

Attention deficit disorder with hyperactivity and the cognitive enhancement Which is the the doctor's responsibility?

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Resumen

El artículo trata del mejoramiento neurofarmacológico de la cognición, uno de los temas más frecuentes en Neuroética y Bioética aplicada a la Neurociencia. Discute acerca del uso racional de estos fármacos. La *normalización social*, según Georges Canguilhem, unifica la diversidad estableciendo valores en común para una sociedad. El mejoramiento cognitivo farmacológico puede favorecer el cumplimiento de deberes y expectativas sociales surgidos a partir de estos valores. El mejoramiento cognitivo farmacológico cosmético y terapéutico (por ejemplo, el utilizado en el TDAH, caso sobre el que se centra este artículo) implica por parte del médico asumir la responsabilidad de facilitar el cumplimiento de ciertas expectativas sociales, adhiriéndose implícitamente a ellas. En la conclusión se considera necesaria entonces, una reflexión del médico acerca del sentido de estas expectativas teniendo en cuenta valores como la vida, la identidad, la integridad, la libertad, la salud y el bienestar de las personas y comunidades.

Palabras-clave: Cognición. Bioética. Neurociencia. Responsabilidad social.

Resumo

Transtorno por déficit de atenção com hiperatividade e o melhoramento cognitivo. Qual é a responsabilidade do médico?

O artigo trata do melhoramento neurofarmacológico da cognição, um dos temas mais frequentados na Neuroética e Bioética aplicada à Neurociência. Discute-se o uso racional destes fármacos. A normalização social, de acordo com Georges Canguilhem, unifica a diversidade estabelecendo valores em comum para a sociedade. O melhoramento cognitivo farmacológico pode favorecer o cumprimento de deveres e expectativas sociais surgidos a partir destes valores. O melhoramento cognitivo farmacológico cosmético e terapêutico (por exemplo, utilizado em TDAH, caso em que este artigo focaliza) implica, por parte do médico, assumir a responsabilidade social de facilitar o cumprimento de certas expectativas sociais, aderindo implicitamente a elas. Conclui-se considerando que é necessária, então, a reflexão do médico sobre o sentido destas expectativas, tendo em vista valores como vida, identidade, integridade, liberdade, saúde e bem-estar de pessoas e comunidades.

Palavras-chave: Cognição. Bioética. Neurociência. Responsabilidade social.

Abstract

Attention deficit/hyperactivity disorder and cognitive enhancement. Which is the medical responsibility?

The article is about neuropharmacological enhancement of cognition, one of the most common topics of the Neuroethics and Bioethics applied to Neuroscience. It discusses the rational use of these drugs. Social normalization, according to Georges Canguilhem, unifies diversity establishing common values for society. The pharmacological cognitive enhancement can help the compliance of the duties and expectations arising from these values. The cosmetic and therapeutic pharmacological cognitive enhancement (for example, used in ADHD, case in which this article is focusing) implies for the physicians the social responsibility of making easier the compliance of certain social expectations, adhering to them implicitly. Then it is necessary for the physician to reflect about the meaning of those social expectations taking into account values such as life, identity, integrity, freedom, health and welfare of persons and communities.

Key words: Cognition. Bioethics. Neuroscience. Social responsibility.

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One of the frequently themes in Neuroethics and Bioethics applied to Neuroscience is the *cognitive enhancement* through the use of neurodrugs. The *smart pills* are neurodrugs that increase the cognitive ability of anyone who take them, in case of who does it has an illness as well whether it is a healthy person, in this case we are talking about a *cosmetic effect* and of a *cosmetic neurology*.

The rational use of these drugs, which consuming is increasingly widespread, in first place obliges, to return to the discussion about what we understand by *normal* and *pathological*. According to the French philosopher and doctor, George Canguilhem¹, the *anomalies*, as expressions of individuals variations on specific aspects, become pathological only in relation to a particular kind of life, in which certain duties of a living being are set as inescapable. We may add, following the thought of this author, that culture has the effect of altering the way of life of men, which will invariably alter his duties and expectations. It follows the latter that the problem of the pathological in humans can not be defined only by the biological.

Facing the biological and cultural uniqueness of human beings, the *social normalization*, while external social election and decision to this organism, is presented as arbitrary social phenomena, that unifies the diversity and establishes common values for a society. Canguilhem notes that, if there are biological rules, *it is because life is not being submissive to the environment, but institution of its own environment, so it puts values not only in the environment, but also in the organism*. Then, the healthy man *is the one who can admits the progress to new standards. The man is healthy in the extent that it is normative with respect to fluctuations in their environment*². Canguilhem called this set of values *biological normativity*. So while demand of *standards* is internal of the biological organism, the *social normalization* rest on an election and decision outside from this organism, while standardized object³.

We think that the pharmacological cognitive enhancement, in case of healthy people as well as to those who suffer from a pathological state, can may promote the fulfilment of duties and expectations arising from these common values. The main purpose of our work is to present the question and guide the formulation of answers about what is the responsibility of the doctor when he has to indicate a *cognitive enhancer* drug, both for therapeutic use (increasingly common, as in case of people with Attention deficit hyperactivity disorder, ADHD) and in case it will be approved for use in healthy people.

As a means to think in the possible answers to the question we have focus our analysis in the use of the *cognitive enhancement* in people with ADHD, taking into account the complexity of the human being as social and biological.

What is Neuroethics?

Being Neuroethics a new area of knowledge, we consider necessary to refer to some of the definitions that we currently have of the same. Since 2002, different problems associated to Neuroscience began identifying themselves as a new part, of a new area of study that began to be called Neuroethics. In that same year, the Foundation DANA, a group of public interest in the United States doomed to the diffusion of the new science of the brain, sponsored a symposium titled, *Neuroethics: map of the new field*. In the same symposium arose the definition of Neuroethics given by Steven Marcus, who describes it as the study of ethical, legal, and social issues that are presented when the scientist findings about the brain and the behaviour are put into practice care, legal interpretations and social and health policies⁴.

The Sweden philosopher and neuroscientist Kathinka Evers mentions in her book *Neuroethics*, that this is interested in the benefits and the potentials dangers of the currently researches about the brain, questioning about issues that during centuries have been the exclusive preserve of Philosophy and that now seem to be object of study shared with Neuroscience such as the case of consciousness, self awareness, values and freedom. Evers mentions that we can divide Neuroethics in two great branches: the *Neuroethics applied and fundamental*.

The first, the *Neuroethics applied*, is focused in practical issues as are those that emerge from ethical issues that come, for example, from the use of technical neuroimages (brain nuclear magnetic resonances, for example) and the use of drugs and different technologies that can produce cognitive enhancement (as discussed below) and frame of mind. The *fundamental* Neuroethics wonders about the manner in which the knowledge of the functional architecture of the brain and its evolution can deepen our comprehension about the personal identity, de consciousness, the intentionality and the development of the moral judgement, among other topics⁵.

The Canadian neuroethicists Erik Racine and Judy Illes, highlight the relation between Neuroethics and Bioethics. For them the Neuroethics is a new field in the intersection between Bioethics and Neu-

rosience that focus in the ethical research in Neuroscience and in the ethical consequences that arise from the transfer of knowledge emerged from the research in Neuroscience to clinical and public domain. Regarding the clinical, provide an opportunity of an Ethic integration of various medical specialities (Neurology, Psychiatry y Neurosurgery) and the Ethic research related with the improvement of patient care⁶.

According to Walter Glannon, Canadian philosopher and neuroethicist, the capacity that have shown the resulted technologies of the current advances in the neuroscientific knowledge of mapping, intervene and alter the neural correlates of the mind involve significant ethical conflicts. This is because these techniques that target the brain, can reveal and change the origin of the mind affecting personal identity, the free will and other aspects of ourselves⁷. Then we shall see how the issue of *cognitive enhancers* constitutes a central topic of discussion for Neuroethics.

What form acquires social normalization in the case of ADHD?

The ADHD has been defined by the American Academy of Paediatrics (AAP), of the United States, as the most common *neurobehavioral disorder* in childhood⁸. The First Latin American Consensus on ADHD in 2007, defined it as the most common *neuropsychiatric disorder* worldwide in the paediatric population⁹. Dwivedi¹⁰ mentions the existence of different prevalences of children diagnosed with ADHD in different countries. The figures given by this author go from 4,5 % to 16,6 %. The last guide of diagnosis and treatment of ADHD in the AAP, talks about a an approximate percentage of 8 % of children and youth with ADHD⁸. The question formulated by Dwivedi, and that we share, is whether the difference in prevalence was not related to the lack of clear definition as to what is ADHD.

The diagnosis of ADHD requires, according to the American AAP, that the child's behaviour meets the criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM IV), of the American Psychiatric Association (AAP)^{8,11}. In turn, the DSM IV, mention the so called *cardinal signs* of ADHD, which include behaviour compatibles with inattention, hyperactivity and impulsivity. According to the guide for diagnosis and treatment of ADHD in the AAP in 2011, *the DSM IV criteria remain the best supported by the evidence and consensus, and represents the best method for communication between clini-*

*cians*¹². According to the First Latin American Consensus of Disorder Attention Deficit Hyperactivity in 2007: The construct of *ADHD is not dependent on cultural factors*¹³. Consider construct a term, or group of theorists terms, used in the formulation of a scientific hypothesis in order to explain and predict events¹⁴.

On one hand this consensus declares an independence of the construct of ADHD of cultural factors and at the same time recognize the absence, at least today, of specific biological markers that can and should search and use in everyday medical practice, in this sense it is mentioned that the diagnostic is clinical, *the biological markers as electroencephalogram (EEG), neuroimaging studies or neuropsychological tests are not definitive or necessary*¹³. The guide of diagnosis and treatment of ADHD in the AAP also mentioned that the malfunction is the indicator of the seriousness in the ADHD¹². Here we must clarify that the American Paediatric Association considers as operating manifestation of peer relationships, academic performance, adaptive skills and school performance⁸.

These parameters become necessary to use the reference of monitors in children's behaviour. According to that Consensus in the daily practice of *doctors who diagnose and treat the patients with ADHD, it includes the use of interviews and screening and severity scales in which patients, parents and teachers provide information about the behaviour observed in the patient*¹⁵. Obviously these behavioural characteristics (detected through scales based on DSM IV criteria) are at risk for a cultural bias (apparently not recognised by this consensus), to be interpreted in different ways, by different observers (this element is taken into consideration by the AAP Guide 2011) which would at least put in a position to debate the supposed diagnostic objectivity of ADHD achieved through the use of scales. If we thought of Canguilhem, he mentions that the *social normalization* unifies the diversity and establishes common values for a society. Regarding this unification of the diversity we mention that a problem that should be taken into account in the case of DSM IV is that it does not provides mechanisms to determine the severity of a symptom or set of symptoms (or signs) related to children according to their developing age⁸, *the sex* or the source of information¹⁶.

The *validity* of a measuring instrument or procedure refers to how well it measures what it intends to measure. In general terms the issue of *validity* raises many questions about the specific characteristics of measurement in medicine, for example,

how well measures a given characteristic in a questionnaire¹⁷. Then, in the case of DSM IV we should consider that the *validity* of the same as an instrument to detect the point at which the deterioration in the attention and activity level become a disorder, is at least questionable or it would merit at least some type of provision to be taken into account by the same doctors or other health professionals.

According to Boyce¹⁸, a general criticism to DSM IV has been that in an effort to improve the *reliability* of the instrument through a common nomenclature that would allow standardized diagnoses, its validity was sacrificed, considering that *reliability* refers to how are reproducible the measurement result if the same is performed several times on the same subject¹⁷. If we consider mental disorders as a product of dynamic interaction between brain biology and the social cultural context in which a child develops, it should be noted that the DSM IV does not provide to the clinician a tool to investigate the individual behaviour in different context although he notes in his Axis IV the need to record the psychosocial and environmental problems that may affects the diagnosis, treatment and/or the prognostic of mental disorder.

Remember also that the DSM IV proposes a multi-axial system that implies in the evaluation on several axis, each of which is related to a different area of information. Through the identification of these difficulties the DSM IV presents as diagnostic manual. We do not intend to undermine the objective and the importance of the same has had and has as an instrument to which emphasizes the need for explicit definitions as a means of reliable clinical diagnostics. What we intend to emphasize with the points raised is that the limits that the DSM IV has as diagnostic tool to demonstrate the existence of epistemological problems and potential bioethics conflicts that can arise about starting the exclusive use of this manual criteria for diagnosis ADHD.

Values and measurable facts define normal

Canguilhem¹⁹ mentions in his work the *normal and pathological* that the *technical and critical vocabulary of philosophy* of Lalande designates the "*norm*" as the *square*, i.e. that which leans neither to the right nor to the left; and remains in a middle. At the same time, he states that the Dictionnaire de médecine de Littré y Robin defines "*normal*" as that which is according to the rule, as that which is regular. Therefore *normal* will be that which is as it

should be and that which is found in most cases of a particular species or that which is an average of a measurable character.

Here Canguilhem finds ambivalence in defining *normal* because in the latter case, describes an *event* and the first a *value* that the speaker gives to the fact. A similar confusion occurs in medicine, where the normal state designates both the usual state of organs and their ideal state. In Medicine, the ordinary object of therapeutics will be the restoration of this usual state. Under this, we can say, that the attention (and also the activity, although with greater operational difficulties regarding the definition of the statistical variable to quantify) could be evaluated statistically in relation to population distribution, but also in relation to what the observer values as what should be.

Facing this definition we ask ourselves, what will depend to consider that a type of attentional performance is whatever it should be, and in turn, is what it should be to fulfil with the which objective or expectation? Can these goals or expectations be morally questionable or at least merit a reflection on their moral content? Probably yes. This affirmative answer leads necessarily to the question about the existence of the possibility that this reflection is given in the context of standard medical practices and health practice in general. Both inattention and hyperactivity may be a pathological state if, using words of Canguilhem^{19,20} are associated with a *pathos*, i.e. a direct suffering feeling, of impotence and thwarted life experienced by the the individual. Then, he won't be ill only in relation to the other, but also in relation to himself. Regarding the diagnostic process itself, standard clinical practice, in what order of importance is located the experience of illness lived by the child with ADHD? Do you take this experience into account?

The interaction between brain and context

The attention and the activity, as already mentioned, are evident through the presence of certain observable behaviours. If we assume that people's behaviour are a manifestation of the functioning of the nervous system, we think that there may be individuals who can present pathological changes in your health and your activity level as well as could present them to a level of any other biological function. This does not discharge the influence that social context has on the biological functioning of the brain and on the final manifestation of certain

behaviours. The behaviours defined as inattention and hyperactives are measurable biological fact influenced by the environment.

Thapar²¹ notes that certain genetic and environmental risk factors interact in increasing the susceptibility of the ADHD. Variants of genes were detected that will give the susceptibility to the appearance of behavioural features compatibles with ADHD. It had been described examples of this susceptibility in relation to genes variants for receptor D4 and D5 dopamine, SNAP-25 gene and a gene variant for the dopamine transporter. Other genes variants have been associated with the influence on the course of this disorder. For example, a variant of gene for the dopamine D4 receptor has been linked to the persistence over time of clinical signs compatibles with ADHD. In turn, the presence of a functional variant of the gene code for the enzyme COMT and a variant gene for the enzyme MAO A, have been associated with the appearance of a anti-social behaviour in individuals with ADHD.

Epigenetic is an emerging field that comprising those non-Mendelian heritable changes in gene expression that are not mediated by alternations in the base pairing of the DNA sequence. It involves the study of the casual interactions between gene and their products. Average epigenetic regulation adaptation to the environment, particularly under adverse environmental conditions, through genomic plasticity which results in the actual phenotype²². Currently we are dealing with the presence of a growing scientific effort to develop statistical models that can adjust to these complex methods²³.

In the case of the ADHD, Thapar also mentions epigenetic factors involved as revealed by the interaction gene/environment. An example of this interaction mentioned by the author is showing the strongest association that occurs between DAT1 haplotype (combination of risk alleles in gene association with the dopamine transporter) and behaviours typical ADHD, in those individuals with a maternal history of alcoholism during pregnancy²¹. In another study²⁴ linked to the presence of certain haplotypes of the DAT 1 in adolescents it has been found that the presence of the same, adding the exposure to the family context that the authors defined as *highly adverse* (evaluated by the *Rutter family adverse index*), has been associated to the most severe manifestation of inattention hyperactivity and impulsive levels, compared to others less adverse types of context and compared with groups of adolescents with other genotype/haplotype.

In this particularly work, it has been considered as familiar context *highly adverse* to the presence of a set of social variables among which it has been mentioned the parent's low educational level, overcrowding, parent's psychiatric disorder, history of family breakdown or crimes, early parenthood, the presence of only one of the parents, unwanted pregnancy, poor social integration, poor parenting skills.

Obviously the only thing we can conclude about this social variables is the presence, evidenced by this work, of some kind of statistical association between them, the presence of specific genetic alterations and the presence of certain behaviours compatibles with ADHD, which would reveal the need for a deeper investigation regarding the potential causality of each of these variables or group of variables relating to the behaviour compatible with ADHD. These studies are of great importance to show the potential partnership that would occur between the presence of certain innate biological characteristics, certain contexts and certain kind of behaviours, in this case, those corresponding to the ADHD. To summarize then, the biology would determined the mayor susceptibility to present behaviours compatibles with ADHD and the context would collaborate in the final manifestation of the same. This type of research is based partially on the idea that an objective taxonomy based on the biomarker discovery will allow the implementation of more effective treatments. However, interestingly, much of the researches regarding the ADHD assume that the detailed diagnostic categories in the DSM IV are valid, so what we have mentioned before, is at least to some authors questionable¹⁸.

The use of cognitive enhancers

The psychostimulants improve performance in working memory, an impaired cognitive function in people with behaviours compatibles with ADHD²⁵. It is the specific case of psychostimulant methylphenidate in therapeutic use in persons diagnosed with ADHD and in healthy individuals in *cosmetic neurology*^{26,27}. For the latter, Smith and Farah mentioned in recent work that the dextro-amphetamine and methylphenidate (both psychostimulants) seem to improve the retention of newly learned information, working memory and the cognitive control in some individuals, however there would be a great uncertainty about the extension of these effects and their dose dependence, individual differences and task specificity²⁸.

The possibility of this ambivalent use of stimulants (such as cosmetics and treatment), added to the aforementioned diagnostic difficulties, the following questions are relevant: In whom do they use them and why? Who and how should they decide to use them?; What values would be at stake?

If the diagnosis of ADHD was in part due to the absence of acceptance by members of the educational system, doctors and relatives on a variety of cognitive and behavioural profiles greater than that currently membership communities are willing to tolerate, then we would face the possibility of an over-diagnosis of this entity and at the same time over the use of the psychostimulants, not as a deficit treatments, but as a cognitive yields enhancers not necessarily pathological.

The expectations of parents and teachers

Besides drugs, we currently have psycho-educational approaches for children with behaviour compatibles with ADHD. Jensen mentions that psychostimulant medication is often effective in short term modification of the so-called *cardinal signs* of ADHD (inattention, hyperactivity, impulsivity), but it is not always effective in long term functional improvement of the child (for example, school performance, or child's relationship with peers and/or adults). Moreover, the psychoeducational approaches alone or in combination with low doses of medication can be effective in long term to reduce the cardinal signs and improve many functional aspects²⁹.

The Hastings Centre has conducted a series of *workshops* with participants from the clinical area and academic research with the aim of analysing the disputes arising from the use of pharmacological treatments for children with behavioural and emotional disorders, with particular emphasis in the case of ADHD. Erik Parens mentions in a publication on the conclusions arising from this meetings, that families have parenting styles and different expectation for children. In this sense the pharmacological treatment emphasizes the value of the *efficiency*, while psychoeducational interventions (also called psychosocial in the different consensus) would emphasize the value of *commitment* of the child with parents, peers, teachers or therapists and vice-versa, since it would be interpreted that the problem would not be only in the child's body but mainly in the interaction with the context³⁰. In the mode of a brief history review in the Latin American context, we can mention that the development of treatment algorithms for

ADHD students in Latin America began with the first consensus of the region held in 2007 in Mexico city; this algorithm took into account only pharmacological options. After the second region consensus held in 2008, in the city of Argentina de Mendoza, it was clear the need to include the psychosocial interventions, thereby defining an algorithm that would provide a multi-modal treatment³¹.

The *Multi-modal Treatment Algorithm for Latin American's Students with ADHD* emerged after the debates taken in the 1^o y 2^o Latin American consensus on ADHD, mentions in the session referred to the *Evaluation and Diagnosis* that, for an objective evaluation of the symptom severity, *it is recommended using validated scales for ADHD in students, such as the SNAP-IV³² or the Latin American Questionnaire. Once established the diagnosis, it is made an intervention plan with parents and the patient. Such a plan should take into account the expectations, beliefs, economic possibilities and family wishes, as well as therapeutic and pharmacological options available in each of the Latin American countries³³.*

We argue that taking into account the *expectations, beliefs and wishes* of the family, should not only be part of the stage of defining the therapeutic strategy, but should also start earlier in the diagnostic stage, if we are guided by ideas held by Canguilhem regarding the involvement of *values* in the definition of *normal*. The *Cartagena Declaration* (3^o Consensus on ADHD) in 2009, expresses this when it says that the disorder of ADHD is of biological origin with participation in its expression of psychosocial elements³⁴. Despite it does not explicit which are those psychosocial elements and how they could be characterized, at least this statement would serve to deduce the existence of social values at stake.

In short, in everyday clinical practice the data that define whether or not a child needs treatment will be his daily *functioning* in the context (school, family, etc.), regarding the values and expectations that this social context deposit on him and according to the fulfilment or not on those expectations by that child. Then we wonder: are appropriate the currently expectations deposit on children in relation to his education and his behaviour at home?; Which are the underlying values and those expectations?

The ADHD and its values

Tealdi mentions in the Bioethics Latin American Dictionary³⁵ that under the evaluated dimension of health, can be associated scientific and technical

concepts with cultural and ethical values. Among these latter we can mention *life*, *identity*, *integrity*, freedom, health and welfare of individuals, communities and social groups. Returning to the particular case of children with cognitive and behavioural disorders such as ADHD, thinking of the values mentioned in relation to this particular disorder leads us to ask another series of questions.

In the case of the value of *life*, we should ask ourselves whether the fulfilment of child's life with suspected ADHD could be given to starting point of using a cognitive enhancer. Does enhance cognition to afford a better school performance, necessarily make a child's life a more fulfilling life? The aforementioned evidence of genetic (and epigenetic) data in relation to susceptibility to present behaviours compatibles with ADHD, and the influence of the context on the final phenotype manifestation highlight the *responsibility* of the community in generating child neurodevelopment flattering contexts and of the fulfilment of life of children in the current process of development.

Regarding the value of the *identity* and in relation to the social normalization mechanisms, are there in the social contexts, in which children develop (school, family, neighbourhood etc.) a real respect for who each one is and for what is he in relation to his biological and cultural uniqueness?

Regarding the respect to the value of *freedom*, are taken into account the views of children and their families in making decisions as to receive or not treatments with stimulants and/or psycho-educational approaches? It is said that a person acts autonomously when is independence of external controls and ability to acts according to a his choice. The active participation of children and their families in making decisions about the type of treatment to be implemented will ensure the implementation of this principle, especially in circumstances like those of ADHD in which the diagnosis and the type of intervention are strongly biased by the presence of intrinsic values of each community. In accordance to this idea, the already mentioned 3^o *Latin American Consensus on ADHD*, meeting in the city of Cartagena (2009) states in one of its sections that the *decision of accepting a pharmacological treatment should be shared responsibility of patients, child or adolescent and the doctor. Children, adolescents, and adults should actively participate in his treatment with family support*³⁶.

The neuroscientific evidence shows that poverty would have an impact through certain mediating factors (for example, pre and perinatal health

factors, home environment and school, the availability of material and cultural resources of the community) about basic cognitive functions. Some of these functions would be involved in cognitive control early to be central to all forms of cognitive activity and social behaviour³⁷. In relation to the value of *health*, in the case of child attentional disorder, unequal access due to economic reasons to the cognitive enhancers drugs, raises a problem in relation to *equity* and since the lack of access could make known the differences in the cognitive performance, that for what mentioned above, are already more likely to be present in children living in poverty contexts.

Considering the value of *integrity* and in relation to the difficulties in establishing the diagnostic of ADHD, the doctors have a tolerance level to the onset of pharmacological adverse effects which is given by a relationship that is defined in terms of risk/benefit. In the case of stimulants, ¿Which would be the tolerance level to the pharmacological adverse effects in the event that we were not dealing with a disorder in a child sick but improving cognitive performance in a healthy one? Of course, that omitting a diagnosis of cognitive disorder when it does exist, may involve a risk to the *integrity* of the person as far that it does not receive proper treatments. We understand the behaviour as an overall biological creation of the individual, then, the attention-enhancing drugs, act exclusively on this ability or somehow have an impact on human nature as a whole, in a dimension that science can only let partially displayed? Thinking about the *welfare* of individuals and social groups, regarding a child with attention problems and hyperactivity is it intended to benefit the child or the social group where this child develops his activity? What values tables take into account the members of the health and educational system when faced with problems such as the ones that develop the TDAH or in general neuro-developmental problems?

Final Considerations

The doctor is in our society responsible for the indication of using cognitive enhancers drugs. It currently has consensus that guide decision-making in that regard in the case of mental disorders that warrant their use (such as in the case of ADHD).

The pharmacological cognitive enhancement both *cosmetic* (beyond current existence or not of a formal authorization by the respective states regarding this form of use of the cognitive enhancers)

as *therapeutic*, mean from the point of view of the doctor prescribing this enhancers, facilitate the fulfilment of certain social expectations (allow good performance in school, have a socially acceptable behaviour at home, school, etc.), some of which may not necessarily be shared by the whole society.

The doctor to prescribe treatment cognition enhancer implicitly adhere to certain kinds of social values and expectations that seek to be covered in part from the use of stimulants and/or psychoeducational approaches. It becomes necessary then, a methodical reflection by the doctor about the meaning of those social values and expectations that lead to the use of these technological resources. However, do they have health professionals with methodological tools to carry out this reflection? We argue that both Bioethics and Neuroethics can be valid disciplinary areas to guide them.

Through this study we aimed to present an overview of the problem of using cognitive en-

hancers drugs which start from a broader analysis that is based only in the consideration of the potential adverse effects associated to the use of a drug, beyond to agree with the importance that this perspective has from the point of view of the integrity of people and especially if we consider that these people can belong to vulnerable sectors of population such as children. In the particular case of doctors, the consideration by them of a table of wide values provide a more comprehensive vision of the universe which is comprised the children and their development, that they offer reductionist views to exclusively biological phenomena. This different way of characterizing the medical responsibility, a starting point for the complementary consideration of scientific concepts (and measurable facts) and values, should lead to the emergence of a new paradigm of care based on diagnostic classifications that result from more comprehensive and integrative theory of the biological individual and the social individual in relation to life.

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