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OUTDOOR EDUCATION, PROCESSES OF INCLUSION OF CHILDREN WITH ADHD AND LEARNING DISABILITIES

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Abstract:
The aim of this paper is to provide a systematic review of the evidence literature showing the role played by Outdoor Education (OE) in the inclusion processes of elementary school children with ADHD, characterized by inattention, hyperactivity, impulsive behavior, and learning disabilities, in order to understand how active outdoor education, by virtue of its characteristics, can provide them with specific sensory integration (Ayres, 1972), an opportunity to explore the natural world, and the chance to interact with peers and engage in active tasks. Therefore, in this study, we sought to determine the influence of outdoor activity based on the classification of studies and categorization of influential factors on the possibility of OE to meet the precise learning needs of children with ADHD in school settings and inclusion processes.

Keywords: outdoor education; primary school; learning; inclusion; students with ADHD

1. Introduction

The aim of this paper is to provide a systematic review of the evidence literature showing the role played by Outdoor Education (OE) in the inclusion processes of primary school children with ADHD (Attention Deficit Hyperactivity Disorder), characterized by inattention, hyperactivity, impulsive behaviour and learning difficulties, in order to understand how active outdoor teaching, By virtue of its characteristics, it can respond to specific learning needs in the school context and facilitate inclusion processes. To this

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end, a systematic review of the literature was carried out that allowed to focus attention on the learning difficulties of children with ADHD and their educational needs, as well as on some educational approaches that would favour inclusion processes, such as mindfulness and Outdoor Education (OE). The corpus of literature and existing legislation show that the issue concerning the inclusion processes of children with ADHD is still present today due to the numerous critical issues that emerge with respect to the risks of school and training failure (Traversetti, 2023), which make it necessary to build contexts rich in environmental stimuli (Frattura, Tonel, Zavaroni & Nardo, 2022), which are able to facilitate the learning and participation of each student, as well as the use of educational and methodological approaches capable of coping with emerging problems (Slavin, 2020). In this sense, EO appears to be increasingly responsive to these needs, as it is considered by teachers to be inclusive for all children, but especially those with special educational needs (Stavrianos & Pratt-Adams, 2022; Wilhelmsson *et al.*, 2012). The paper describes some characteristics of children with ADHD, outlines the main characteristics of inclusive educational approaches and focuses on the role of OE in inclusion processes.

2. Attention Deficit Hyperactivity Disorder

ADHD is a neurodevelopmental disorder which manifests as a developmental disorder in children and adolescents at an early age. Like all developmental disorders, it manifests itself within an evolutionary trajectory that goes from normality to a pathological state, affirming itself precisely as a developmental deviance with respect to the typical trajectory of the same. This disorder is not degenerative and can be improved with diagnosis in childhood. Its matrix is neurobiological in nature and consists of the lack of development of the frontal lobes and attentional circuits, in particular of the CNS system, i.e. the groups of neurons responsible for inhibition and self-control processes (Caniglia, 2018, p. 71; Ianes & Cramerotti, 2012). However, environmental components have a strong impact on the manifestation of symptoms. The primary features of the disorder are attention deficit, hyperactivity and impulsivity. Children with ADHD are unable to complete their educational, play, or recreational activities, quickly moving from one game to another or from one cartoon to another, due to the inability to maintain attention; they are easily distracted, lose details and forget things, have difficulty maintaining concentration and become bored after a few minutes, and need to get up often. Children with ADHD are also unable to inhibit responses and do not think before acting, and because of these cognitive attitudes and consequent behaviours, they may find themselves in dangerous situations.

It is precisely impulsiveness that leads them to have relational difficulties, and that often condemns them to marginalization.

The diagnosis of ADHD is not always easy, as the characteristics of impulsivity and hyperactivity, typical of the disorder, can sometimes be easily mistaken for simple liveliness, making it difficult to recognize the threshold of demarcation between

normality and pathology and risk pathologizing healthy behaviours. ADHD has two levels of symptoms: the first concerns the characteristics of hyperactivity, impulsivity and difficulty in attention; the second concerns secondary symptoms and associated disorders such as aggressive behaviour, school difficulties, interpersonal problems and emotional disorders.

The first conceptualization of childhood hyperactivity was traced back to the English paediatrician George Still (1902), in a speech published in the journal *Lancet*, in which he described the abnormal behaviour of a group of children. Two poles were still identified on the basis of symptoms: the pole of hyperactivity and the pole of inattention. Still (1902), in an attempt to channel these two poles into a common "framework", traced it back to a real disorder of the will, where children had difficulty both inhibiting inappropriate behaviours and maintaining appropriate ones (Caniglia, 2018). These defects were generally traced back to defects in morality and to the bad education received from the family environment. After a series of observations, Still came to hypothesize that the cause lay in a brain injury and not in moral education, as the children were too young to learn immoral behaviour and belonged to different social classes (Caniglia, 2018, p. 75).

Traditionally, society had associated the hyperactive child with *homo criminalis*, that is, a subject whose behaviour did not conform to prevailing normative patterns. The result was a need for social control, for the repression of attitudes that were not aligned with the dominant morality. Still's (1902) hypothesis, on the other hand, following the observations of the variables age and social context of origin of the children, advanced the idea that it was not a matter of bad education on the part of the families, but of a cause of biological origin: these children would not have been able to contain their behaviour or pay attention to school activities, Not even if they wanted to. According to Still, the disease kept these children subjugated and altered their behaviours, making them annoying, hyperactive, and inattentive. A hundred years after Still's claim, the *National Institute of Menro/Health* claimed that this syndrome would produce adult, criminal and antisocial subjects, despite the fact that the syndrome had not yet been sufficiently studied.

Even today, ADHD can be confused with other pathologies, which manifest themselves with anxiety and mood changes and which, in turn, manifest themselves with some characteristics of ADHD disorder; in this case, a diagnosis that demonstrates the correspondence of some of the diagnostic criteria, such as intelligence, memory and concentration (for example, ADHD can manifest itself with reading difficulties) is essential.

The stage of development of the disorder and the first manifestation is preschool age, which lasts until 7-12 years of age, although in this age group the symptoms are mild, therefore difficult to identify. Generally, girls manifest the inability to concentrate when watching a cartoon or a game, moving quickly from one to another, and some disorders of emotional dysregulation are accompanied by excessive tantrums, while children show greater impulsivity and hyperactivity (Caniglia, 2018, p. 73). Considering

that one-third of ADHD children have a slow maturation of the frontal lobes, with growth we can see the normalization of intellectual abilities; In two-thirds of the subjects, the disease develops with both personal and social consequences, putting them at risk of taking drugs to overcome this discomfort. The most obvious symptoms are difficulty maintaining attention and controlling impulsivity and movement and executive functions, i.e. the skills essential for activating, inhibiting or coordinating goal-oriented behaviours, which allow behaviour to be self-regulated according to environmental demands or personal needs. In individuals with ADHD, these functions do not involve regular activity since the lack of inhibition and self-control and the difficulty in postponing gratification can compromise the management of cognitive-behavioural responses to the environment. The interaction between the symptoms of the disorder and the surrounding environment implies a maladjustment of the subject, which manifests itself in difficulties in interpersonal relationships, low self-esteem, demotivation and emotional disorders.

Pupils with ADHD find it difficult to adapt to the rules of the school context:

- behavioural instability and continuous movement, in kindergarten and primary school; disorder and cognitive inability to control and inhibit mechanisms in secondary school;
- cognitive inability to pay attention, to organize knowledge and plan a work plan, to produce written texts;
- interpersonal difficulties and trust-based relationships with teachers (Ianes & Cramerotti, 2012).

In Italy, the scholastic integration of pupils with disabilities has been a long and articulated process which has developed over thirty years. The youth protests of the 1960s focused attention on the need for a school for all and for all. Social attention has been focused on pupils with disabilities and socially and culturally disadvantaged pupils, who were previously relegated to special schools (Greco, 2015; Ianes & Cramerotti, 2012).

In industrial society, a person with a deficit was considered, from a medical point of view, an atypical individual, and his condition was perceived as having a poor psychophysical constitution (Greco, 2015, p. 50). In the mentality of industrialized society, the deficit was perceived based on the mechanization of production processes, which evoked the idea of production waste related to the "*defective piece*" (Greco, 2015, p. 50); the scientific definition of the deficit definitively supplanted the imaginary and fantastic vision of the "*monster man*" of the previous period. A step forward, from an inclusive perspective, was taken with Law No. 118 of 30 March 1971, which introduced the principle according to which compulsory education must take place in standard public school classes, except in cases of severe intellectual deficiencies or physical impairments, such as to prevent integration (art. 28). The treatment of children with disabilities, with a view to school inclusion, was further developed with Law no. 270 of 20 May 1982, which established the criteria for the formation of classes that accommodate pupils with disabilities and for the assignment of support teachers.

A fundamental point of arrival for social and scholastic integration is Law no. 104 of 5 February 1992: the protection of the human dignity of people with disabilities passes through complete social integration; the Law obliges the State to remove the conditions that prevent full social participation of persons with disabilities and to specify the training courses for specialized teaching staff. This Law prepares, on an educational and scholastic level, three fundamental documents to ensure scholastic inclusion and didactic continuity: functional diagnosis, dynamic functional profile (replaced by the functioning profile with Legislative Decree no. 66/2017), individualized educational plan. On the basis of the IEP, personalized educational paths have been created by the ASL, the socialization project by local authorities, and the personalized study plan by educational institutions. Law no. 107 of 9 January 2015 and Legislative Decree no. 66/2017 provide for the implementation of the PTOF (Three-year Plan for Educational Offerings, which replaced the POF introduced by Law no. 59 of 15 March 1997) as a document that encompasses school planning autonomy and is a guarantee of the plurality and scholastic integration of pupils with disabilities.

In the Ministerial Directive of 27 December 2012, "*intervention tools for pupils with special educational needs and territorial organisation for school inclusion*", it is clearly defined that pupils with special educational needs are: specific learning disorders (Law 170/2010); language deficits; deficits in non-verbal skills; motor coordination deficits; attention deficit and hyperactivity disorder (ADHD). SEN pupils are not individually assigned a special education teacher (who will be present in the classroom if they have to care for one or more pupils with disabilities). However, the Class Council may establish the use of specific compensatory tools and dispensation measures provided for by Law 170/2010 to be allocated on the basis of psycho-pedagogical and didactic considerations, arising from communications and clinical documents (diagnosis) of families.

The studies carried out in the field of special pedagogy focus mainly on the interaction between pupils with deficits or with SEN and the school environment, from which it follows how the special pedagogue must deal with problems of both a social and historical nature and functional and relational, using the appropriate educational methodologies, analysing and identifying the characteristics of the deficit and the specific actions to be implemented towards the individual, designing actions that aim to eliminate barriers to the scholastic inclusion of pupils with disabilities or specific developmental disorders, in synergy with local, provincial and regional authorities, local health authorities and local associations. It is a matter of planning actions both at the intra-school and extra-scholastic level, aimed at creating a network based on a differentiation of specialized and cooperating functions.

One of the purposes of the World Organization (WHO) is the classification of diseases. The ICD (*International Classification of Diseases*) classifies diseases according to antonymic, physiological, and etiological characteristics of the disorders. In 1975, the WHO issued the ICHD (*International Classification of Headache Disorders*), an appendix that covers the consequences related to diseases classified in the ICD. The two classifications were complementary until 1999. In 2001, the WHO published the ICF (*International*

Classification of Functioning, Disability and Health), which marked a significant turning point in the social consideration of diseases, overcoming the previous social division between normality and disability and advancing a conception that responds to the real needs, personal and individual, of each person, in relation to the environments with which he or she comes into contact. This is an interpretation of disability that starts from a multidimensional conception of disability, which manifests itself differently depending on the contexts in which the person finds himself. The ICF classification can be defined as a review of the components of health, which has overcome previous classifications of diseases, which marginalized people with disabilities from society, declaring the end of the state of health and the beginning of a disease. In other words, the ICF describes the residual capacities, the personal skills and competencies that derive from them, shifting the focus from illness to health, and functioning (what the person is able to do), the type of disability (what the person is unable to do in different contexts), the presence of body impairments or dysfunctions of various biological nature, and the adaptation of contexts (the adaptation in the various contexts in which the person is able to do it). The person lives). The description of these aspects takes place through the clarification of the concept of health, the aspects related to it and the contexts of the person's life (Frattura *et al.*, 2022).

Functional diagnosis is the basis for the implementation of an adequate Individualized Education Plan (IEP); in fact, the ICF makes it possible to know all the aspects concerning pupils with disabilities or with SEN and implies the intervention of various teams of school operators, who must act as a group, with appropriate educational and didactic actions. The ICF provides a scientific basis for the understanding of health, its conditions and related causes and consequences, for the use of a common scientific language describing the state of health, for improving communication between different users, for offering the possibility of comparison between different countries and for creating a systematic coding system in the medical field.

3. *Mindfulness* applied to children with ADHD

The educational approach of *Mindfulness* (from the Latin "mederi", to heal, to heal; from the Sanskrit "sati", awareness, self-remembering) promotes the cognitive faculties of children with ADHD. It consists of a set of practices of concentration of the mind on objects, images, thoughts or physiological breathing, which allows the improvement of psychophysical conditions (Crescintini & Menghini, 2019).

The practice of mindfulness derives from the ancient religions of Buddhism, Hinduism, and yoga practices and, specifically, was taught by the Indian prince Siddhartha Gautama (566-486 BC), known as Buddha, more than two millennia ago. Gutama advocated a psycho-pedagogical conception based on four assertions called "noble truths": the human mind is characterized by the presence of pain (*dukka*); pain originates in the transience of all things (*annicaj*); the pain and difficulty of living in transience generate human "poisons", that is, suffering, desire, hatred, ignorance; Man's liberation is through complete realization (*nibbana* and *parnibbana*). Gutama elaborated

an eight-degree educational curriculum that led to the liberation of man, in which self-awareness was attained at the seventh degree of formation (p. 14). Mindfulness-oriented meditation was divided into three moments: breath awareness exercises (concentration on the moments of breathing), body awareness exercises (concentration on the sensations that generate the body parts), and mind awareness exercises (concentration on moods, thoughts, fantasies, which originate in the mind). The MOM (mindfulness-oriented meditation) practice aims to develop a "non-judgmental" cognitive attitude, characterized by kindness, which involves the ability to be present, fluidly, in the flow of life and promotes the development of compassion for oneself and towards others. The shift in attention allows for a psychological condition, called mindfulness, which stimulates a greater presence in the current time of the complexity of life. Presence allows the "observation" of mental thoughts, which implies the ability to cancel the emotional involvement originating from worries and the understanding of the functioning of the mind, interrupting the automation of behaviours.

Mindfulness would thus promote attention and emotional regulation, body awareness and a change of perspective on oneself. Neuroimaging techniques showed the parts of the brain involved in neuronal activity during meditation, i.e. the moment when attention is focused on the breath (focusing), the change of attention on another thought (distraction, mind-wandering), the return of attention to the breath (reorientation of attention); The parts involved are the alert system (frontal cortex, right parietal cortex, thalamus), the salience network (inferior insula, prefrontal cortex), which activates both the executive network (lateral prefrontal cortex and basal ganglia) and the orientation network (superior-parietal cortex, temporo-parietal junction, frontal ocular fields and superior colliculus), the dorsal anterior cingulate cortex and the basal system (default mode network) involved in the memory of past events and in the imagination of future events of the neuropsychological system, i.e. mental time travel (Posner, & Petersen, 1990). While the latter contributes to the individual's disposition to "get lost" in the flow of events, mindfulness regulates the functioning of the same. Some integrated protocols in use in cognitive-behavioural psychotherapy, such as mindfulness-based stress reduction (MBRS), have made it possible to increase awareness of behavioural disorders (Santonastaso, Zaccari, & Vicari, 2019, p. 67).

In several studies on heterogeneous groups of children with different disorders (mood disorders, anxiety disorders, problems with relationships with parents), it has been shown that MBSR therapy has allowed a significant reduction in anxiety, depression, and somatic discomfort and favoured improvements in self-esteem (p. 70).

According to *the American Academy of Child and Adolescent Psychiatry*, ADHD is one of the most frequent neurodevelopmental disorders; 5% of school-age children and 2.5% of adults, with a higher frequency in the male sex variable than in the female sex (3 to 1). ADHD can present in three forms: prevalence of inattention; prevalence of impulsive hyperactivity; combined form (inattention and hyperactivity/impulsivity). For school-age children and adolescents, *evidence-based* treatments are based on multimodal therapy, in which cognitive-behavioural psychotherapy or *training* on the social skills of children

and adolescents are associated with *parent training*, aimed at families, and *teacher training*, aimed at teachers, to manage behaviours in the classroom. In the most severe cases, therapeutic treatment is also pharmaceutical.

Bishop *et al.* (2004) state that *mindfulness* is involved in the regulation of attention in four activities: direction of attention, inhibition of processing, and undirected attention (pp. 230-241). *Mindfulness* practice with children with ADHD has shown improvement on three levels: behavioural, neuropsychological, and cerebral. In fact, some studies have observed that thanks to the use of this approach, inattention, hyperactivity, and impulsivity are reduced, and improvements are produced in attentional tests, particularly in reaction times, as confirmed by teachers. Parents, on the other hand, confirm a reduction in parental stress and a reduction in their children's hyperactivity (Van de Weijer-Bergsma *et al.*, 2012). Along the same lines, further studies have shown that participants with oppositional-defiant disorder showed a significant reduction in inattention, hyperactivity, and impulsivity (Van der Oord, & Tripp, 2020). Finally, such an approach would allow improvements in the relational and social aspects of all children and a decrease in externalized oppositional-defiant behaviours (Haydicky *et al.*, 2019).

4. Outdoor Education (OE) as an inclusive approach

Starting from a systematic analysis of the literature, it is clear that OE can be included among the inclusive educational approaches by virtue of its intrinsic peculiarities. The expression OE refers to an "*organized reaction to the phenomenon of indoorization*" (Bortolotti, 2019, p. 19) and a way in which, at an international level, "*educational theories and practices (school and extracurricular) are encompassed by the centrality that is recognized to the external environment as a privileged place of education*" (Farné & Agostini, 2014, p. 10). The EO contemplates a wide "*variety of pedagogical experiences characterized by active teaching that takes place in environments outside the school and that is linked to the characteristics of the territory and the social and cultural context in which the school is located*" (Giunti *et al.*, 2023, p. 5), with evident and numerous benefits on a physical, social, psychological and educational level for all pupils (Giunti *et al.*, 2023), especially for those with Attention Deficit Hyperactivity Disorder. The analysis of the studies conducted shows that direct contact with the environment, mainly the natural one, seems to bring numerous benefits to children with ADHD both in terms of learning and inclusion processes.

The American scholar Louv (2006), in fact, established that there can be a close connection between the behavioral disorders of the child, his development and the lack of exposure to the open air. Kaplan (1995) had previously developed *the Attention Restoration Theory* (ART), according to which focused attention can be restored through exposure to alternative environments, particularly natural ones. Ulrich's (2023) Stress Recovery Theory (SRT), which looks at the regenerative effects of natural environments to promote greater and faster recovery from stress, goes in a similar direction. There are numerous studies on the positive effects of the natural environment on learning and well-being in the literature and those on children with ADHD are also present in the

experimental area, as in the case of the study conducted by Taylor and Kuo (2011), which highlight the positive effects of the subjects' exposure to the open environment. Specifically, these beneficial effects have also been found in subsequent studies, which would lead to the reduction of negative ADHD-related behaviors in children (Dineen, 2018; Amoly *et al.*, 2014), to the improvement of mood, but also to the regulation of behavior, thus increasing the concentration related to school disciplines (Morrison, 2022). In addition to the positive effects on children with ADHD, the findings suggest that OE also has positive effects on the learning of children with special educational needs and disabilities, in general, and, in particular, on their social skills and independence (Glanville, 2023). Other similar studies highlight how OE, by providing for the use of large and diversified environments and laboratory and experiential activities of different kinds, would respond to the specific movement needs of children with ADHD (Allen, 2016).

This has been evident, especially following the spread of COVID-19, an emergency period in which we have realized the importance of outdoor spaces for learning and for the health of the individual and how a school capable of including well-being among its objectives is also capable of being inclusive, welcoming and valuing interests, the knowledge and skills of all students. To speak of "*an inclusive school means, first of all, to design a welcoming context, suitable for experimenting with different learning experiences through laboratory-based teaching*" (Mulligan, 2001; Mentasti & Meccariello, 2021, p. 309). Unfortunately, however, there are still too few studies that address the issue of OE as an inclusive educational approach, despite the fact that the need for it is now strongly affirmed by many parties, thanks to the possibilities it offers in ensuring well-being, inclusion, learning and calm. OE appears to improve the motivation and interest of students with autism, for example, through the use of experiential and more concrete activities and attention span, leading to the decrease of negative behaviours in students with disabilities (Szczytko, Carrier, & Stevenson, 2018; Fronzek, 2023) and those with ADHD (Webster, 2011). However, despite the challenges and barriers still present today in the performance of OE at school, it is worth remembering that the benefits for students with disabilities are very significant and related to the decrease of inappropriate behaviour, thanks to the increase in social skills, the development of communication skills and self-motivated behaviour, as well as involvement, concentration and attention (Velit, 2020; Carlson, 2022; Berman, Jonides, & Kaplan, 2008).

Among the emerging results in the use of OE is the fact that spending time outdoors has a beneficial effect on mental systems, with a reduction in emotional and physical stress, with a consequent increase in positive and minor behaviours and with reports of anxiety or symptoms of attention-deficit/hyperactivity disorder (ADHD). Interesting are the series of studies that, in this sense, see the same students report that, when the opportunities for stress are reduced, they are able to focus better on their work (Johnson, 2023; House, 2018; Taylor, & Kuo, 2004; 2011). The results indicate that OE-related interventions produce beneficial effects on the emotional and social development of pupils, in terms of well-being, relaxation, sense of belonging, successful experiences,

positive group experiences and strengthened executive functions (Sarivaara *et al.*, 2022). The ability to solve problems and cooperate in group activities is enhanced by exposure to the natural environment, resulting in a reduction in aggressive behaviours in children with ADHD and a progressive improvement in their relationships with peers, as nature becomes the most appropriate and suitable environment to meet their individual needs (Kahle, 2023; van den Berg & van den Berg, 2010).

Studies also show that OE is of fundamental importance for students with intellectual disabilities, who can take considerable advantage of the possibilities of using the five senses, thus increasing participation in educational activities (Brodin, 2009; Ayres, 1972).

These aspects are of fundamental importance if we consider that mental health, which encompasses the ability to reduce stress, increase concentration and self-esteem and the overall well-being of the child, directly affects his learning (Maller, 2009). Here it is important to remember the role played by *placed-based education*, which "*recognizes the value of place and territory as a primary source of stimuli for learning and as a privileged space for personalized, authentic, meaningful and engaging learning*" (Giunti *et al.* 2023, p. 10), and which could contribute to developing self-efficacy skills precisely in children with learning difficulties (Carter-Guyette, 2019). Stimuli from the natural environment, therefore, would seem to have positive effects on children with disabilities, but especially with ADHD, feeding their curiosity for the outside world, their ability to manage the environment, their physical and emotional health (Peterson, 2011), improving attention, stress levels, self-discipline, interest and enjoyment in learning, increasing physical learning and providing contexts of calmer, quieter, and safer acquisitions, based on cooperation, stimulation of autonomy, and alternative forms of play in the open air (Kuo, Barnes, & Jordan, 2019).

5. Outdoor Education and "Sensory Diet" of Children with ADHD

ADHD, as we have seen, consists of a persistent pattern of inattention and/or hyperactive, impulsive behavior. It is widely stated that children with ADHD have more sensory problems, which are more common than other children. As is well known, sensory processing is a neurological process in which the body notices, responds to, and uses sensory information (Dunn, 2001) of different natures. Children with ADHD, therefore, have problems interacting effectively in the daily environment precisely because of a sensory processing disorder, otherwise known as sensory integration disorder, which affects the interpretation of information that comes from the senses (Panagiotidi *et al.*, 2018; Galiana-Simal *et al.*, 2020). People with ADHD are thus more likely to be overwhelmed by sensory input from any of these areas than people without ADHD (Kamath *et al.*, 2020; Lane & Reynoldss, 2019). Research has shown that excessive reactivity to stimuli (high-pitched and loud sounds, bright lights, etc.) could cause strong sensory overload (Lane & Reynoldss, 2019) and an inability of the subject to develop self-concept (Kranowitz, 2005). This means that poor sensory information can lead to poor

motor coordination, incessant movements, inattention and impulsive behavior, which lead to an overall functional impairment in all contexts, in the family as well as at school, involving the subject in risky activities of different nature or problems from a social point of view (Barkley, 2010; Bunford *et al.*, 2015). This produces a sensory sensitivity that often leads to exaggerated emotional and behavioral reactions compared to the experiences and impulsive emotional responses that are exasperated, such as, for example, the reaction of anger in the presence of a very noisy place (DeSerisy, Hirsch, & Roy, 2019).

It is precisely on the level of the management of sensory hypersensitivity that it is possible to think of the benefits that OE, in terms of interventions and educational strategies, can bring, where an "education to sensations" is facilitated to allow an adequate processing, to help manage the discomfort that sensory hypersensitivity entails (for example, headphones with music or white noise can be used to muffle noises coming from outside; It is useful for the person to create a sensory area that is always ready to use and within reach, such as having some tissues or a bag with rice that can be manipulated, etc.). In essence, educational interventions related to sensory integration can help facilitate the process of acquiring sensory information and sorting it for its functional use.

Experimental studies (Kumari Sahoo & Senapati, 2014) show that, due to its intrinsic characteristics, OE allows for a combination of activities and environments with sensory stimulation that may be able to meet the sensory needs of a child with ADHD, not only with the aim of maintaining a state of calm and alertness but also to prevent problematic behaviors, such as self-abusive ones. This is because children with ADHD have a sensory processing deficit, as mentioned, which disturbs their level of arousal, self-organization, and self-regulation. OE would therefore provide a real "sensory diet" that would allow the child to develop his cognition and motor skills and to understand his emotions, favorably affecting that impairment of quality of life, in terms of physical, psychological and social functioning, which often affects children with ADHD. The sensory diet passes through outdoor activities precisely to positively affect functional behavior in the family such as at school and life skills, self-concept, social relationships, risky activities, with a consequent improvement in the quality of life of the child with ADHD. Therefore, careful design and implementation of OE interventions can help the child with ADHD feel less anxious and more comfortable (Aquilla, Yack & Sutton, 1998). This also leads us to reflect on the importance in teaching of allowing children to experience successful situations in the activities of daily living and occupations, improving the overall quality of their life, at school as well as at home. The literature suggests that OE acts on social, cognitive, linguistic and motor skills through the provision of diversified activities while helping to facilitate neuromuscular, sensory, cognitive and socio-emotional development and exploration and interaction with the environment (Fisher Murray, & Bundy, 1991; Brannan *et al.*, 2003; Rynders *et al.*, 1990). Finally, studies have shown that in children with ADHD, outdoor play offers important opportunities to explore the natural world, interact with peers, engage in healthy physical activities, and find a real "outsensory diet" (Kumari Sahoo & Senapati, 2014;

Whittle, 2016) as a means of treatment through outdoor play on functional behaviour in children with ADHD. In conclusion, OE, by making use of direct contact with the natural environment, is a real source of experiences for all children, especially for those with ADHD, capable of ensuring their development and well-being (Keniger, *et al.*, 2013).

6. Conclusions

In conclusion, the studies underline how OE can, by virtue of its characteristics, be considered, by virtue of its characteristics, an inclusive educational approach capable of positively influencing some learning factors of children with special educational needs, in particular those with ADHD, as it is able to pay greater attention to stress and anxiety levels, reducing and containing them, thanks to the use of practical and experiential activities and cooperation among peers, which would lead to an increase in social skills. If it is true, therefore, that EO produces numerous advantages, in terms of learning and inclusion, for all students, with and without special educational needs, it is equally true that the literature is still too limited and that more exploration is needed to highlight precisely the role that EO plays in the inclusion processes of children with special educational needs and those with ADHD. The literature seems to focus, however, above all on the analysis of the beneficial effects of the natural environment, often forgetting that EO is not limited to the use of natural spaces, but instead involves the whole territory and its multiple resources.

Conflict of Interest Statement
The author has no conflicts of interest to declare. There is no financial interest to report. I certify that the submission is my original work and is not under review at any other publication and I have no commercial associations (e.g., consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might pose a conflict of interest in connection with the submitted article.

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