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# Exploring the Efficacy of a Mindfulness Program for Boys With Attention-Deficit Hyperactivity Disorder and Oppositional Defiant Disorder

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## Abstract

**Objective:** This study was the first attempt to explore the efficacy of a mindfulness protocol for children with attention-deficit hyperactivity disorder (ADHD) and oppositional defiant disorder (ODD), and their parents. **Method:** Fifty male children with ADHD and ODD diagnosis, aged 8 to 12, were randomly assigned to the mindfulness intervention ( $n = 25$ ) or the wait-list ( $n = 25$ ) group. Outcome measures included children, parents', and teachers' reports and objective measures of attention. **Results:** Children from the intervention group had a greater reduction in hyperactive behaviors in the school context (effect size [ES] = 0.59) and a greater improvement in visual sustained attention (ES = 0.77) and in Avoidance and Fusion Questionnaire scores (ES = 0.43) than those in the wait-list control group. No significant effect of the intervention on aggressive behaviors was revealed. **Conclusion:** A mindfulness intervention for children and their parents showed partial beneficial effects in children with ADHD + ODD. (*J. of Att. Dis.* 2021; 25(11) 1544-1553)

## Keywords

mindfulness, randomized controlled trial, ADHD, attention, treatment efficacy, meditation

## Introduction

Attention-deficit hyperactivity disorder (ADHD) is one of the most frequent disorders in children. *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association [APA], 2013) suggested a prevalence of 5%; similar findings emerged from systematic reviews, which indicated a community prevalence of ADHD between 2% and 7% (see, for instance, Sayal et al., 2018). Difficulties in sustaining attention and difficulties related to overactivity and poor impulse control are the main clinical characteristics of children with ADHD (APA, 2013). The presence of ADHD puts children at higher risk for several negative outcomes: Studies showed that ADHD children globally show poorer mental health, worst academic performances, and impaired social functioning (Efron et al., 2014; Lee et al., 2008; Sayal et al., 2018). From an economic perspective, ADHD represents a significant cost for society, with an estimated annual cost per patient between €9,860 and €14,483 in Europe (Le et al., 2014).

Currently, behavioral treatments and medications are the main treatment options for youths with ADHD. Behavioral interventions are usually delivered in the form of behavioral

parent training, which mainly aims to teach parents to adequately use rewards and negative consequences to improve or diminish children's behaviors. Even though they are usually effective (Zwi et al., 2012), several studies showed that they also have some limitations (Goode et al., 2018; Pelham & Fabiano, 2008; Van den Hoofdakker et al., 2012).

Regarding medication for ADHD, psychostimulants are the most prescribed drugs (Graham et al., 2011). The stimulant treatment has been reported to improve symptoms in 70% to 80% of children with ADHD (Atkinson & Hollis, 2010). Furthermore, research has shown that children diagnosed with ADHD who take psychostimulant medication score higher on neuropsychological measures of attention and verbal learning (Biederman et al., 2008). Overall, stimulants have largely demonstrated their efficacy in reducing

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ADHD symptoms across numerous studies and that is why it is considered the first-line option for ADHD treatment (for a review, see Faraone et al., 2015). However, alongside all these assets, it is necessary to consider a series of concerns related to pharmacological interventions for ADHD. First, a small percentage of individuals who are prescribed medication to treat ADHD symptoms have adverse side effects (for a review, see Graham & Coghill, 2008); second, nonadherence rates within ADHD patients are estimated from 13% up to 64% (Adler & Nierenberg, 2010; Biederman et al., 2019); finally, parents sometimes do not consent to pharmacological treatment and/or prefer psychological approaches.

ADHD is often comorbid with other psychiatric disorders (Spencer et al., 2007), and this may have crucial implications on children's outcomes and intervention efficacy. Oppositional defiant disorder (ODD) is among the most frequent ADHD comorbidities (Harvey et al., 2016; Reale et al., 2017). Children with ADHD and ODD exhibit an earlier onset of ODD symptoms, which also appear more severe; they are more aggressive and have heightened difficulties in regulating their emotions and behavior than those with ADHD or ODD alone (Loeber et al., 2000; Nijmeijer et al., 2008). Comorbid behavioral problems in ADHD children are associated with diminishing medication effect size for aggression (Connor et al., 2002; Gurnani et al., 2016), although other studies do not support this finding (Masi et al., 2017). Also, intervention models for children with ODD usually diminish their effects when children have ADHD comorbidity (Jensen et al., 2001; Muratori et al., 2015). In summary, when ADHD is comorbid with ODD, clinical effects are harder to reach, and there are no guidelines providing for a standardized treatment for children with ADHD and ODD (Liu et al., 2019).

### *Mindfulness Interventions for Children With ADHD and ODD*

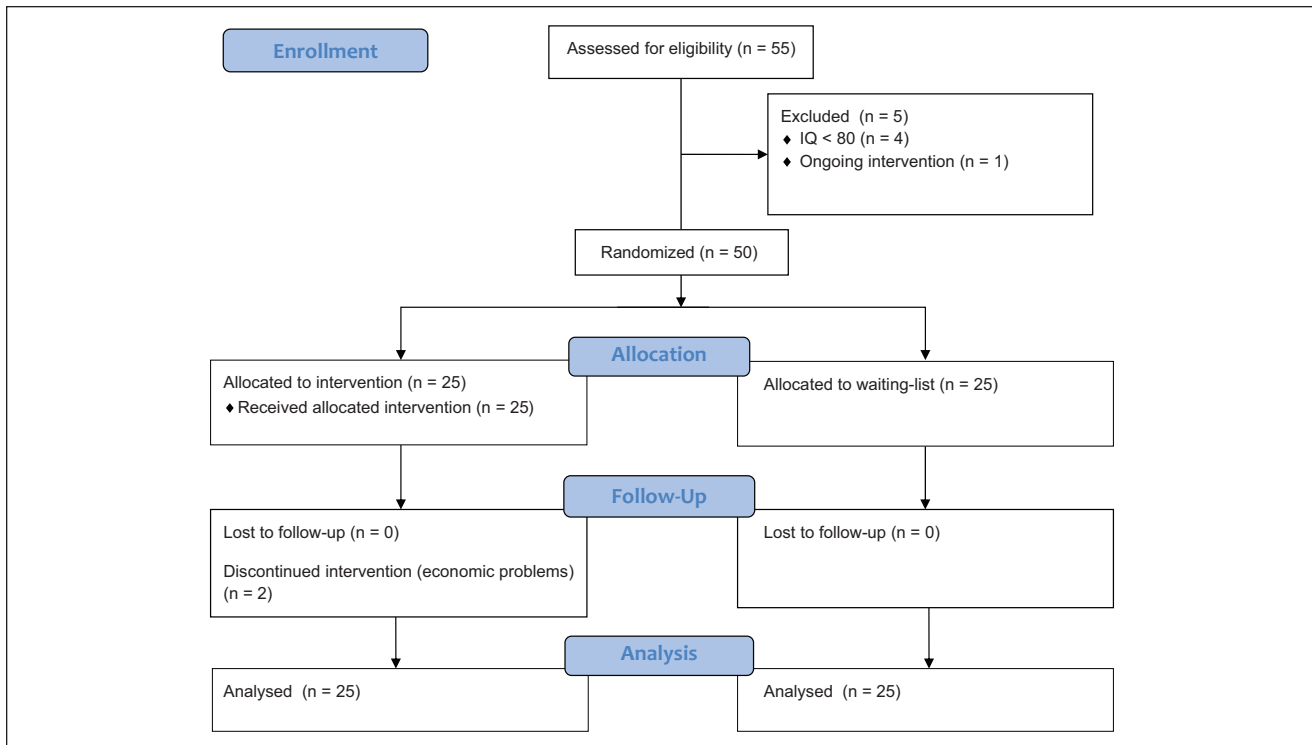
Mindfulness has been defined as intentionally directing attention to moment-by-moment experiences with curiosity and acceptance (Kabat-Zinn, 2003). A recent review showed that mindfulness-based interventions have positive effects on attentional skills, executive functioning, and negative behaviors in children (Dunning et al., 2019). We also deem that mindfulness-based interventions can overcome, at least partially, some limitations encountered by traditional interventions for ADHD. Some authors posited, for instance, that behavioral parent training might significantly improve neither children's, nor parents', emotion regulation skills (see, for instance, Singh et al., 2010). Mindfulness-based interventions have been shown to promote emotion regulation skills in both children and adults (Chambers et al., 2009; Perry-Parrish & Sibinga, 2014). Although adherence and compliance might be a problem with ADHD patients,

mindfulness interventions are usually relatively short, and hence the effort required is merely for a limited period of time. This may reduce the risk of dropout and enhance parents' and children's compliance (see, for instance, Singh et al., 2010). Finally, they can be a promising alternative when pharmacotherapy cannot be administered.

Previous studies showed that mindfulness interventions could reduce ADHD symptoms (for reviews, see Cairncross & Miller, 2020; Evans et al., 2018), with a significant reduction of inattention, impulsivity, and hyperactive behaviors, though these results were more prominent for adults rather than children (Cairncross & Miller, 2020). For instance, results from Felver et al. (2017) supported the hypothesis that participation in a mindfulness-based intervention significantly improves children's attention regulation; Lo et al. (2020), investigating the feasibility of a family-based mindfulness intervention in children with inattention and hyperactivity symptoms, found that children in intervention condition had greater improvements in ADHD symptoms than those in the wait-list control group. All these previous studies stated that mindfulness researchers should collect objective measures of attention inattention and hyperactivity, and collect the ratings of teachers, to evaluate the generalizability of the intervention.

Mindfulness-based interventions have also been increasingly considered a promising approach to address childhood aggressive and externalizing problems. They aim to implement the ability to recognize, label, and accept the internal experiences, including thoughts, feelings, and physical sensations as well as promoting stress management and relaxation strategies (Greco & Hayes, 2008; Krisanaprakornkit et al., 2010). Thus, we can hypothesize that they may help children to become more capable of managing their anger and, consequently, to reduce the emission of oppositional defiant core behaviors. In parallel, a mindful program for parents could improve parent-child interaction and parenting strategies, by reducing parental stress and parental reactivity to children's negative behaviors and improving parental attention and executive functioning (Bögels et al., 2010, 2014). We can speculate that all these changes may foster an improvement in children's externalizing behavior, too.

For instance, the "Meditation on the Soles of the Feet" is a mindfulness-based intervention that aims to improve aggression and anger management (Singh et al., 2003). This technique enables participants to shift their attention from an emotionally arousing situation or thought, to a neutral part of the body, the soles of the feet in this case. Like that, people can stop and settle down, and then decide which is the best way to respond to a trigger situation. Through practice, this mechanism becomes more and more automatic and easier to be applied within different life contexts. Studies showed that the "Meditation on the Soles of the Feet" is effective in reducing aggressive behaviors in



**Figure 1.** CONSORT flow diagram.

Note. CONSORT = Consolidated Standards of Reporting Trials; IQ = Intelligence Quotient.

several populations (Singh et al., 2003, 2007, 2017). Similar findings were found by Bögels et al. (2008).

Considering the aforementioned promising findings, this pilot study was a first attempt to examine the efficacy of a mindfulness-based intervention for children with ADHD + ODD. The outcome measures of the work included child-, parent-, and teacher-report questionnaires, and objective measures of attention. Even though ADHD and ODD frequently co-occur, there are no randomized controlled trials (RCTs) investigating the efficacy of mindfulness-based interventions with clinical samples of children with both ADHD and ODD. The objective of this study was to examine whether a mindfulness-based intervention can reduce children's ADHD symptoms and aggressive behaviors.

## Method

### Procedures

The study has been conducted in an outpatient hospital, working with children and adolescents with psychiatric problems (Masi et al., 2016). Usually, pediatricians refer children to our hospital to receive a psychiatric assessment. In this clinical context, we started a parallel RCT with pre- and posttreatment measurements to explore the effects of a mindfulness training versus a wait-list control condition.

The eligibility criteria were male sex and diagnoses of ADHD and ODD, verified by the K-SADS-PL (Schedule for Affective Disorders and Schizophrenia for School-Age Children—Present and Lifetime Version; Kaufman et al., 1997). Participants were excluded from participation if (a) they were suffering from autism spectrum disorder, (b) Intelligence Quotient (IQ), assessed with Wechsler Intelligence Scale for Children—Fourth Edition (WISC-IV; Wechsler, 2012), was below 80, and (c) they were undergoing other ongoing interventions (pharmacological and/or psychosocial). Psychologists assessed every patient for the eligibility and exclusion criteria of this study. We asked children who received ADHD + ODD diagnosis from October 4, 2018 to November 30, 2018 to participate in the study. Parents and children signed an informed consent, and then they were enrolled in the study and were randomized to the mindfulness intervention or to a wait-list control group. The first author allocated participants using a computer-generated list of random numbers. The random allocation had an allocation ratio of 1:1. Then, all participants filled in the pretest (T1) and children from the mindfulness condition started the treatment they were assigned to. Participants in the control condition did not receive any kind of active treatment during this 8-week-long period. After that, participants in the wait-list condition could get enrolled in an intervention. See Figure 1 for a flowchart of

recruitment and study procedures. This study was approved by the Ethics Review Board “Comitato Etico Regionale per la Sperimentazione Clinica della Regione Toscana” (No. 177/2017). The study is registered on ClinicalTrials.gov (No. NCT03698240).

### Participants

Participants ( $n = 50$ ) were male children between 8 and 12 years of age with ADHD and ODD, and their parents ( $n = 73$ ; 20 couples, 30 mothers, and three fathers). Participating in this study was completely voluntary and participants were free to quit the study and/or the treatment at any moment without having to give a reason and without any consequences for further treatment.

The experimental group included 25 male children with diagnoses of both ADHD and ODD, with a mean age of 8.75 years ( $SD = 0.71$ ). Mean IQ was 100.29 ( $SD = 8.87$ ), whereas baseline externalizing problems score, assessed with the  $T$  scores of the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001; Hudziak et al., 2004), was 65.55 ( $SD = 1.43$ ). The wait-list control group also included 25 male children with diagnoses of both ADHD and ODD. Their mean age was 9.05 years ( $SD = 1.05$ ). Mean IQ was 97.73 ( $SD = 8.29$ ) and baseline externalizing problems score was 66.15 ( $SD = 1.13$ ). All participants were Caucasian. Parent-reported approximate family yearly incomes ranged from less than €15,000 to more than €40,000, with a cluster (75.0%) between €20,000 and €30,000, which aligns with the Italian mean household income. All the participants, except two children and their parents, completed the study. These children dropped out due to economic reasons.

### Intervention

Mindfulness trainers were qualified by the Center for Mindfulness in Medicine, Health Care, and Society, Medical School, University of Massachusetts. The mindfulness training for children was conducted in groups of five boys and consisted of nine weekly (eight treatment sessions + one introductory session) 1.5-hr-long sessions. For the children’s training, the “Fiore Dentro” protocol was used (Montano & Villani, 2016). It is an adaptation of the mindfulness-based stress reduction (MBSR) protocol (Kabat-Zinn, 2003). Children learned to focus and enhance their attention, awareness, and self-control by doing mindfulness exercises during training and home practice.

Each session shared a common structure: (a) opening meditations; (b) homework revision; (c) brainstorming and sharing of experiences; (d) formal meditation; (e) readings, fables, and nursery rhymes related to the main objective of the session; (f) closing meditation; and (g) homework assignment. Exercises included sitting and

**Table 1.** Mindfulness Training for Children.

Session	Theme	Goal
1	The “Secret Garden”	<ul style="list-style-type: none"> <li>• Introduce mindfulness</li> <li>• Establish general rules</li> <li>• Mindful listening</li> </ul>
2	Explore mind and body	<ul style="list-style-type: none"> <li>• Introduce the beginner’s mind concept</li> <li>• Awareness in daily life</li> <li>• Mindful eating</li> <li>• Breathing meditation</li> </ul>
3	The wandering mind	<ul style="list-style-type: none"> <li>• Introduce the mind wandering concept</li> <li>• Recognize unkind thoughts</li> <li>• Body scan meditation</li> </ul>
4	Emotions and feelings	<ul style="list-style-type: none"> <li>• Promote emotional learning</li> <li>• Experience the importance of accepting feelings</li> <li>• Body scan meditation</li> </ul>
5	The negative feelings	<ul style="list-style-type: none"> <li>• Exploration of stressful events</li> <li>• Experience the nonjudgmental observation</li> <li>• Body scan meditation</li> <li>• Yoga</li> </ul>
6	The minute before the action	<ul style="list-style-type: none"> <li>• Introduce the STOP model to solve problems</li> <li>• Body scan meditation</li> <li>• Yoga</li> </ul>
7	Practice of loving kindness	<ul style="list-style-type: none"> <li>• Mindfulness as support in communication</li> <li>• Mindful eating</li> <li>• Yoga</li> </ul>
8	Conclusion of the course	<ul style="list-style-type: none"> <li>• Loving kindness to myself</li> <li>• Consolidate learning</li> </ul>

Source. Adapted from Montano and Villani (2016).

Note. STOP = Stop, Think, Options, Plan.

walking meditation, mindful eating, hatha yoga, and body scan. Children were asked to focus on meditation practices only for a few minutes at a time: This ensured that children would consider meditation as a feasible and not too hard activity, enhancing their motivation and compliance (see Table 1 for a detailed description of the intervention for children). At the same time, parents attended a parallel mindfulness intervention delivered in group setting. Generally, they learned to be more present in the here and now with their children without judgment, to take care of themselves, and to respond instead of reacting to their children’s negative behaviors. This intervention highlighted the importance for parents to practice meditation every day, to improve their mindful attitude, and to be a better model for their children. Meditations included sitting and walking meditation, mindful eating, body scan, and yoga exercises (see Table 2 for a detailed description of the intervention for parents).

**Table 2.** Mindfulness Training for Parents (Developed by P.M., C.C., and S.V.).

Session	Theme	Goal
1	Stress of being a parent	<ul style="list-style-type: none"> <li>• The automatic parenting</li> <li>• Body scan meditation</li> </ul>
2	The beginner's mind	<ul style="list-style-type: none"> <li>• Expectations and interpretations</li> <li>• Sitting meditation</li> </ul>
3	Reconnection to the body	<ul style="list-style-type: none"> <li>• Attention to the sensations of the body</li> <li>• Awareness of pleasant events</li> <li>• Seated yoga</li> </ul>
4	Respond to children mindfully	<ul style="list-style-type: none"> <li>• Stressful events and acceptance</li> <li>• Standing yoga</li> <li>• Introduce 3-min breathing as coping</li> </ul>
5	Parenting patterns	<ul style="list-style-type: none"> <li>• Introduce the concept of parental schema</li> <li>• Walking meditation</li> </ul>
6	Conflicts and parenting	<ul style="list-style-type: none"> <li>• Apply mindfulness to parental difficulties</li> </ul>
7	Self-compassion	<ul style="list-style-type: none"> <li>• Loving kindness</li> <li>• Self-compassion</li> <li>• Organize a family mindful day</li> </ul>
8	Mindful parenting	<ul style="list-style-type: none"> <li>• Body scan meditation</li> <li>• Care plan of children and self</li> <li>• Consolidate learning</li> </ul>

## Outcome Measures

**Modified Overt Aggression Scale.** Modified Overt Aggression Scale (MOAS; Kay et al., 1988) is a clinician-administered scale that measures four types of overt aggression over the past week: verbal aggression, physical aggression against property, auto-aggression, and physical aggression against other people. It was used to evaluate the changes in children's aggressive behaviors in the home context. MOAS raters were not aware of the treatment condition of the child. The MOAS uses a Likert-type scale from 0 to 3. The mean Cronbach's alpha for each assessment point was .83.

**Strengths and Difficulties Questionnaire.** In this study, we used the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) teacher report to evaluate children's hyperactive behaviors and conduct problems in the school context. Teachers were not aware of the treatment's aims and activities, and thus we thought they could provide us with a more objective evaluation of children's behavior. The Italian validated version of the SDQ (Tobia et al., 2011) is a 25-item questionnaire that assesses behaviors in children ages 4 to 16. The SDQ uses a Likert-type scale from 0 to 2. For each of the two scales, the score can range from 0 to 10. In the current sample, the SDQ reliability was generally satisfactory, as demonstrated by the mean internal

consistency of subscales (mean Cronbach's alpha for each assessment point): .83 for conduct problems and .86 for hyperactivity.

**Bells Test—Revised.** The Bells Test—Revised (Biancardi & Stoppa, 1997) is an objective measure to evaluate sustained attention in children. Speed and Accuracy in selecting the target stimuli (bells) were assessed. The Speed score refers to the number of bells found by the child in the first 30 s of the task, whereas the Accuracy score refers to the total number of bells found during the whole task (120 s).

**Matching Familiar Figures test from Italian Battery for ADHD.** The Matching Familiar Figures (MF-20) test from Italian Battery for ADHD (Marzocchi et al., 2010) measures objectively the children's impulsiveness. In the MF-20 test, participants were shown a figure and were asked to find the matching one among six choices. The MF-20 test includes 20 items. It is an objective measure of children's impulsivity.

**Child and Adolescent Mindfulness Measure.** Children completed the Child and Adolescent Mindfulness Measure (CAMM; Greco et al., 2011), a questionnaire that assesses present-moment awareness and nonjudgmental, nonavoidant responses to thoughts and feelings in youths (i.e., "I keep myself busy so I don't notice my thoughts or feelings"), and the 10 items are rated on a five-point scale. The CAMM has been shown to be reliable ( $\alpha = .81$ ) in the current sample.

**Avoidance and Fusion Questionnaire for Youth.** We used the Italian version of the Avoidance and Fusion Questionnaire for Youth (AFQ-Y; Schweiger et al., 2017) proposed by Greco et al. (2008) to assess psychological inflexibility as intended by the Acceptance and Commitment Therapy theoretical framework (i.e., "The bad things I think about myself must be true"). It is a 17-item child-report questionnaire. The AFQ-Y uses a five-point Likert-type scale. The AFQ has been shown to be reliable ( $\alpha = .84$ ) in the current sample.

## Statistical Analyses

We used a multilevel (mixed-model) analysis, as data collected at different measurement occasions (T1, T2) form a hierarchical structure of measurements nested within persons. Experimental effects are indicated by significant parameters for group-by-time interactions and effect sizes. For each group, 25 participants were included in the analysis. We tested the hypotheses in SPSS 25 with linear mixed-effects models (MIXED) with full information maximum likelihood (ML) estimation (West, 2009). The main intervention effect was tested across the whole sample and the

**Table 3.** Statistics for the Children's Variables.

Variable	Experimental group (N = 25)		Wait-list control group (N = 25)		Group by time B (SE)	p
	T1 M (SD)	T2 M (SD)	T1 M (SD)	T2 M (SD)		
Age	8.75 (0.71)	—	9.05 (1.05)	—	—	—
IQ	100.29 (8.87)	—	97.73 (8.29)	—	—	—
CBCL Ext.	65.55 (1.43)	—	66.15 (1.13)	—	—	—
MOAS	12.25 (1.65)	10.25 (1.85)	12.45 (1.55)	10.85 (1.90)	0.200 (0.048)	.222
SDQ—Conduct	2.85 (1.66)	2.55 (1.46)	3.05 (1.09)	2.30 (2.07)	−0.824 (0.620)	.192
SDQ—Hyperactivity	6.20 (2.60)	4.16 (2.50)	6.25 (1.88)	6.25 (1.83)	<b>2.05 (0.442)</b>	<b>.000</b>
Bells Test—Speed	−0.15 (1.53)	0.41 (1.14)	−0.02 (0.99)	0.34 (1.20)	−0.288 (0.238)	.233
Bells Test—Accuracy	−0.35 (1.10)	0.56 (0.56)	−0.30 (0.89)	−0.28 (1.00)	<b>−0.933 (0.283)</b>	<b>.002</b>
MF-20—Speed	0.36 (1.49)	−0.06 (1.26)	0.83 (1.53)	0.37 (1.22)	0.438 (0.285)	.134
MF-20—Accuracy	1.05 (1.50)	0.64 (1.29)	0.57 (1.30)	−0.28 (1.00)	0.169 (0.330)	.612
CAMM	25.52 (6.50)	26.00 (8.38)	24.65 (7.30)	24.70 (6.70)	−0.045 (2.28)	.984
AFQ	27.21 (13.80)	19.5 (10.08)	25.70 (11.04)	27.20 (12.50)	<b>8.86 (3.20)</b>	<b>.009</b>

Note. Statistically significant results ( $p < .05$ ) from the deviance tests for the fixed effects and from the Wald tests for the random effects are in bold-face. IQ = Intelligence Quotient; CBCL Ext. = Child Behavior Checklist—Externalizing Domain; MOAS = Modified Overt Aggression Scale; SDQ = Strengths and Difficulties Questionnaire; MF-20 = Matching Familiar Figures; CAMM = Child and Adolescent Mindfulness Measure; AFQ = Avoidance and Fusion Questionnaire for Youth.

slope within each sample was then calculated together with effect size estimates. Cohen's (1988) effect size of the pre-post change in the treatment group and in the control group was calculated as standardized effect size in a mixed/multi-level model, where standard deviations were derived from the standard errors of the estimated marginal means (Hedges & Hedberg, 2007). The data supporting the results presented in this article can be requested from the corresponding author.

## Results

There were no differences between the intervention and wait-list control groups in the measures at the baseline assessment. The rate of attendance to the intervention was 85% of the sessions for both child and parent groups. Table 3 describes the trend of the variables in the two groups across time and reports the group-by-time interactions for all variables. In relation to the experimental group, significant interactions of group by time were found for AFQ scores, SDQ—Hyperactivity, and the Accuracy scores of the Bells Test. As detailed by the descriptive statistics in Table 3, scores in SDQ—Hyperactivity and AFQ decreased across time only in the experimental group. At the same time, the accuracy scores of the Bells Test increased across time in the experimental group, whereas accuracy scores remain unchanged in the control group. No intervention effects were found for MOAS scores, SDQ—conduct problems, CAMM scores, and performances in the MF-20 test.

Table 4 presents the intervention effect sizes in the two groups. The higher effect sizes for the experimental group were for Bells Test—Accuracy scores and it was 0.77; the

**Table 4.** Effect Size Estimates.

Variable	Experimental group	Wait-list control group
AFQ	0.43	0.09
SDQ—Hyperactivity	0.59	0.00
Bells Test—Accuracy	0.77	0.04
MOAS	0.10	0.09
SDQ—Conduct	0.10	0.12
Bells Test—Speed	0.11	0.11
MF-20—Speed	0.08	0.08
MF-20—Accuracy	0.04	0.04
CAMM	0.02	0.00

Note. AFQ = Avoidance and Fusion Questionnaire for Youth; SDQ = Strengths and Difficulties Questionnaire, teacher report. MOAS = Modified Overt Aggression Scale; MF-20 = Matching Familiar Figures; CAMM = Child and Adolescent Mindfulness Measure.

effect sizes for the SDQ—Hyperactivity subscale and AFQ scores were, respectively, 0.59 and 0.43. These effect sizes were much higher than those in the control group, which ranged from 0.00 to 0.09 for the same measures. The higher effect size for the control group was for SDQ—conduct problems scores.

## Discussion

Recently, mindfulness interventions have been widely applied to promote mental health and well-being in children and adolescents (Dunning et al., 2019). One of their main fields of application is the treatment of ADHD (Evans et al., 2018). Even though ADHD and ODD frequently co-occur,

there are no studies investigating the efficacy of mindfulness-based interventions with clinical samples of children with both ADHD and ODD. This study sought to explore the efficacy of a mindfulness-based intervention for children with both ADHD and ODD diagnoses. The current findings were promising: Hyperactive behaviors, assessed with the SDQ teacher report, decreased in children from the experimental group, compared with those in the wait-list group. We also evaluated children's attentional skills with a set of objective measures. Results showed a significant improvement in their visual sustained attention, as indicated by the Bells Test–Accuracy scores. Meditation and mindfulness-based activities could help children to be more focused on moment-by-moment experiences and to intentionally direct their attention to what they are doing in the present. This may help them maintain their commitment during prolonged activities, leading to better performances in tasks evaluating sustained attention (see also Felver et al., 2017).

Importantly, we did not find effects of the intervention on children's aggressive behaviors. Although our study indicated that a mindfulness intervention model could be suitable for children with ADHD and ODD diagnosis, it did not promote a reduction in aggressive behaviors, evaluated in both home (MOAS) and school contexts (SDQ). Probably, improving mindfulness skills is not sufficient to obtain a significant reduction in children's aggressive behavioral problems. Future mindfulness protocols could integrate specific activities to target also specific risk factors for aggressive behavioral problems (Huguet et al., 2019).

Finally, children from the experimental group showed an improvement in psychological inflexibility as suggested by the AFQ-Y scores. Children learned to see thoughts for what they are, that is, just thoughts: They are not the ultimate truth, and as they come up to their minds they go away. In this way, negative feelings and thoughts may become less scary and easier to accept for children. Anyway, further studies are needed to evaluate whether all these effects are maintained across time. It is noteworthy that all the above-mentioned changes were not found in the wait-list control group, and thus they cannot be attributed just to the effect of time or assessment procedures.

Results appeared promising, though it is important to interpret them in light of the limitations of this work. First, the small sample size appears an important limitation, even if it is similar to that of most previous studies (see, for example, Biegel et al., 2009; Felver et al., 2017; Schonert-Reichl et al., 2015; Tan & Martin, 2015). We also did not include an evaluation of children's characteristics, such as callous–unemotional traits, which are usually considered a predictor of weaker treatment response (Pisano et al., 2017). A significant limitation in this research is the lack of an active control group, and thus the results from the mindfulness condition could be due to nonspecific aspects of the treatment. Finally, this sample

was restricted to males and therefore does not inform how this treatment might impact females.

ADHD and ODD commonly co-occur in clinical practice. Even though medication and psychosocial treatments have good effects in children with ADHD and ODD (Masi et al., 2017; Muratori et al., 2019), mindfulness interventions could be promising alternatives for children who do not adequately respond to these interventions or for those whose parents do not provide their consent for pharmacological intervention. Moreover, the group format helps create a unique sharing and learning environment: All the participants have the opportunity to engage with people with similar issues, to share feelings and thoughts, and to practice the strategies learned during the sessions in a realistic manner, but in a safe context. Besides, brief group interventions like the one tested in this work meet the needs of outpatient clinics that have to take care of several patients on a daily basis and can benefit from the implementation of economical and efficient treatments. More generally, because attention regulation is critical to healthy psychosocial development and childhood represents the time frame during which these processes are susceptible to change, these findings suggest that mindfulness interventions can be considered effective for supporting the development of attention regulation in children. Future studies will investigate the generalizability of these preliminary findings in different settings and populations.

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### Ethical Approval

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

### Informed Consent

Parents signed the informed consent for their own and their child's participation. Children were also requested to sign their own informed consent.

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