**A Warning for the Public:**

**Pharmacological Treatment for Attention Deficit Hyperactivity Disorder Is Ineffective, Unsafe, and Unethical\***

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**Abstract**

Many studies have been conducted on the efficacy and safety of stimulant psychiatric mediations (e.g., Ritalin, Adderall, and Concerta) that are designed to treat Attention Deficit Hyperactivity Disorder (ADHD). However, the findings of these studies are often hidden from the public. The present article rigorously reviews more than 120 widely accepted scientific sources (comprehensive literature reviews, meta-analysis studies, longitudinal studies, clinical controlled studies, and case studies) and reveals a critical mass of evidence proving that pharmacological treatment for ADHD is ineffective in the long run. Moreover, this type of treatment can aggravate symptoms, create a biochemical imbalance, and lead to serious side effects and irreversible damage to the child’s young and developing brain.

\*Warning: The use of psychiatric medications may create physiological dependence, and the withdrawal process may be accompanied by unpleasant symptoms and real danger. The purpose of this article is to provide the general public with reliable and evidence-based information on pharmacological treatment for Attention Deficit Hyperactivity Disorder. The information in the article is, in no way, a medical recommendation or suggestion to any one individual to discontinue or reduce pharmacological treatment, and it should not be construed as such. Each individual has their own unique circumstances, challenges and characteristics. Thus, any decision regarding the discontinuation or reduction of medication should be accompanied by a personalized medical consultation.

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Dr. Keith Conners limped slowly onto the stage. The audience stood in his honor and applauded. They likely felt that this was their last chance to show their respect to the founding father of ADHD. They probably did not expect to hear his candid opening words: “Attention Deficit Hyperactivity Disorder is a national disaster of dangerous proportions” (Schwarz, 2019). In a follow-up interview he added, “The numbers make it look like an epidemic. Well, it’s not. It’s preposterous. This is an invention to justify giving out medication at unprecedented and unjustifiable levels” (Schwarz, 2013).

**Introduction – The Epidemic of Pharmacological Treatment**

The dramatic statement by Dr. Keith Connors, the guest of honor at the 2012 conference for ADHD experts, was made after the American Center for Disease Control and Prevention (CDC) published estimates that 3.5 million children in the United States were receiving medications for Attention Deficit Hyperactivity Disorder (ADHD) (Visser et al., 2014). The huge increase in the number of children diagnosed with ADHD since the disorder’s inclusion in the Diagnostic and Statistical Manual of Mental Disorders (DSM) in 1980 was astonishing. In less than forty years, the prevalence of the disorder in the population had soared from just a few percentage points to double-digit percentages. This proliferation was accompanied by a sharp increase in the number of children taking psychiatric medications on a daily basis (Piper et al., 2018). Stimulants became the “first choice for treating ADHD” (Ministry of Health, 2020) and the demand for the “magic” pills soared.

For the majority of diagnosed children (62%–76%), amphetamines (e.g., Adderral), methamphetamines (e.g., Desoxyn) and, of course, methyphenidate (e.g., Ritalin and Concerta) are prescribed in unprecdented amounts (Danielson et al., 2018; Visser et al., 2016). In fact, these drugs are ranked at the top of the list of the best-selling medications for children (Chai et al., 2012; Qato et al., 2018) – an ostensibly festive and certainly profitable concert of effective and safe medicines. Some may say, “Ok, well, that’s how Americans are, always searching for quick solutions.” But the numbers do not lie. “This is a pandemic,” they shout (shouting is something at which they are quite adept), a pandemic that has spread to most Western countries, including a small province in the Middle East (Hoshen et al., 2016).

Recently published data from the medical records of Israel’s Leumit health fund show staggering numbers. In Israel in 2020, the rate of children diagnosed with ADHD was approximately 20%[[1]](#footnote-1) (Merzon, Manor, et al., 2020) and the rate of children receiving medications for ADHD was at least 8.8%[[2]](#footnote-2) (Merzon, Gutbir, et al., 2020). These rates have earned Israel a silver medal in the Ritalin Olympics. This is the third year in a row that Israel has ranked second in the world in methylphenidate intake (see Figure 1) (International Narcotics Control Board, 2018). The crowd will rise to the singing of the anthem. “Ok, enough already with the demagoguery.” Some may say, “what’s wrong with the fact that Israel manages to provide effective and safe pharmacological treatment to so many children?” This is precisely the question the current article seeks to answer.



Figure 1 – Methylphenidate: Rates of consumption in the 20 countries and territories reporting the highest consumption in 2018, compared with 2016 and 2017 (International Narcotics Control Board, 2018)

The current article begins with the obvious. Stimulant psychiatric medications designed to treat ADHD are not dietary supplements. They are designated as psychoactive substances and are prohibited by Israel’s Dangerous Drugs Ordinance. Like psychoactive drugs, which affect the central nervous system, ADHD medications manage to penetrate the blood-brain barrier and cause biochemical changes in the brain, that miraculous organ that makes us who we are.

The absence of any fundamental difference between ADHD medications and dangerous drugs leads to the presumption that daily pharmacological treatment may result in physiological addiction, serious side effects, and long-term irreversible damage. In order to dispel or mitigate this presumption, we must seriously consider three questions. Is ADHD truly a disorder; that is, a chronic brain defect that meets the scientific criteria of a psychiatric diagnosis? Is pharmacological treatment for ADHD effective in the long term? And to what extent is pharmacological treatment harmful and dangerous?

In my previous articles, I discussed at length the answer to the first question of whether ADHD is a real disorder. In brief, in my opinion, the answer is no. Rather, ADHD is a cluster of normal behaviors found in millions of children around the world, primarily in educational frameworks. These behaviors have no neurological basis nor any discriminant validity. Consequently, there is no scientific justification for labeling them a psychiatric disorder, and certainly not for “treating” them with psychiatric drugs (Ophir, 2020). But I cannot ignore the fact that the majority of my colleagues within my professional community have not accepted these positions. Therefore, in the present article, I will address two additional questions regarding the efficacy (Chapter 1) and the safety (Chapter 2) of pharmacological treatment for ADHD. I will then describe how pharmacological treatment affects a child’s daily behavior (Chapter 3) and how pharmacological treatment influences the human brain (Chapter 4). Finally, I will reflect on why most of us are unaware of the extensive and disturbing information that has been uncovered about the long-term effects of ADHD medications (Chapter 5). At the end of the article (Conclusion), I will interpret a case study, which integrates the responses to each of these questions into a uniform narrative. My clear conclusion is that not only is pharmacological treatment for ADHD ineffective in the long run, but its influence on the child’s developing brain may exacerbate symptoms of the disorder and lead to severe physical and mental damage over time.

Just before embarking on our journey, it is important for me to issue a travel advisory. The information about pharmacological treatment presented here is not easy to digest. It may cause some of you to shake uncomfortably in your chair, suffer from a cramp in your stomach, and perhaps even feel resistance or anger. If, by chance, you experience any of these symptoms, please forgive me. I do not seek to instill fear or to provoke. My sole motivation is to direct your attention – parents, teachers, doctors, and therapists – to information about pharmacological treatment that has accumulated over the years, information that is deliberately hidden from us (Chapter 5). If there is one important thing that we have learned from the COVID-19 crisis, it is the importance of receiving transparent and credible public health information. I believe that only when we have a credible and unbiased picture of pharmacological treatment can we make the right decisions for our children.

Due to the complexity and sensitivity of the topic of this article, my responses to the questions posed in the previous paragraph will be based entirely on over 120 scientific sources (including numerous sources by researchers who support pharmacological treatment). While I have tried to make this extensive and complex information as accessible and understandable as possible, you should expect an academic journey suitable for those who are prepared for a long-distance run. The vast majority of the sources cited in this article have been published in leading and widely accepted academic journals. These are not conspiracy theories found on the fringes of the internet, but rather comprehensive literature reviews, clinical trials, longitudinal studies, and case studies. These materials are usually accessible to anyone with a standard university license and can also be obtained directly from me, subject to the observance of accepted copyright laws.

**1. Chapter One – Is pharmacological treatment for ADHD effective in the long run?**

 “If so many children are being treated with ADHD medications, then their effectiveness must have been proven countless times!” I have heard this statement endless times since I published my position paper on ADHD. I was surprised that much of the general public is unaware of the facts that have long been known to scientists dealing with the effects of pharmacological treatment, including those who support it. Not only are these drugs ineffective in the long run, but they can worsen the symptoms of ADHD. What follows is the complete response to the question this chapter poses.

**1.1. The effectiveness of short-term pharmacological treatment is temporary, limited, and questionable.**

The vast majority of comparative and longitudinal studies on the efficacy of pharmacotherapy for ADHD have been conducted over the span of a few weeks (14–49 days). These studies indicate that there is indeed a short-term improvement in the symptoms of ADHD as well as in behavioral and academic performance using pharmacotherapy. However, a literature review and meta-analysis published by the Cochrane organization found that symptomatic improvement is temporary, minor, and questionable (Storebø et al., 2015).

If you are unfamiliar with the Cochrane organization, now is the time to become acquainted with it, especially in these days of medical-scientific uncertainty. The Cochrane organization is a non-profit, voluntary organization comprised of scientists and health professionals from 130 countries who are committed to conducting and disseminating quality and unbiased research. Their goal is to enable people to make medical decisions based on reliable information that is not tainted by conflicts of interest. While they admittedly do not always manage to withstand the pressures of pharmaceutical companies, their publications have a unique scientific value. Now, returning to the issue at hand, the literature review and meta-analysis conducted by the Cochrane organization revealed that schoolteachers tend to report behavioral and symptomatic improvement in children who have taken ADHD medications. However, the report also noted that this improvement has very little clinical significance for the children themselves (Storebø et al., 2015).

The limitations regarding children’s improvement that were reported in the Cochrane review paper corresponds with a long-standing finding of Professor Russell Barkley, an authority on ADHD. Early in his career, Barkley noted that the primary effect of the medications was on the conduct of the hyperactive child in the classroom (class management). The medications made the children more obedient and “calm” (see Chapter 3 for more details); however, they did not improve the children’s academic performance (Barkley & Cunningham, 1978). In other words, the primary noticeable effect of the medications was not the relief of bothersome symptoms resulting from the neurodevelopmental phenomenon called ADHD, but rather the relief of symptoms of a socio-cultural phenomenon called: school and classroom disorder.

How, then, can the academic improvement reported by many of the people “on the ground” be explained? The source of the improvement observed in the field (and not in carefully designed studies) can likely be attributed to three factors: First, when first starting pharmacological treatment, there is sometimes a euphoric moment. ADHD medications are not fundamentally different than other potent stimulants, and the initial effects can be dramatic. The child suddenly feels able to perform tasks that previously felt impossible, the educator marvels at the incredible change and rushes to call the parents to tell them about the miracle that has occurred (“it’s unbelievable, it’s as if he’s a different child”), and the parents finally feel proud and relieved. This feeling, as if the cork has finally been popped, that the problem is solved, and the child’s true potential is finally revealed, is a powerful and exciting. But this feeling is equally dangerous, because it is addictive (psychologically) and disregards the fact that this “different child” is a child who is under the influence of stimulants. It is well known that the effect of these substances dissipates within 4-12 hours (Wolraich & Doffing, 2004), produces a rebound effect in which the symptoms increase (see section 1.3 below), and activates compensatory mechanisms that reduce the intensity of the change (see section 4.2). Consequently, the child must take the medication over and over again in order to achieve the same miraculous and exciting effect that was achieved the first time. However, over time, this effect is typically increasingly unlikely to reoccur (see section 1.2).

Second, like many other medications, ADHD medications activate a placebo response – an improvement in symptoms that is due not to the active ingredient in the medication, but rather to the expectation of improvement or conditioning that was created during the first few times of taking the medication. The placebo response is so significant that it is able to improve a person’s performance on objective computerized attention tests, such as the TOVA assessment (Rotem et al., 2020), and significantly reduce the intensity of symptoms reported in self-report indices (27.6% improvement), such as the Conners rating scale (Ben-Sheetrit et al., 2020). On the ground (e.g., at school), then, the placebo response can be easily be attributed to the active ingredient in the medication, which is precisely the reason why the randomized controlled trial was introduced. Many times, results from randomized controlled trials indicate an improvement after taking the medication, but a similar or partial improvement also appears among participants in the control group who take a placebo.

Third, in a longitudinal comparative study, there is typically a natural improvement in the symptoms associated with ADHD which is unrelated to the treatment. This improvement occurs in both the experimental group and the control group as a result of a phenomenon called regression to the mean, which is primarily the result of the child simply growing older. Throughout life, and especially during childhood and adolescence, the human brain develops, adapts, and improves in accordance with the changing needs of reality (Doidge, 2007; Rubin, 2009). Even those who believe in the existence of the disorder are aware that in many cases, ADHD behaviors are not due to an organic phenomenon (a neurodevelopmental disorder), but rather to the developmental stage of the child. Otherwise, how can one explain that in most countries of the Western world, including in Israel, there is a greater prevalence of diagnoses and treatment among children who are younger than the majority of their classmates (Evans et al., 2010; Halldner et al., 2014; Hoshen et al., 2016)? In other words, immaturity in comparison to one’s peers is perceived by the teacher and physician as ADHD.

Because children each develop at their own pace and have their own unique neuropsychological strengths and weaknesses (Armstrong, 2011; McGee, 2012), there is good reason to assume that children will acquire many cognitive skills as they develop, as long as there is no evidence of widespread brain damage, such as intellectual disability. The brain development that occurs during childhood and adolescence is immense: hyperactive behaviors are mitigated and the cognitive-organizational functions become more sophisticated (Gathercole, 1999), especially in a loving and supportive environment. From this perspective, it is possible to understand how a large portion of children who are diagnosed with ADHD are later considered “recovered” once they reach adulthood (American Psychiatric Association, 2013), as well as how even those who claim that children with ADHD have unique brain characteristics are forced to admit that these disappear in adolescence and adulthood (Hoogman et al., 2017; Hoogman et al., 2019). We note that, of course, it is more difficult for some of us to concentrate or persevere in tasks even in adulthood, but these features in and of themselves do not justify a psychiatric diagnosis or pharmacological treatment (Ophir, 2020). In light of all of this, when testing the effectiveness of stimulant medications, we should not be satisfied simply with evidence of improvement after individuals take the medication, because that improvement is expected, particularly during the natural course of development. This is one of the reasons why it is important to conduct controlled studies with a control group – to prove that the observed improvement in the experimental group is significantly greater than the natural improvement that occurs during development.

And yet, there are, of course, quite a few studies that have been able to demonstrate some short-term improvement in the experimental group compared to the placebo group; otherwise we would not have entered this “medication maze” in the first place. However, as previously mentioned, the Cochrane review indicates that even these reported improvements are typically minor. Moreover, even the minor improvement is likely based on inflated, not to mention malicious, reports (for more information, see Chapter 5). According to the editors of the Cochrane review, the vast majority of the studies reviewed were of poor scientific quality and had a high risk of bias, overestimating the benefits of the medication and underestimating its dangers. Thus, we must treat the (minor) improvement reported in those studies with great skepticism and caution (Storebø et al., 2015).

**1.2. Pharmacological treatment is not effective in the long term (MTA Study – the controlled longitudinal study of the American Institute of Mental Health)**

Even if there is some improvement in the short-term, what happens when the child stops taking the medication? Is the improvement indicative of how things will be in the future? Alternatively, what happens if the child continues to take the medication for a long period of time to cope with the daily limitations brought on by the disorder? After all, ADHD is ostensibly a chronic brain disorder (Biederman & Spencer, 1999) that affects all aspects of life and lasts into adulthood (Kooji et al., 2019). Unfortunately, these questions have no reassuring answers.

Even proponents of pharmacological treatment express doubt about ADHD medications’ long-term effectiveness, acknowledging that in the forty years since ADHD entered the DSM (in 1980), there has been no convincing evidence that pharmacological treatment is effective in the long term (e.g., Chang et al., 2019). In fact, since the invention of the disorder, doctors and researchers have long known, of course, about the lack of a scientific basis for pharmacological treatment, but children have increasingly continued to be treated with drugs. In 1992, the National Institute of Health (NIMH) decided to take action and conducted a longitudinal, randomized controlled trial (RCT) with the aim of ending the debate over ADHD treatment and proving the effectiveness of long-term pharmacological treatment once and for all. The study, the Multimodal Treatment of ADHD Study, or MTA, to this day is considered the highest quality study conducted on the subject.

The first publication of the results from the MTA study, 14 months after the study began, provided proponents of pharmacological intervention with cause for celebration. It appeared that pharmacological treatment was so successful at reducing the symptoms of ADHD that there was no need for any additional intervention, such as behavioral therapy, which had been combined with pharmacological treatment in one of the study groups (The MTA Cooperative Group, 1999). However, the celebrations were both premature and excessive. Three years after the start of the study, the picture became more complicated. In the researchers’ words, in the long run, between two and three years, “medication use was a significant marker, not of beneficial outcome, but of deterioration. That is, participants using medication in the 24- to 36-month period actually showed increased symptomatology during that interval relative to those not taking medication” (Jensen et al., 2007). The person who signed off on this conclusion, Dr. Peter Jensen, Professor of Child Psychiatry, also led the MTA study and, as the first author, also signed off on the previous conclusions that had been made after 14 months.

With time, the original optimistic expectations of doctors and researchers were shattered. Six years and eight years later, the medications had shown no advantage over the unmedicated control group, neither in reducing ADHD symptomatology nor in improving academic performance (Molina et al., 2009), and certainly not in reducing the symptoms of the disorder in adulthood (Swanson et al., 2017). Similar findings have emerged in a recent meta-analysis conducted by researchers who are known for their support of pharmacological treatment (for more information, see Chapter 1.4) (Boland et al., 2020). The overall effect, calculated from a number of studies examining the effects of pharmacotherapy on academic performance (as a continuous variable), was neutral; in other words, there was no indication that pharmacotherapy led to any sort of benefit.

**1.3. Pharmacological treatment may actually exacerbate symptoms and cause a deterioration in learning (longitudinal studies from Canada and Australia)**

Not only did the MTA study not find any benefits to pharmacological treatment, but six years after the start of the study, a positive correlation was found between medication use and ADHD symptoms, as well as impaired functioning overall (Molina et al., 2009). Essentially, six years after the inception of the MTA study, the conclusion from this highest quality research conducted on pharmacological treatment found that the longer that children use ADHD medications, the worse their symptoms and functioning over time!

Similar conclusions have also been drawn from prospective longitudinal studies conducted in Canada and Australia. A naturalistic study conducted in the province of Quebec found a deterioration in academic performance, including a decline in math scores, following an arbitrary policy change which led to an increase in the use of pharmacological treatment (Currie et al., 2014). Another study conducted in Western Australia, the Raine Study, found that pharmacological treatment increased the risk of the child experiencing academic failure and a decline in school performance (Whitely, 2012). In fact, it is even possible to argue that these studies provide preliminary evidence that the medications themselves produce ADHD-like effects (in Chapter 4, I will describe the potential mechanism in detail).

**1.4. Pharmacological treatment has not been shown to be “protective” against long-term adverse effects (medicalization, disease mongering, and research distortions)**

During times of debate, given the limited and dubious effectiveness of pharmacological treatment in improving the “symptoms” of the disorder, there are those who argue that the medications serve valuable long-term goals of protecting against future risks that those diagnosed with ADHD may incur.



An image from an article published on the website of a private center for the diagnosis and treatment of ADHD disorders claiming that pharmaceutical treatment of ADHD can reduce automobile accidents among adults with the disorder [see [link here](http://www.anigma.co.il/%D7%94%D7%98%D7%99%D7%A4%D7%95%D7%9C-%D7%91%D7%94%D7%A4%D7%A8%D7%A2%D7%AA-%D7%A7%D7%A9%D7%91-%D7%91%D7%A7%D7%95%D7%A0%D7%A6%D7%A8%D7%98%D7%94-%D7%9C%D7%9E%D7%A0%D7%99%D7%A2%D7%AA-%D7%AA%D7%90%D7%95), last updated on 24.8.20]

As can be seen in the image above, the claim of protection against future risks consists of three parts. The first part reminds the reader that ADHD is a naturally occurring disorder, which “results from changes in the brain structure and its functioning, also chemically.” The second part warns that the disorder increases future risks, such as car accidents, and the third part presents scientific findings that “effective pharmacological treatment significantly reduces” risk. With the assumption that these three claims are true, the conclusion is that “there is also no escaping pharmacological treatment,” just “like glasses.” Such conclusions are sometimes accompanied by a covert or overt recommendation of a specific brand of drug whose advantages clearly outweigh those of the older medication whose patent has expired.

Such conclusions as seen above in the featured article are presumably reliable, as they are based on scientific research. Furthermore, conclusions from a recent literature review and meta-analysis indicate that ADHD medications are able to protect against a host of risks associated with ADHD (Boland et al., 2020). Among other risks, the medications have been found to protect against injuries and accidents (Chen et al., 2017), delinquency (Mohr-Jensen et al., 2019), drug use (Change et al., 2014), and suicide (Liang et al., 2018). As we have very recently learned, these medications have even been found to protect against COVID-19 infection (Merzon, Manor, et al., 2020).

But, is this an accurate scientific picture? In a previous article addressing the scientific validity of ADHD diagnoses (Ophir, 2020), I listed a series of methodological and conceptual failures that refute the first two elements of the above claims touted in the article. The first, ostensibly maintaining that ADHD is a chronic disorder that “results from changes in the brain structure and its functioning, also chemically” has no scientific basis. On the contrary, there is ample evidence to contradict this view, and leading psychiatrists, who form the core of scientific consensus, are now dispelling the myth that children with ADHD suffer from a biochemical imbalance in the brain (for more information, see section 4.1). Comparing pharmacological treatment to glasses, then, is a fundamentally incorrect comparison, simply because psychiatric disorders of questionable scientific validity cannot be likened to physiological diseases or disorders.

Similarly, the second part of the claim, that ADHD is a dangerous disorder, is far from reality. Of course, there is a possibility that adventurous, curious, and not particularly obedient children will engage in risky activities that will expose them to certain dangers (Pollark et al., 2020), but there is a big gap between this reality and the claim that ADHD is a risky condition, as well as the conclusion that “there is no other option” other than daily pharmacological treatment. These severe hypothetical risks are not part of the definition of ADHD (American Psychiatric Association, 2013). They also are not characteristic of young children, and to the best of my knowledge, they have never been associated with ADHD in a direct, causal relationship. On the contrary, there are studies that have challenged the correlation between the disorder and these risks. For example, one meta-analysis study did not find any evidence that drivers with ADHD drive more carelessly or under the influence of alcohol compared to other drivers (Vaa, 2014). In fact, this meta-analysis refuted the oft-touted claim that drivers with ADHD are four times more likely to be involved in a car accident than drivers without ADHD (Barkley et al., 1993). In short, one should not rush to believe the claim that ADHD is a risky condition that requires daily medication. Conversely, we are much more likely to be witnessing two familiar phenomena from the modern world of medicine: medicalization and “disease mongering.” The result of the first stage, medicalization, is that classroom behaviors or academic performance that do not meet some artificial threshold are labeled as a neuropsychiatric condition requiring medical intervention (Maturo, 2014; Searight & McLaren, 1998). In the second “disease mongering” stage, pharmaceutical companies and their representatives artificially exaggerate the prevalence, severity, and danger of the medical condition (Blasco-Fontecilla, 2014; Wolinsky, 2005), in the hope of increasing the rate of sales of their medications (for more details, see Chapter 5).

But even if we accept the claim that energetic or distracted children indeed face greater physical risks, we are still left with the third claim that pharmaceutical treatment is able to mitigate them. According to the consumer leaflet that comes with a common ADHD medication, “the doctor may order you to stop taking Ritalin for certain periods of time (for example, on weekends, or during school or long vacations).” That is, even according to the drug marketers, the drug is like glasses which are needed for daily conduct most, but not all of the time and for most, but not all situations. ADHD, then, can be likened to a “seasonal illness,” which probably does not require life-saving treatment when there are no studies supporting such an approach (Ophir, 2020). And, unlike glasses, medications can cause serious side effects and long-term damage (see Chapters 2, 3, and 4). Fortunately (in my opinion), it appears that the majority of the general public does not “buy” the findings that emerge from the disease mongering research. Most users of ADHD medication choose to take the medication in academic environments only, and many parents avoid giving it to their children outside of school hours (Ophir, in preparation). Although parents are acting out of intuition, in this case, intuition is certainly worth relying on. Too often, medication studies, likely to have been influenced by the pharmaceutical companies (Whitaker & Cosgrove, 2015), exaggerate the effectiveness of a medication in a biased and unsubstantiated manner (Storebø et al., 2018). For example, in the recent meta-analysis mentioned above (Boland et al., 2020), in which all four authors had connections to pharmaceutical companies (according to their own declarations), the researchers concluded that the findings indicated that pharmacotherapy for ADHD was associated with a reduction in the risk of a variety of adverse effects associated with the disorder. However, when reviewing the results chapter of the study, a different picture emerges (Ophir & Shir-Raz, 2020). The protective effects of the medications against the majority of the risks, which included suicide, head injuries, drug use, and delinquency were based on only two studies (per each risk) and were **not** found to be significant. The only protective effect that was significant was for accidents and injuries, but this finding was characterized by too much heterogeneity, which makes it difficult for the researcher to interpret its meaning. This phenomenon, in which results are presented as if significant, but do not reflect the findings themselves, is called “spin” in the academic world (Boutron & Ravaud, 2018).

Similar spins and distortions in the analysis and interpretation of findings were also found in a disturbing, recently published article claiming that ADHD may increase the risk of contracting COVID-19, and that stimulant medications are able to mitigate the risk (Merzon, Manor, et al., 2020). In this article, the authors actually did not have any ties to the pharmaceutical companies (according to their declarations), but the study has so many problems that its conclusions cannot be trusted. A health risk researcher in the medical sciences, Dr. Yaffa Shir-Raz, and I conducted a thorough examination of the study (Ophir & Shir-Raz, 2020). Although we were unable to gain access to the database on which the conclusions were based from the researchers, we were able to compare the information in the article to the data presented in two other articles published just one day later by the first author (one article that used the same database and another article that was published in the same journal). In our investigation, we found that the article on ADHD and COVID-19 suffers from at least seven distortions and spins designed (even if not consciously or intentionally) to achieve the desired results, and possibly to continue to propel disease mongering (for more information on the distortions found in this study, see Chapter 5).

It is important to mention here that, even if there are more valid studies which have not resorted to methodological manipulations and have not unfairly framed the findings, most of them, as previously mentioned, rely on uncontrolled experiments that do not enable conclusive conclusions to be drawn. In contrast, when examining the relevant medications in controlled studies, as was done in the MTA study, it appears that the medications do not protect against risks such as drug use or criminal activities (Molina et al., 2013; Swanson et al., 2008). Not only is there no convincing evidence that the medications protect against future risks, but there is a wealth of evidence to the contrary – that the medications endanger the user, as we will see in the next chapter.

**2. Chapter Two: To what extent is pharmacological treatment for ADHD harmful and dangerous?**

Have you ever stopped for a moment to ask, why, apart from the MTA study, there are no other qualitative studies on the efficacy of long-term pharmacological treatment? Although such studies can be expensive and complex to carry out, it should a worthwhile investment, for pharmaceutical companies in particular. After all, a study that proves that a certain medication taken in childhood has a positive effect throughout life will multiply the company’s profits ten times over. The first answer to that question is that apparently, as shown above, longitudinal studies do not yield the desired results (particularly for the pharmaceutical companies, which typically help fund the study). However, another possible and more alarming answer is that such studies may reveal that there are a large number of participants who are not able to handle the adverse effects of the medications, and therefore drop out from the trial at an early stage (Storebø et al., 2018). In short, randomized controlled studies that are conducted over a long period of time may reveal permanent harm and adverse effects that will be very difficult to minimize or dismiss casually.

Consider the MTA study, for example. Apart from the decline in academic performance and the worsening of symptoms, it turned out that prolonged medication use also had developmental effects. Children who continued to take the medication in childhood were, on average, five inches shorter in adulthood (Swanson et al., 2008; Swanson et al., 2017). This phenomenon is well documented in the literature (Storebø et al., 2018), and even those who support pharmacological treatment do not dismiss it (Faraone et al., 2008; Vitiello, 2001). The typical marketing strategy, therefore, is to try and minimize this outcome by saying that it is not a “very serious” side effect. But is it accurate to say that it is “not a serious side effect’? After all, what might the impact on growth indicate? Whether it is due to daily appetite suppression or an acute and persistent impairment of the growth hormone (Aarskog et al., 1997; Faraone et al., 2008), how can it be determined that it is purely aesthetic damage and not a deceleration of growth processes and all that this entails, including deceleration in the development of the brain itself? Who knows what the child would have been able to achieve without the medicine?

For those who still view the negative impact on growth as a reasonable developmental price to pay, let us investigate some of the other dozens of adverse side effects of the medication. You must have noticed that I chose to begin the title of the current chapter – which addresses the dangers of pharmacological treatment – with the phrase “to what extent” and not “is.” This is because no researcher claims that pharmacological treatment is safe, including researchers who publicly support pharmacological treatment. The question is not whether pharmacological treatment is dangerous, but rather how dangerous it is and whether its dangers are lower than its benefits. After learning about the limited effectiveness of long-term treatment, we are left primarily with the question of how dangerous and harmful it is. In order to avoid fanning unsubstantiated fears, I approach this question solely on the basis of literature reviews, longitudinal studies, and case studies published in the scientific literature, with no reference to newspaper clippings or personal stories.

**2.1. Mild side effects**

Most children who are treated with ADHD medications suffer from at least one side effect (Storebø et al., 2018). Some of the mild effects are quite familiar. A literature review of 44 studies examining behavioral changes following the use of ADHD medications indicated a long list of side effects (Konrad-Bindl et al., 2016). You can judge for yourselves just how “mild” some of the side effects identified in these studies are: restlessness, hyperactivity (no, this is not a mistake), dizziness, nail biting, nightmares, crying, reduced speech, tics, aggressive behaviors, emotional volatility, anxiety, loss of joy in life, and depression. Incidentally, the prevalence of the latter side effect, depression, has skyrocketed at an alarming rate among girls following the increase in medication use cited in the Canadian study mentioned previously (Currie et al., 2014).

2.1.1. Involuntary motor/vocal movements (tics)

There is not enough time to list all the mild sild effects of the medication (a partial list is available in the consumer leaflet attached to the medication), but before proceeding to a discussion of the serious side effects, let us dwell for a moment on one of the “mild” side effects: tics. NIMH researchers conducted a double-blind study of 45 hyperactive boys treated with ADHD medications (methylphenidate or dextromethamphetamine) and made a particularly disturbing finding. Sixty percent of the boys had involuntary motor/vocal movements (tics) (Borcherding et al., 1990). Because the tics can appear as rather subtle gestures, in order to more easily identify them, I will detail some of the movements and behaviors that characterized a large proportion of the children who took the common drug (methylphenidate). These included abnormal movements of the mouth and face (tongue thrusts, licking/smacking/pursing of the tongue and lateral movements of the chin), stereotypic gestures, such as picking at clothes and fingernails and repeated rubbing of the chest, eyes, or face, and other tics such as blinking, head jerking, grunting, and involuntary trembling in the hands and feet.

A case study recently published in the *Journal of Clinical Psychopharmacology and Neuroscience* by doctors who support pharmacological treatment and want to help their colleagues enlist their patients’ cooperation and compliance in adhering to daily treatment, describes the case of a 12-year-old girl who bites her tongue and lower lip as a result of low doses of methylphenidate. Attempts at alternate pharmacological treatments, specifically atomoxetine (e.g., Strattera), were unsuccessful, and when they returned to the use of methylphenidate, the bites were so intense and painful that the doctors were forced to discontinue the pharmacological treatment (Gokcen et al., 2018). Fortunately, discontinuation of the medication resulted in cessation of the bites.

From my perspective, the tics themselves, as well as the other “mild” side effects, are sufficient to have us “take pause” and re-examine whether this is the way in which we want to treat our children, especially in light of the shaky scientific basis about both ADHD and the effectiveness of the medications, as discussed previously. In my opinion, it appears that many parents are worried about the medications’ side effects and rarely give them to their children for a long period of time. For example, in the COVID-19 study mentioned above, only one-quarter of those diagnosed (24.6%) filled three consecutive medication prescriptions in the year preceding the study (Merzon, Manor, et al., 2020). Despite the seemingly consensual assumption that this is a disorder that requires daily management (Kooij et al., 2019), many of those diagnosed with the disorder discontinue the medication when they are not in school (e.g., on weekends, holidays, or during the COVID-19 school closures) (Ophir, in preparation). However, because there are still many who believe that the benefits of pharmacological treatment outweigh the “mild” side effects, we must continue with a discussion on the long-term, severe side effects of pharmacological treatment.

**2.2. Severe long-term side effects**

The latest estimate published by the Cochrane organization, following a review of 260 studies, is that one percent of all people treated for ADHD will suffer from a very serious side effect (Storebø et al., 2018). One percent may sound minor, but given the rates of medication use noted at the start of this article, this translates to a vast number of children, and certainly far beyond the unfounded minimal estimations that appear in the consumer leaflet (Ophir, 2020). Serious side effects include premature death, heart problems, and severe psychiatric symptoms. Generally, I do not like to refer to studies in an “academic grocery list” fashion, but given my familiarity with readers’ healthy skepticism, I will elaborate on a number of illustrative studies that have found evidence of severe long-term side effects.

2.2.1. Premature death

Premature death in childhood and adolescence is an immense tragedy. Fortunately, this is not a common phenomenon at all, but it appears that the use of stimulants increases its risk. One explanation for this phenomenon is the increased risk of suicide. Among adolescents and young adults (15-21) who took methylphenidate (Ritalin), the risk of dying from suicide is tens of percent higher than their peers (Standardized Mortality Ratio = 1.84). Among young children (11-14) who take methylphenidate, the risk of dying from suicide is low in absolute numbers but, relative to other children who do not take the medication (in which the risk is close to zero), the risk is enormous (Standardized Mortality Ratio = 161.91) (McCarthy et al., 2009).

This disturbing statistic corresponds with the findings mentioned above regarding the loss of joy in life and depression associated with the use of ADHD medications (Currie et al., 2014). Another explanation for premature death is likely related to the effects of stimulant medications on the cardiovascular system. A study that examined factors that may have caused the sudden death of 564 children and adolescents between the years 1985–1996 in the United States (by comparing a parallel sample of children killed in car accidents), found that the risk of unexplained sudden death increases dramatically when the child is taking stimulant medications (OR = 7.4) (Gould et al., 2009).

2.2.2. Cardiovascular problems

Of course, we cannot know with certainty what exactly caused the sudden death among the children in the study in question, but the authors of the study suggest that the increase in mortality is the result of the medications’ effects on the cardiovascular system (Gould et al., 2009). This hypothesis did not appear out of nowhere. Even the most ardent supporters of medication recognize that the risk to the cardiovascular system is one of the most serious reported events (Faraone, 2018). This is likely the reason why the *Lancet* journal devoted to child and adolescent health recently issued special guidelines for starting pharmacological treatment for ADHD during the COVID-19 pandemic (Cortese et al., 2020). According to the new guidelines, pharmacological treatment should not be started during the COVID-19 pandemic if the person diagnosed with ADHD has a history of breathing or heart problems.

As was shown in the Australian Raine Study discussed above, stimulants endanger the user because they can cause a significant increase in diastolic blood pressure over time (Whitely, 2012). Another study conducted in southern Ontario on 2,013 children in grades 5–8 also found an increase in systolic and diastolic blood pressure and a significant increase in heart rate among medicated children (Amour et al., 2018). It is important to note that the same study also found that the heart rate and blood pressure of children diagnosed with ADHD and **not** receiving medication were the **same** as those of children not diagnosed with ADHD.

Similar findings were also obtained in a large study that retrospectively examined the cardiac activity of 55,383 children and adolescents diagnosed with ADHD with data spanning ten years (Winterstein et al., 2007). The study found that the use of stimulant medications increased the risk of emergency room visits for cardiac reasons. Among those who were not on stimulant medications, the risk of emergency room visits remained very low, at the sample level of risk as the general population. Lastly, a prospective longitudinal study of all children born in Denmark over the course of a decade found that stimulant medications doubled the risk of developing cardiac events (Dalsgaard et al., 2014).

2.2.3. Severe psychiatric symptoms – psychosis and mania

Special attention should be paid to severe psychiatric side effects. One of the justifications sometimes made for the necessity of pharmacological treatment is that medications reduce the risk of developing other serious psychiatric symptoms, such as psychotic or manic episodes (Biederman et al., 2009). The data, however, indicate the exact opposite.

Over a decade ago, researchers from the U.S. Food and Drug Administration (FDA) conducted a review of the data collected across 49 randomized controlled trials (RCTs) performed by the drug manufacturers themselves (who, of course, seek to demonstrate the efficacy and safety of drugs). The investigation revealed abnormal rates of psychotic and manic episodes (relative to the general population) in the experimental groups taking medications for ADHD. The hallucinations that were prominent among the children were visual and sensory hallucinations of insects, snakes, and worms (Mosholder et al., 2009). Accordingly, a large study conducted in Taiwan on 73,049 children and adolescents with ADHD, which tried to prove that ADHD is so dangerous that it could develop into a psychotic disorder, found that children treated with methylphenidate were at a higher risk for developing psychotic disorder during the course of the study compared to children who were diagnosed with ADHD but were not taking the medication (Shyu et al., 2015). Another study, conducted on adolescents with bipolar disorder, found that this severe disorder appeared earlier in adolescents who took stimulant medications compared to adolescents who did not use these medications (DelBello et al., 2001).

Reassuring results have recently emerged from Sweden, with a study that found no apparent increase in the risk of psychosis following the use of methylphenidate (Hollis et al., 2019). However, it is advisable not to give too much weight to this finding. Of the 61,814 participants who took the medication in the Swedish study, findings were presented on only 23,898 participants (38.7%). The majority of the sample was excluded from the study for a variety of reasons, including death (0.6%), taking other ADHD medications in addition to methylphenidate (11.2%) and most oddly, for being of “inappropriate age” (49.5%) (Hollis et al., 2019, p. 654). In other words, the researchers ignored the data on approximately half of the participants in their sample who started treatment with methylphenidate before the age of 12. The researchers’ disregard of a large portion of data, and the fact that four of the researchers have connections to pharmaceutical companies (for more information, see Chapter 5), raise a suspicion that, even their data shows an increased risk of psychosis following the use of medications before adolescence.

In stark contrast to the Swedish study, Canadian researchers who followed children treated with stimulants (primarily methylphenidate) for five years found that almost ten percent of them developed psychotic symptoms and that the vast majority (88%) were young children under the age of 12. Aside from the increased risk of psychosis, nearly 12% of children developed mood disorder symptoms (overall, at least 18% developed some sort of disorder) (Cherland & Fitzpatrick, 1999). Take note of what this study shows then happened. Following the onset of new symptoms, some of the children “gained” an additional psychiatric diagnosis of a pervasive developmental disorder (PDD) or bipolar disorder (BPD) which, of course, entails additional pharmacological treatments besides stimulants. In such cases, proponents of pharmacological treatment tend to claim that the disorder was so severe in the first place that the stimulants actually masked or delayed the onset of the new disorder. However, in the study in question, it is difficult to make this argument because more than half of the cases of psychotic outbreaks occurred almost simultaneously with the first dose of the medication or within a few weeks after it (Cherland & Fitzpatrick, 1999).

The direct link between the usage of ADHD medications and the onset of severe psychiatric symptoms was also demonstrated in a large study of 12,856 young adults aged 18–24 (Cressman et al., 2015). This study revealed an increased risk of hospitalization for psychosis or mania within 60 days of first administering the drug (OR = 1.86). Moreover, one-third of young adults who were hospitalized received a prescription for ADHD medications when they were released from the hospital, and almost half of them (45%) needed to return to the hospital within a short period of time. These findings are consistent with findings from studies on monkeys that exhibited stereotypic gestures and hallucination-like behaviors following a “treatment” of low doses of stimulants (Castner & Goldman-Rakic, 1999). Now, judge for yourself what preceded what: the severe disorder or the treatment for the disorder.

Unfortunately for society as a whole, when findings that challenge the safety of pharmacological treatment appear, they are not given exposure. Yet, there are some doctors who have emerged from the silence and published shocking case studies on the effects of pharmacological treatment. As early as 1967, even before the invention of modern ADHD (Ophir, 2020), the scientific journal of the Canadian Health Organization published a case study of psychosis that developed from treatment with amphetamines (Ney, 1967). Billy (pseudonym), an eight-year-old boy with a perfectly normal developmental history, was diagnosed with a disorder then known as Minimal Brain Damage[[3]](#footnote-3) due to his poor performance and behavioral disruptions in the classroom, and he was treated with amphetamines. One day, shortly after Christmas, Billy began to hallucinate that unidentified figures were throwing snowballs at him, spying on him, and talking about him. He heard strange noises (which he demonstrated to his parents by pinching his nose), which did not allow him to fall asleep, and he felt that someone was touching him on his thighs and genitals, and he could not be convinced that any of these things were not realistic. One time, out of panic, he jumped off the trampoline in a dangerous manner because he thought someone was looking at him from around the corner. Billy was in an endless loop. When he tried to stop the pharmacological treatment, the hallucinations stopped but his hyperactivity increased, and he was expelled from school. When he resumed taking the medication so that he could go back to school, his paranoid delusions and hallucinations returned. In this study, similar to the other studies mentioned above, the hallucinations were connected to the pharmacological treatment. They appeared while taking the medication and disappeared upon its cessation.

A more recent case study published in one of the leading American journals in psychiatry (*The American Journal of Psychiatry*) relates the story of a young boy diagnosed with ADHD due to his difficulty in concentrating and his tendency to get distracted. At the age of seven, the child began taking methylphenidate (Ritalin) and, apart from “mild anorexia,” everyone was satisfied with the improvement in his symptoms. Then, at eight years old, having no personal or familial prior psychiatric history, and shortly after recovering from the seasonal flu, he suddenly developed visual and auditory hallucinations. The boy saw old people (who were not there) and felt a strong need to throw himself down the stairs. During this time, the child felt constant fear and anxiety. He cried a lot at school and was unwilling to separate from his mother. Fortunately, lowering the dose of the medication alleviated the psychotic symptoms and the discontinuation of the medication eliminated them altogether (Ross, 2006).

The last case study discussed in this section is the most shocking one of all. Changes in the dose of methylphenidate (in this case, Concerta) given to a ten-year-old boy diagnosed with ADHD caused severe sensory hallucinations (Rashid & Mitelman, 2007). The child felt that there was fluid dripping down his legs due to a genital injury (that had not actually occurred) and believed that the tip of his penis and his scrotum were damaged in such a way that his urine seeped down towards his feet and the floor. These hallucinations were accompanied by burning sensations in these areas and a feeling as if he had a stone in the tip of his penis. In addition, he experienced sensory hallucinations in which he felt insects crawling under his skin and inside his hair and mouth. As a result, he developed cleansing motions and rituals to remove them. Due to these symptoms, the methylphenidate treatment was stopped and within two days, the entire psychotic manifestation disappeared, including multiple somatic sensations (Rashid & Mitelman, 2007).

I apologize to the readers if the case descriptions that I have presented have made them feel uncomfortable. These descriptions are indeed unpleasant to read, but they are important for illustrating the severity of the risks involved in pharmacotherapy for ADHD. As I wrote in the opening of this article, the purpose of the article is not to instill fear or to provoke, but to expose the information that is hidden from us (Chapter 5), and enable us to make the best decisions for our children.

**3. Chapter Three – How is pharmacological treatment manifested in everyday behavior?**

**3.1. Behavioral withdrawal, apathy and depression (sometimes interpreted as behavioral improvement in the classroom)**

Among the many “mild” side effects of methylphenidate, the “behavioral withdrawal” phenomenon stands out the most (Mayes et al., 1994). Many children who take medication for ADHD exhibit “zombie-like behaviors” (Swanson et al., 1991) and appear to an onlooker as withdrawn, indifferent, and sometimes even in shock. The child becomes much less curious (Fieldler & Ullman, 1983) and much more apathetic, passive, and submissive (Granger et al., 1993). And although we are all familiar with the “zombie” phenomenon, it is not hinted at in the consumer leaflet accompanying the common medication (Ophir, 2020). I do not know why indifference or apathy are not mentioned, but I imagine that the authors of the leaflet feared that we would discover the following simple truth: the desired effects of the drug (a decrease in hyperactivity and distractions) are actually a major negative side effect of the drug (Breggin, 2013, pp. 81–82). The medication acts like a “mental chain,” which disciplines the child and deprives him or her of the need for “action” and the desire to shoot small paper balls at classmates. This may be why the vast majority (77%) of children receiving the medication are boys (Fogelman et al., 2003).

And what’s wrong with a little indifference, you ask? The apathy that results from the medication gradually develops into a feeling of lacking joy in one’s life, social withdrawal, and melancholy – known side effects of the drug which, for some reason, are also overlooked or minimized by the drug manufacturers. For example, an older short-term RCT study that miraculously demonstrated the benefits of methylphenidate for kindergarten children (!) minimized the side effects in the abstract of the article. However, a closer examination shows that kindergarten children who took the medicine in high doses were less interested in other children and were significantly sadder than children not exposed to the medication (Firestone et al., 1998). As can be seen from the publication year of the study I just cited, this is not a new phenomenon that has been unknown until now. As early as the 1970s, Professor Barkley reported a decrease in the overall level of activity and an increase in the preference to play alone among children who took the medication (Cunningham & Barkley, 1978). These effects may explain the high incidence of depressive disorder in children taking medication for ADHD (Cherland & Fitzpatrick, 1999; Currie et al., 2014).

**3.2. Stereotypic and compulsive behaviors (sometimes interpreted as behavioral improvement in the classroom)**

Behavioral withdrawal (e.g., of unwanted behaviors in the classroom) is accompanied by another phenomenon of over-focus and compulsive behavior, which is sometimes also interpreted as a desirable effect of the medication (Breggin, 2013, pp. 82–83). In the NIMH double-blind study mentioned above, half of the children (51%) treated with ADHD medications developed compulsive behaviors (Borcherding et al., 1990). Compulsive behaviors may be perceived by teachers or parents as positive and desirable behaviors: for example, continuously practicing an instrument or strictly adhering to accuracy. However, when performed constantly, these behaviors can be excessive and ineffective. Here, again, I will detail the behaviors in order to enable parents to identify them when they appear. Such behaviors included repetitive checking of work, many erasures and corrections, pedantry and insistence on unimportant details, repeatedly drawing in the same place, re-performing tasks that appear to the child as if they had been done imperfectly, repetitive, purposeless speech or play, and difficulty completing activities in the home or classroom (Borcherding et al., 1990).

What happens, then, to children who take the medication on a daily basis at school? Children, like the cubs of other animals, have a need to run around, investigate, play, and use their senses to explore the environment; when children are given amphetamines, methamphetamines or methylphenidate, they turn off. Studies conducted on monkeys demonstrate that these substances turn the monkey into a submissive animal. Instead of trying to escape from the cage, the monkey hardly moves. It exhibits depressive-like behaviors and useless stereotypic-compulsive behaviors, such as walking in circles or repeatedly chewing the palms of their hands (Breggin, 2000; Castner & Goldman-Rakic, 1999; Castner & Williams, 2007).

Among school children, the medication suppresses unwanted classroom behaviors. The child’s spark is extinguished. The children no longer seek to find exciting stimuli in the classroom and do not look out the window with hopes of discovering something that will save them from boredom. Instead, they become obsessively focused on the task of accurately copying what is on the board or meticulously completing the worksheets in front of them. In light of these observations and the absence of proof of medication’s effectiveness, and the presence of multiple risks as described in previous chapters, a significant moral question arises, especially in the context of the power relations that exist between adults and children. With the use of the medication, the one in the powerful position (the adult) exercises authority over the one in the weak position (the child), thereby turning the child into a submissive, conformist, and obedient child (Breggin, 2000). I would not be surprised if future generations learn in school that pharmacological treatment was used as a “chain” to oppress millions of children in the early 21st century.

**4. Chapter Four – How does pharmacological treatment affect the human brain?**

If the goal of attaining obedience through biochemical coercion was only limited to the school setting, it would still be possible to understand how there are people who support distributing the medication. However, today we know that these medications cause permanent brain damage; and it’s time to say enough. The truth about these medications is quite contrary to the narrative that is marketed to the public, such as that ADHD medications are necessary to prevent long-term damage. As illustrated above, many studies have attempted to prove that ADHD is dangerous and requires medication but, all too often, these studies “forget” to separately examine the children who are treated with medication. Without an examination that compares children taking medication and children not taking medication, we cannot determine whether the adverse effects arise from the disorder or the medication.

When studies are conducted to examine the difference between those diagnosed and taking medication and those diagnosed but not taking medication, disturbing findings are revealed. A recently published study found an increased risk (2.4 times) of brain disease in the basal ganglia and cerebellum areas in 31,769 adults with ADHD (Curtin et al., 2018). However, when the risk for brain disease was tested only among the 4,960 adults who took ADHD medications, there was a multifold increase in risk (by 8.6). Among the other participants, for whom information about medication use was not available, the risk was decreased (by 1.8). As can be seen from the studies discussed in the earlier section on psychosis and mania, these researchers also presumed that the source of the increased risk among those taking medication was that these patients had more severe ADHD symptoms in the first place. But, is this a plausible explanation? To answer this question, we must delve into the psychopharmacology of the medications.

**4.1. Pharmacological treatment creates a biochemical imbalance and causes irreversible brain damage (the biochemical imbalance that is attributed to ADHD is a myth)**

How do ADHD medications actually work? In a narrative that has been strongly promoted by pharmaceutical companies and their representatives (Schwarz, 2017), it has been argued that children with ADHD lack sufficient amounts of key neurotransmitters – dopamine and norepinephrine – which are necessary for the proper functioning of cognitive-organizational processes (del Campo et al., 2011). Specifically, the chemical imbalance in the brain has been attributed to a problem in the reabsorption process of these molecules. Without getting mired in neurobiological complexity, I will mention in a schematic manner that the neurotransmitter molecules (e.g., dopamine) are secreted by the pre-synaptic neurons to the synapse, stay there for a while and then continue on to the receptors in the post-synaptic neurons. The remaining neurotransmitters that are left in the synapse are returned to the neurons from which they came, through specific proteins called transporters, in a process called reabsorption. For years it has been argued that the reabsorption process is deficient in children with ADHD. In an article that has been cited hundreds of times, Thomas Spencer and colleagues examined eight studies and found that six of them demonstrated that there were too many dopamine transporters in the brains of children with ADHD (Spencer et al., 2005). In other words, dopamine is eliminated too quickly from the synapse, and thus the brains of the children do not attain the full potential of dopamine concentration. This is the point at which stimulant medications are introduced. The medications ostensibly compensate for the biochemical deficiency by blocking the reabsorption of dopamine and norepinephrine and retaining them in the synapse for a longer amount of time (Rosa-Neto et al., 2005).

But, is there really any evidence of chemical imbalances in Spencer’s review? In addition to the two studies that did not find this imbalance, it turns out that four other studies “forgot” to separate children who took medication and children who did not take medication (see Table 1 in Spencer et al., 2005). Moreover, a study that was conducted a few years later found no difference in the amount of dopamine transporters between subjects with and without ADHD (Wang et al., 2013). In reality, already at the end of the last century, the theory of “biochemical imbalances” was abandoned by the mainstream psychiatry research (with some saying that it was never supported) (Whitaker & Cosgrove, 2015). The majority of mental health researchers do not support simplistic and one-dimensional explanations such as biochemical imbalance (Jucaite & Nyberg, 2012; Kendler, 2005; Krishan & Nestler, 2010). On the contrary, they view it as a sort of popular myth that does not have any scientific basis, and they resent those who try to attribute it to the field of psychiatry. In the words of Professor Ronald Pies, who was the editor-in-chief of the *Psychiatric Times*, “As for the bogus chemical imbalance theory and its misattribution to the profession of psychiatry, it is time to drive the stake into its misbegotten heart” (Pies, 2019).

If a biochemical imbalance in the brain could be demonstrated, then we would be able to abandon the battery of tests and the expensive, long, and unreliable behavioral examinations and settle for an unequivocal biological test that would determine whether or not the child has ADHD. However, as explicitly stated by Professor David Kupfer, who led the task force of the DSM-5, the reality is that we have no biochemical markers for psychiatric disorders (Kupher, 2013), including advanced brain imaging measures. The literature on brain differences between children with and without ADHD suffers from a significant reliability problem (Ophir, 2020) and the results that have been reported in the literature do not agree about specific agreed-upon regions of the brain (Samea et al., 2019). This is also likely the reason why the medications are claimed to work on everyone, regardless of religion, race, and diagnosis. The claim that only medications can improve performance among those diagnosed with ADHD is a false myth in and of itself (Ophir, 2020). I do not know how doctors who prescribe these medications today justify their use, especially in light of the fact that, even from their perspective, a large proportion of ADHD diagnoses appear to be misdiagnoses (Merten et al., 2017).

However, for the purposes of discussing how pharmacological treatments work, let us assume there is some degree of truth in the biochemical imbalance hypothesis and that the reabsorption process does indeed occur too quickly in the brains of children with ADHD. How will the medications treat that problem? In the short term, they will retain the neurotransmitters in the synapse and thus artificially increase certain cognitive abilities, but what will happen to the child’s brain in the long term? Considering the lack of longitudinal studies in humans and the understandable ethical limitations, in order to answer this question, we must turn to animal studies which allow researchers a greater latitude in analyzing the effects of the medications.

Studies in monkeys show that stimulants given over a long period of time, and in doses similar to those given to children, cause long-term brain damage (Castner & Williams, 2007). Brain damage is manifested in the degeneration of the nervous system, damage to brain plasticity and damage to organizational functions – the same cognitive functions that are presumed to be impaired in ADHD. Studies on mice have yielded similar results. In an attempt to deal with the neurotoxin methylphenidate, oxidative stress and inflammation of brain cells develops in the brains of mice, which ultimately damages the DNA molecules (Andreazza et al., 2007) and leads to cell degeneration both in the cerebral cortex and the hippocampal region which exists deep within it (Motaghinejad et al., 2016; Motaghinejad et al., 2017).

The extensive brain damage likely originates from exactly the same brain process that was intended to improve following the administering of the medication. In one of the first studies on the long-term effects of methylphenidate in mice, damage to the dopamine transporters was observed in a region of the brain called the striatum. This damage persisted over time, even after the discontinuation of the medication (Moll et al., 2001). Another study found that methylphenidate elicits a chain of inflammatory-protective responses in the brain that are manifested by an increase in microglial cells (designed to protect the brain) in the basal ganglia region and a decrease in the number of dopamine-secreting cells in the striatum, within the substantia nigra pars compacta (Sadasivan et al., 2012). The reason that I note the specific regions is because these are regions that play an important role in the way that animals, including humans, react to reinforcements, and therefore also in the development of physiological addiction to medications and drugs.

The significant brain damage that affects the dopamine regulation system, which occurs following the administration of methylphenidate, reduces the mouse’s sensitivity to reinforcements (Marco et al., 2001); similar to the child’s behavior that had been squashed, so too is the mouse’s behavior. A mouse that receives methylphenidate becomes an apathetic mouse. It is less responsive to reinforcements such as sugar, new and intriguing activities, and sexual activities (Bolanos et al., 2003). It is reluctant to spontaneously explore the environment as it had done in the past, and it appears to be a depressed animal (Carlezon Jr. et al., 2003).

**4.2. Compensatory mechanisms and psychoactive substance addiction**

As with any drug, in addition to the direct adverse effects of the drug, there is also damage that results from the brain’s attempts to deal with the neurotoxin. A young researcher by the name of Dr. Emanual Quansah from the Center of Neuroscience in Michigan recently published fascinating findings from his doctoral dissertation. Through various bioanalytical methods, Quansah compared mice that received methylphenidate for a short period of time with mice that received the medication for a long period of time, and found that the latter mice suffered from many long-term biochemical changes in the brain (Quansah, 2017). The particularly troubling finding is that, among mice that received the drug for a long period of time, there was a significant increase in dopamine transporters, the same proteins whose function it is to eliminate dopamine from the synapse (Quansah & Zetterström, 2019). It seems that the brain realizes that it is under a dopamine “attack,” and consequently produces more and more transporters to eliminate the excess dopamine.

It is now easy to understand why the desired effects of the medication weaken over time, why there is an exacerbation of symptoms in long-term use and why, when an attempt is made to stop the medication, there is an increase in ADHD symptoms as well as the onset of severe withdrawal symptoms (Wang et al., 2013). Even if methylphenidate appears to be effective to some extent in the short term, quite quickly it causes long-term changes to the dopaminergic system. These changes constitute the basis for drug tolerance and addiction, phenomena well known to us from people who use stimulants (Proebstl et al., 2019). In light of this, it is no wonder that when methylphenidate is given to hyperactive mice (you would be surprised, there actually are such creatures) that are later exposed to cocaine, they consume more cocaine than their musine counterparts that did not receive the medication (Kantak & Dwoskin, 2016). In short, animal studies demonstrate that stimulants can cause physiological addiction to hazardous substances.

In my opinion, it is difficult to differentiate a physiological addition that originates from changes in the dopaminergic system from an addiction that is purely psychological, but there is a reasonable foundation on which to base the belief that daily medication use may also produce a non-physiological sense of dependence. A large Israeli longitudinal study of 6,830 children and adolescents recently published in the journal *European Child & Adolescent Psychiatry*, found that prolonged used of ADHD medication in childhood predicted the use of antidepressants in adolescence (Madjar et al., 2019). Children who adhered to the use of methylphenidate in childhood had a 50% higher chance of taking antidepressants in adolescence compared to children who did not adhere to the use of the medication! One potential explanation for these results is the one that the researchers posited (like many researchers before them, as we have seen from the earlier studies discussed); that is, that the increase in risk was more pronounced among those who adhered to the medication because their ADHD was more severe in the first place (and therefore, allegedly developed into depression). However, when considering the findings from the animal studies presented here and the studies presented in the earlier section on severe psychiatric symptoms, it seems to me that this explanation is unjustified and \_\_\_\_\_\_. In my opinion, there are more plausible explanations, which do not contradict one another: (1) that stimulant medications increase the risk depression, as we saw above; (2) that the overloading of external substances on the central nervous system activates compensatory mechanisms and leads to physiological addiction; and (3) that taking the medication at a young age instills in the young child a psychological perception that problems and challenges are solved with pills (Ophir, 2020). Things are a bit difficult, so let’s take Ritalin; things are much more difficult, so Prozac or Clonex or Risperdal or Lithium – solutions in a capsule, provided directly by a doctor.

**5. Chapter Five – How is it that the public is unaware of the ineffectiveness and risks of the medications? – Connections with pharmaceutical companies**

Some readers must be asking themselves, where has all this information been all this time? How is it, for example, that many doctors are unfamiliar with the data from the MTA study? To begin answering these questions, I recommend visiting a page from the official NIMH website [dedicated to addressing questions and answers about the institute’s flagship research](https://www.nimh.nih.gov/funding/clinical-research/practical/mta/the-multimodal-treatment-of-attention-deficit-hyperactivity-disorder-study-mta-questions-and-answers.shtml). As of August 24, 2020, for no apparent reason, the site presents only the results obtained after the first 14 months of the study, while completely ignoring the results obtained in subsequent years. Maybe the website editors did not know about the long-term studies that were conducted afterwards? However, a look through the website reveals that this is not an innocent mistake or a lack of knowledge. At the bottom of the page, in the last section, is a list of sources where you can “find more information about MTA research.” This list contains a large portion of the studies that I have presented in this article about the long-term results of the study, up to eight years after the beginning of the project. This “forgetfulness,” is better referred to as the deliberate concealment of information.

But how could such an important institute as the NIMH conceal such sensitive information from the public? Here too, there is a one word answer: money. And in four words: lots, lots of money. In the United States, for example, as I had mentioned at the start of the article, stimulant medications for ADHD treatment are at the top of the list of best-selling medications, especially for boys; 9.4% of elementary school-aged boys and 4.3% of middle school-aged boys receive stimulant medications (Qato et al., 2018). In 2010, methylphenidate won first-place in the “medication race” out of all the other treatments and medications given to adolescents (12–17) and won the prize for “greatest number of prescriptions written” (Chai et al., 2012). Some might suggest that this is due to an increase in ADHD, while others would attribute it to a disturbing increase in the (somewhat false) marketing efforts of pharmaceutical companies (Schwarz, 2017; Whitaker, 2005).

A study that tracked the money spent on the marketing of ADHD medications in the United States found that between 2014 and 2018, pharmaceutical companies spent over $20 million on lavish meals and other benefits to 55,105 pediatricians, psychiatrists, and family physicians (Hadland et al., 2020). I have no doubt that doctors who prescribe the medications do so out of genuine and professional considerations and believe that they are contributing to the mental well-being of the child. However, in the final analysis, numbers do not lie and free meals meant to promote a particular drug quickly convert to an increase in the number of prescriptions written for that drug (DeJong et al., 2016).

The more disturbing connections for me, however, are the economic ties formed between the pharmaceutical companies and the scientists. Many of the experts who represent the scientific consensus on ADHD (Kooji et al., 2019), including some Israeli experts, currently have (or have had in the past) economic engagements with pharmaceutical companies (Whitaker, 2005), which undermine the neutrality and objectivity necessary for conducting quality scientific research. For example, a recent meta-analysis that sought to demonstrate the benefits of methylphenidate (in the short term, of course) revealed a significant publication bias favoring publication of studies that point to drug treatment benefits and avoiding publication of studies that challenge these benefits (Pievsky & McGrath, 2018).

Publication bias is a problem plaguing many scientific fields, but in the case of ADHD, the problem relates not to loyalty to the specific field of research, but rather to an economic conflict of interest. This is true of studies in psychiatry in general (Cosgrove et al., 2006) and studies of ADHD in particular. For example, the vast majority of the 260 studies examined in the review discussed earlier were of very low scientific quality (GRADE quality rating = very low) and received a critical risk rating by independent reviewers, the highest bias rating.[[4]](#footnote-4) Such a risk comes at a price. When comparing studies funded by pharmaceutical companies with studies not funded by them, we find that the former report significantly fewer side effects and risks resulting from medication use (Storebø et al., 2018). These biases have been presented throughout the present article – in the recent meta-analysis discussed in section 1.4 (Boland et al., 2020), in the Swedish study on the psychosis phenomenon discussed in section 2.2.3 (Hollis et al., 2019), in the RCT study on kindergarten children in section 3.1 (Firestone et al., 1998), and even the study which, according to its authors, did not have any conflict of interest, on the role of medications in preventing the spread of COVID-19 discussed in section 1.4 (Merzon, Manor, et al., 2020).

In fact, the study on ADHD and COVID-19 is a fascinating case study because it brings together a multi-layered series of manipulations and spins that can provide a glimpse into the entire field. In the following four paragraphs (which can be skipped without interrupting the flow of the article), I will present two examples of distortions from a review article I co-authored with Dr. Yaffa Shir-Raz (Ophir & Shir-Raz, 2020). The first example regards the heart of the definition of ADHD. In a study that addressed the link between ADHD and COVID-19, the operative definition of the disorder included any person who had ever received such a medical diagnosis. Ostensibly, this is a reliable definition. However, the first author of that study published another article on ADHD and shigellosis the next day, also based on the Leumit Health Services’ medical records, in which a different definition was presented. In this second study, a person was defined as having ADHD only if the diagnosis was accompanied by three prescriptions for ADHD medications having been filled. The reason for narrowing the criterion, according to the researchers, was that the initial diagnosis of the disorder is not reliable enough because it is “given temporarily with a referral of the patient to ADHD clinics” (Merzon, Gutbir, et al., 2020).

It is important to understand that this is not a matter of nitpicking. From the moment that the researchers chose to define ADHD differently, astonishing and unexplained gaps in diagnosis rates were created. Whereas the one study (referring to ADHD and shigellosis) reported diagnosis rates ranging from 8.6% to 10.6% among children aged 5–18, the other study (on ADHD and COVID-19) reported rates ranging from 18.85% to 28.14% among children aged 5–20 (weighted average = 20.25%!). These are atypical rates on a global scale. Not only are these rates double the rates reported by the same first author (and another author), but they are very different than the data published by the CDC, and they are certainly nowhere near the data from the DSM itself, which determined that 5% of children suffer from ADHD. In fact, when such an unusual statistic is obtained, it should be considered the most striking result in the article and become the topic of urgent discussion in the scientific community. It stands to reason that if the core variable of the study is incorrect, then the whole study is problematic, and if the core variable is accurate, then it means that we are in the midst of a huge epidemic – an ADHD epidemic, which is much larger than the COVID-19 epidemic.

Another example of spin in the reporting of data and findings illustrates how the risks involved in pharmacological treatment can be disguised. Towards the end of the article on ADHD and COVID-19, the researchers note “a major weakness of the study” and admit that: “data regarding the presenting symptoms and severity of Covid-19 infection, as well as adverse clinical outcomes (hospitalization and mechanical ventilation) were not assessed” (Merzon, Manor, et al., 2020, p. 6). The choice of words here is very problematic. After all, the authors had access to medical records that they said included laboratory tests, medication prescriptions, and hospitalizations. Moreover, in another study that examined vitamin D and COVID-19, which was based on the exact same dataset of 14,022 Leumit Health Services’ medical records and was written by three of the same authors, the researchers did assess the symptoms and complications.

Why did the researchers choose not to “assess” these complications in the first study? After all, without presenting the data on COVID-19 complications, we cannot assess the safety of the ADHD medications in the context of the pandemic. Is it right to prescribe ADHD medications during a global infectious disease pandemic? Even proponents of pharmacological treatment for ADHD admit that it can cause cardiovascular problems. As described in section 2.2.2., a journal belonging to the *Lancet* issued special guidelines stating that pharmacological treatment for ADHD should not be started during the COVID-19 pandemic in cases in which there is a concern of breathing or heart problems. Furthermore, recent studies on stimulant medications (including methamphetamines) have shown that they can damage the blood-brain barrier and increase the risk of bacteria and viruses entering the brain, such as HIV, which causes AIDS (Kousik et al., 2012; Sajja et al., 2016). As such, they should be used with caution, especially during an infectious disease epidemic.

Therefore, when interpreting findings from studies dealing with ADHD medications, it is advisable to be skeptical and cautious, especially when regarding studies published during periods when there is likely be a decline in the sales of ADHD medications, such as during the first wave of the COVID-19 pandemic (Ophir, in preparation). For those who are not deeply involved in the quantitative research, this may sound like a theory of association, but the unpleasant truth is that in recent years, the field of biomedical research has suffered from an excess of fabricated results (Steen, 2011) – “spins,” intentional and unintentional, which create a false representation that does not reliably reflect the findings (Boutron & Ravaud, 2018). These phenomena require researchers to share their raw data files with the scientific community, as far as is ethnically possibly (Cumming, 2013) but, unfortunately, not all of them satisfy this requirement (Ophir & Shir-Raz, 2020). If the great scholars are found to decline into dishonesty, what can be said about the pharmaceutical companies? There is now real evidence, from the U.S. legal system, that companies that market psychiatric medications manipulate the data to achieve desired results. When desired results are not obtained, companies hide the results, partially report them, or discard evidence of serious adverse side effects (Whitaker, 2005).

At this point, it is important for me to repeat that, in the context of the connections formed between pharmaceutical companies and doctors and scientists, there is no hint that the latter two are acting with malicious intent. It is clear that many of them believe that the medications they are researching or prescribing to patients are capable of improving the quality of life of children or adults with ADHD. But even they, perhaps more than others, are subject to the effects of the false marketing campaign of large pharmaceutical companies (Schwarz, 2017). Thus, ultimately, what reaches the public is distorted scientific-medical information.

In my humble opinion, the conflicts of interest that exist between pharmaceutical companies and scientists and the host of risks involved in providing pharmaceutical treatment, place a great deal of responsibility on physicians. The physician who prescribes the ADHD medication should inform the parents of the extensive information available about the risks and, if not the information itself, then at least the fact that pharmacological treatment and the very existence of ADHD are at the core of a profound historical debate in the scientific literature. The rules of medical ethics in particular, and human morality in general require this. *Primum non nocere*. First, do no harm.

**Conclusion and a Representative Case Story**

 The picture that has emerged is bleak. Pharmaceutical treatment for ADHD is ineffective. In the short term, medication may lead to some improvement (especially for schoolteachers), but in the long term, the medications exacerbate symptoms of the disorder and cause many mild side effects. For example, they impair the growth process and produce involuntary motor/vocal movements. On a daily basis, during school hours, the medications suppress children’s behaviors. They cause them to retreat socially and become apathetic, and to over-concentrate and engage in useless compulsive behaviors that are sometimes interpreted by adults as a sign that hyperactive symptoms are easing and their ability to concentrate is increasing.

Quite a few children, unfortunately, will also suffer from much more serious side effects, such as heart problems and psychotic and manic episodes, symptoms that are by proponents of pharmacological treatment often deny are caused by medications, instead interpreting these symptoms as signs of serious psychiatric disorders that had previously been “dormant.” As such, Ritalin has become the “most effective and safe,” “first-choice treatment for ADHD,” a gateway to psychiatric labels, hospitalizations, and other dangerous medications.

**A representative case story**

As we approach the end of this article, I would like to tell you the story of a kind child named Toby, a story that was recently published in the *Journal of Child and Adolescent Psychopharmacology* (Friedland et al., 2019) and which represents the typical deterioration that begins with stimulant medications and may end with a life revolving around psychiatric issues. Toby, an energetic and kind-hearted fourth-grade child, was born in a normal birth to two parents in a stable relationship, with no history of mental illness in the family. Toby was an easy baby, who ate and slept well, but when he got to kindergarten at the age of three, the kindergarten teacher informed the parents that he was playing in a disorganized and inconsistent manner. In elementary school, Toby’s devoted parents took him for a psycho-didactic evaluation that indicated a level of intelligence in the typical range (IQ = 93), as well as difficulties in comprehension, reading, and mathematics (standard scores ranged from 80–90). “Fortunately,” according to the authors, “Toby had a pleasant temper and even if he fooled around at times, he had no behavioral problems.” But, in the fourth grade, it all began to unravel.

As the level of difficulty in school increased, Toby’s began to exhibit behaviors indicative of high levels of distraction and impulsivity, as well as behaviors that created disturbances in the classroom. According to the authors, these behaviors appeared to be “because of the difficulties” Toby was experiencing in learning, particularly in reading and arithmetic. From here, the path was short to diagnosing him with ADHD and prescribing a stimulant medication, lisdexamfetamine (which is known as an expensive and improved medication called Vyvanse). In the first few days, the medication led to an improvement in Toby’s ability to concentrate (along with a decrease in appetite and difficulty falling asleep) but, after a week, Toby started behaving strangely. He was anxious, pulled at his lower lip, and chewed objects. His concentration abilities became abnormal. He was hyper-focused on just one activity, in a repetitive and relentless manner. For example, he would repeatedly draw the same objects over and over, across piles of pages. As a result, even when he wanted to play with other children, he was unable to disconnect from his obsessive behavior.

After three weeks, Toby’s worried parents asked the doctor to stop the medication, but stopping it caused an unexpected deterioration. It seemed as if, all of a sudden, Toby’s entire personality had changed. For three consecutive days, Toby was exceptionally energetic, irritable, and angry. He began to behave in an uncharacteristic way, harassing other children and cursing. According to his parents, it looked like “ADHD on steroids.” His parents rushed to get him on an older medication (methylphenidate) but it did not work, and Toby returned to the previous medication. After two months of stereotypic behaviors, during one of the school breaks, another attempt was made to stop the medication, but this time, Toby’s reaction was severe. According to the authors, “it was much beyond a recurrence of ADHD.” Toby’s behavior became hypersexual, hyper-hyper-active, provocative, and aggressive. When Toby returned to school, he began taking the medication again, but the obsessive behaviors also recurred, until his parents could no longer bear it and decided to stop pharmacological treatment immediately. In the third attempt to stop the medication, the problematic and inappropriate behaviors had already become extreme and dangerous. Among other things, Toby tried to jump out of a moving vehicle, threw a bottle at a police officer, set fire to a store, destroyed his classmates’ belongings and exposed himself in public. These behaviors led to his hospitalization in a psychiatric ward, where Toby was diagnosed with acute mania and treated with antipsychotic medications and mood stabilizers.

Thanks to Toby’s parents, the story does not end in the tragedy of the chronic psychiatric patient. Toby’s parents sought out a second opinion to find out if Toby was truly suffering from an acute bipolar disorder that had been “dormant” until now. During the second evaluation, the doctors observed that the extreme behaviors were a result of withdrawal from the medication and its toxicity. In a genetic examination conducted by the doctors, the possibility was also ruled out that Toby’s reaction to the medication was unique to him. At the end, all things turned out almost all well. Seven months after his release from the hospital, Toby was no longer taking any psychiatric medications and the manic episodes had not reappeared. According to the doctors who described the case, Toby still had a tendency to be hyperactive and impulsive, and his academic performance was not yet high, but his teachers managed to guide and supervise him, and he had many friends and hobbies (Friedland et al., 2019).

In light of Toby’s typical developmental history and his limited cognitive abilities in a conventional school environment, Toby’s story is a powerful and representative one. Toby did not have an easy time at school, not because he had a neurodevelopmental disorder but because of his (completely normative) personality and skills which did not fit with the school settings. As a consequence, he became a victim of medicalization (Maturo, 2013). Rather than addressing this issue through psycho-educational means, teachers and doctors turned to common psychiatric labeling (ADHD) and default treatment (medications). From that point, there was a very short path toward the escalation of his situation. The medications were not effective. On the contrary, they exacerbated the symptoms (“ADHD on steroids”) and caused the onset of severe psychiatric symptoms. The doctors who prescribed the medications refused to see them as the source of the new symptoms and chose to hospitalize Toby, suspecting a new psychiatric disorder (bipolar disorder), and treated him with new psychiatric medications.

Toby’s story ended well, but the sharp-eyed among you must have realized that I made a slight change to the phrase “all’s well that ends well.” Toby’s story may have ended well, but it sheds light on many other cases in which concerned parents trust the medical establishment and are simply unaware of the potential side effects of the medications. The courage and resourcefulness that Toby’s parents showed – which gave them the ability to stand up to the medical system and demand that it reexamine itself –literally saved Toby’s life. Other parents may have accepted the prevailing medical position that refuses to acknowledge the role of medications in creating psychiatric symptoms, instead viewing these symptoms as a product of a dormant disorder that has just surfaced.

The current article is dedicated to all those mothers and fathers who seek to stop the cycle of psychiatric medications at the first dose of Ritalin, who stand up firmly against the medical establishment by relying on the dozens of scientific sources I have presented here and say: enough. As I cautioned at the start of the article, the current article should not be used as a recommendation or encouragement for any specific individual to stop existing pharmacological treatment. Rather it serves to bring existing information to light to the general public. The truth is, as extensively demonstrated in the article, that the existing information is quite simple to understand: ADHD medications, as I wrote in the introduction, are not fundamentally distinct from other psychiatrics medications or from alcohol or other mood-altering drugs. At first, the user may feel powerful feelings of intense concentration, tremendous abilities, euphoria, or calmness, but when used over a long period of time, their desired effects decrease and their negative effects start to increase. The brain recognizes the psychoactive substances as neurotoxins, and activates compensatory mechanisms in an attempt to fight invaders. These compensatory mechanisms, not the ADHD, cause a biochemical imbalance in the brain (as mentioned previously, the chemical imbalance attributed to the disorder is an urban legend whose purpose is to convince of the necessity of the medication).

The studies presented in the current article demonstrate that, in addition to the possible damage to the blood-brain barrier itself, daily exposure to stimulants can cause an increase in the concentration of neurotransmitters and the degeneration of the receptops in the post-synaptic neurons and thereby lead to physiological addiction. Then, when the user seeks to stop using these substances, we are likely to see an aggravation of exactly the same behaviors/emotions that led to the medication in the first place (“ADHD on steroids,” as in the case of Toby). Unfortunately, some parents are unaware of the tolerance that develops with the prolonged use of medications and mistakenly assume that the increase in symptoms that appears when they stop the medication is an indication of their necessity (“the child needs the medication, otherwise he destroys the house”). Other parents actually realize that the temporary worsening of the symptoms is a direct result of stopping the medication, but they see it as a mild side effect, which can be affectionately called – the “rebound” effect, although there is nothing endearing about it. On the contrary, it is a disturbing sign of the development of physiological dependence on the drug.

Therefore, before turning to the harsh intervention of biochemical processes, it is worth remembering Solomon’s wisdom: “In the face of madness, only love, that is the only answer.” Instead of stimulants, let’s give our children an overdose of love and empowerment (and ourselves a hearty dose of patience and faith) and, if necessary, use the variety of excellent alternative treatment options available for ADHD (Curtis & Patel, 2008; Fabiano et al., 2009; Ng et al., 2017).

It may sound like a cliché, but I fervently believe that in most cases of ADHD (not in cases in which the diagnosis of ADHD masks severe neurodevelopmental or psychiatric disorders), a supportive and loving environment will allow the child’s elastic brain to do what it knows to do best during the typical developmental process – to adapt and improve itself in the face of the dynamic needs of reality (Doidge, 2007; Rubin, 2009). We saw the mitigating effect that the normal developmental process of adolescence had on the “symptoms” of the group of children who did not receive medication in the MTA study. Thus, there is no reason to take a gamble on medications that impair the child’s typical brain development.

It’s 2020, forty years since the invention of ADHD, and it’s time we liberate ourselves from the tempting grasp of pharmaceutical companies. We live in an age characterized by the democratization of information and unprecedented access to knowledge, and there is no reason for us to allow these companies to hide the disturbing information about ADHD and pharmaceutical treatment. Returning to the message of the late Dr. Keith Conners, the “Father of ADHD,” with which we opened this article, who said near the end of his life: “The numbers make it look like an epidemic. Well, it’s not. It’s preposterous. This is a concoction to justify the giving out of the medication at unprecedented and unjustified levels.”

In the long run, not only is pharmaceutical treatment ineffective, but it is also likely to worsen the symptoms of ADHD. As we have seen, it causes behavioral withdrawal and compulsive behaviors, and can cause an outbreak of mania or psychosis, as well as many other harmful reactions, including cardiovascular problems. And the mind “knows.” The brain, understanding that these are dangerous toxins, activates compensatory mechanisms that disturb the delicate and healthy biochemical balance, and result in extensive and sometimes irreversible changes in the child’s young and developing brain. The public shall know and shall be careful.

1. The estimate of the number of children diagnosed with ADHD in Israel was calculated by the author from the Leumit Health Services data published in a recent study on ADHD and COVID-19 (Merzon, Manor, et al., 2020). This study was based on a large sample of 14,022 medical records, and the diagnosis rate of ADHD in the relevant age group (5–20 years old) was found to be 20.25%. Similar, and even higher, rates were observed by the author in two additional samples that I collected last year (2020): (1) a representative sample of 502 young adults (Jewish individuals, aged 18–30), which was collected through the company, panel 4 all; and (2) 853 young adults, who were recruited via snowball sampling in collaboration with other researchers as part of a larger study on screen time (Ophir, in preparation). [↑](#footnote-ref-1)
2. The proportion of children receiving ADHD medication was calculated by the author in a recent study on ADHD and shigellosis (Merzon, Gutbir, et al., 2020). Similar to the study referred to in the previous footnote (on ADHD and COVID-19), this study was also based upon the Leumit Health Services’ medical records. Approximately 8.8% of a large sample of 51,995 children (5–18 years old) received stimulant medications for ADHD. Note that this rate (8.8%) is, to some extent, an underestimate, because it includes only cases in which at least three prescriptions were filled within a period of 12 months. [↑](#footnote-ref-2)
3. ADHD/ADD entered the DSM in 1980. The psychiatric labels that preceded it included two labels that addressed physiological dysfunction in the brain itself: Minimal Brain Damage and Minimal Brain Dysfunction (Lange et al., 2010). [↑](#footnote-ref-3)
4. The risk of bias in studies was measured using a tool called ROBINS-I (Stern et al., 2016). Studies can receive one of the following four scores: low risk, moderate risk, serious risk, or critical risk of bias. [↑](#footnote-ref-4)