

## Mindfulness and Attention Deficit Hyperactivity Disorder

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**ABSTRACT :** This study aims to evaluate the effects of a Mindfulness program directed at a child diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). To this end, a qualitative case study was developed focusing on a six-year-old child diagnosed with ADHD. A Mindfulness program, consisting of eight sessions, was created and implemented with the objective of providing the student with the opportunity to learn and experience different Mindfulness techniques, with the aim of improving their level of attention and concentration. The results obtained after the application of the program showed that Mindfulness techniques contribute to the well-being of children diagnosed with ADHD in educational contexts, positively influencing their behavior in the classroom.

**Keywords -** ADHD, Attention deficit, Mindfulness

### I. INTRODUCTION

ADHD is a common neurodevelopmental disorder in childhood, which can persist into adulthood. It is characterized by difficulty with attention, hyperactivity, and impulsivity, affecting school performance, social relationships, and increasing the risk of anxiety, depression, and substance dependence (Antunes, R., 2022; Antunes N. L., 2009).

Treatment combines medication and behavioral methods, with multimodal interventions being widely recommended (García, 2001). Non-pharmacological therapeutic strategies, such as meditation and Mindfulness, emerge as a complementary treatment capable of improving the behavior and learning of children with ADHD (Selikowitz, 2010), since Mindfulness practices can increase the neuroplasticity of the brain, which can lead to improved attention, self-regulation, and executive functions, areas that are related to the symptoms of ADHD (Nikander, 2015).

Given these assumptions, the main objective of this article was to study the beneficial effect of a Mindfulness program aimed at a child diagnosed with this problem.

This article, in addition to the introduction, is organized into four further sections. The first concerns the theoretical framework of the analysis, the second is dedicated to the methodology, and the last two refer to the presentation and discussion of the results and the conclusion.

ADHD is one of the most frequent neurodevelopmental disorders in childhood. It is commonly diagnosed in children and can extend into adulthood. These children have difficulties with concentration, are excessively active, and cannot control their impulsive behaviors. These behavioral changes cause problems at school, at home, or with friends and, therefore, end up affecting their academic, social, family, and, in the future, professional life (Antunes R., 2022; Neto 2014). Antunes R. (2022) states that:

From a pathophysiological point of view, ADHD is a neurobiological disorder that involves a dysfunction of several specific regions of the central nervous system, specifically the prefrontal cortex, basal ganglia, and cerebellum. These areas are responsible for planning, attention, and task execution, and are also fundamental in the mechanism of self-regulation and inhibitory control. This dysfunction is associated with a reduction in the size of these areas and a lower availability of neurotransmitters, such as dopamine and norepinephrine (p. 20).

In addition to the above characteristics, hyperactivity is accompanied by other associated problems, less specific but equally important. Problems with social integration occur due to difficulty managing frustration and following rules, which causes rejection from other children who do not want to play with them, thus leading to social isolation. Self-esteem deficits arise as a consequence of constant conflicts with the social environment and their experiences of failure. The reactions of adults and peers lead them to have a very poor self-concept and a low level of self-esteem (Antunes R., 2022; García, 2001).

Because of these difficulties, some children experience academic failure, have difficulty maintaining friendships, feel anxious and have depressive symptoms, and demonstrate a higher probability of using and becoming dependent on illicit substances (Antunes N. L., 2009).

Early diagnosis and treatment of ADHD are crucial for its prognosis, as they promote a reduction in the intensity of symptoms, improvement in academic performance, and facilitation of social integration. With adequate and individualized support, these children substantially modify their behavior (Antunes R., 2022).

According to Selikowitz (2010), meditation is a technique that can serve as a complementary treatment to improve the behavior and learning of children with ADHD.

Mindfulness is a type of meditation that, according to Nikander (2015), can increase brain neuroplasticity, and consequently lead to improved attention, self-regulation, and executive functions, areas that are related to the symptoms of ADHD.

Mindfulness is characterized as a form of awareness and attention focused on the present moment, accepting all thoughts, feelings, and sensations as they are, without judgment, and observing them in a more conscious way (Snel, 2023).

The origin of Mindfulness, also known as mindful awareness, comes from the contemplative practices of Buddhism, which had as its main objective the development and improvement of psychological well-being. It originated thousands of years ago in civilizations in China and India, being considered by Buddhists as the "right path" to liberation from suffering (Kabat-Zinn, 2018).

John Kabat-Zinn, a university professor in Massachusetts, was one of the first authors to develop Mindfulness practices in the West, bringing Mindfulness to universities. In 1979, he developed a stress reduction program based on this technique, which lasted eight weeks and became known as MBSR ("Mindfulness-Based Stress Reduction"). With this program, Kabat-Zinn wanted to demonstrate that Mindfulness could be used as a form of therapy for pain and stress, aiming to promote the well-being and quality of life of all people and not just a spiritual practice, as it was seen by Buddhists (Silva, 2021).

Currently, Mindfulness programs are applied in different areas to improve concentration, complex decision-making processes, and performance. For example, in the field of education, Mindfulness can contribute to improving students' academic performance, facilitating the ability to acquire knowledge, improving the quality of the learning environment, and can also increase the cognitive functioning of individuals (Shonin et al., 2015). Mindfulness-based practices reveal positive impacts on various cognitive functions, such as the reduction of ruminative thoughts (Feldman et al., 2010), the decrease in emotional distortions in cognitive tasks, the increase in the ability to focus attention, and the reduction of mental dispersion (Baer, 2006). In this way, attention is improved through Mindfulness practices, transforming into conscious attention to the present moment, which leads to intentional self-regulation (Baer, 2003).

More specifically, Mindfulness practices are indicated and recommended for children and adolescents diagnosed with ADHD, specific learning disabilities such as dyslexia, and autism spectrum disorders. However, it is important to clarify that the practice of Mindfulness does not cure these disorders; these practices are intervention strategies that can help them cope with the problems that affect them, with tumultuous emotions, the inability to sit still, and impulsive reactions, since most children and adolescents enjoy practicing them and also benefit from them in the aspects mentioned above (Snel, 2023).

Literature has shown that the practice of Mindfulness leads to transformations, both short-term and long-term, in different parts of the brain, including the dorsolateral prefrontal cortex, the anterior and posterior cingulate cortex, the insula, and the amygdala (Menezes et al., 2014).

It is believed that Mindfulness promotes brain neuroplasticity, which in turn results in improvements in adaptability, creativity, and problem-solving skills (Esteban, 2016). According to neuroscience, Mindfulness

promotes an increase in neuroplasticity, that is, the brain's ability to modify itself in response to lived experiences, which can have significant effects on the individual (Davidson et al., 2003).

In a study conducted with young people diagnosed with ADHD, Zylowska et al. (2008) found that Mindfulness intervention can lead to a reduction in ADHD symptoms and improve performance on neurocognitive deficit assessments, which supported the potential of these adolescents to improve attention and emotional regulation through Mindfulness training.

The practice of Mindfulness allows children to be more attentive in the classroom, leading to improved impulse control, which in turn reduces stress for students and teachers and decreases behavioral problems. These benefits contribute to these practices gaining increasing respect in the areas of prevention and education, being considered a beneficial alternative for the development of self-regulation skills in children and young people (Kabat-Zinn 2003).

## II. METHODOLOGY

The methodology used included the development and application of a Mindfulness Program for Children to a six-year-old male student diagnosed with ADHD.

From a methodological point of view, the approach followed was a Qualitative Case Study.

A case study essentially aims to understand the behavior of a subject, a given event, or a group of subjects or an institution, considered as a unique entity, different from any other, in a specific contextual situation, which is its natural environment (Sousa 2005, pp. 137 and 138).

The qualitative approach involves a deep understanding of the facts referred to in a social context, knowing more specifically the trajectory of the subjects related to the research process. This study, focused on a single phenomenon, in this case, a student, is delimited in time and action, and aims to collect as much detailed information as possible (Sousa, 2005).

As previously mentioned, the study focused on a six-year-old male student attending preschool at a kindergarten in Lisbon. He has a diagnosis of Language Disorder, ADHD, and Oppositional Defiant Disorder, and is not medicated. He is a gentle, playful, and restless student, enjoys participating in school activities, and has a shorter attention span than expected for his age group.

Thus, the study was designed to assess the extent to which a Mindfulness program could improve the attention deficit of the student under study, and to study the beneficial effects of applying the program as an agent promoting well-being.

The application of the Mindfulness program took into account several procedures that will be described below.

To better understand the student's family, school, and clinical history, and to ensure that the information obtained through other instruments applied in the study was as accurate as possible, a documentary analysis of the student's individual file was carried out and a semi-structured interview was used. According to Sousa and Batista (2011), the interview follows a set of topics or questions to be addressed, the interview guide, which gives the interviewees greater freedom in their answers. This data collection technique was used with the student's guardian and the head teacher. In this sense, two interview guides were developed to obtain the necessary data, and these were subjected to pre-tests.

To assess the problems of opposition, cognitive/inattention problems, and problems of excessive motor activity in the student, the guardian and the kindergarten teacher were asked to complete, before the application of the Mindfulness Program, the reduced and adapted version of the Conners Scale for Parents and Teachers (validated for the Portuguese population by Rodrigues, 2005), which comprised 26 and 27 items respectively. In both versions, the frequency of the observed behaviors was classified using a four-point Likert scale, where the values (0), (1), (2), and (3) mean: never, a little, frequently, and very frequently, respectively.

Subsequently, structured observation was used, which allowed us to collect information about the behaviors that we considered important for this research. According to (Vilelas, 2017), during a structured observation, the observer's focus is on aspects of the situation that are explicitly defined, using simple, quick recording methods that do not rely on memory, thus minimizing the risks of misunderstanding. In this way, two observation grids were created: the student's development and learning assessment grid and the direct observation grid - Mindfulness Program for children, which were completed by the researcher. The student development and learning assessment grid, completed before and one month after the implementation of the Mindfulness Program, was developed based on the three content areas foreseen in the OCEPE (2016) and assesses a total of 71 competencies, according to the scale: acquired, not acquired, and in acquisition, with the aim of verifying whether there was progress in the student's development and learning.

The program was implemented during the month of May of the 2023/2024 school year, with sessions held twice a week. The Mindfulness program for children, Table 1, consists of eight 45-minute sessions, divided into four blocks.

**Table 1. Mindfulness Program for Children**

Block	Objectives	Activities	Materials	Procedures
<b>Discovering the Breath</b>	- Become aware of the breathing process;- Understand the link between internal state and breathing;- Learn to regulate breathing cycles to calm body, mind, and emotions.	My First Mindfulness Book	Yoga mat, book, expandable ball.	The student is invited to take off their shoes and sit comfortably on the yoga mat. Then, the book " <i>My First Mindfulness Book</i> " is read and discussed, introducing the concept and benefits of mindfulness. Afterwards, a breathing exercise is performed with an expandable ball — opening it while inhaling and closing it while exhaling — repeating the process three times. During the exercise, the focus is on following the ball's movement, promoting calmness and breath regulation.
<b>Conscious Breathing</b>			Yoga mat, stuffed animal.	The student lies down comfortably on the yoga mat, placing their hands on the stomach and chest, noticing the abdomen rise (as air enters) and fall (as air exits). Then, placing the index finger under the nose, they feel the warm air while exhaling. Next, a stuffed animal is placed on the belly so the student can observe its rise and fall, helping focus attention and calm the body.
<b>Discovering the Five Senses</b>	- Use the senses to work on concentration and focus;- Explore each sense through directed attention;- Show how the senses can	What Food Is It?	Yoga mat, different foods, blindfold.	The student sits comfortably on the yoga mat and is given something aromatic (such as cinnamon, orange, or herbs). They close their eyes and focus on the sense of smell. After a few moments, they describe what they smelled and felt. Then, the same is done with taste — chewing slowly, observing changes in the food, and trying to identify it. The activity strengthens concentration and reduces

	serve as anchors for mindfulness and present-moment awareness.			anxiety.
<b>Mystery Bags</b>		Drum, mystery bags.	The student moves their body to the rhythm of a drum, releasing energy. Movements match sound intensity: strong for loud sounds, gentle for soft sounds. When the sound stops, the child freezes. Afterwards, they reflect on physical sensations and the contrast between calm and agitation. Then, they receive a small bag and are asked to use touch and hearing to guess what's inside — describing weight, texture, and sounds. The process is repeated with several bags, and the child shares their sensations afterwards.	
<b>Discovering Emotions</b>	- Develop emotional awareness;- Work on emotional education;- Normalize all emotions and promote healthy contact with each of them;- Provide tools to manage intense emotional states.	The Calm Jar	Yoga mat, book, Calm Jar.	The student sits comfortably on the yoga mat to listen to the book " <i>My First Book of Emotions</i> ." Afterwards, a discussion follows about different emotions (anger, sadness, fear, joy), highlighting that emotions aren't "wrong" — only how we express them might be. The <i>Calm Jar</i> is then introduced: the child shakes it and observes the glitter swirling inside. The comparison is made between the glitter and emotions — though agitated at first, they eventually settle. This reflection helps understand that strong feelings are temporary and pass over time.
<b>Emotion Bubbles</b>		Yoga mat, soap bubbles.	Sitting comfortably with eyes closed, the student visualizes someone very special and imagines giving them a hug,	

			reflecting on the feelings this evokes. Then, they blow soap bubbles after deep inhalations, repeating the process to promote relaxation. They are encouraged to imagine each bubble carrying away worries and fears, reinforcing calmness and well-being.	
<b>Mindfulness in Nature</b>	- Demonstrate care and respect for the environment;- Observe natural surroundings attentively;- Listen carefully to physical and natural sounds;- Create artistic expressions freely using natural elements.	Mindful Walk in Nature	Recording sheets, marker.	During an outdoor walk, the student observes nature closely, explores corners, and records discoveries on a worksheet. Attention is then directed to sounds — footsteps, birds, wind, or rain. With eyes closed, the child identifies and notes the sounds heard, reflecting on the sensations they evoke.
<b>Mandalas with Natural Elements</b>		Printed mandala images, various natural elements.	During a nature walk, the student collects natural materials (sticks, leaves, stones). Later, in a calm spot, they observe their characteristics (texture, color, shape, scent). Then, they learn about the meaning of mandalas through images and examples. Finally, the student uses the collected materials to create their own <i>Natural Mandala</i> and reflects on the experience.	

All activities carried out during the 8 sessions of the program were supported by simple, playful, and creative exercises. At the end of the program, the student was offered a Mindfulness Kit, containing some

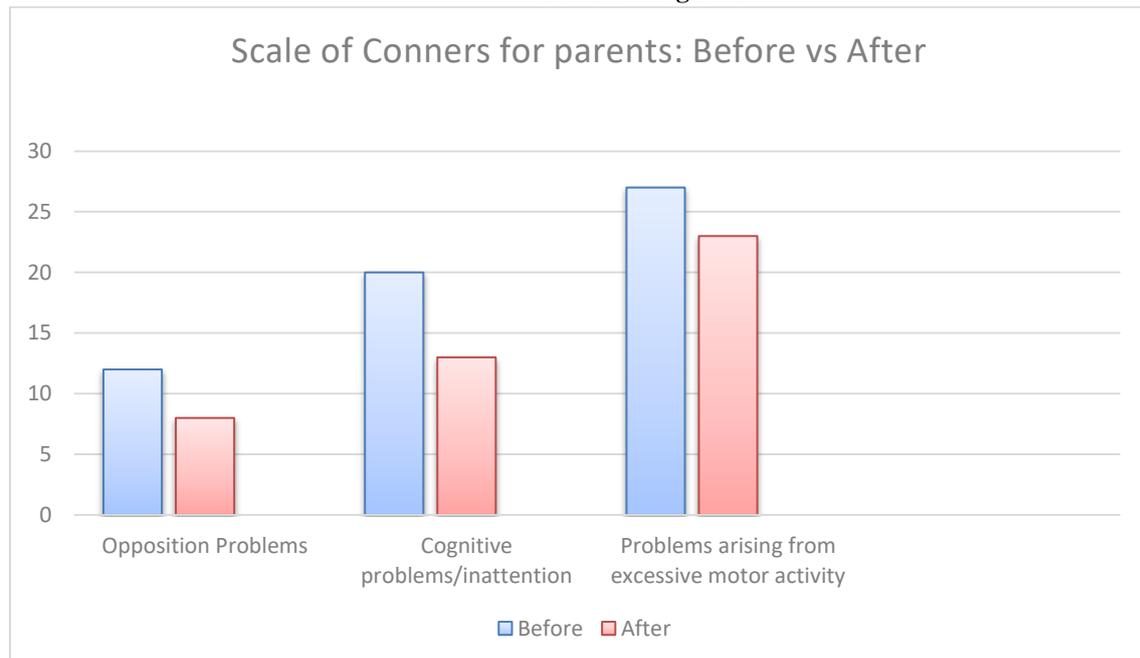
playful materials and a notebook with exercises that he could do at home with his family, thus continuing the Mindfulness practices. Of the eight sessions, four took place at the CAA and two in the school garden, with no interruptions during each session, since only the researcher and the student were present during their execution. During the Mindfulness sessions, the student showed great interest and receptiveness, participating with considerable enthusiasm in the proposed exercises. After each session, the student was invited to give their evaluation, and then the researcher filled out the direct observation grid - Mindfulness Program for children, composed of 13 items, using the scale: acquired, not acquired, and in acquisition, in order to record the student's behavior, progress, and level of receptiveness to the Mindfulness sessions.

One month after the application of the Mindfulness program for children, the Conners Scales for Parents and Teachers and the student's development/learning assessment grid were applied again, and the results obtained were analyzed and compared before and after the application of the Mindfulness program.

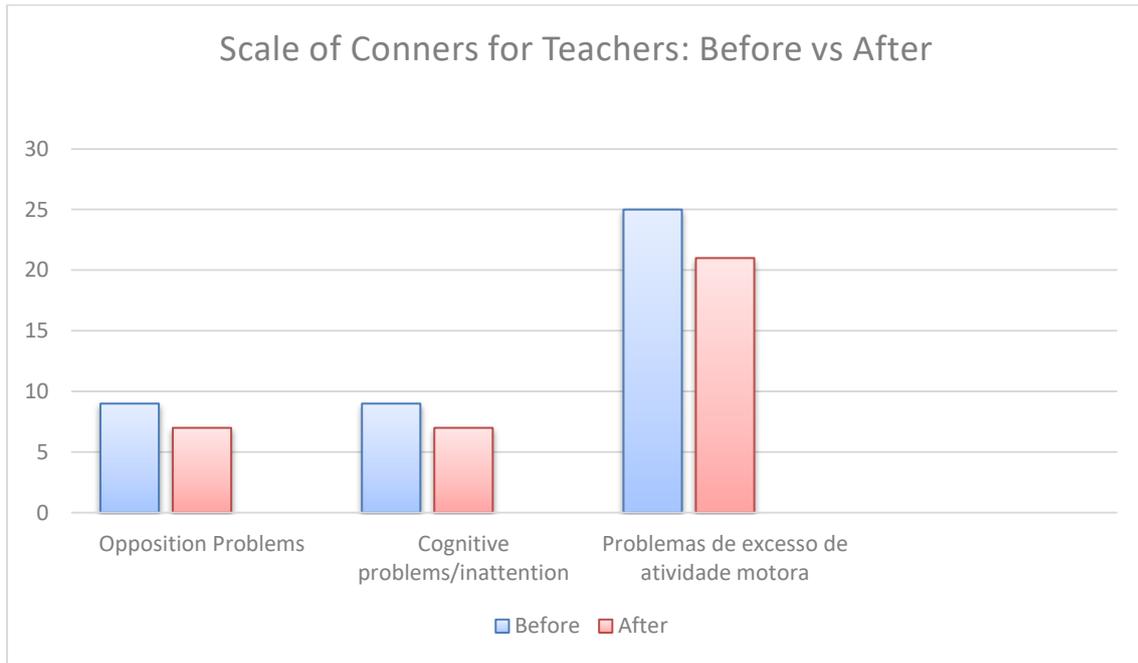
### III. RESULTS AND DISCUSSION

The implementation of the Mindfulness program, considering all the results achieved, was successful, as it met its objectives, functioning as an agent promoting student well-being. The promising effects of using this technique were confirmed, reinforcing the results obtained in the study by Zylowska et al. (2008), which showed that Mindfulness intervention leads to a reduction in ADHD symptoms and improves performance in assessments of neurocognitive deficits.

**Figure 1. Differences in results obtained on the Conners Scale for parents: Before vs. After the Mindfulness Program.**

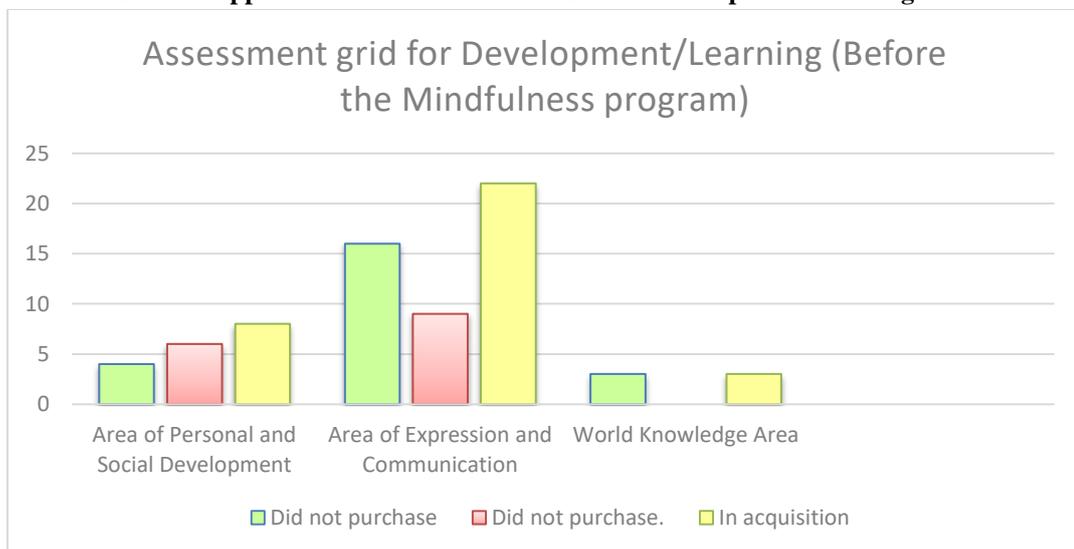


**Figure 2. Differences in results obtained on the Conners Scale for teachers: Before vs. After the Mindfulness Program.**

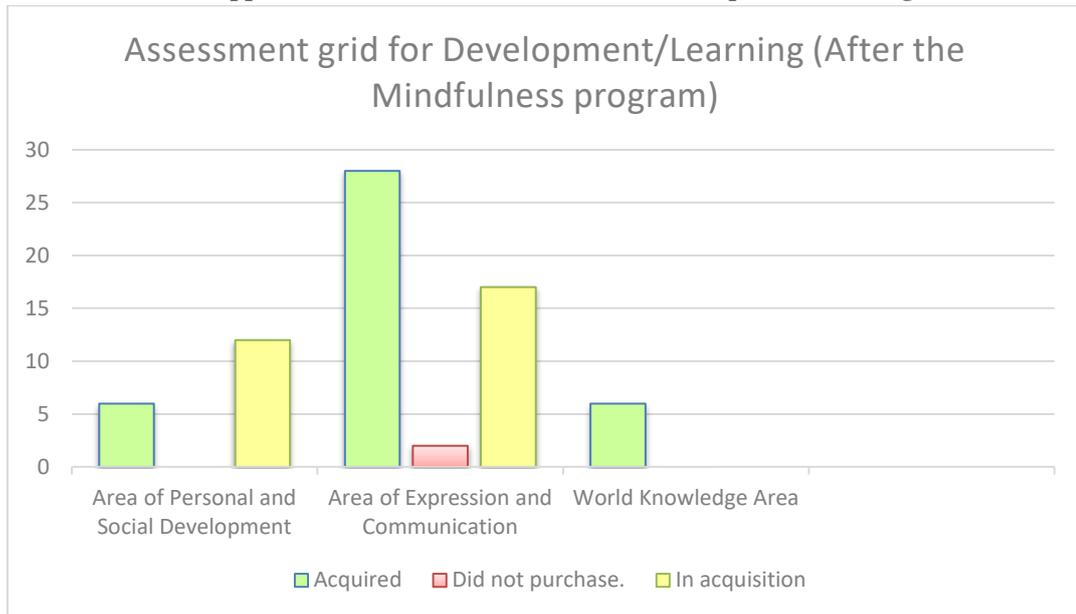


According to the analysis of the Conners Scale values, after the application of the Mindfulness program, we can verify, as indicated in Figure 1 and 2, that both the Conners Scale for Parents and the Teachers' Scale showed a decrease in the Raw Score value in relation to oppositional problems, as well as inattention/cognitive problems, and problems of excessive motor activity, after the implementation of the Mindfulness Program. This decrease was more significant in the questions related to cognitive and inattention problems present in the Conners Scale for Parents. This indicates improvements in the student's ability to focus and concentrate, reinforcing that Mindfulness practices enable children to be more attentive in the classroom, leading to improved impulse management, which in turn reduces student stress and decreases behavioral problems (Kabat-Zinn, 2003). These scales also revealed better results regarding the student's oppositional problems, proving that Mindfulness is a type of meditation which, according to Nikander (2015), can increase brain neuroplasticity and consequently lead to better attention, self-regulation, and executive functions—areas that are related to ADHD symptoms. In this sense, we can see that with the implementation of this Mindfulness program, there was a decrease in the Conners Scale scores, with the impact of this intervention being positive on the student's ability to focus and concentrate, and improving their behavioral regulation.

**Figure 3. Assessment Grid of Development/Learning (Before the Mindfulness program).**  
 Source: Application of the Assessment Grid of Development/Learning



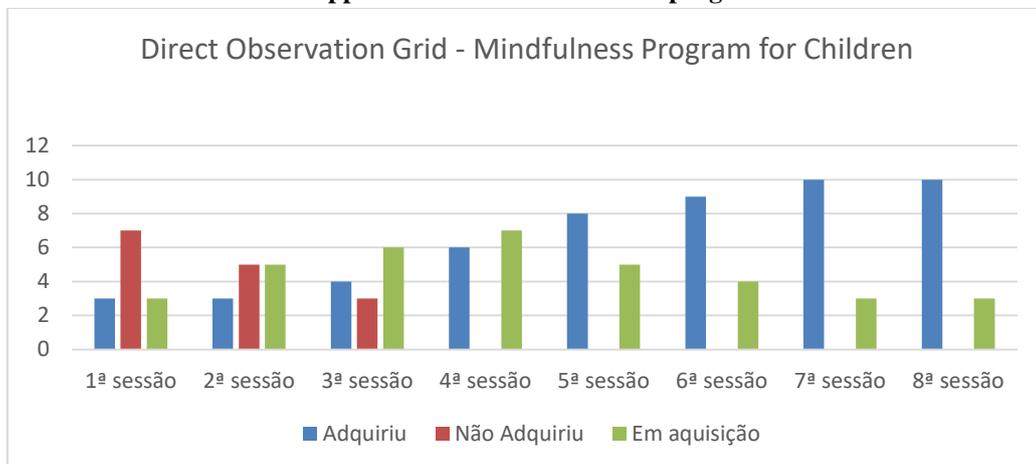
**Figure 4. Assessment Grid of Development/Learning (After the Mindfulness program).**  
**Source: Application of the Assessment Grid of Development/Learning**



When we make a comparative analysis of the results obtained in completing the assessment grids of the student's development and learning, which focused on the three content areas foreseen in the OCEPE (National Curriculum Guidelines for Basic Education), we can verify, as shown in Figure 3 and 4, that after the end of the Mindfulness program the student obtained quite positive results, since there was an increase in the number of skills acquired by the student in all content areas foreseen in the OCEPE. Upon further analysis of the three content areas, we can see that the area where the student obtained the best results was Knowledge of the World, having acquired all the skills that were evaluated. Regarding the different domains of the Expression and Communication Area in which the student was evaluated, he showed better results in the domains of mathematics and art education, which reinforces the idea that the application of Mindfulness programs in education contributes to improving students' academic performance, facilitates the ability to acquire knowledge, improves the quality of the learning environment, and increases students' cognitive functioning (Shonin et al., 2015). These results are consistent with what the literature says, since according to neuroscience, Mindfulness promotes an increase in neuroplasticity, that is, the brain's ability to modify itself in response to lived experiences, which can have significant effects on the individual (Davidson et al., 2003).

**Figure 5. Results obtained in the direct observation grid during the implementation of the Mindfulness Program.**

**Source: Application of the Mindfulness program for children**



Regarding the completion of the direct evaluation grids of the Mindfulness Program, when analyzing the evolution of the graph in Figure 5, relating to the results obtained throughout the 8 sessions that constituted the Mindfulness Program, we can see a quite significant evolution in relation to the items acquired by the student during the Mindfulness program. This reveals that during the program the student managed to use Mindfulness techniques to regulate their concentration, being more attentive to the present moment, proving that Mindfulness practices are indicated and recommended for children diagnosed with ADHD, since they constitute an intervention strategy that can help them deal with the problems that affect them, with tumultuous emotions, with the fact that they cannot stay still and react impulsively (Snel, 2023).

#### IV. CONCLUSION

In this study, the "Mindfulness for Children" program was created and applied to a six-year-old child diagnosed with ADHD. The program aimed to improve the student's level of attention and concentration and promote the development of their emotional regulation skills.

The "Mindfulness for Children" program consisted of eight 45-minute sessions, divided into four blocks, during which simple, playful, and creative activities and exercises were carried out, allowing the student to learn and experience different Mindfulness techniques that helped them be more attentive to the present moment and increase their ability to focus and concentrate. This proved that Mindfulness techniques contribute to the well-being of children diagnosed with ADHD in educational contexts, positively influencing their classroom behavior and academic performance.

Mindfulness strategies thus emerge as useful tools to be applied to children diagnosed with ADHD in a school setting, not only in the classroom, but also to promote self-regulation in relationships between students, allowing them to manage aggression, behavioral disturbances, indiscipline, and stress.

In this sense, based on the results obtained, we believe that this study can serve as a starting point for a longitudinal research project, which should be continued with this population, in order to gather scientific evidence that justifies the integration of Mindfulness practices, not only in schools, but also as part of therapeutic processes for children and young people with ADHD.

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