Emotional and Cognitive Profile of Adolescents With ADHD: 
Effects of Learning Mediated Interaction

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Abstract

This paper highlights the need to pay attention to those features that support and accompany the learning interactions of a group of adolescents with attention deficit disorder and hyperactivity disorder (ADHD) as part of an intervention approach which is essentially cognitive. This contribution is part of a study in progress with a threefold purpose, namely: first, to describe and assess the factors that tend to favor the development of processes, skills and behaviors that are latent in the portfolio individually, but whose outward manifestation is usually insufficient or deficient and in inadequate family contexts, educational and social; secondly, it is intended to test whether the change in the quality of some skills affect cognitive processes that underlie the social-emotional competence of people; and thirdly, to outline a proposal for an educational complex that promotes the development of all stakeholders in a learning interaction with adolescents with ADHD. We present here some of the main findings so far.

Keywords: mediated learning, cognitive modifiability, emotional competence, ADHD.

1. Introduction

The aim of this study is to identify a group of teenagers and young adults with attention deficit hyperactivity disorder (ADHD) deficient cognitive functions most frequently affecting the skills involved in social-emotional competence, and at the same time, describe psycho-educational interactions driving changes in the internal system needs and deficient cognitive functions that underlie behavior. ADHD is characterized not only by excessive motor activity and cognitive problems; emotional difficulties coexist but have hardly been explored because the interest of researchers has focused on cognitive aspects. The main theories hold that emotional recognition should not be affected in these people, and that it does not involve any executive process. However, certain characteristic symptoms of the disorder, such as inattention and impulsivity, may hinder the recognition of emotional stimuli such as facial expressions and prosody. On the other hand, people with ADHD have significant difficulties to modulate their affective states, precisely because this regulation involves different executive control processes with a component of a cognitive nature. The lack or dysfunction of people with ADHD, more clearly expresses the need for human mediation for potential resources of the subject to begin to emerge and be part of a gradual and regular process in their cognitive and affective repertoire. One of the important issues of this research focuses on identifying those cognitive factors that promote awareness and emotional regulation (Cassidy, 1994; Gross, 1999; Sattler, 2002, *Correspondence should be addressed to: Fernando González Gatica, Department of Education, University of Navarra, Library Building, 31080 Pamplona, Spain. Tel: (+34) 948 42 56 00 E-mail: fgonzalez.7@alumni.unav.es

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Calkins & Fox, 2002), in order to contribute to the design of educational strategies aimed at developing the processes involved in emotional self-regulation, and with it, in the development of a richer repertoire of socio-emotional skills. The assumption that underpins the study is that cognitive functions are essential mental conditions for the existence and operations of thought of any other function of behavior (Feuerstein, 2006), being present and as an integral aspect in each of the skills and processes that underlie the social-emotional competence. Both levels contribute to the development of adaptive response (Brooks and Haywood, 2003), guiding the process performance of the subject by its most thoughtful and analytical basis, ensuring gradually increased regulation behavior and less impulsivity. The change is valued according to measuring by pre and post testing of the factors included in the Raven Standard Test, the dimensions of emotional intelligence are assessed through the Mayer, Salovey and Caruso Emotional Intelligence Test (MSCEIT, 2009) and the components of the modifiability profiles of Feuerstein (2002). The quantitative results will be compared with those obtained by the control group, consisting of a homogeneous sample of college students who have not been diagnosed with ADHD. Intervention is observed and analyzed from the presence and frequency of those strategies which come from the universal and specific criteria of mediation via the MLE Rating Scale (Lidz, 1991).

At the time of submission of this article, the investigation remains open in its early intervention, as the methodological design provides for a minimum of 60 hours time-direct work with the experimental group distributed over nine months, which have not been completed for carrying out the measurement post. The intervention phase considers the application of selected instruments from the Instrumental Enrichment Program, Classic (Feuerstein, 1980) and Basic (R. Feuerstein and Feuerstein Ra., 2004) and a series of activities drawn from the educational program emotional and moral growth (PECEMO, Alonso-Gancedo and Iriarte, 2005) to evaluate the transfer of learning. The intervention will end in June 2012, so the results presented in this paper are therefore preliminary and are described qualitatively.

2. General characterization of the ADHD

Attention deficit hyperactivity disorder is a concept based on matching in one person a certain number of symptoms. Although the diagnostic manuals identify a number of mental abilities affected and the presence of behavioral and social difficulties associated with this disorder, they have failed to specify a cognitive and emotional profile that will help advance the educational approach and treatment of ADHD. Cognitive models currently under discussion range from those that presuppose the existence of a basic nuclear deficit, whose low efficiency can be explained by itself all the events linked to ADHD, and those who advocate a multiple deficit, which involves the interaction of various cognitive aspects, there being no single source.

According to DSM-IV TR (2003) ADHD is characterized by a degree of inattention and / or hyperactivity-impulsivity that is maladaptive and inconsistent with developmental level. It is a neurobiological disorder and chronic origin that begins in childhood and whose symptoms persist throughout the life cycle, although with some variations: with age the motor hyperactivity decreases and is transformed into mental hyperactivity or feeling of impatience, it keeps the attention deficit and difficulty for planning and organizing, which often lead to poor academic performance / employment, rejection by friends, to decreased self-concept of involvement in risk behaviors and a greater number of emotional conflicts.

The pathogenesis of ADHD involves the interplay of multiple genetic and neurobiological or environmental factors. Scientific evidence points to the importance of genetics in ADHD (Ribases et al., 2008): a heritability coefficient of 0.76 (Faraone et al., 2006) and the presence of genes that carry a higher risk of ADHD associated with chromosomes 4, 5, 6, 8, 11, 16 and 17 (Faraone et al., 2006, Smalley et al., 2002). It is also postulated that ADHD defined as a disorder of cortical maturation rather than a deviation in development (Shaw et al., 2007) and functional imaging has shown that children with ADHD have cognitive impairment in different components of executive functions (Willcut et al., 2005), such as response inhibition, vigilance, working memory and planning (Barkley,
This suggests that ADHD involves a developmental disorder of self-control, caused by difficulties in attention span, impulse control and excessive motor activity.

From a psychological perspective, one of the most comprehensive explanatory models of ADHD has been proposed by Barkley (1997), for whom the deficit in behavioral inhibition leads to delayed or impaired development of four executive neuropsychological functions: the nonverbal working memory, verbal working memory, self-regulation of affect / motivation / arousal, and reconstitution. The most important component of this model is the inhibition of behavior, which provides the basis to display the skills mentioned above. According to Barkley, problems sustaining attention, for example, are the result of an underactive behavioral inhibition system, especially for a poor interference control (2006). Brown (2000, 2006) coincides with the functions identified by Barkley, but his model on complex cognitive abilities that are affected in ADHD, adds and emphasizes two important aspects: motivation and emotion regulation.

If the starting point is to assume that there is stability of the factors that characterize the thinking styles and patterns of behavior of a subject from the youth stage, coexisting with chronic conditions resulting from unfavorable ADHD, the conclusion is that susceptibility to change in these people is scarce, while the permanence of their maladaptive condition is presumed (Nigg, Goldsmith, and Sachek, 2004; Parker, Majeski, and Collin, 2004). But if we assume that the human being is undetermined, open and accessible to change throughout their life cycle, even assuming the existence of optimum periods for development, those crucial moments do not exclude the potential that all the human beings have to change and be modified under certain specific conditions of interaction. That is, the development of skills and processes are latent in the realm of possibilities for all subjects, exceeding the limits imposed by age, etiology, or a severe condition of deprivation, since human beings have a capacity to learn and interact in the world far greater than is usually manifested through modal behavior, either because the internal processes (cognitive, affective and volitional) that are present in their personal repertoire are used in a limited or inadequate way, or because the subjects had a significant lack of mediated learning experiences.

3. Structural cognitive modifiability

Among the many concepts that address the development and cognitive functioning, which is generated from Vigotsky conceptual framework (1979), particularly since the construct of the zone of proximal development, appears to be one of the most fruitful to explore the development from the perspective of teaching and learning. Feuerstein, Rand, Hoffman and Miller (1980, 2006) asserts in his theory of Structural Cognitive Modifiability and Mediated Learning Experience, the cognitive performance of a person can be changed significantly, if you receive the benefit of interactions quality learning, oriented to the activation of new cognitive structures and the development of potential or propensity to learning. According to Feuerstein, the characteristics of adaptability, flexibility and plasticity of intelligence give the quality of being modifiable to any person (2006).

Structural Cognitive Modifiability is the central concept of a theoretical framework whose purpose is to explain individual differences in cognitive development. The Mediated Learning Experience (MLE) is considered as the variable responsible for developing the flexibility of schedules and ensuring that the incentives to leave their mark and affect the person in a meaningful way, raising processes in cognitive and affective dimension are often overshadowed by unsatisfactory or inappropriate performance. Feuerstein argues that when a subject does not respond cognitively to the requirements of the different social levels, it is due to improperly used and / or cognitive function inefficiency (2003). Cognitive function corresponds to an internalized mental structure whose components are energy and intellectual nature. Operating systems are what the subject acquires during his life cycle and that internalized as habits and mental personal performance to the point where they can be considered as prerequisites for the operations of thought and of all human behavior (Feuerstein, 2003). These cognitive functions are operationally described by their participation in the processes of each phase of the mental act. The input stage is
responsible for feeding data to the cognitive system. The output phase is responsible for issuing and acting upon the conclusions reached by the development. The development phase is the core of the cognitive process and its main feature is to transform information into distinctive and organized knowledge.

4. Socio-emotional competence

Various models and theories of emotion emphasize the procedural nature as a central element (Mayer & Salovey, 1997, Bar-On, 1997, 2006, Higgins, Grant and Shah, 1999; Bonano, 2001, Gross and Barrett, 2011.) Being inextricably linked to reasoning, emotion-cognition interaction and co-processing is what makes people more adaptive and therefore, greater subjective well-being in personal and social functioning. At the same time, they all agree and emphasize the central role of emotion regulation (Gross, 2002, 2008), which is understood as a procedural device by which blend or modulate emotions, increasing, reducing or redirecting emotional responses. A growing corpus of work supports the assumption that individual differences in emotion regulation play an important role in pro-social behavior and general social functioning of individuals (Eisenberg, Fabes, Guthrie, and Reiser, 2000). Thus, subjects poorly controlled, sometimes irritable and impulsive, prone to externalizing behavior problems in childhood or later in adolescence or adulthood and, therefore, conduct maladaptive behaviors (Eisenberg, Fabes et al, 2000, Bandura, 1989; Caprara and Pastorelli, 1993). In the regulatory process of the emotions knowledge and emotional language plays a key and meaningful role. More specifically, the development of emotional knowledge depends largely on the development achieved in the symbolic processes and skills of mental representation, allowing to internalize emotional experiences, and emotional knowledge depends, in turn, on the ability to differentiate one unique emotional experience from another, giving them a specific verbal label (Izard, Woodburn, Finlon, Krauthamer-Ewing, Grossman and Seidenfeld, 2011).

Language provides the necessary tools to label emotions, thereby enabling the individual to establish relationships between cognitions and feelings, getting a better understanding of emotional states and associated behaviors (Barrett, Lindquist and Gendron, 2007; Cole Dennis, Simon Smith and Cohen, 2009), with a redirection of emotional responses and impulsive responses (Izard et al, 2011). Those individuals, who have difficulty focusing and sustaining attention, or inhibiting impulsivity, often omit important signs and emotional cues, being unable to use one's own emotional motivation to adapt best in social contexts. By contrast, when subjects are helped to use the knowledge to self-regulate their emotional experience and expression of their affective states the motivation to achieve a desired goal increases. (Izard, 2002, 2007), and it facilitates the learning processes (Trentacosta and Izard, 2007, 2010), the ability to understand the thoughts and feelings of others, distinguishing between them (Wellman, Cross & Watson, 2001).

One of the explanatory models of emotional intelligence postulates the existence of a series of cognitive abilities or skills of the lobes of the prefrontal cortex to perceive, assess, express, manage and self-regulate emotions. For some researchers, like Fuster (2003), Happaney, Zelazo and Stuss (2004), there are two different types of prefrontal lobe abilities, but they are closely related: (1) those involved in problem solving, planning, response inhibition, development and implementation of strategies and working memory and executive functions corresponding to metacognitive, (2) and those involved in the coordination of cognition and emotion, which are the emotional executive functions.

5. Method

The study is being conducted with ten young people between 17 and 24 years old, linked to an association of the province of Navarra (Spain), which provides care and counseling for children, youth and adults with learning disabilities, behavioral and attention deficit and hyperactivity. The initial group consisted of 20 youngsters, but difficulties of transport, economic or time inconsistency with their studies meant that ten left between the fourth and seventh week after the intervention began. This takes place twice a week, 90-minute sessions with two groups based
on age criteria, being the mediator of the process the first author of this article. In each group there are four men and one woman and they have all been diagnosed with ADHD combined subtype and receive drug treatment.

6. Preliminary results

The salient features observed throughout the intervention process indicate a significant deficit in cognitive functions and peripheral phase of the middle phase of the mental act that affects the four dimensions of emotional competence (Mayer and Salovey, 1997). Cognitive functions that manifest themselves poorly without the assistance of mediation are:

- Blurred perception, which affects the clear and accurate perception needed to focus on all relevant details of the stimulus which is perceived incompletely or with poverty of details, lack of clarity and / or imprecise delimitation of its borders.
- Unplanned, impulsive and unsystematic exploratory behavior, which expresses the difficulty of systematic exploration of the stimuli, or to direct their attention to a plan or order. This is manifested mainly in the lack of control, insufficient awareness of the need to collect additional data and in a fragmented and unsystematic exploratory behavior.
- The lack of tools to designate appropriate verbal attributes, which reduces the amount and quality of information gathered, manipulated and communicated.
- Inadequate or lack of precision or accuracy, manifested in the inadequacy of data collected in the phase of input and communication and also incomplete in the output stage, and the misrepresentation of data, offering trial approaches instead of precise answers and using relative rather than absolute terms.
- Inadequate or lack of ability to consider two or more sources of information at the same time, manifested in their willingness to focus and take into consideration only one of several dimensions of an object, event or situation.
- Inability to differentiate between relevant and irrelevant information in a situation which makes it difficult to reduce the state of incompatibility between the data being processed.
- Lack of the need to seek logical evidence, observed in an inadequate formulation of the reasons to draw conclusions, and a lack of need to seek explanations of inconsistent phenomena.
- Deficiency of hypothetical-deductive thinking and lack of strategies to test hypotheses, manifested in the lack of need and / or readiness to seek alternatives that explain phenomena and their relationships.
- Lack or deficiency of planned behavior, which has been observed as a consequence of the lack of internalization, impaired representation and lack of internal control.
- Inadequate or lack of internalization, manifested in the prevalence of specific behavior and facing a situation or specific situation with an inappropriate generalization and a low level of abstraction due to the limited use of symbols, signs and concepts.
- Cognitive blocking, seen in the lack of initiative to give new answers often preceded by memory failure following a prolonged activity of the type trial and error.
- Trial and error behavior, manifested in the lack of inhibition and control of the responses so that all relevant information has been prepared.
Regarding the dimensions of socio-emotional competence with greater difficulty, we note:

- In emotional perception a certain inability to perceive and identify emotions and emotional content in themselves and affective states of others, lack of attention to accurately decode emotional signals and facial expressions of the body is observed;
- The difficulty to generate and use emotions to solve problems, reason, make decisions and work in an efficient way, often interfered with by anxiety and anger.
- The difficulty in understanding complex emotional information, especially on how to combine emotions and understand what gives rise to different emotional states.
- The difficulty to modulate emotions and the ability to regulate emotions reflectively, rather than acting from them without thinking.

In relation to the strategies of mediated interaction, they have been directed primarily to:

- The domain of impulsivity, giving clear instructions that are not meet before being asked and/or where there are sufficient arguments to support it, noting the exploratory activity of young people to decide when to give them the answer, creating, in this way, a latency time sufficient to prolong exposure to stimuli and information required for the task.
- To enhance the cognitive repertoire, in the absence of need for greater investment in exploration and development of information, moved internally to deliver an immediate response. They are required to establish a larger number of relationships, a greater number of criteria for analysis and specific transfer of learning obtained from a different situation to another, integrating information in seemingly unconnected events.
- To produce reflective thinking, interrogative style pose by a degree of ambiguity, inconsistency or conflict, leading them to wonder about what does not appear evident in the first instance of analysis, or questioning their own behavior that led to success or failure.

The mediation process has been built mainly on the criterion of explicit intentionality of the mediator faced with the task that arises, noting what one expects to see in the performance of each one of them. They have been asked to create a work plan and to anticipate possible ways of overcoming difficulties, leading to generate reciprocity and a willingness to face the task in an analytical and reflective way. This interaction is directed to mediate the process of regulating behavior, adapting to the type or nature of the activity.

7. Conclusions

Speaking of changes and cognitive and affective profiles involves an understanding of intelligence and emotion as manifestations of states of the organism, rather than resulting from persistent features and unchanging over time. The processes underlying these states are considered as a dynamic expression of complex interactions of biological, cognitive, emotional, cultural and experiential. The potential of the human, its permeability to the mediating action and dynamism of the transformative process favor the emergence of new structures and capabilities that enrich the subject by making it more autonomous, flexible and self-regulated.

The type of interaction, time, rhythm and precise moments when mediation is required, and the use of certain cognitive strategies to support and sustain the complex thought processes, and/or to arrange and produce motivational and emotional attitudes in young people, is a crucial basis to generate and provoke changes in those characteristics described above. While it is not possible to establish a unique profile in youth with ADHD, and each brings his specific psychological individuality, this study suggests the presence of a number of cognitive and
emotional functions that are often poorly presented and affecting the quality of performance and social development. At the same time, with the appropriate mediation of these processes, these deficiencies are modified. After the intervention, it will be possible to check the effectiveness of interaction offered and assess the magnitude of changes in emotional competence from the improvement of cognitive functions. The profile that we intend to develop, is not a profile of failures, but rather one of changes that may open fresh ground to enrich educational practice and to give an opportunity of development for people with ADHD.

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