*Article*

# Mindfulness Training for Children with ADHD and Their Parents: A Randomized Control Trial

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## Abstract

**Objective:** The aim of this randomized control trial is to analyze the efficacy of a Mindfulness-based program (MYmind) in improving ADHD symptoms, associated problems, executive functions, and family functioning. **Method:** The sample was composed of 30 children (9–14 years old) with an ADHD diagnosis and their parents. Participants were randomized into two groups, the MYmind group ($n = 15$) and a wait-list group ($n = 15$). Participants were assessed in three time periods: pre-, post-intervention, and at 6-month follow-up. **Results:** After the program, parents reported a decrease in parenting stress and improvements in parenting styles. Six months after the intervention, parents reported significant improvements in children's inattention symptoms, executive functions, learning problems, aggression, and peer relations. Overreactivity was the only variable that showed a decrease in both the post-test and follow-up periods. **Conclusion:** These results suggest that the MYmind program is a promising treatment for children with ADHD and their parents.

## Keywords

ADHD, children, intervention, mindfulness, parenting

ADHD is a disorder characterized by a persistent pattern of inattentive behaviors, excess activity, and difficulty controlling impulses or impulsivity, which negatively impacts learning and social and affective development. These symptoms often persist into adolescence and adulthood (American Psychiatric Association [APA], 2013). Furthermore, according to the DSM-5, attention deficit hyperactivity disorder occurs in about 5% of children.

Children and adolescents with ADHD often have deficits in one or more areas of executive functioning, including working memory, inhibition, planning, or cognitive flexibility (Willcutt et al., 2005). Moreover, the difficulties of children with ADHD affect the family environment. Parents of children with ADHD present higher levels of parental stress than the general population (Theule et al., 2013) and this parental stress can negatively impact parents' feelings of competence, perceptions of quality of life, and marital relationships (Edwards et al., 2001).

International guidelines (APA, 2013; National Collaborating Centre for Mental Health [NCCM], 2009; Wolraich et al., 2019) recommend two types of interventions for children and adolescents with ADHD: pharmacological and psychosocial treatments. However, both interventions have limitations. In the case of pharmacological treatments, studies have shown a lack of adherence during adolescence (Adler & Nierenberg, 2010), limited and inconsistent evidence for maintaining the medication for more than 2 years (Van de Loo-Neus et al., 2011), or side effects associated with medication, such as loss of appetite, adverse effects on weight or height, irritability, and motor tics, among others (Charach et al., 2006). Regarding psychosocial interventions, the cost of their maintenance can be an impediment for many families (Jensen et al., 2005). These limitations suggest the need to find new alternatives or intervention components. Among the psychosocial interventions, mindfulness-based interventions (MBIs) have emerged in the recent years and shown promising results (Cairncross & Miller, 2020).

Research suggests that MBIs could be effective for children and adolescents with ADHD; however, reviews on this topic agree that there is a need for more research, specifically studies with randomized control groups, large samples, and follow-up periods to assess the maintenance of benefits (see Chimiklis et al., 2018; Davis & Mitchell, 2019; Evans et al., 2018; Househam & Solanto, 2016, for

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review). MBIs that involve both the parents and the child seem to be the most promising (Evans et al., 2018). Among these interventions, the MYmind program (Bögels et al., 2013), a MBI specifically designed for children with ADHD and their parents, is worth mentioning. The goals of this program are, first, to improve attention and concentration and decrease impulsivity, hyperactivity, and disruptive behaviors in children and adolescents with ADHD between 9 and 18 years old and, second, to help families integrate mindfulness into their daily lives to manage ADHD symptoms, stress, family relationships, and difficult emotions (Bögels et al., 2008).

There have been five studies that examine the efficacy of MYmind in children with ADHD in terms of outcomes. Although the results of these preliminary evaluations vary, MYmind has shown to be effective in improving ADHD symptomatology, executive functioning, behavioral problems, parenting stress, and discipline styles (Bögels et al., 2008; Haydicky et al., 2015; Van der Oord et al., 2012; Van de Weijer-Bergsma et al., 2012; Zhang et al., 2017). Three of these studies used a non controlled pre post design. The study by Bögels et al. (2008) shows in 14, 11 to 17-year-old children with externalizing disorders (only 2 with a primary diagnosis of ADHD), improvements in attention and internalizing and externalizing problems, among others. Zhang et al. (2017) used a similar design with 11 children with ADHD, showing improvements in some attention variables (after testing corrections). Van de Weijer-Bergsma et al. (2012) added an 8 and 16 weeks follow-up periods to the previous designs using a small sample ($N = 10$) of 11 to 15 years old children with ADHD. They found some improvements in attention, behavior problems, executive functioning, and parental overreactivity, with main changes at 8-week follow-up.

The other two studies used a within-group control design. Van der Oord et al. (2012) included a within-group waitlist to control for the effects, with an 8-week follow-up. Their participants were younger (8–12 year old) children with ADHD, who showed improvements in parent-rated ADHD behaviors and significant reduction of parental stress and overreactivity. Haydicky et al. (2015) used a time series design with four time points, where participants served as their own controls. They used the largest sample so far, 18 participants, 13 to 18 years old, with ADHD, and added a psycho education component to the sessions. Results revealed improvements in inattention, conduct problems, peer relations, and parenting stress.

The perceived effects and mechanisms of action of MYmind have also been studied through qualitative analysis (Haydicky et al., 2017; Siebelink et al., 2020; Zhang et al., 2017). Although the results of all the previous MYmind studies are promising, the sample sizes are small (ranging from 10 to 18 participants), most of them focus on ages over 10 and their designs do not include control groups. Moreover, none of them used an RCT design, which makes it necessary to conduct more experimentally rigorous studies.

More recent studies conducted with other MBI programs (such as Fiore Dentro or Mindfulness Matters) in children and adolescents with ADHD showed improvements in attention and hyperactivity (Lo et al., 2020; Muratori et al., 2020), as well as in executive functions and emotion dysregulation (Kiani et al., 2017). These studies included control groups and used larger samples, but they did not include a follow-up phase or pure ADHD clinical groups (their samples were sub-clinical, mixed, or comorbid with oppositional defiant disorder).

The objective of this article is to analyze the efficacy of the MYmind intervention program (Bögels et al., 2008) in a sample of children diagnosed with ADHD and their parents, for improving ADHD symptoms, associated problems, executive functions, and family functioning using a randomized wait-list control group, with a follow-up period of 6 months.

## Method

### Participants

A total of 30 children between 9 and 14 years old ($M = 10.6$; $SD = 1.69$) with a clinical diagnosis of ADHD ($n = 15$ experimental group/MYmind group; $n = 15$ wait-list control group) and their parents (29 mothers and 1 father) participated in the study. The inclusion criteria of the study were having a clinical diagnosis of ADHD (the diagnosis had to be performed by a specialist—psychologist, neuro-pediatrician, or psychiatrist—at least 2 years prior to participation on the study); having an estimated IQ above 80, according to the WISC-IV (Wechsler, 2005); and for at least one parent to commit to participate in the training. ADHD status was confirmed by the parents' version of the *Conners—3rd Edition* (Conners, 2008). All participants were rated within the clinically significant range ($T \geq 70$) on at least the Inattentive or the Hyperactive-Impulsive subscales. Comorbidity with oppositional defiant disorder was not considered an exclusion criterion as long as the child behavior was not too disruptive for a group-training. All the participants in the research were asked to maintain the same medication instructions indicated at the beginning of the training.

The different presentations of the diagnosis were confirmed before the training through parental reports following the criteria of the fifth version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013). A total of 30% of the sample had a predominantly inattentive presentation, 13% had a predominantly hyperactive-impulsive presentation, and 56.66% had a combined presentation.

**Table 1.** Socio-Demographic Characteristics of the Sample.

| | Wait-list | | MYmind | |
|---|---|---|---|---|
| | *n* | *M* (*SD*)/% | *n* | *M* (*SD*)/% |
| Children | | | | |
| Age | 15 | 11.6 (1.29) | 15 | 10.33 (1.83) |
| Sex (% male) | 12 | 80 | 11 | 73.3 |
| Presentation | | | | |
| Inattention | 5 | 33.3 | 4 | 26.7 |
| Hyperactivity/I | 2 | 13.3 | 2 | 13.3 |
| Combined | 8 | 53.3 | 9 | 60 |
| ADHD medication | 10 | 66 | 7 | 46.6 |
| Parents | | | | |
| Age | 15 | 47.4 (3.81) | 15 | 44.6 (5.1) |
| Education | | | | |
| Elementary school | 0 | 0 | 2 | 13.3 |
| High school | 4 | 26.7 | 2 | 13.3 |
| University education | 8 | 53.3 | 8 | 53.3 |
| Missing | 3 | 20 | 3 | 20 |
| Employed (% yes) | 13 | 86.6 | 11 | 73.3 |
| Civil status | | | | |
| Married/Cohabit | 14 | 93.3 | 13 | 86.6 |
| Single/Divorced | 1 | 6 | 2 | 13.3 |

The presence of associated comorbidities was obtained from the information reported by parents using anamnesis. Three participants showed oppositional defiant disorder, two dyslexia, two anxiety symptoms, one sleep disorder and Tourette syndrome, and one had epilepsy. The MYmind and control groups did not significantly differ in the proportion of comorbid disorders. Table 1 shows the socio-demographic characteristics of the sample. There were no statistically significant differences in sex $X^2$ (1, $N = 30$) = 0.24, $p = .624$, inattention symptoms $t(28) = -0.09$, $p = .928$, and hyperactivity/impulsivity symptoms $t(28) = 1.43$, $p = .163$ between the MYmind and wait-list groups. However, there were statistically significant differences in age $t(28) = 2.18$, $p = .038$.

## Procedure

The sample was recruited through two associations for parents and children with ADHD of Castellón and Valencia. Parents were informed about the objective of the research and information of the inclusion and exclusion criteria was provided. Parents and children gave their written and oral informed consent, respectively. Before starting the training, the families were asked to complete an anamnesis to gather their sociodemographic and clinical information. Assessments were conducted by the first author of this article at three different times: at pre-test (1 week before starting the training), at post-test (at the end of the eighth session of the training), and at follow-up (6 months after the end of the training). This research has been approved by the Deontological Commission of Universitat Jaume I and follows the ethical guidelines of the Declaration of Helsinki.

Participants were randomized into the MYmind group or the wait-list control group. At the end of the last assessment, participants in the wait-list control group were invited to participate in the program. A flow diagram of the enrollment process is shown in Figure 1. One of the participants from the wait-list control group left the research in the follow-up phase.

## MYmind Program

The program consists of eight sessions over an 8-week period, for both parents and children. A detailed description of the program can be found in Bögels et al. (2013). Although the original program by Bögels et al. (2008) indicates that the children's and parent' sessions are carried out in parallel, in our research, we conducted the sessions consecutively. That is, on the same day, the parents' session was conducted first, immediately followed by their children's session. Following the original protocol, in the first and fifth sessions, parents and children shared part of a session for approximately 20 minutes.

The children's sessions were held in small groups of four to five members and were guided by a professional certified in the MYmind program who was accompanied by a support figure who acted as an observer. These children's sessions were conducted once a week for 8 weeks and had a

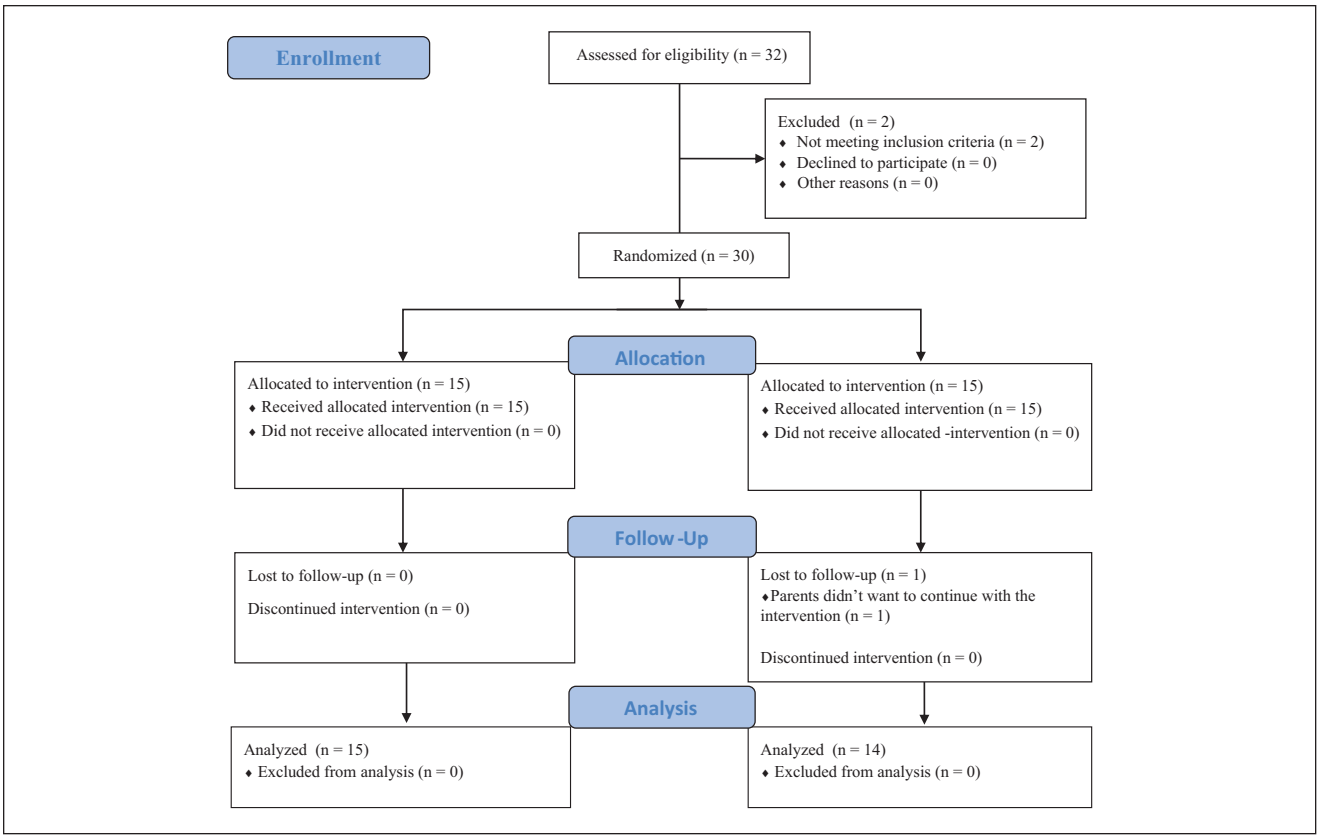


**Figure 1.** Flow diagram of the enrollment process.

duration of 60 minutes each (1.5 hours for parental sessions), with no breaks. Children performed exercises where they learned to focus and improve their attention, self-control, and body awareness (adapted meditations and yoga positions). See Bögels et al. (2008) and Haydicky et al. (2015) for a brief overview of the content of children and parent sessions.

In addition to the sessions with parents and children, the program includes an activity book to practice what was learned in the session at home, in a formal and informal way. Each family was given the activity book, and audio-recordings with the different meditations were sent each week by email.

## Measures

### ADHD symptoms and associated problems

*Conners—3rd Edition* (Conners, 2008). The Conners 3 assesses symptoms of ADHD and associated learning, behavioral, and emotional problems of children between 6 and 18 years old. We used the short version for parents, in which they report their children's symptoms organized into six subscales: inattention, hyperactivity, learning problems, executive functions, aggressive behavior, and peer relations. The 43 items are assessed on a Likert scale from 0 to 3 points, with 0 being "not true at all " and 3 "very much true". The direct scores were transformed into T scores,W which were used in this study. The Conners scales have shown good reliability and validity, with test-retest reliability coefficients of 0.71 to 0.98 and internal consistency between 0.77 and 0.97. The internal consistency of the subscales in our sample ranges from acceptable to excellent (Cronbach $\alpha = .70$ to .93), with the exception of Learning problems ($\alpha = .58$).

*Executive functions.* The *Letter-Number Sequencing* is a subtest of the WISC-IV (Wechsler, 2005) included in the working memory index. The test involves listening to an unordered sequence of numbers and letters and responding with the numbers in ascending order and the letters in alphabetical order. The scalar score of this test was used as a measure of working memory.

The *Inhibition* subtest of the NEPSY-II (Korkman et al., 2007) measures the child's ability to inhibit a natural response (Inhibition condition) and switch between different response types (Switching condition). On this test, the child is shown a series of black and white geometric shapes or arrows and has to name the geometric shape or the direction of the arrow. In the inhibition condition, the child has to respond using the opposite of the figure that is being shown.

For example, when looking at a circle the child has to say "square" or when looking at an arrow pointing upwards, the child has to say "down." In the Switching condition, the response will depend on the color of the shape or arrow; if the figure is black, the child has to say the correct name of the figure/arrow direction, but if it is white, the child has to say the name of the opposite figure/arrow direction. Thus, if the figure is a black circle, the child should say "circle," but if it is a white circle, the child should say "square." We have used the scalar scores (mean 10 and standard deviation 3) of the inhibition and switching conditions as measures of inhibition and shifting, respectively.

*Parenting styles.* The *Parenting Scale* (Arnold et al., 1993) assesses the use of dysfunctional parenting strategies for managing their child's behavior. It consists of 30 items using a 7-point Likert scale and, grouped into three subscales. Laxness, defined as a permissive and inconsistent discipline; Overreactivity, which reflects displays of anger and irritability in response to a child's misbehavior and indicates authoritarian, emotional, and rude discipline; and Verbosity, defined as the use of force or verbal or physical violence. The scale has good test-retest reliability and adequate internal consistency, with Cronbach's alpha coefficients of .85 for verbosity, .80 for overreactivity, and .78 for laxness (Rhoades & O'Leary, 2007). The internal consistency of the total score in our sample was good (Cronbach $\alpha = .77–.85$).

*Parenting stress.* The *Parenting Stress Index-short version* (PSI-SF; Abidin, 1995) assesses parents' stress due to various sources within the parenting context, using a 6-point Likert scale, ranging from "Strongly disagree" to "Strongly agree." The Total Stress score is a sum of three subscales: Parental Distress, which refers to the perception of stress in their role as parents; Parent-Child Dysfunctional Interaction, which indicates the extent to which parents feel satisfied with their child and their interactions with them; and Difficult Child, which refers to how easy or difficult to take care of the parent perceives their child to be. Higher scores indicate greater parental stress. This questionnaire has adequate psychometric properties (Díaz et al., 2010). Overall PSI demonstrates an excellent internal consistency in our sample (Cronbach's $\alpha = .87–.92$).

### Statistical Analysis

A series of analysis of covariance (ANCOVA) were used to compare the MYmind and wait-list groups after the MYmind intervention (post-test), as well as at follow-up. Pre-test scores and age were used as covariables. ANCOVA is a statistical method suitable for pre- and post-test designs (Dimitrov & Rumrill, 2003). Partial eta squared was used as a measure of effect size; values of less than 0.06 are considered small, between 0.06 and 0.14 are considered medium, and above 0.14 are considered large. Effect sizes of change were also calculated within each group from baseline to post-test and to the follow-up periods using Cohen's *d*. As Cohen (1988) suggested, $d = 0.2$ is considered a small effect size, 0.5 a medium effect size, and 0.8 a large effect size.

Finally, a power analysis was conducted to determine whether the present study was adequately powered with our sample size ($N = 30$) using G*power v. 3.1.9.743 (Heinrich-Heine-Universität, Düsseldorf, Germany). A large effect size of $f = 0.40$ found in previous literature was selected (Lo et al., 2020, Muratori et al., 2020, Van der Oord et al., 2012). Results indicated that the current study had 98.83% of power for ANCOVAs.

## Results

Regarding ADHD symptoms, ANCOVA results indicated that there were no statistically significant differences between the MYmind and wait-list groups in inattention and hyperactivity/impulsivity at post-test. At follow-up, the MYmind group showed less inattention compared to the wait-list group ($p = .0324$; $\eta_p^2 = 0.170$), whereas no statistically significant differences were found in hyperactivity/impulsivity in this period (see Table 2). Within groups effect sizes for inattention and hyperactivity/impulsivity in the MYmind group were high at post-test ($d = 0.91$, $d = 0.83$, respectively) and follow-up ($d = 1.31$, $d = 0.99$, respectively) (see Table 3).

Group differences at post-test did not appear for any of the associated problems variables (see Table 2). However, there were statistically significant differences at follow-up between the MYmind and wait-list groups for learning problems ($p = .013$, $\eta_p^2 = 0.214$), aggression ($p = .045$, $\eta_p^2 = 0.151$), and peer relations ($p = .030$, $\eta_p^2 = 0.175$), indicating that the MYmind group had a significant decrease in associated problems compared to the wait-list group 6 months after the treatment. It should be noted that within group effect sizes were especially high for the learning problems variable in the MYmind group, both between pre-post-test ($d = 0.71$) and between pre-follow-up ($d = 1.52$) (see Table 3). These results should be interpreted cautiously as the internal consistency of the Learning Problems subscale was poor.

Regarding the executive functions, there were statistically significant differences between MYmind and wait-list groups only in the parent reported variable (Conners) at follow-up ($p = .002$, $\eta_p^2 = 314$), indicating that children in the MYmind group had significantly higher executive functions than the wait-list group (see Table 2). Differences in shifting ($p = .079$, $\eta_p^2 = 114$) and parent reported variable ($p = .089$, $\eta_p^2 = 188$) at post-test were nearly significant and presented medium to large effect sizes. No significant effects on working memory and inhibition were found in post-test and follow-up periods, although the effect sizes at

**Table 2.** Results of ANCOVAs for Child Variables.

| | MYmind ($n = 15$) | | | Wait-list ($n = 15$) | | | Statistics pre-post | | Statistics pre-follow | |
|---|---|---|---|---|---|---|---|---|---|---|
| Child variables | Pre *M* (*SD*) | Post *M* (*SD*) | Follow *M* (*SD*) | Pre *M* (*SD*) | Post *M* (*SD*) | Follow *M* (*SD*) | Group $F_{1,27}$ (*p*) | $\eta^2_p$ | Group $F_{1,26}$ (*p*) | $\eta^2_p$ |
| ADHD symptoms | | | | | | | | | | |
| Inattention | 81.53 (6.17) | 76.93 (7.23) | 70.80 (14.20) | 81.27 (9.42) | 80.47 (8.96) | 79.92 (9.88) | 0.74 (.397) | 0.028 | 5.13 (.032)* | 0.170 |
| Hyperactivity/impulsivity | 77.07 (11.52) | 69.40 (13.02) | 67.46 (14.19) | 82.33 (8.31) | 80.60 (11.21) | 79.07 (12.48) | 2.10 (.159) | 0.075 | 2.85 (.103) | 0.103 |
| Associated problems | | | | | | | | | | |
| Learning problems | 66.80 (11.07) | 61.80 (7.29) | 55.60 (8.47) | 64.87 (9.96) | 62.47 (9.27) | 63.28 (9.31) | 0.34 (.564) | 0.013 | 5.88 (.023)* | 0.190 |
| Aggression | 65.27 (17.81) | 62.67 (15.01) | 59.93 (15.34) | 61.80 (17.08) | 63.67 (19.54) | 66.21 (18.23) | 0.88 (.356) | 0.033 | 4.43 (.045)* | 0.151 |
| Peer relations | 77.60 (16.01) | 71.87 (17.39) | 63.80 (11.46) | 75.40 (17.92) | 73.47 (18.95) | 74.28 (17.66) | 0.12 (.732) | 0.005 | 5.31 (.030)* | 0.175 |
| Executive functions | | | | | | | | | | |
| Working memory | 7.47 (3.09) | 9.47 (3.11) | 9.66 (2.87) | 9.47 (3.54) | 9.00 (2.83) | 8.42 (3.84) | 1.67 (.207) | 0.060 | 2.65 (.116) | 0.096 |
| Inhibition | 9.40 (3.50) | 9.53 (2.97) | 10.27 (4.01) | 9.13 (3.48) | 10.27 (3.86) | 9.64 (2.87) | 0.07 (.798) | 0.003 | 2.67 (.115) | 0.096 |
| Shifting | 8.54 (3.54) | 11.33 (3.83) | 10.87 (3.54) | 9.53 (3.24) | 9.73 (3.03) | 10.78 (2.81) | 3.34 (.079) | 0.114 | 0.11 (.737) | 0.005 |
| EF parent report | 75.60 (6.72) | 69.67 (9.45) | 64.26 (9.27) | 74.33 (13.65) | 75.33 (11.00) | 73.07 (13.22) | 3.13 (.089) | 0.188 | 11.43 (.002)* | 0.314 |

*$p < .05$.

**Table 3.** Effect Sizes of Change for Child Variables.

| | MYmind ($n = 15$) | | Wait-list ($n = 15$) | |
|---|---|---|---|---|
| | Pre-post | Pre-follow | Pre-post | Pre-follow |
| | Mean dif. *d* [95% CI] | | | |
| ADHD symptoms | | | | |
| Inattention | 0.91 [0.16, 1.66] | 1.31 [0.52, 2.10] | 0.12 [−0.60, 0.83] | 0.19 [−0.53, 0.90] |
| Hyperactivity/impulsivity | 0.83 [0.09, 1.58] | 0.99 [0.23, 1.75] | 0.23 [−0.48, 0.95] | 0.41 [−0.31, 1.13] |
| Associated problems | | | | |
| Learning problems | 0.71 [−0.03, 1.45] | 1.52 [0.70, 2.33] | 0.33[−0.39, 1.05] | 0.22 [−0.50, 0.94] |
| Aggression | 0.21[−0.51, 0.93] | 0.43 [−0.30, 1.15] | −0.14 [−0.85,0.58] | −0.33 [−1.05, 0.39] |
| Peer relations | 0.46 [−0.27, 1.18] | 1.32 [0.53, 2.11] | 0.14 [−0.58, 0.86] | 0.08 [−0.63, 0.80] |
| Executive functions | | | | |
| Working memory | −0.86 [−1.61, −0.11] | −0.98 [−1.74, −0.22] | 0.20 [−0.52, 0.91] | 0.38 [−0.34, 1.10] |
| Inhibition | −0.05 [−0.77, −0.66] | −0.31 [−1.03, 0.41] | −0.41[−1.14, 0.31] | −0.21 [−0.93, 0.50] |
| Shifting | −1.01[−1.77, −0.25] | −0.88 [−1.63, −0.13] | −0.09[−0.80, 0.63] | −0.55 [−1.28, 0.18] |
| EF parent report | 0.96 [0.21, 1.72] | 1.87 [1.01, 2.73] | −0.11 [−0.82, 0.61] | 0.13 [−0.59, 0.84] |

follow-up were medium ($\eta_p^2 = 0.096$). Moreover, the large within group effect sizes for working memory in the MYmind group pre-post ($d = 0.86$) and pre-follow-up ($d = 0.98$), compared to those of the wait-list group (pre-post, $d = 0.20$, pre-follow-up, $d = 0.38$) is worth noting. Shifting also had large within group effect sizes pre-post ($d = 1.01$) and pre-follow-up ($d = 0.88$), compared to those of the wait-list group (pre-post, $d = 0.09$, pre-follow-up, $d = 0.55$) (see Table 3).

ANCOVA results for the PSI indicated that the MYmind group had significantly lower parenting stress at post-test compared to the wait-list group ($p = .038$, $\eta_p^2 = 0.155$), and nearly significant at follow-up ($p = .067$, $\eta_p^2 = 0.128$) (see Table 4). Regarding the subscales, the MYmind group had statistically significant lower scores on Parental Distress ($p = .038$, $\eta_p^2 = 0.155$) and Parent-Child Interaction ($p = .005$, $\eta_p^2 = 0.269$) at post-test, but the results were not maintained at follow-up or on the Difficult Child variable.

The MYmind group showed a significant reduction in parental Overreactivity at post-test ($p = .020$, $\eta_p^2 = 0.192$), which was maintained at follow-up ($p = .006$, $\eta_p^2 = 0.264$). The Verbosity variable showed a significant decrease at follow-up ($p = .036$, $\eta_p^2 = 0.165$). Changes in Laxness were non-significant (see Table 4). Table 5 shows the effect sizes of change for parental variables.

## Discussion

The objective of this article was to analyze the efficacy of the MYmind program (Bögels et al., 2013) in children with ADHD and their parents. Overall, the MYmind intervention had a positive impact on most of the areas considered in this study.

Regarding ADHD symptomatology, compared to the wait-list group, MYmind parents reported significant reductions in inattention at follow-up, but not at post-test. It is possible that the effects on attention appear after continuing and consolidating the mindful practice. Another explanation would be that inattention symptoms take more time to be observed by parents. Although not statistically significant, hyperactivity/impulsivity symptoms showed a tendency toward improvement in the post-test and follow-up periods in the MYmind group, with a high effect size pre-post and pre-follow-up ($d = 0.83$, $d = 0.99$, respectively).

These effect sizes can be compared to the ones reported in other studies with significant results (Lo et al., 2020, Muratori et al., 2020, Van der Oord et al., 2012); therefore, it is possible that the analysis with a larger sample size would have shown significance. The clearer effects on inattention are consistent with Haydicky et al. (2015), who suggest that the intervention might target attention related processes more than hyperactive symptoms.

In line with the results for ADHD symptoms, associated problems (learning problems, aggression, and peer relations) showed a tendency toward improvement after the treatment. However, compared to wait-list parents, MYmind parents reported significant changes in the three variables only at follow-up. These results should be interpreted cautiously as the internal consistency of the Learning Problems subscale was poor. Our results support the reduction in externalizing symptoms associated with ADHD after a mindfulness intervention (Haydicky et al., 2015, Van de Weijer-Bergsma et al., 2012). The large effect sizes related to improvements in learning problems and positive relationships between children and their peers in the MYmind group are especially interesting because studies show that ADHD is associated with poorer grades, poorer academic performance, and lower rates of finishing compulsory education (Loe & Feldman, 2007), as well as greater rejection by peers, lower levels of social skills, and impaired social cognitions (Ros & Graziano, 2017).

**Table 4.** Results of ANCOVAs for Parental Variables.

| | MYmind ($n = 15$) | | | Wait-list ($n = 15$) | | | Statistics pre-post | | Statistics pre-follow | |
|---|---|---|---|---|---|---|---|---|---|---|
| Parental variables | Pre *M* (*SD*) | Post *M* (*SD*) | Follow *M* (*SD*) | Pre *M* (*SD*) | Post *M* (*SD*) | Follow *M* (*SD*) | Group $F_{1,27}$ (*p*) | $\eta^2_p$ | Group $F_{1,26}$ (*p*) | $\eta^2_p$ |
| Parenting stress | | | | | | | | | | |
| Parental distress | 32.46 (9.37) | 27.33 (5.72) | 26.26 (10.81) | 34.66 (8.39) | 35.26 (8.56) | 35.07 (9.60) | 4.79 (.038)* | 0.155 | 3.67 (.067) | 0.128 |
| Parent-child interaction | 28 (6.34) | 28 (4.39) | 30.73 (6.50) | 28.66 (7.11) | 34.13 (9.34) | 31.46 (6.43) | 9.58 (.005)* | 0.269 | 0.18 (.673) | 0.007 |
| Difficult child | 39.86 (6.13) | 37.20 (5.37) | 33.26 (7.24) | 41.10 (6.49) | 40.13 (8.25) | 33.14 (9.91) | 1.25 (.274) | 0.046 | 0.02 (.901) | 0.001 |
| Total | 100.33 (17.51) | 92.53 (12.77) | 90.26 (18.27) | 104.43 (19.06) | 109.53 (23.05) | 99.66 (18.20) | 6.42 (.018)* | 0.198 | 0.88 (.357) | 0.034 |
| Parenting scale | | | | | | | | | | |
| Laxness | 2.69 (0.91) | 2.72 (0.80) | 2.63 (0.61) | 3.04 (0.81) | 3.04 (0.979) | 2.85 (0.67) | 0.10 (.752) | 0.004 | 0.55 (.465) | 0.022 |
| Overreactivity | 3.65 (0.74) | 2.98 (0.91) | 2.83 (0.92) | 3.88 (0.71) | 3.77 (0.778) | 3.85 (1.03) | 6.18 (.020)* | 0.192 | 8.97 (.006)* | 0.264 |
| Verbosity | 4.23 (0.65) | 4.04 (0.78) | 3.70 (0.85) | 4.68 (0.61) | 4.8 (0.818) | 4.61 (0.73) | 1.83 (.188) | 0.066 | 4.93 (.036)* | 0.165 |
| Total | 3.49 (3.75) | 3.28 (0.61) | 3.06 (0.57) | 3.79 (0.50) | 3.77 (0.51) | 3.71 (0.43) | 3.28 (.082) | 0.112 | 10.84 (.003)* | 0.302 |

*$p < .05$.

**Table 5.** Effect Sizes of Change for Parental Variables.

| | MYmind ($n = 15$) | | Wait-list ($n = 15$) | |
|---|---|---|---|---|
| | Pre-post | Pre-follow | Pre-post | Pre-follow |
| | Mean dif. *d* [95% CI] | | | |
| Parental stress | | | | |
| Parental distress | 0.88 [0.13, 1.63] | 0.82 [0.07, 1.56] | −0.09 [−0.81, 0.62] | −0.06 [−0.79, 0.67] |
| Parent-child interaction | 0 [−0.72, 0.72] | −0.57 [−1.30, 0.16] | −0.77 [−1.63, −0.13] | −0.59 [−1.29, 0.19] |
| Difficult child | 0.62 [−0.12, 1.35] | 1.31 [0.52, 2.10] | 0.17 [−0.54, 0.89] | 1.28 [0.48, 2.08] |
| Total | 0.68 [−0.06, 1.41] | 0.75 [0.01, 1.49] | −0.32 [−1.04, 0.40] | 0.34 [−0.39, 1.07] |
| Parenting scale | | | | |
| Laxness | −0,05 [−0.76, 0.67] | 0.10 [−0.61, 0.82] | 0.00 [−0.72, 0.72] | 0.39 [−0.39, 1.07] |
| Overreactivity | 1.08 [0.31, 1.84] | 1.31 [0.52, 2.10] | 0.20 [−0.52, 0.91] | 0.05 [−0.68, 0.77] |
| Verbosity | 0.35 [−0.37, 1.07] | 0.93 [0.18, 1.69] | −0.22 [−0.94, 0.50] | 0.14 [−0.59, 0.87] |
| Total | 0.10 [−0.61, 0.82] | 0.21 [−0.50, 0.93] | 0.05 [−0.66, 0.77] | 0.22 [−0.50, 0.96] |

Compared to wait-list parents, MYmind parents reported improvements in executive functions at follow-up; however, there were no significant differences between the wait-list and MYmind groups on the neuropsychological tests. It is worth noting that the test that measured shifting, that is, one's cognitive flexibility to switch between different tasks, showed nearly significant improvements at in the post-test period, with high between group effect sizes for the MYmind group. Within group changes in Working memory in the MYmind group revealed high effect sizes at post-test and follow-up. Although the ANCOVAs were not statistically significant, the within group changes in the MYmind group are similar to the ones found in the few studies that have used neuropsychological measures (Huguet et al., 2017; Kiani et al., 2017). Our results provide further evidence supporting previous literature on the efficacy of MBIs in improving executive functioning (Jansen et al., 2016).

MYmind had a particularly significant impact on parental outcomes. Our results indicate that, compared to wait-list parents, MYmind parents reported a significant reduction in parenting stress after the intervention, as suggested by other studies (Bögels et al., 2014; Haydicky et al., 2015; Lo et al., 2020; Van der Oord et al., 2012). Specifically, there were improvements in parent-child interactions, that is, the extent to which parents feel satisfied with their children and their interactions with them, and in parental distress, referring to the personal stress parents experience about their parenting role. The results did not remain significant at the follow-up, however, the effect size from pre- to follow-up was high in the MYmind group, which suggests that the improvements obtained on some aspects of parental stress could be maintained up to 6 months after the program.

Regarding general parenting styles, MYmind parents showed a significant improvement 6 months after the intervention. The subscale referring to the authoritarian, rude, and inflexible parenting style is the one showing the greatest improvement. In fact, the intervention effects on overreactivity appeared at the end of the program (post-test) and were maintained at follow-up. In other words, parents indicated that they reacted with less anger, frustration, and irritability toward their children. These results are consistent with the two previous quasi-experimental studies that used parenting style variables, which reported reductions in parental overreactivity after a combined parent–child mindfulness training (Van der Oord et al., 2012; Van de Weijer-Bergsma et al., 2012).

It is possible that a reduction in parental stress has facilitated different patterns of interactions between parents and their children. In other words, the behaviors that would have been irritating at another time, are observed from a more comprehensive perspective (Bögels et al., 2014) and their child's emotional needs are addressed more objectively. Taken together, our results support the contributions of Lippold et al. (2015), which suggest that mindful parenting may improve mother—adolescent relationships by reducing negative parental reactions to information and adolescent perceptions of over-control. They also support the study by Singh et al. (2010), which concludes that the calm resulting from the practice of personal meditation after a mindful parenting training is manifested in parents in many ways, most commonly in the non-escalation of potentially negative interactions with their children, producing peace and calmness in parents and their children.

The present study provides data on the effects of MBI in ADHD, using a wait-list control group and children from 9 to 14 years old, which allows us to extend previous promising results of this training to younger ages. The effect sizes of ADHD symptoms, executive functions, learning problems, peer relations, and parental variables in the MYmind group are large or similar to those reported for cognitive-behavioral interventions (Toplak et al., 2008), behavioral

parent training (Chronis et al., 2006), and combined treatments using medication and psychosocial approaches (Majewicz-Hefley & Carlson, 2007). Moreover, including a follow-up assessment suggests that MYmind has an impact on children with ADHD and their families that continues even becomes stronger for at least 6 months after the treatment (with large effect sizes, $d > 1$, in many cases). These results are more encouraging than those from most MBIs, which show small to moderate effects ($d$s = 0.30–0.50) at follow-up (Goldberg et al., 2021). The improvements in some variables in our follow-up can be explained by the fact that not only the children, but also the parents were involved in the treatment and they were encouraged to continue the mindful practice. In fact, the parallel parent-child training design is one of the main perceived facilitators of participation in MYmind (Siebelink et al., 2020).

However, this study has some limitations. First, although larger than in most previous studies using the MYmind program, our sample size is still small because of recruiting difficulties, given that parents find it difficult to make time for a family activity on a scheduled basis. Second, most of the variables used in this study were parent ratings and parents were part of the intervention; therefore, it would have been desirable to include teachers' measures as well. We decided not to use self-report measures because the tendency reported in children with ADHD to overestimate their own competence more than their peers without ADHD (Colomer et al., 2016). Third, we did not use an active control group, which prevented us from controlling aspects like group, psychoeducation, or hope.

For future lines of research, it would be interesting to explore the effects of including a family member in the treatment in order to clearly analyze the benefits of joint parent-child interventions versus child interventions. It would also useful to study the commitment effect after training and the role of support sessions in different outcomes. For example, biweekly or monthly support sessions would make it possible to observe whether the improvements achieved with the program are sustained over time.

Overall, the results of this study indicate that MYmind can be a promising treatment for children and adolescents with ADHD. These results suggest that MYmind could immediately impact parental and family factors which, subsequently, could contribute to the improvement of personal factors in children with ADHD. Future studies may help to clarify this hypothesis. More research with larger samples and randomized clinical trials (RCT) will be necessary to ensure that the MYmind program is an effective intervention tool for children with ADHD and their parents.

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