spontaneous MW, with dysregulated neural functions (default mode network (DMN) overactivity during task conditions), may underpin functional deficits: such as internal distractibility justifies behavioral symptoms, such as losing track during conversations, avoiding tasks that require sustained attention, not completing tasks, and misplacing things.
- MW and self-regulation problems with lower performance on executive functions or can the two theories complement each other?

### Dimensional continuum

Those symptoms must be detected that, while not reaching the diagnostic threshold, impair functioning and for which the patient has no compensatory mechanisms. They must be both discovered and treated: in patients in transition or when they are entering the job market or a more demanding academic activity.

### Endophenotypes

Research has yet to adequately clarify this issue, having thus far yielded diverse, heterogeneous outcomes using neuroimaging, genetics, P1 markers, subtypes, comorbidity, chronotypes, etc.

### Differential diagnoses with high intellectual abilities

We find academic and occupational underachievement in these individuals with a very high IQ.

They are detected late; they display mental hyperactivity and cannot stop thinking. They look like late-onset ADHD.

Academic failure must be prevented in these kinds of patients; they are easily confused, and go unnoticed, since they do not need to study until they reach college levels.

### Differential diagnosis (DD)

Personality disorders, particularly borderline: given their emotional instability and dysregulation and impulsivity. Comorbidity with aggressive behaviors, substances, anxiety, depression, OCD; impulse control disorders, and pathological gambling.

There are ADHD habits that are customary in these patients, but not comorbid disorders, such as: overeating, lack of exercise, smoking, excessive drinking alcohol, abusing illegal substances, poor sleep habits, consuming junk food, and driving carelessly.

#### There are symptoms that are not included in DSM-V for ADHD:

- Emotional dysregulation, DD with borderline personality disorder;
- Mind-wandering, DD with depression, OCD, and
- SCT [13]: Daydreaming, trouble staying alert, easily confused, easily bored, spacey, lethargic, underactive, slow moving, slow information processing.

### ADHD treatment

We must treat the symptoms of ADHD, such as self-regulation disorder and its executive function deficits, as well as the added symptoms: MW, emotional dysregulation.

The executive functions affected include: self-directed imagery to achieve hindsight and foresight (awareness of ourselves across time) [10], showing self-control, directing behavior toward the future, and freeing themselves from being controlled solely by the events of the moment. These improve with medication.

Self-directed speech to control ourselves through language: this executive function falters with MW.

The sense of underachievement and of failing themselves and their families can be so serious in adults with ADHD, that it calls for add-on psychological treatment.

Motivational interviewing and cognitive-behavioral approaches, focusing on emotional regulation, organizational skills, and problem-solving, as well as mindfulness, are all treatments to be evaluated [14].

Personalized programs that deal with education, occupational, and social issues may be more successful than medication alone [15].

### When to treat?

Are they aware of their deficits and problems or is it other people who see them? They do not manage time, interpersonal relationships, or mental hyperactivity. They lack insight into their disorder. After many years without knowing what's wrong with them, they are only aware that it is very hard for them to function at work and studies, despite their best efforts; some struggle and dedicate many hours, while others only try once; they are unaware of their deficits; their relatives do notice.

As they develop and evolve, their impulsivity and hyperactivity improve, albeit their attention deficit does not [16].

Psychoeducational treatment: it is very important that they realize what is happening to them so that they can try out compensatory mechanisms and how to address what is going on. To do so requires a good evaluation that includes their daily functioning. They are often unaware of their deficits.

According to DSM-V, treatment should be given when ADHD causes patients anguish and/ or problems with personal, family, academic, occupational, or social adaptation [17].

How do they learn resources and abilities over time?

With or without supervision, they partially make up for deficits. While they improve with medication, their executive function does not fully develop. What is achieved through compensatory resources? They learn from what is taught to hyperactive children: time management, how to prioritize, awareness and responsibility, incentives and rewards, external working memory, to be organized, proactive, problem resolution [18].

How can MW be overcome? Through motivation and rewards, meditation and medication. MW is sometimes good for creativity, though not when undertaking a task that requires more working memory [19].

### Mind wandering

#### Definition

MW is an unintentional shifting of attention toward internal thoughts; or, self-generated experiences that are decoupled from immediate environmental inputs and current tasks at hand [20-22]: thoughts constantly on the go, thoughts flitting from one topic to another, and multiple thoughts at the same time. MW has been used to encompass a variety of mental phenomena, such as attentional lapses, free-flowing thought, and perseverative rumination [23].

MW can be deliberate, intentional, spontaneous, or unintentional [24,25]. It is the spontaneous, unintentional shifting of attention that appears to be highly germane to ADHD symptomatology, as seen in the difficulties in controlling processing, inhibiting information that is distracting, and unintentional task inattention [24,25].

The tendency to mind wander varies considerably both within and across individuals; this variability can affect mental health in conditions such as ADHD and Alzheimer's disease [26,27]. High MW in ADHD is associated with more severe clinical features (e.g. inattention, hyperactivity, executive function deficits, emotional dysregulation, and quality of life) [27]. What is observed in these patients is mental hyperactivity, they cannot stop thinking, whether consciously or not. It may involve ruminations or situations from the past.

#### Etiology

Spontaneous MW that is detrimental to performance, has been proposed as a mechanism that accounts for many of the symptoms and impairments of ADHD [28,29]. It can reflect dysfunctional connectivity between the brain's flawed deactivation of the default mode network (DMN) and defective upregulation of executive control regions, [30]. It leads to excessive spontaneous MW in individuals with ADHD, during task performance *versus* resting state conditions [31], which might underpin the inattentive symptoms of ADHD and cognitive task performance deficits. This is in line with the DMN interference model hypothesis [32]. Processes linked to the normal neural regulation of MW (context regulation, sensory decoupling, salience thresholds) are impaired in ADHD [11].

#### Dimensions of MW

MW is understood as a subtype of spontaneous-thought phenomena that also includes creative thought and daydreaming [29]. This dimension of automatic constraints on content of thought is weakest for common forms of daydreaming and strongest for mental phenomenon such as ruminations and obsessions [29]. Other studies relate creativity with deliberate MW [33].

SCT symptoms have also been correlated to ADHD and MW [34]. For some individuals, the multiplicity of states within the construct of MW are a source of unhappiness and error [35,36], while for others, they are a source of creativity and constructive thought [37].

The dimensions associated with MW to date can include: (1) temporal focus [38]; (2) topical stability [39]; (3) valence [40]; (4) depth of decoupling [41]; (5) level of awareness [42], and (6) intentionality [43] and valence [44].

Similarly, spontaneous MW was positively associated with trait negative affect and negatively associated with trait positive affect [43]; negative mood could therefore be a precursor of mind-wandering, whilst some suggest that a worse mood is a consequence of mind-wandering [44].

Mental disorders that are marked by alterations in spontaneous thought and hyperactive/impulsive traits, including depression, anxiety, ADHD, and OCD symptoms [45]; it suggests that MW may not be useful as a diagnostic criterion for inattention [46].

### The functional effect of MW

MW has been associated with various impairments in the functioning of daily life: deficits in reading comprehension [47]; negative mood [38]; more traffic accidents [48]; worse learning [49] and academic performance, life-satisfaction, and self-esteem and greater stress [50], unhappiness [35], and impaired performance in daily life and in the lab [51] and attenuated environmental processing [52]. However, its benefits have been associated with goal-directed thinking [53], creativity [54], and planning [55].

On the other hand, ADHD is also associated with impairments in daily life including poorer psychosocial, educational, and global functioning [56]; greater propensity toward having traffic accidents [57], academic underachievement [58], reading comprehension difficulties [59], and toward low self-esteem [60].

That both ADHD and MW in non-ADHD controls appear to be linked to similar functional and cognitive impairments.

Thus, the excessive, spontaneous MW in ADHD can be expected to lead to the impairments typically experienced by people with ADHD in their daily lives: problems following a conversation, reading and watching a film; maintaining a coherent train of thought for problem-solving and holding thoughts in mind; difficulties falling asleep due to constant mental restlessness associated with excessive MW, and feeling exhausted by the mental effort required to sustain focus on daily activities.

As previously stated, just like certain symptoms of ADHD, in MW, distraction by internal thought and inattention to focal tasks [61], associated with the following: (1) impulsivity [62], (2) poor sustained attention [63], and (3) hyperactive behavior, i.e. fidgeting [63], all of which are core characteristics of ADHD. Moreover, like ADHD, MW has been correlated with (1) poor academic performance [64], (2) elevated response variability [63], (3) failures of executive control [65], and (4) difficulties in the workplace [29]. While these findings are consistent with the hypothesis that MW is a central feature of ADHD, inasmuch as it displays traits of ADHD, it can be counterargued that MW has also been correlated with patience [66], controlled processing [53], and premeditation [38], all of which are often thought to be antithetical to ADHD characteristics. Furthermore, MW has similarly been associated with a reduction in external distraction [67], whereas ADHD is thought to be associated with greater distraction from external sources [68]. All of this leads us to believe that MW involves different aspects that have yet to be fully studied.

### MW treatment

Methylphenidate, enhanced salience, and reward normalized DMN deactivation; all reduce the frequency of MW and/or facilitate a more controlled form of MW; consequently, it has been suggested that it affects inattention [69].

Meditation can reverse some of these abnormalities, producing functional and structural changes in the brain. Mindfulness training is another intervention that is thought to act on the regulatory processes involved in MW and ADHD [70].

### Conclusion

It is important that professionals be trained to detect and treat these patients and for patients to comprehend what is happening to them, so that they can acquire the abilities and compensatory mechanisms they may need. Though it is a neurodevelopmental disorder and improves over time, symptoms remain that affect clinical, personal, occupational, and social functioning.

Psychopharmacological treatment is not always needed and its duration will also depend on these patients acquiring personal resources and on the support they receive. This is an author opinion according his experience.

MW is gaining relevance in the body of literature dealing with ADHD, despite the fact that it is not included as a symptom in DSM-V criteria and that it causes functional impairment.

The creative capacity of some patients with ADHD is a huge advantage; they may have ideas that others might never grasp.

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