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# TREATMENT OF ADHD IN ADULTS

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**Adult attention-deficit hyperactivity disorder (ADHD) is a common mental health condition that has been estimated to affect one out of twenty people worldwide. It causes persistent problems, such as difficulty paying attention, hyperactivity and impulsive behavior. Adult ADHD can lead to unstable relationships, poor work or school performance, low self-esteem, and other problems, which can severely reduce the individual quality of life. ADHD begins in childhood, but often is not recognized or diagnosed before adulthood. In adults, hyperactivity may decrease, but struggles with impulsiveness, restlessness and difficulty paying attention often continue.**

**Treatment for adult ADHD is similar to treatment for childhood ADHD, consisting of medication, psychological counseling (psychotherapy) and several supportive approaches. This article gives a brief overview of current approaches and Communication-Focused Therapy® as developed by the author.**

Keywords: attention deficit hyperactivity disorder, ADHD, Communication-Focused Therapy®, CFT®, diagnosis, treatment, psychotherapy, psychiatry

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## Introduction

ADHD in adults is a childhood-onset, persistent, neurobiological disorder associated with high levels of morbidity and dysfunction. The estimated prevalence of current adult ADHD in the US was estimated to be 4.4% in 2006. (Kessler et al., 2006) It was highly comorbid with many other DSM-IV disorders assessed in the survey and was associated with substantial role impairment. The majority of cases were untreated. Analyses of non-US studies suggests that the prevalence of ADHD, at least in children, is close to 1 in 20 also outside the US. (Faraone, Sergeant, Gillberg, & Biederman, 2003)

Outcome studies find that ADHD symptoms and impairments persist into adulthood in around two thirds of cases (Faraone, Biederman, & Mick, 2006). The impact of ADHD on everyday life may diminish with age as many patients develop effective coping mechanisms. Still, ADHD more often than not remains an impairing condition in adults. ADHD-related impairments such as poor time management, procrastination and distractibility can affect areas of life, including work, daily activities and social and family relationships, leading to a decreased quality of life (Pitts, Mangle, & Asherson, 2015). In a study by Altszuler in the US, young adults with ADHD experienced greater financial dependence on family members and the welfare system and had lower earnings than comparisons. A projection of lifetime earnings indicated that ADHD group participants could expect to earn \$543,000–\$616,000 less over their lifetimes than comparisons, although this is probably an underestimate due to underrepresentation. (Altszuler et al., 2016)

ADHD in adults is associated with increased accidents, medical resource utilization, antisocial behavior, drug and alcohol abuse and dependency. Increased risk for ADHD drivers may be the result of increased risk taking, increased hyperactivity/impulsivity or distraction behavior, and increased vulnerability to factors that interfere with driving in general (Merkel et al., 2016). Over time, from adulthood into old age, there seem to be problems with stability caused by low self-confidence, being quick-tempered, and due to defiantness (Philipp-Wiegmann, Retz-Junginger, Retz, & Rösler, 2016).

A variety of comorbid conditions such as impulse-control/personality, anxiety, mood, substance use, learning, and sleep disorders overlap with adult ADHD, and several of them have symptoms that can mimic those of ADHD, including hyperactivity, impulsivity, inattention, and disruption of circadian rhythms, adding to the complexity of recognition and diagnosis of ADHD in adults. (Kooij et al., 2012).

## From Childhood to Adulthood

Symptoms start in early childhood and continue into adulthood. In some cases, ADHD is not recognized or diagnosed until the person is an adult. Adult ADHD symptoms may not be as clear as ADHD symptoms in children. In adults, hyperactivity may decrease, but struggles with impulsiveness, restlessness and difficulty paying attention may continue. Studies in children and younger adults show a reduction in hyperactive-impulsive symptoms, whereas the number of inattentive symptoms stays stable. However, in a retrospective longitudinal study by Semeijn covering childhood up to old age, the balance of inattentive/hyperactive-impulsive symptoms in childhood and adulthood largely remained the same. (Semeijn et al., 2016)

## Older Adults

Attention-deficit/hyperactivity disorder (ADHD) has been shown to continue into old age. In a survey questionnaire study of participants with a mean age in the mid-50s, it was found that the health-related quality of life and satisfaction with life was significantly reduced when compared with population norms. Nonemployment and severe ADHD were associated with poor quality of life. (Lensing, Zeiner, Sandvik, & Opjordsmoen, 2015) In a different study based on interviews, Michielsen and colleagues explored how ADHD may have affected the lives of older adults, who were unaware of their diagnosis. Four themes corresponded to ADHD symptoms: “being active,” “being impulsive,” “attention problems,” and “mental restlessness.” In addition, the themes “low self-esteem,” “overstepping boundaries,” and “feeling misunderstood” emerged. (Michielsen et al., 2018)

## Psychotherapy

Communication plays an important role in the treatment process, which is also the case in ADHD. It is known that such parameters as motivation and enjoyment of a task can make a significant difference. Several therapies are helpful in the treatment of ADHD. The author has already suggested elsewhere that this effect is likely to be due to changes in internal and external communication patterns, which make it easier for the patient to successfully pursue own needs, values and aspirations. Particularly in ADHD the ability to see meaning and relevance in a task or situation can improve attention and focus considerably. However, this requires a level of connectedness with oneself and the world. Since all the major psychotherapeutic techniques work with communication on some level, they can be effective. Communication-Focused Therapy®, which has been developed by the author for several mental health conditions and is described and discussed extensively elsewhere (Haverkamp, 2017a, 2017b, 2018a), puts a greater focus on the internal and external communication patterns and processes than most, however.

Current studies on cognitive behavioral therapy (CBT) for adult ADHD show comparable effect sizes to behavioral treatments for children with ADHD, which are considered well-established treatments (Knouse, Teller, & Brooks, 2017). Using data from the multicenter study

Comparison of Methylphenidate and Psychotherapy in Adult ADHD (COMPAS), therapy evaluation based on the patients' perspective supported the concept of ADHD-specific group psychotherapy as a potentially useful therapy option in ADHD. (Groß et al., 2017)

## Medication

The medication of ADHD is in many patients relatively straight forward. Various kinds of stimulants or drugs with a similar effect are used to treat the symptoms of reduced concentration, scattered focus, and so forth. For patients suffering from ADHD they are quite effective. However, medication usually requires taking time with the patient to explore and assess the individual symptoms, their history and the patient's overall situation in life. Standardized questionnaires can be helpful, a complete neuropsychological assessment is unfortunately often not feasible due to the high costs involved, although it could help counter potential overdiagnosis of ADHD (Paris, Bhat, & Thombs, 2015). Approaches are available for detection of feigned ADHD (i.e., self-report questionnaires, personality inventories, cognitive tests used in routine neuropsychological assessment and tests specifically designed for detecting feigned cognitive dysfunction). (Tucha, Fuermaier, Koerts, Groen, & Thome, 2015)

Fear surrounding the abuse of stimulants is an important issue. However, extensive research shows that adults with ADHD appear to benefit from treatment with stimulant medications in similar ways as children, including significant improvements on driving performance. Evidence suggests that children with ADHD who are treated with stimulant medication are less likely to develop a substance use disorder in adolescence and adulthood. (Kooij et al., 2012)

## Symptoms

In adults, the main features of ADHD may include difficulty paying attention, impulsiveness and restlessness. Symptoms can range from mild to severe. Many adults with ADHD are not aware they have it — they just know that everyday tasks can be a challenge. Adults with ADHD may find it difficult to focus and prioritize, leading to missed deadlines and forgotten meetings or social plans. The inability to control impulses can range from impatience waiting in line or driving in traffic to mood swings and outbursts of anger. In a study by Guntuku and colleagues, Twitter users with ADHD were found to be less agreeable, more open, to post more often, and to use more negations, hedging, and swear words, and posts were suggestive of themes of emotional dysregulation, self-criticism, substance abuse, and exhaustion. A machine learning model could predict which of these social network users had ADHD with an out-of-sample AUC of .836. (Guntuku, Ramsay, Merchant, & Ungar, 2017)

Adults with ADHD exhibit impairments in executive functions which include management and planning, attention, emotion control, effort, working memory, and self-regulation. Impairment of functions can impact on successful task execution.

Adult ADHD symptoms may include:

- Impulsiveness
- Disorganization and problems prioritizing
- Poor time management skills
- Problems focusing on a task
- Trouble multitasking
- Excessive activity or restlessness
- Poor planning
- Low frustration tolerance
- Frequent mood swings
- Problems following through and completing tasks
- Hot temper
- Trouble coping with stress

Stress can lead to changes in the symptoms of the condition. While ADHD symptoms are positively associated with perceived stress, in a study by Combs and colleagues, inattention and sluggish cognitive tempo, as opposed to hyperactivity-impulsivity and newly proposed executive dysfunction symptoms, were the most consistent predictors of perceived stress. (Combs, Canu, Broman-Fulks, Rocheleau, & Nieman, 2015)

## The Wandering Mind

Mind Wandering can be viewed in two ways. One is that the mind is more prone to seek out novel stimuli, the other one that the mind is less able to keep the attention in one spot. Biederman and colleagues investigated Mind Wandering using the Mind-Wandering Questionnaire (MWQ) and the ADHD module of the Schedule for Affective Disorders and Schizophrenia for School-Age Children Epidemiologic Version. Two inattention items ('failure to pay attention to detail' and 'trouble following instructions') had the strongest association with the MWQ. The combined score of the two inattention items best identified high-level mind wanderers. (Biederman, Fitzgerald, et al., 2017) From this, it seems that it is the inability to stay in one place, which best describes mind wandering. It is possible in this regard, that the novelty seeking aspect in many patients with ADHD may actually be related to an inability to keep the attention focused. Bioulac and colleagues, for example, were able to show that not only inhibitory control deficits but also pathological level of alertness independently contribute to highway driving impairment in ADHD patients. (Bioulac et al., 2016)

## Impulsiveness

An association between adult ADHD and gambling has frequently been suggested. The higher levels of impulsivity may be an independent risk factor. It is not entirely clear, however, how a possibly increased proneness to take risks could fit into the accepted model. In a study by

Dai and colleagues, the ADHD group was more likely to meet the criteria for problem gambling and was more impulsive than controls based on a composite discounting measure. ADHD symptoms were correlated with gambling-related cognitions and behavior. Probability, but not delay discounting, explained significant variance in gambling-related measures after controlling for ADHD symptoms. (Dai, Harrow, Song, Rucklidge, & Grace, 2016)

## Poor Inhibition

Poor inhibitory control is a well-established cognitive correlate of adults with ADHD. However, inhibition is not just the opposite of continuation, but a separate cognitive faculty. Maoz and colleagues used various computerized tests to assess cognitive functions. There were strong correlations between corresponding measures in the continuous performance tests, but there were only minimal correlations between them and the response inhibition task, supporting the specificity of impairments in different cognitive domains (Maoz, Aviram, Nitzan, Segev, & Bloch, 2018)

Impaired inhibition outside of consciousness is a common observation in ADHD. Neely and colleagues measured inhibitory control using a standard Go/No-Go reaction time task and a more sensitive continuous grip force task among adults with and without ADHD. Compared to adults without ADHD, adults with ADHD made more failed inhibits in the classic Go/No-Go paradigm and produced greater and more variable force during motor inhibition. (Neely et al., 2017)

Reduced efficiency of the inhibition of incorrect responses can also cause difficulties when engaged in a learning task. For example, in a study by Persen and Ohrmann, participants with ADHD made significantly more errors than the control participants, while they revealed unimpaired implicit learning performance. (Pedersen & Ohrmann, 2018). Making more mistakes in academic or professional setting is thus not necessarily due to impaired learning in a person suffering from ADHD, but it can also be a consequence of poor inhibition. As a more complex picture of separate cognitive abilities emerges in ADHD, it becomes even more relevant to offer specific techniques and advice to patients that helps them in their difficulties in everyday tasks.

## Novelty Seeking

Novelty seeking is from a psychological perspective a personality trait associated with exploratory activity in response to novel stimulation, impulsive decision making, extravagance in approach to reward cues, quick loss of temper, and avoidance of frustration. In a study by Instanes and colleagues, ADHD patients had significantly higher scores on the Temperament and Character Inventory (TCI) dimension novelty seeking compared with the control group. (Instanes, Haavik, & Halmøy, 2016) However, Donfrancesco and colleagues demonstrated that novelty seeking is also more marked in ADHD subjects even if one corrects for impulsivity

items. (Donfrancesco et al., 2015) This supports the view that novelty seeking can be a phenomenological feature of ADHD separate from impulsivity and temperamental aspects.

## Differential Diagnosis

Patients borderline personality disorder (BPD) and ADHD often present deficits in affect regulation, impulse control, substance abuse, low self-esteem and disturbed interpersonal relationships. In ADHD attention, the deficit frequently appears more pronounced in situations which lack external stimulation, while patients with borderline personality disorder experience dissociative symptoms more often when they feel emotionally stressed. In ADHD it is the absence of outside meaningful information which causes more symptoms, while in borderline personality disorder some internal information may be given to much relevance. (Haverkamp, 2010)

The attempts to autoregulate lead to different phenomenologies in the two conditions, when a patient is experiencing mental pressure. Patients with ADHD often try to regulate their labile emotional balance by excessive sports, excessive work, sexual behavior, and not seldomly impulsive aggressive behavior. Patients with borderline personality disorder, on the other hand, tend to experience dissociative states, when they are emotionally stressed, to the extent where they essentially freeze. The latter may also be related to experiences of traumatization which many patients with borderline personality disorder have experienced in their past.

Among the many other psychiatric conditions which have overlaps with ADHD, OCD shall be mentioned as both conditions can interfere with daily activities, routines and tasks in somewhat similar ways. Inhibitory dysfunction is a key behavioral and cognitive phenotype of attention-deficit hyperactivity disorder (ADHD) and obsessive-compulsive disorder (OCD), and they both display commonalities as well as specific differences. Both disorders show neuropsychological deficits and fronto-striatal dysfunction during tasks of motor response inhibition and cognitive flexibility. (Rubia et al., 2009)

## Comorbidity

Persistent ADHD is associated with an increased risk of comorbid psychiatric disorders in adults. In a study with non-ADHD controls and non-persistent ADHD participants, adults with persistent ADHD were significantly more likely to have psychiatric comorbidities. (Yoshimasu et al., 2018) In a 2007 study by Sobanski and colleagues, the prevalence of psychiatric lifetime comorbidity was 77.1% in patients with ADHD in contrast to the 45.7% prevalence in the control group. Significantly more patients suffered from depressive episodes, substance related disorders and eating disorders. Another interesting finding was that patients with ADHD and lifetime diagnosis of comorbid psychiatric disorders differed from patients with

pure ADHD in their psychosocial functioning only in the percentage of unemployed individuals, which was higher in patients with psychiatric comorbidity. (Sobanski et al., 2007)

The CAT (Comorbilidad en Adultos con TDAH) register has been used as a cross-sectional, multicenter, observational sample of adults with first-time ADHD diagnosis. Psychiatric comorbidities were present in about two-thirds of the sample and were more prevalent in males and in the hyperactive-impulsive and combined subtypes. The most common comorbidities were substance use disorders, anxiety disorders, and mood disorders. (Piñeiro-Dieguez, Balanzá-Martínez, García-García, Soler-López, & Group, 2016)

## Neurobiology

Convergent data from neuroimaging, neuropsychological, and neurochemical studies have implicated abnormalities in neural systems dedicated to attention and executive function in ADHD patients. It is commonly understood that ADHD is associated with cortical and functional alterations in brain regions that are critical for the regulation of executive function across the life cycle.

Anatomic brain MRIs show anomalies in ADHD, especially in nonremitting patients. MRI analyses have revealed volume reductions in gray-matter structures of patients suffering from ADHD. (Makris et al., 2015) Brain developmental trajectories have also been observed, while stimulant drug treatment has been shown to ‘normalize’ anatomic and functional measures in ADHD. Much of the neuroimaging literature on ADHD derives from studies that included participants treated with psychostimulants and other medications (Seidman et al., 2011). Neuroimaging has also been useful in identifying intermediate phenotypes for studies on the familial/genetic impact in ADHD. (Friedman & Rapoport, 2015)

## Principal Structures

Within a neural systems formulation of ADHD, the set of gray structures hypothesized to be principally involved are the dorsolateral prefrontal cortex, anterior cingulate cortex, orbitofrontal cortex, lateral parietotemporal cortex, caudate nucleus and cerebellum (Makris et al., 2009; Seidman et al., 2011; Seidman et al., 2005; Valera, Faraone, Murray, & Seidman, 2007). The caudate nucleus and the dorsal anterior cingulate cortex are believed to be key structural components of the anatomical neural systems supporting executive functions, attention, impulsivity, and emotional regulation.

A small number of pediatric studies showed an association of ADHD with brain alterations in the anterior cingulate cortex, cerebellar vermis and white matter (Bledsoe, Semrud-Clikeman, & Pliszka, 2009; Castellanos et al., 2002; Pliszka et al., 2006). Bledsoe et al. (2009) also showed reduced area in the posterior inferior cerebellar vermis in treatment-naïve ADHD children compared with treated and not treated controls, which reflects the overall biological motive

in ADHD, that treatment of ADHD can reverse or normalize some of the observed variations in patients suffering from ADHD.

The dorsolateral prefrontal cortex, anterior cingulate cortex, and orbitofrontal cortex are important regulators of other cortical and subcortical brain regions and play important roles in executive functioning. Their deficiencies appear to be consistent with the symptoms encountered in ADHD (Seidman et al., 2006). The mesh of connections between these frontal cortical centers qualifies them as critical networking nodes for the interface of drive, emotion, cognition, and motor function as well as for the modulation of cognitive control (Bush et al., 2000).

The existing experimental data suggests that the dorsolateral prefrontal cortex and the anterior cingulate cortex are associated with monitoring of conflict and modulation of cognitive control as well as modulation of allocation of attention in real time. Interactions between the dorsolateral prefrontal cortex, orbitofrontal cortex, inferior parietal lobule, amygdala, and brainstem centers, such as the locus coeruleus or the ventral tegmental area, enable the anterior cingulate cortex to integrate sensitive information in real time to monitor conflict associated with competitive cognitive tasks and, in concert with the dorsolateral prefrontal cortex, to modulate cognitive control and produce balanced behavior (Miller & Cohen, 2001). Lateral orbitofrontal cortical connections with the anterior cingulate cortex are relevant in translating motivational information into action. It is likely that anomalies in the functioning of these areas gives rise to some of the classic symptoms of ADHD, such as attention deficit, impulsivity and hyperactivity, when attention regulation and modulation as well as the resolution of conflicting pieces of information no longer works efficiently.

## Anterior Cingulate Cortex

Abnormalities in the ACC in medication-naïve adults with ADHD have been shown (Makris et al., 2010). While limited, these magnetic resonance imaging (MRI) findings to date are consistent with current models in ADHD clinical research, and with basic neuroscience supporting the relevance of these brain structures to the phenomenology of ADHD symptoms and cognitive control (Bush, Luu, & Posner, 2000; Makris, Biederman, Monuteaux, & Seidman, 2009; Seidman, Valera, & Makris, 2005; Sonuga-Barke, 2003).

Medication-naïve participants affected by ADHD reach adult life with structural brain alterations. The ACC, caudate nucleus, and CBL have been shown to be volumetrically reduced in medication-naïve children with ADHD (Bledsoe et al., 2009; Semrud-Clikeman, Pliszka, Lancaster, & Liotti, 2006)

A study by Mostert and colleagues shows that resting-state functional connectivity differences between adult patients and controls exist. Patients showed significantly stronger connectivity in the anterior cingulate gyrus of the executive control network. Trends were also observed for stronger connectivity in the cerebellum network in ADHD patients compared to controls. However, the effect sizes were despite the large sample size due to large overlaps in connectivity. These effect sizes were slightly larger when testing for correlations between

hyperactivity/impulsivity symptoms and connectivity strength in the executive control and cerebellum networks. (Mostert et al., 2016)

## The Cerebellum

Although structural alterations in the cortical networks involved in EF, attention, and impulse control have been considered to be central to the symptoms of ADHD, the cerebellum may be another crucial structure accounting for ADHD's phenomenology (Seidman et al., 2005; Valera et al., 2007; Valera et al., 2010). The cerebellum is massively interconnected with the frontal, parietal, temporal, and occipital cerebral cortex (Strick et al., 2009) exerting an influence over nonmotor regions of the cerebrum and, therefore, plays an important role in human cognitive and emotional functions (Strick et al., 2009). Structures in the cerebellum are known to be key components of the neural systems responsible for attention, executive control and emotional regulation (Makris et al., 2009). There appears to be persistence of cerebral abnormalities into adulthood. An absence of resolution of an abnormal morphometric phenotype present earlier in childhood and adolescence has been shown in pediatric MRI studies (Castellanos et al., 2002). It is of interest that reductions in cerebellar volumes in previous work with children were shown to be present in ADHD children even after controlling for whole-brain volumes that had been significantly different (Castellanos et al., 2001).

The notion of cerebellar involvement in ADHD has been proposed since the 1990s (Levinson, 1990) and since then volumetric changes have been documented in medicated children and adolescents (Berquin et al., 1998; Castellanos et al., 2001; Castellanos et al., 2002; Mostofsky, Reiss, Lockhart, & Denckla, 1998) as well as adults with ADHD, and in children with ADHD not treated with medication (Bledsoe et al., 2009).

## Psychotherapy

Treatment should usually combine medication with psychotherapy. There are various flavors of psychotherapy to choose from, and it is important to match the right therapy with the specific patient and the specific symptoms. Psychotherapy should at least help with the following:

- Improvement in time management and organizational skills
- Learning to reduce impulsive behavior
- Developing better problem-solving skills
- Coping with past academic, work or social failures
- Improving one's self-esteem
- Learning ways to improve relationships with family, co-workers and friends
- Lowering the sensitivity to mood swings

Much of this depends on helping the patient to better process information internally and communicate externally. How one selects and manages meaningful information develops to a large extent over time within a wider framework that is hardwired biologically. It is now well accepted that within these wider biologically determined structures, psychotherapy can have biologically very real effects on the configuration of the neural network as the brain retains a high level of plasticity throughout life. On a much larger morphological level, the normalization of brain structure volumes when a patient is on medication mentioned above attests to the brain's ability to change itself

## Mindfulness and Mindfulness-Based Cognitive Therapy (MBCT)

Attention deficit is one of the two primary deficits in ADHD, and training in mindfulness can be helpful. This includes becoming more aware of details in life and focusing on them more effectively. There are various training manuals for individual and group work. Some patients may also find self-help books and mobile phone apps helpful. Mindfulness has cognitive and behavioral aspects, which can both be practiced. The concept of mindfulness is derived from Zen Buddhist meditation practices and concepts. In dialectic-behavioral therapy there are three “what” skills (observing, describing, participating) and three “how” skills (taking a nonjudgmental stance, focusing on one thing at a time, being effective) (Linehan, 1993). Situations in which the patient could not practice mindfulness are analyzed with a view to help the patient at being more mindful in daily life.

Hepark and colleagues obtained in a group of patients treated with mindfulness-based cognitive therapy (MBCT) a significant reduction of ADHD symptoms, both investigator-rated and self-reported, as well as significant improvements in executive functioning and mindfulness skills were found. Additional analyses suggested that these improvements were partially mediated by an increase in the mindfulness skill “Act With Awareness.” (Hepark et al., 2019)

## CBT

Cognitive-behavioral therapy is one of the most extensively researched forms of psychotherapy. Learning new behaviors and new thought patterns and perspectives are important parts of CBT. In a large meta-analysis in 2006, effect sizes were found for CBT for unipolar depression, generalized anxiety disorder, panic disorder with or without agoraphobia, social phobia, posttraumatic stress disorder, and childhood depressive and anxiety disorders. (Butler, Chapman, Forman, & Beck, 2006) Randomized controlled trials on ADHD patients with and without medication have demonstrated that CBT is an effective treatment for ADHD in adults. (Weiss et al., 2012) The study by Weiss and Murray showed that both groups showed robust improvement in both symptoms and functioning, while the use of medication did not significantly improve outcome over and above use of CBT and placebo. Initiation of CBT treatment after medication stabilization has been suggested. (Safren, 2006).

An Internet-based cognitive behavioral therapy program has shown a significant reduction in ADHD symptoms in comparison with the waiting-list controls at posttreatment, and the result was maintained at 6-month follow-up. (Pettersson, Söderström, Edlund-Söderström, & Nilsson, 2017) However, in-depth interviews of 12 psychologists using grounded theory revealed that participants perceived that the executive function ability impairment of adults with ADHD can have an effect on the successful use of information system-based assistive tools. (Binhadyan & Wickramasinghe, 2018)

There are several approaches to help a patient structure and organize his or her day better. Hallowell and Ratey (1994) have developed concrete and practical advice in this regard, from organizing the day to organizing help, and more.

## Communication-Focused Therapy (CFT)

Communication plays an important role in ADHD. As already noted above, if a patient sees enjoyment and meaning in a task, concentration and focus can be practically normal. Most of the information about what is meaningful and relevant comes through communication with oneself and others. Communication-Focused Therapy (CFT) has been described by the author to address this in ADHD (Haverkamp, 2017b) and several other mental health conditions. One important benefit is that a better sense of oneself can also increase one's interactions with others, and so have a positive effect through improved social skills and a better and more supportive environment. The techniques used in communication-focused therapy has been discussed in other publications. (Haverkamp, 2018c, 2018b)

## Communication Patterns

ADHD has a lot to do with how one interacts with the environment. Strategies, which maybe worked for a while, are not as helpful anymore. In therapy, in the interaction between therapist and patient new communication patterns can be developed. Patients suffering from ADHD have often developed maladaptive interaction strategies with their environment, which contribute to the life impairment brought about by the ADHD symptoms. One strategy developed in childhood may simply be avoidance, as one has learned that committing to an interaction or an activity has been unsatisfying due to the inability to stay focused. Rather than trying to make interactions and activities more interesting and meaningful to oneself, the patient learns to withdraw. To reverse this, it is important to help patients see meaning in activities and interactions again by helping them connect with themselves in better ways.

Communication patterns used in an interaction with oneself and in interactions with others are interrelated. Both entail observing and decoding flows of information, identifying relevant and meaningful pieces, and interpreting them, and then responding by encoding and sending out information. Looking at these processes in therapy can be very helpful in making communication again a tool that benefits the patient rather than interfering with his or her life.

The ability to observe the flows of information and the reactions they cause, both internally and externally, is also an important skill to build and shape in therapy. It helps the patient to develop strategies to interact with oneself and others over a life-time. In ADHD, this can help a patient find motivation for relevant activities more easily and focus more easily what is truly important to the individual.

## Understanding Communication

Understanding how communication works can be very helpful to a patient suffering from ADHD. This means not just explaining how messages and meaning are sent and received, but also to allow the patient to experiment in the therapeutic setting. This should be the space where the patient feels safe and supported enough to engage in experimenting with communication which in the long-run is effective in dealing with the ADHD itself as well as the secondary communication and relationship effects. The more a patient understands how meaning and relationships are created and maintained in relevant and effective communication, the more of a sense of control he or she will have. For a child it may also be helpful to demonstrate and experiment with the explanation in a playful way. This also helps strengthen the therapeutic relationship and motivate towards therapy.

## Communication Patterns

Communication patterns are different from communication scripts. They describe how a person uses information in specific situations or quite generally. For example, external general communication patterns may be not to ask questions, not to communicate dislike (saying 'No') or to prevent feeling sadness (blocking the signal 'I am sad') external specific communication patterns may include not talking about one's anger with one's parents or sexual issues with a partner internal general communication patterns may include to think about all different angles before deciding on anything internal specific communication patterns may include not to allow feelings of sadness to reach consciousness.

There is little difference in the communication flows that are conscious or unconscious, except that some are being made conscious. This plays a special role in ADHD where it is more difficult for information (and the emotions associated with it) to hold the focus. However, if one sees the communication processes within and outside the focus as being subject to the same rules and mechanisms, one can increase the emotional value or focus pull attached to some information to hold the focus firmer on the information flow connected with an activity or a thought process.

## Focus

Focusing on things that are relevant and meaningful to oneself motivate, benefit oneself and make happy. Unfortunately, many people in their work, at school or in social interactions feel a need to focus on things that on deeper reflection are neither very relevant nor meaningful to themselves. Often, people have little insight into what is relevant or meaningful to them, which can lead to less satisfaction in an activity, which also leads to less focus and concentration. Hyperactivity can then often be a result of it as well. Of course, life does not

only consist of enjoyable activities, but the search itself to find more meaningful activities in itself can feel relevant if one understands that one is engaged in this process.

Children and adults with ADHD often do not have the opportunity to do things they enjoy, and feel are relevant to them, which usually makes the symptoms and their underperformance and lack of focus worse. In those cases, where this is possible, individuals can be high achievers. For example, in the case of one IT specialist with classic ADHD symptoms in many areas outside his IT area, he was tremendously successful and happy in his job, because he was able to do the job he loved. The positive experiences from his job also translated into a happy family life despite a clear ADHD diagnosis. This sounds like an exception, but it is quite obvious how schools, colleges and society as a whole could help individuals suffering from ADHD by supporting them in making things more meaningful and helping them to find out what is meaningful to them. Especially in the case of ADHD, once size fits all does not apply.

This does not mean one just has to give children total freedom to ‘find themselves’, but it is important to support them to find what is important to them by fostering better communication with themselves and with others. The same also applies to adults with ADHD, who have often developed maladaptive communication patterns with themselves and others, which solidify and entrench the ADHD. By helping children and adults acquire better communication patterns with themselves and others, they can find more relevance and meaning in activities. For example, often there is a lack of information to make the link between an activity or a relationship, for example, and the basic values, needs and aspirations the individual holds. The ADHD can make it more difficult to select and find this information. It can thus increase motivation, focus and concentration by working with a patient on finding more relevant information through reflection with oneself and communicating with others. Communication itself should become more interesting to the patient and be seen as an important tool in overcoming the limitations imposed by the ADHD.

## Attention Deficit Hyperactivity Disorder (ADHD)

Attention deficit hyperactivity disorder (ADHD) is a mental disorder of the neurodevelopmental type. It is characterized by problems paying attention, excessive activity, or difficulty controlling behavior which is not appropriate for a person's age. The symptoms appear before a person is twelve years old, are present for more than six months, and cause problems in at least two settings (such as school, home, or recreational activities). In children, problems paying attention may result in poor school performance. Although it causes impairment, particularly in modern society, many children with ADHD have a good attention span for tasks they find interesting. Its causes are unknown.

It is thus not a condition which interferes with the ability to focus and concentrate globally, but one that makes it important to help patients see enjoyment and meaning in everyday tasks. If something feels relevant, patients with ADHD often have less of a problem with it. The important task is to help the patient in seeing the connections between activities and their basic parameters, their needs, values and aspirations. While medication is often needed in more severe cases of ADHD, it can lower the ‘pressure’ to select more relevant and meaningful activities. This in turn can dampen changes which may help a patient with ADHD to be engaged in more meaningful and relevant activities in more interesting settings. Even when it comes

to reading a book, patients with ADHD have far less difficulties with one that captivates them. Regarding adult ADHD, it is obvious in clinical practice that many patients are stuck in jobs they can only identify with partially but are afraid to leave, in part at least due to the greater feelings of uncertainty and instability brought on by the ADHD. In these cases, efforts are better invested into making the job more meaningful or finding ways to change it rather than coping skills. The former relies heavily on internal and external communication processes, which should be a chief focus in therapy.

## Cutting Through Complexity

An individual suffering from ADHD sees a lot of fragments in the world as the mind wanders from one place to the next. This can lead to a feeling of being overwhelmed as the seemingly unresolved complexity of the world, the relationships with others and the own person increases. Observing how the patient takes in information and how he or she

Helping the patient see connections helps to see relevance to themselves and the meaningfulness of a task. One way to get there is to make complex relationships between tasks and own interests and aspirations easier to see. Schoolwork as an end in itself may not be very motivating, not just to people suffering from ADHD, but if a subject matter can be tightly linked to a unique interest focus and concentration can often be restored. For someone with ADHD it is not enough to do things because one does them. There has to be heartfelt reason for it. People without ADHD have the reward of some reward in the future, for individuals with ADHD the reward needs to be closer at hand. The therapeutic relationship, supported by the flow of meaningful messages, should convey to the patient that tools to get what they need and want are available. Together with others, things can become possible.

## Communication-Focused Therapy (CFT)

Communication-Focused Therapy (CFT) was developed by the author to focus more specifically on the communication process between patient and therapist. The central piece is that the sending and receiving of meaningful messages is at the heart of any change process. CBT, psychodynamic psychotherapy and IPT help because they define a format in which communication processes take place that can bring about change. However, they do not work directly with the communication processes. CFT attempts to do so.

We engage constantly in communication. The cells in our bodies do so with each other using electrical current, molecules, vibrations or even electromagnetic waves. People communicate with each other also through a multitude of channels, which may on several technologies and intermediaries. It does not have to be an email. Spoken communication requires multiple signal translations from electrical and chemical transmission in the nervous system to mechanical transmission as the muscles and the air stream determine the motions of the vocal cords and then as sound waves travelling through the air, followed by various translations on the receiving end. At each end, in the sender and in the receiver, there is also a processing of information which relies on the highly complex networks of the nervous system. Communication, in short, happens everywhere all the time. It is an integral part of life. Certain communication patterns can, however, also contribute to experiencing anxiety and panic attacks.

## *Autoregulation*

Communication is an autoregulatory mechanism. It ensures that living organisms, including people, can adapt to their environment and live a life according to their interests, desires, values, and aspirations. This does not only require communicating with a salesperson, writing an exam paper or watching a movie, but also finding out more about oneself, psychologically and physically. Whether measuring one's strength at the gym or engaging in self-talk, this self-exploration requires flows of relevant and meaningful information. Communication allows us to have a sense of self and a grasp of who we are and what we need and want in the world, but it has to be learned similar to our communication with other people.

Giving patients with ADHD a greater sense of being in control of their own destiny and interacting with others and shaping the world in a way which gets their needs and wants met. Even though young patients with ADHD seem demanding and in control of things in a wild way, at the core they are very conscious of not being in control over events in life. There is the constant sense of not getting what one needs and wants, especially in older patients, which leads to misdiagnoses of personality disorders, particularly narcissism or dissocial personality disorder. It is important to see the ADHD with its maladaptive communication patterns with oneself and others at the core.

## Reconnection

In ADHD there is often a strong sense of disconnect, which also causes a loss of insight into what is meaningful and relevant to the own person. This, however, makes it more difficult to find the activities and relationships that one can more easily focus on and engage with. Reconnection on an emotional level means reflecting on activities and interactions in the past which generated positive feelings, reconnecting on a cognitive level means reflecting on one's thought patterns and content, often with the help of a therapist.

The therapeutic setting has the advantage that the focus is on this reconnecting work and there is little distraction from other people and everyday life demands. The work of the therapist is to support the patient in this journey of reflecting on interaction patterns and reconnecting with self and the world.

## Understanding ADHD

Someone suffering from ADHD can focus quite well on things that are motivating. However, for things that are not motivating it can be far more difficult to focus and concentrate on. Thus motivation, or seeing relevance and potential excitement and satisfaction, in things is probably more relevant to someone suffering from ADHD.

Many therapeutic approaches target the focus or concentration rather than motivation. However, changing motivation and making things more meaningful may be a better long-term strategy. This can develop if changes in perspective lead to the perception of more meaning in oneself and in the world around, in behaviors and thoughts.

## *Disconnection*

There is a vicious cycle in which the symptoms of ADHD cause a disconnectedness from oneself and others. This not only leads to feelings of loneliness, but also to a loss of a sense of effectiveness in the world, the ability to effect changes and to get ones needs, wants and aspirations met. The disconnect is often a result of the perceived failure in carrying out tasks which seem effortless to others, like schoolwork or otherwise simple repetitive tasks. Later in life, they can lead to resignation on the job and resentment towards others. Of course, at the core is anger, hopeless and helplessness about oneself. The antidote to this is the reconnection already mentioned above.

## Motivation

Motivation is a key parameter in ADHD because if one is genuinely motivated about an activity, the ADHD symptoms often vanish, particularly the difficulties in focus and the tendency of the mind to wander. Using better communication with oneself and others to build motivation is usually the best way to achieve a more permanent effect. The patient should develop the skillset to be able to motivate myself or herself to choose and do the things in life which are relevant to himself or herself.

## Meaning

In therapy an important part is to rediscover meaning and to find it in the things that are relevant to the patient. Relevant is anything that is close to his or her values, basic interests, aspirations, wants, wishes and desires.

Seeing communications as meaningful requires perceiving a relevance to oneself in them, as well as a message that can bring about some change. In many situations it may be that it is difficult to spot meaningfulness in something before it has been tried out, but people often engage in it anyhow if they believe that it holds the potential to be meaningful. Much in the world would never have been accomplished without this course of action. To people suffering from ADHD, such a way of doing things seems to be closed off. The emotionally felt relevance and meaningfulness has to be there right away. So, an important question becomes how to bridge this gap in time. CFT aspires to do just this by working with meaningful messages in the exchange between therapist and patient.

## Experiencing the World

Communication helps in identifying and finding meaning, either communication with oneself or with others. The exchange of messages is like a learning process in which meaning can be identified, found and accumulated. Through meaningful interactions one accumulates more meaning, more connectedness with oneself and the world and reduces the need for thoughts and behaviors which are triggered by fears, guilt, self-blame and other negative emotions. This also helps against depression and anxiety.

Perceiving more meaning also makes interacting with others and oneself more meaningful. This has a positive effect on one's interaction patterns, how and in which one ways one relates to one's environment and exchanges messages with it. The fact that meaning can be created in an interaction, or any instance of communication, can be liberating from someone with ADHD because it means one does not have to wait for meaning. It is already there, if one just engages in it.

'Experiencing' should be taken quite literally. It means interacting and engaging with the human- and non-human worlds. Since meaning comes out of these interactions, it cannot be understated how helpful and effective it is to support a patient in potentially meaningful interactions with the environment. The interaction with oneself is the flip side of the interactions with the environment. A person suffering from ADHD usually needs to learn communication patterns that make it easier to engage with the internal and external worlds. Fears an anxiety may even become greater for a short time in the beginning before they fall off. It may be helpful to follow treatment suggestions for anxiety to support the patient in overcoming these fears and anxieties.

## Communication Patterns

The patterns in which people communicate determine the benefits the communication process. If the interaction patterns are not helpful in understanding messages or in reacting to the messages from others, they are maladaptive. Unfortunately, since communication is the mechanism which drives autoregulatory processes, these maladaptive communication patterns may not necessarily result in more adaptive ones, even if there is the pressure to change. In not so few cases, this pressure may even result in a deteriorating vicious cycle if the maladaptive communication patterns need to be relied on by autoregulatory processes. For example, if a patient suffering from ADHD feels he or she needs to socialize more and make small talk in informal gathering, it can lead into a vicious cycle if the negative self-talk is not resolved at the same time. Otherwise, anxiety will lead to more self-consciousness, more anxiety, less ability to interact as one would want to, even more negative thoughts, even more anxiety, and so on. To break this cycle, it is thus important to go through four stages of addressing maladaptive communication patterns:

- Observation
- Awareness
- Experimentation
- Insight

Those stages can also be worked on in parallel, although the focus on specific topics should be slightly different then. It is finally insight, and awareness in the beginning, which brings about lasting change. Once information has been committed to memory, it usually stays there. A trained behavioral or even cognitive pattern can be unlearned, while a learned communication pattern is essentially stored indefinitely and will be used if it is advantageous to do so.

A change in communication patterns can happen in any meaningful interaction, including a therapeutic setting, which provides more skilled feedback and a fertile ground for

experimenting with new communication patterns. The patient not only becomes aware of his or her own communication patterns, but also experiences how using modifications to these patterns can feel differently and lead to different responses from others.

In ADHD, the communication space of a therapeutic setting can help the patient to find more confidence and experience more authorship in affecting the dynamic, as well as develop insight into oneself and how to see more meaning in the world. The interaction with another human being can bring about the discovery of more meaning in the world. That is a basic axiom of communication theory, and shows again and again in the practice of psychotherapy.

## Values, Needs and Aspirations

Often, individuals suffering from ADHD have become uncertain about what is genuinely important to them and the fit between these values and interests and their current life situation. Whether in the professional or romantic realms, getting having one's needs, values and aspirations met, makes happy in the long run. This also applies to obviously altruistic situations. If I value helping people, it is important that I do that to make me happy.

Some people need to spend more time by themselves, while others thrive in social settings. In the end, a mix appropriate to the individual leads to the greatest motivation and positive feelings. This applies to many personality and character attributes as well. Some can slowly change over time, but many, such as a person's core values, change little, if at all. Particularly for an individual with ADHD, it helps to have a good grasp of what they are, because pursuing them can lead to a much better focus and greater satisfaction and success. For everyone, but particularly for those with ADHD, a major task in life is to steer one's life in the direction of one's basic interests, values and aspirations.

To discover what is meaningful it is helpful to spend some effort on identifying values, needs and aspirations. This process can be very helpful to adults but may be more difficult in children and adolescents who are still developing and understanding of these parameters. Helpful here could be engaging in play or other activities where they can be identified. In adults this can be accomplished within a normal psychotherapy setting.

## Self

Objective: The purpose of this study is to shed light on therapy-relevant factors, such as self-esteem, self-efficacy, and resources in adults with ADHD in comparison with a healthy control group. Method: A total of 43 adults who met Diagnostic and Statistical Manual of Mental Disorders (4th ed., text rev.; DSM-IV-TR) criteria for ADHD in adulthood were matched with a nonclinical sample in terms of age and gender. All participants (N = 86) were assessed with self-ratings: Symptom Checklist-90–Revised (SCL-90-R), Rosenberg Self-Esteem Scale, General Perceived Self-Efficacy Scale, and Dick's Resources Checklist. Results: Adults with ADHD showed lower levels of self-esteem and self-efficacy when compared with the control group. The authors found some, but not all, of the resources of adults with ADHD to be reduced. In other words, people with ADHD seem to possess specific resources. Conclusion: Our results have important implications for the treatment of adult ADHD and suggest that specific therapy

programs should include resources-oriented modules for enhancing self-esteem, self-efficacy, and fostering strengths. (Newark, Elsässer, & Stieglitz, 2016)

## Meaningful Messages as the Instrument of Change

Communication is the vehicle of change. The instruments are meaningful messages which are generated and received by the people who take part in these interactions. In a therapeutic setting, keeping the mutual flow of information relevant and meaningful brings change in both people who take part in this process. The learning curve for the patient may be steeper in certain respects because he or she spends less time in this interaction style than a therapist.

## Better Communication Patterns

For patients with ADHD, communication patterns have often developed as short time strategies at first, and were then kept for the perceived lack of better choices. Often, they become quite maladaptive over time, partly because of social isolation or conflict due to worsened ADHD symptoms, which can make them even less suited to benefit the patient. As described above, to get out of this vicious cycle awareness and insight into present patterns and the development of new patterns is key.

## Towards Interests and Values

Behaviors and activities will only increase satisfaction in the long run if they take into account the basic interests, values and aspirations of the individual. This requires identifying them first, as described above, and then finding ways to implement them more into the person's life. Fears and conflicts may need to be addressed, which are often associated with more substantial changes in a person's life. However, to find these basic parameters requires connecting with oneself to be able to retrieve this information, which requires overcoming any fears or anxiety that may prevent this. The therapeutic setting should offer the space where this is possible.

## Individual Success

Succeeding in life is both an individual and communal accomplishment. Communication with oneself and others is the important link and mechanism in attaining it. Especially for someone suffering from ADHD, failures at school or on the job often lead to less self-confidence and secondary psychiatric symptoms. To turn this around, it is important for the person suffering from ADHD to develop the communication skills and insight to reconnect with oneself and the world around. More specific techniques for communication-focused therapy are described elsewhere (Haverkamp, 2010, 2017a).

## Psychoeducation

Psychoeducation patients on their condition and how they can adapt better to daily living and arrange their life in ways that works for them. Enough time should be set aside for this, because it can lower the anxiety, uncertainty, depressed thought or hopelessness which can make the ADHD worse. In a controlled, neuropsychological intervention study in adult ADHD, it was demonstrated that adults with ADHD benefitted from a structured course of Goal Management Training which also included psychoeducation on the important aspects of executive functioning as well as counseling with respect to coping behaviors. (In de Braek, Dijkstra, Ponds, & Jolles, 2017)

## Medication

Medication is not a permanent cure for ADHD, but may help someone with the condition concentrate better, be less impulsive, feel calmer, and learn and practice new skills. Often the medication is taken as long as it helps. However, medication should always be an integral part of a comprehensive treatment plan with psychotherapy, psychoeducation, psychosocial support, advice on exercise and diet, and often group therapy, mindfulness meditation and other approaches.

Several epidemiological studies have been conducted in the Scandinavian countries, partly due to the availability of data from public registers. Between 2008 and 2012 the overall prevalence of ADHD medication use in the adult population in the five Nordic countries (Denmark, Finland, Iceland, Norway and Sweden) increased from 2.4 to 5.3 per 1000 men and 1.8 to 4.4 per 1000 women. Methylphenidate was used by 88 %. Treatment was discontinued within the first year by 21 %. Among all users of ADHD drugs, 53 % of men and 64 % of women concurrently used other psychotropic drugs, most frequently antidepressants and hypnotics. Psychotropic co-medication increased with age and was more pronounced among women than men. (Karlstad et al., 2016) In Sweden, the annual prevalence of ADHD in the general population of Sweden was found to be 1.1 per 1,000 persons in the year 2006 increasing to 4.8 per 1,000 persons in 2011. The majority of diagnosed patients received pharmacological treatment, with methylphenidate being the most common dispensed drug. Comorbidities in the autism spectrum were most common for younger patients, while substance abuse, anxiety, and personality disorder were the most common comorbidities in older patients. (Giacobini, Medin, Ahnemark, Russo, & Carlqvist, 2018)

Sometimes, if the medication stops working, it is possible to try a drug holiday to increase the effectiveness again. For many types of medication, the dose is increased gradually to find the amount which just achieves a satisfactory symptom relief. A prior medical check-up with at least bloodwork and screening for cardiovascular issues, including blood pressure, heartrate and ECG is advisable before starting the medication.

Generally, there are five types of medication which have been used to treat ADHD:

- methylphenidate
- dexamphetamine
- lisdexamphetamine
- atomoxetine
- bupropion and other antidepressants

In a number of countries, most or all of these medications are licensed for use in children and teenagers. Atomoxetine is quite often also licensed for use in adults who had symptoms of ADHD as children.

In a 2017 study of data from medical databases and two trial registers no evidence was found that amphetamines improved ADHD symptom severity compared to other drug interventions. While they seemed to improve the severity of ADHD symptoms, as assessed by clinicians or patients, in the short term, they did not appear to improve retention to treatment. Side effects could cause a higher attrition rate. However, the investigators reported that the evidence generated by this review is of low or very low quality. (Castells, Blanco-Silvente, & Cunill, 2018)

## Older Adults

The problem with side effects and somatic complications may rise to a level that makes pharmacotherapy for ADHD difficult in older adults (usually 65 years and over). In motivated patients, different psychological therapies alone or in addition to pharmacotherapy should be considered. (Torgersen, Gjervan, Lensing, & Rasmussen, 2016) In any case, a thorough medical check-up would seem particularly important in older adults before starting medication.

## Groups of Medication

### Methylphenidate

Methylphenidate is the most commonly used medication for ADHD. It belongs to a group of medicines called stimulants that work by increasing activity in the brain, particularly in areas that play a part in controlling attention and behavior. The medication can be taken as either immediate-release tablets (small doses taken two to three times a day), or as modified-release tablets (taken once a day in the morning).

Methylphenidate primarily acts as a norepinephrine–dopamine reuptake inhibitor (NDRI). It shares part of its basic structure with catecholamines. Methylphenidate is most active at modulating levels of dopamine and to a lesser extent norepinephrine. Methylphenidate binds to and blocks dopamine transporters (DAT) and norepinephrine transporters. One hypothesis is that methylphenidate amplifies basal dopamine activity, leading to nonresponse in those with low basal DA activity.

In a study by Bloch and colleagues, anxiety and cognitive performance improved from baseline in ADHD adults after taking methylphenidate. In controls, cognitive performance improved, but state anxiety did not abate after a recess. (Bloch et al., 2017)

Some of the side effects which are more often encountered may also include, aside from others,

- a small increase in blood pressure and heart rate
- loss of appetite, which can lead to weight loss or poor weight gain
- trouble sleeping
- headaches
- stomach aches
- mood swings

## Dexamphetamine

Dexamphetamine is also a stimulant, which is often licensed for children and adolescents only. Its biological effect is similar to methamphetamine. Like other amphetamines, it inhibits or reverses the transporter proteins for the monoamine neurotransmitters serotonin, norepinephrine and dopamine and releases these neurotransmitters from synaptic vesicles via vesicular monoamine transporter 2. Dexamphetamine is frequently taken as a tablet once or twice a day, although an oral solution is also available.

Some of the side effects which are more often encountered may also include, aside from others,

- decreased appetite
- mood swings
- agitation and aggression
- dizziness
- headaches
- diarrhea
- nausea and vomiting

## Lisdexamphetamine

Lisdexamphetamine is a prodrug of dexamphetamine, which is activated in the body.

Some of the side effects which are more often encountered may also include, aside from others,

- decreased appetite, which can lead to weight loss or poor weight gain
- aggression
- drowsiness
- dizziness
- headaches

- diarrhea
- nausea and vomiting

## Atomoxetine

Atomoxetine is a selective noradrenaline reuptake inhibitor (SNRI), which means it increases the levels of serotonin and norepinephrine, although the latter is probably the neurotransmitter which plays a greater role in ADHD. It comes in capsules, taken once or twice a day, and is in many countries licensed for the treatment of ADHD symptoms in adults. Atomoxetine has been linked to some more serious side effects, such as suicidal thoughts and liver damage.

Some of the side effects which are more often encountered may also include, aside from others,

- a small increase in blood pressure and heart rate
- nausea and vomiting
- stomach aches
- trouble sleeping
- dizziness
- headaches
- irritability

## Antidepressants

Bupropion and other antidepressants are currently investigated for their effectiveness. They seem to work in some patients with ADHD, especially if it is a later form.

## Memantine

Memantine is currently undergoing further research. In a study by Biederman and colleagues with adults suffering from ADHD and executive function deficits, adjunct treatment with memantine to osmotic release oral system-methylphenidate was associated with improvements in selective areas of executive functioning. (Biederman, Fried, et al., 2017)

## Diet and Supplements

There is no strong evidence that particular diets or supplements have a beneficial effect. However, taking care of oneself and staying healthy is particularly important in patients with

ADHD, as they are at a higher risk of losing track of caring for themselves. Diets and supplements are not without risks.

People with ADHD should eat a healthy, balanced diet. Some people may notice a link between types of food and worsening ADHD symptoms. For example, sugar, food colorings and additives, and caffeine are often blamed for aggravating hyperactivity, and some people believe they have intolerances to wheat or dairy products, which may add to their symptoms.

Some studies have suggested that supplements of omega-3 and omega-6 fatty acids may be beneficial in people with ADHD, although the evidence supporting this is very limited.



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