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Do Portuguese Preschoolers With High Hyperactive Behaviors Make More Progress Than Those With Low Hyperactivity After Parental Intervention?

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Abstract

Improvement over 12 months of two groups of Portuguese preschoolers is analyzed after a parental intervention with the Incredible Years Basic Parent Program (IY). The groups were defined by the children's initial levels of hyperactive behaviors (high hyperactivity, $n = 34$; low hyperactivity, $n = 18$). Changes in the children's reported hyperactive behaviors and in mothers' self-reported parental practices and mood were evaluated from baseline to the 12-month follow-up. Preschoolers with higher initial hyperactivity levels seem to have benefitted more from the IY intervention compared to children with lower baseline levels. However, this low-hyperactivity group improved as well. Findings also indicate high levels of maternal acceptance and satisfaction with the intervention in both groups, although some differences were observed. Overall, findings suggest that IY is equally suitable for parents of Portuguese preschoolers with high- and low-hyperactive behaviors at baseline, highlighting the usefulness of the program for children with different risk levels.

Keywords

hyperactive behaviors, preschool children, early intervention, Incredible Years Basic Parent Training

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is most frequently identified in school-age children, even though ADHD symptoms may be present in children under the age of 5 (e.g., Egger & Angold, 2006; Lahey et al., 1998). Despite the huge developmental changes within this age period (Kern et al., 2007; Sonuga-Barke, Auerbach, Campbell, Daley, & Thompson, 2005), which require a carefully staged approach to the early identification and intervention of ADHD (National Institute for Health and Clinical Excellence, 2008), studies comparing this condition in preschool and school-age children show a similar symptom structure and neuropsychological

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patterns, as well as similar associated global impairment (e.g., at school, home, and with peers) and long-term difficulties (e.g., academic underachievement, antisocial behavior, social exclusion, delinquency, and substance use; e.g., DuPaul, McGoey, Eckert, & VanBrakle, 2001; Lahey et al., 2004; Sonuga-Barke, Dalen, & Remmington, 2003). Thus, preschoolers presenting high levels of ADHD symptoms are a prime target for early intervention (Sayal et al., 2012) to prevent the negative developmental trajectories (e.g., comorbid externalizing disorders) usually associated with early-onset ADHD (Beauchaine & McNulty, 2013; Sonuga-Barke, Koerting, Smith, McCann, & Thompson, 2011; Webster-Stratton, Reid, & Beauchaine, 2011).

Recent guidelines from the American Academy of Pediatrics (2011) and from the National Institute for Health and Clinical Excellence (2008) strongly recommend parental behavioral training (PBT) as the first-line treatment option for ADHD in preschool years, and hold that pharmacological treatment should be considered only when there is still significant room for improvement after a behavioral intervention trial or when this first-line approach is not available. In addition, behavior change is more likely to occur in young children and, at this age range, generally involves change in caregivers' practices (Egger & Angold, 2006; Hutchings & Gardner, 2012). This reinforces the value of PBT interventions directly targeting effective parenting practices and behavior management strategies, as well as child disruptive behaviors and parent–child interactions, over other intervention strategies in preschool years (Lundahl, Risser, & Lovejoy, 2006; National Institute for Health and Clinical Excellence, 2008). In fact, specifically regarding ADHD, growing empirical evidence from randomized controlled trials (RCTs) shows that PBT can reduce reported ADHD symptoms (generally among young children with other comorbid disruptive behaviors) and improve parenting practices, both in short- and long-term assessments (e.g., Bor, Sanders, & Markie-Dadds, 2002; Herbert, Harvey, Roberts, Wichowski, & Lugo-Vandelas, 2013; Jones, Daley, Hutchings, Bywater, & Eames, 2008; Matos, Bauermeister, & Bernal, 2009; Pisterman et al., 1992; Sonuga-Barke, Daley, Thompson, Laver-Bradbury, & Weeks, 2001; Thompson et al., 2009; Webster-Stratton, Reid, & Beauchaine, 2013).

In view of this, the Incredible Years Basic Parent Training (IY; Webster-Stratton, 2001), an evidence-based PBT (http://www.nrepp.samhsa.gov/ViewIntervention.aspx?id=311) and "promising" program according to Blueprints criteria (http://www.blueprintsprograms.com/factSheet.php?pid=7719a1c782a1ba91c031a682a0a2f8658209adbf), for children between 3 and 8 years of age with behavior problems, was selected as the intervention program for this study. IY has recently been shown to be effective in reducing ADHD symptoms, and sustained improvements were demonstrated after long-term follow-up in two different trials of preschoolers with ADHD symptoms and comorbid conduct problems (Jones et al., 2008; Webster-Stratton et al., 2011). As with other PBT programs (e.g., Bor et al., 2002; Matos et al., 2009; Sonuga-Barke et al., 2001), the IY group intervention is based on social learning and operant conditioning theories (Webster-Stratton, 2001). It focuses on developing positive parent–child interactions, encouraging child cooperation, increasing supportive parenting approaches, nonviolent discipline strategies and effective limit setting, and promoting children's social-emotional regulation skills through parenting. Thus, the IY program focuses on developing skills that are usually impaired in children with ADHD and in their parents (Webster-Stratton & Reid, 2014; Webster-Stratton et al., 2013).

Despite the evidence for the effectiveness of PBT, not all families benefit from it equally. Consequently, research has also aimed to identify the target populations for whom this type of intervention works best (e.g., Beauchaine, Hinshaw, & Pang, 2010; Gardner, Hutchings, Bywater, & Whitaker, 2010) and to identify the characteristics of children and parents that could contribute to different treatment outcomes (see Lundahl et al., 2006; Menting, Orobio de Castro, & Matthys, 2013; Reyno & McGrath, 2006 for a revision). Among the different child variables that can predict the response to PBT, the initial severity of the child's behavior problems has been identified as one of the most studied predictors and is considered moderately associated with treatment outcomes (e.g., Reyno & McGrath, 2006). Nevertheless, the literature is not consistent about this

issue: some studies showed that children with high levels of behavior problems benefited from PBT interventions more than children with lower levels of disruptive behavior (e.g., Hautmann et al., 2010; Jones et al., 2008; Reid, Webster-Stratton, & Baydar, 2004; Webster-Stratton et al., 2013), while others suggested that severe behavior problems are resistant to change and are associated with poorer outcomes (e.g., Hinshaw, 2007; Kazdin & Wassell, 2000). Furthermore, the severity of ADHD in preschoolers was identified as a significant risk marker of symptoms persisting into middle childhood and of a future externalizing trajectory (e.g., Lahey et al., 1998). Therefore, it is important to target children with early signs of ADHD at an initial stage and to observe the differences in the outcome of treatment depending on initial levels of symptoms. This will enable early interventions to be better tailored to the specific needs of the children and their families, thereby maximizing their success potential.

In Portugal, previous analyses with this sample of children with ADHD behaviors whose parents had received the IY intervention for 14 weeks showed statistically significant short-term (Azevedo, Seabra-Santos, Gaspar, & Homem, 2013) and long-term (Azevedo et al., 2014) improvements in reported measures of preschoolers' hyperactive behaviors and mothers' observed and self-reported parenting practices and sense of competence. Furthermore, IY has demonstrated good levels of acceptability among Portuguese participants (e.g., high attendance rates, low dropout, high levels of reported program satisfaction; Azevedo et al., 2013).

The main purpose of the present study was to supplement a previous IY effectiveness study (Azevedo et al., 2013) by analyzing the potential differences in IY benefits taking into account the initial level of hyperactive behaviors. More specifically, it aims to analyze differences in the change observed (from baseline to 12-month assessment) in two groups of preschoolers with different levels of initial hyperactive behaviors (high- and low-hyperactivity groups) after an IY intervention that had previously demonstrated short- and long-term effects with these children and mothers in general (Azevedo et al., 2013, 2014). Long-term change in this study was defined as the difference in children's (hyperactive and oppositional/explosive behaviors) and mothers' (dysfunctional parenting practices, depressive mood) outcome measures from pre- to 12-month follow-up assessments. The second aim of this study was to analyze whether there were differences between the two groups regarding mothers' levels of attendance and satisfaction with the IY program, according to their perceptions of the ease and usefulness of the parenting strategies covered and the methods used during the sessions. These analyses may highlight which components of the program are most valued by mothers of children with different levels of hyperactive behavior.

Method

Study Participants and Procedures

The participants in this study were drawn from a larger sample of a longitudinal RCT (the main trial; $N = 125$) that tested the effectiveness of the IY program in Portuguese preschoolers at risk of disruptive behaviors (Seabra-Santos, Gaspar, Azevedo, Homem, & Leitão, 2012). Children eligible for the main trial had either been referred by health professionals or were self-referred by their families, and had scored equal to or above the Portuguese borderline cut-off levels (Abreu-Lima et al., 2010) on the Conduct (≥ 5) or the Hyperactivity Scale (≥ 7) of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 2001). Other inclusion criteria were the child's age (between 3 and 6 years), preschool attendance, and parental interest in participating in a 14-session group intervention, combined with their ability to read Portuguese. For this particular study (the at-risk-of-ADHD subsample), another inclusion criterion was considered: scoring equal to or above the Portuguese at-risk cut-off level (≥21 corresponding to the 80th percentile; Eugénio, 2011) as assessed by a specific ADHD measure, the Werry–Weiss–Peters Activity Scale (WWPAS; Routh,

1978). Thus, on this at-risk-of-ADHD subsample, 83% ($n = 43$) of children scored above the borderline cut-off score of the SDQ Hyperactivity subscale, and all preschoolers (100%) were at a risk level for ADHD on the WWPAS.

Although measures were also collected immediately after the intervention (6 months after baseline; Azevedo et al., 2013), this article will focus only on the long-term changes observed in mothers and children with different hyperactivity levels, 12 months after baseline, approximately 7.5 months after intervention. For that purpose, the children were divided in two groups: they were included in a high-hyperactivity group if they scored equal to or above the 95th percentile on the WWPAS, and in a low-hyperactivity group if they scored below the 95th percentile (<28). Therefore, of the 52 children at baseline, 34 were in the high-hyperactivity group and 18 were in the low-hyperactivity group. The sociodemographic characteristics of the high- and low-hyperactivity groups of participants (children and their primary caregivers, all mothers) are shown in Table 1. No differences were found between groups with regard to these characteristics.

All the families gave their written consent, and the study design was approved by the Portuguese National Protection Committee of Data and by the Medical Ethical Committee of the mental health center involved in the study.

Study Measures

The measures selected for this analysis (mother's interview, maternal rating scales of the child's behavior problems, and self-reported assessments of parenting effectiveness, mood, and satisfaction with the program) are described in detail in the assessment protocol of the main trial (see Seabra-Santos et al., 2013). A second caregiver has completed the assessment form whenever interest in participating in the study has been demonstrated (attending an IY group). However, only the first caregiver's results were considered in this article. These measures were previously used in preliminary studies with Portuguese samples (see Seabra-Santos et al., 2013 for description of these studies) and are the most frequently used in similar high-standard studies (e.g., Hutchings et al., 2007; Thompson et al., 2009).

Strengths and Difficulties Questionnaire (SDQ). This 25-item questionnaire was designed as a brief behavioral screening measure to assess the occurrence as *none* (0), *some* (1), or *much* (2) of the time of conduct problems, hyperactivity, emotional symptoms, peer problems, and prosocial behavior in children. A total difficulties score can be derived, as can subscale scores (ranging from 0 to 10). This measure was adapted for Portuguese children (Fleitlich, Loureiro, Fonseca, & Gaspar, 2005). In this study, SDQ has been completed by mothers and was used only as a first screening measure. The internal consistency of the subscales used in this subsample was low (.52 for hyperactivity and .49 for conduct problems); nevertheless the SDQ has been included in similar studies (e.g., Hutchings et al., 2007; Jones et al., 2008), and good psychometric properties were found for the English samples (Goodman, 2001) and acceptable ones for the Portuguese samples (Abreu-Lima et al., 2010).

Werry–Weiss–Peters Activity Scale (WWPAS). This 27-item mother-reported measure evaluates the hyperactive behaviors of preschoolers in different situations of daily life (e.g., during meals, watching television, drawing, playing, sleeping). Parents rate the frequency of symptoms as occurring *none* (0), *some* (1), or *much* (2) of the time, and a total score (ranging from 0 to 54) is derived by adding up these ratings. WWPAS has been used in several studies of behavioral problems (including ADHD) in preschool-age children, and has been shown to be predictive of clinical ADHD diagnosis (Sonuga-Barke, Lamparelli, Stevenson, Thompson, & Henry, 1994) and to have good psychometric properties on international studies (e.g., Eyberg et al., 2001; Sonuga-Barke et al., 2001; Thompson et al., 2009). Studies that used this measure with nonclinical Portuguese samples have shown high levels of internal consistency (between .87 and .91; Almeida,

Table 1. Baseline Characteristics for Participants in Low and High Hyperactivity Groups.

Baseline characteristics	Low hyperactivity (n = 18)	High hyperactivity (n = 34)	p value
Primary caregiver: no (%)			
Mother	17 (94%)	31 (91%)	
Adoptive mother		2 (6%)	.527[b]
Grandmother	1 (6%)	1 (3%)	
Age (years): $M \pm SD$	36.33 ± 4.06	36.38 ± 6.19	.908[a]
Years of education: $M \pm SD$	14.11 ± 3.84	13.79 ± 3.97	.840[a]
Marital status: no (%)			
Married/as married	15 (83%)	28 (82%)	.756[b]
Divorced/separated/single	3 (17%)	6 (18%)	
Mother's depressive symptoms (BDI)	8.41 ± 7.73	9.42 ± 7.50	.545[a]
Family SES[c]: no (%)			
Low	5 (28%)	11 (32%)	
Medium	7 (39%)	15 (44%)	.750[b]
High	6 (33%)	8 (24%)	
Child			
Age (years): $M \pm SD$	4.17 ± 0.71	4.21 ± 0.95	.879[a]
3 years: no (%)	3 (17%)	10 (29%)	.286[b]
4 years: no (%)	9 (50%)	9 (27%)	
5 years: no (%)	6 (33%)	13 (38%)	
6 years: no (%)		2 (6%)	
Gender (male): no (%)	12 (67%)	25 (74%)	.603[b]
Reference: no (%)			
Clinically referred	11 (61%)	18 (53%)	.573[b]
Community referred	7 (39%)	16 (47%)	
Comorbid oppositional/aggressive behaviors: no (%)	15 (83%)	26 (77%)	.568[b]

Note. BDI = Beck Depression Inventory; SES = socioeconomic status.
[a]Mann–Whitney *U*-test for continuous variables.
[b]Chi-square tests for categorical variables.
[c]SES was defined using a standardized classification developed for Portuguese population (Almeida,1988).

2009; Eugénio, 2011). For this particular sample, the Cronbach's alpha coefficient was .82. In this study WWPAS was used to select the at-risk-for-ADHD subsample and also for grouping participants according to high and low hyperactivity levels.

Preschool and Kindergarten Behavior Scales–2nd Edition (PKBS-2). This rating scale assesses preschoolers' social skills and problem behavior (Merrell, 2002). For the present article, we analyzed two externalizing behavior problems subscales, filled in by the mother: the Overactivity/Inattention (PKBS-O/I: eight items; score ranges from 0 to 24) and the Oppositional/Explosive (PKBS-O/E: nine items; score ranges from 0 to 27). In the original version, the PKBS-2 showed high levels of internal consistency (Cronbach's α coefficients between .80 and .90). This scale was studied and adapted for the Portuguese population by Major (2011) and has also demonstrated good psychometric properties (Cronbach's α coefficients between .76 and .97). Internal consistencies for this sample were .72 and .91 for the O/I and O/E subscales, respectively.

Parental Account of Childhood Symptoms (PACS). PACS (Taylor, Schachar, Thorley, & Wiselberg, 1986) is a semistructured clinical interview that evaluates ADHD and conduct symptoms, and

their impact on family functioning over the previous 6 months across different daily routines. Interviewers with adequate training (specific training with an international researcher and expert in PACS interview, training implementing the instrument within clinical and nonclinical samples before this trial study, supervision, and interrater agreement procedures) rated the severity and frequency of symptoms from mothers; descriptions and two subscale scores (hyperactivity, scoring between 0 and 37; and conduct problems, scoring between 0 and 54) were derived. For this study, we used the PACS interview version for preschoolers from Sonuga-Barke et al. (1994), which has demonstrated high interrater (between .92 and .98) and test–retest (between .78 and .62) reliability . A study with a nonclinical sample of Portuguese preschoolers (see Seabra-Santos et al., 2013) has demonstrated satisfactory levels of internal consistency (between .64 and .71) and high interrater reliability (between .94 and .98). In this article, we used both Hyperactivity and Conduct Problems subscales. The Cronbach's alpha coefficient for PACS subscales in this sample ranged from .59 (Hyperactivity subscale) to .72 (Conduct Problems subscale), and the interrater reliability between two independent coders (of 20% of the interviews) was high (intraclass correlation = .98).

Parenting Scale (PS). We used this self-reported measure (Arnold, O'Leary, Wolff, & Acker, 1993) to assess parents' dysfunctional discipline practices. A total score and three subscale scores can be derived: Laxness (11 items; for example, "When my child does something I don't like: I do something about it every time it happens" to "I often let it go"); Overreactivity (10 items; for example, "When my child misbehaves: I raise may voice or yell" to "I speak to my child calmly"), and Verbosity (7 items; for example, "When I tell my child not to do something: I say very little" to "I say a lot"). Answers are coded on a 7-point scale between two opposite extremes: after reversing some items, 7 indicates a high use of an ineffective discipline strategy, and 1 indicates a high use of an effective discipline strategy, so that a higher score in PS represents more use of negative parenting practices. Internal consistency in the original study ranged from .63 to .84 (Arnold et al., 1993). In previous Portuguese exploratory nonclinical samples with preschoolers (see Seabra-Santos et al., 2013), this scale has shown lower levels of internal consistency (ranging from .63 to .74), especially for the Verbosity subscale (.41). Internal consistency for this sample was also low, ranging from .50 (Verbosity) to .70 (Laxness).

Beck Depression Inventory (BDI). This 21-item self-reported inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) measures the severity of symptoms associated with depression. Respondents rate the intensity of depressive symptoms on a scale ranging from 0 (*no symptomatology*) to 3 (*severe symptomatology*). A total score is derived by summing these ratings. The BDI was translated and adapted for Portuguese population by Vaz-Serra and Abreu (1973) and has demonstrated good psychometric properties. In this study, the internal consistency of the total scale as assessed by Cronbach's alpha was .90.

Parental Satisfaction Questionnaire. To assess the acceptance and satisfaction with the IY program, mothers who participated in the IY intervention completed a 53-item questionnaire (Webster-Stratton, 2001) at the end of the 14-week intervention program. The questions regarded their general satisfaction with the IY program (9 items; for example, "How confident are you in your ability to manage your child's current behavior problems in the home on your own?"). They were also asked to score the following dimensions: level of difficulty and usefulness of the methods used (16 items; for example, group discussion, roleplay, use of DVDs) and parenting strategies trained (14 items; for example, play, praise, ignore), their satisfaction with the group leaders' skills (10 items; for example, the leader's preparation), and the level of support from the group (4 items; for example, "Feelings about other group members' interest in me and my child"). A 7-point scale was used, where a higher score meant a higher level of satisfaction. In this study,

the mothers' satisfaction concerning the methods used and the parenting strategies covered through the IY program were analyzed. Internal consistency of the total questionnaire as assessed by Cronbach's alpha was .88.

Intervention: Brief Protocol Description

The IY manualized program was delivered during 14 weekly evening sessions (of approximately 2 hr each, from 6 to 8 p.m.) at a university-based facility ($n = 9$ groups) or mental health center ($n = 2$ groups). Groups of 9 to 12 parents were run by six group leaders ($n = 2$ leaders per group), who had been trained and supervised in the program by international trainers and mentors and had extensive clinical experience (a minimum of 10 years of previous experience in clinical early child psychology or psychiatry).

The IY program, developed by Webster-Stratton (2001), is based on social learning and collaborative principles, and addresses different parenting strategies (e.g., play [Sessions 1-3]; descriptive comments—social, emotional, persistence, and academic coaching [Session 3]; praise and rewards [Sessions 4-6]; household rules and routines [Session 7]; clear commands [Sessions 8 and 9]; parents' self-calming thoughts [along Sessions 8-12]; ignoring [Session 10]; time-out [Sessions 12 and 13], consequences [Session 13]; problem solving [Session 14]). The program uses a multimethod approach (e.g., roleplay, DVDs with video vignettes illustrating parenting skills, group discussion, reading materials, feedback on parents' home activities). Each of the IY program's 14 sessions has a different main content (a new parenting skill or behavior management strategy, such as "play" or "commands"), but they all follow the same structure: revision of the previous session, discussion on parents' home activities (e.g., skill practicing, book chapter reading), development of a new topic through video vignette presentation illustrating parent–child interactions (with Portuguese subtitles), group discussion, and "in vivo" practicing (e.g., role-plays). To increase parents' involvement in the IY program, group leaders call parents every week to check with them their home activities with the child and the weekly goal they established for themselves; parents who miss a session are sent handouts and offered individual extra time at the beginning of the following session (Webster-Stratton, 2001).

To ensure that the program was implemented according to integrity requirements, group leaders had been reliably trained and received continuous support from different IY-accredited mentors and went through a rigorous accreditation process to be certified as group leaders by the IY international agency (3-day workshop, supervision and validation of recorded group sessions). They all had previous experience with the program prior to the trial study. After each session, a leader checklist was completed to closely monitor the adherence to the manualized protocol. Self- and peer-evaluation questionnaires were also filled in so that the degree of fidelity in IY implementation could be appraised in peer–coach supervision sessions (for more details about intervention integrity, see Azevedo et al., 2013).

Statistical Analysis

Analyses were carried out with SPSS 19.0, and results were considered to be statistically significant at an alpha level up to .05. Due to the small sample size, trends toward significance were also reported in the "Results" section, as a marginally significant result, although limitations in the interpretation of these results were considered. Only the results of those who had completed the intervention were analyzed ($n = 44$: high hyperactivity = 28 and low hyperactivity = 16), because previous analysis with this sample had shown similar results for both per-protocol and intention-to-treat approaches. Furthermore, at 12-month follow-up, the level of attrition was small, and the percentage of noncompleters ($n = 8$) did not significantly differ between groups (high hyperactivity = 17%; low hyperactivity = 11%; $\chi^2 = 0.38$, $p = .530$). Baseline sociodemographic and clinical

differences were examined using the Mann–Whitney *U*-test for continuous variables and chi-square tests for categorical variables. Nonparametric tests were also performed for exploring differences in change from baseline to follow-up (12-month assessment) between groups defined by severity (high- and low-hyperactive behaviors) in selected child and mothers' outcome variables. Nonparametric statistics were primarily used in this analysis due to the small sample size.

Results

IY Attendance

Preliminary analysis showed a nonsignificant difference between groups regarding the intervention dropout rate (high hyperactivity = 9% and low hyperactivity = 6%; $\chi^2 = 0.17$, $p = .674$). Excluding the four mothers who dropped out of the intervention, no significant differences were found in the program attendance rate, considering a number of sessions attended above or below 9 (i.e., two thirds of the total 14 sessions): 100% and 93% of the mothers in the low- and high-hyperactivity groups, respectively, attended nine or more IY sessions (high hyperactivity: $M = 11.45$, $SD = 1.80$ [7-14 sessions]; low hyperactivity: $M = 12.59$, $SD = 1.50$ [9-14 sessions]; $\chi^2 = 1.14$, $p = .285$). In addition, significantly more mothers from the high-hyperactivity group attended the IY with a second caregiver (high hyperactivity = 55% with fathers and 3% with grandmother; low hyperactivity = 23% with fathers; $\chi^2 = 5.27$, $p = .022$).

Long-Term Change

As expected, at baseline, the preliminary analyses showed no significant differences between groups except in two of the ADHD measures (WWPAS: $U = 0.000$, $p \leq .001$; PACS-HI: $U = 144.000$, $p = .002$). For all the other measures, the groups were equivalent at baseline (see Table 2 for *M* and *SD*).

As regards the progress made between the two assessments (from baseline to 12-month follow-up), the children and mothers in both groups showed positive alterations (as expected) for almost all the analyzed outcome measures (child ADHD and oppositional/explosive behaviors, and mothers' dysfunctional practices; see Table 2, "Note"). Nevertheless, statistical differences were found between the two groups as regards the changes observed in 3 of the 10 outcome measures analyzed (Table 2). More specifically, there was a significantly greater improvement among the high-hyperactivity preschoolers compared to the low-hyperactivity subgroup regarding ADHD-reported behaviors (WWPAS: $U = 110.500$, $p = .008$). In what concerns ADHD behaviors, as evaluated through interviews, the improvement found (high hyperactivity > low hyperactivity) was marginally significant (PACS-HP: $U = 101.500$, $p = .055$). Similarly, the mothers of children in this group also showed a significantly higher decrease in their overreactive parenting practices (PS-Overreactivity: $U = 117.000$, $p = .018$). Although the mothers in either group were not clinically depressed at baseline, those in the high-hyperactivity group showed significantly more reduction (BDI: $U = 125.500$, $p = .032$). Further analysis comparing groups at follow-up showed no significant differences between them, except for interviewed ADHD behaviors ($U = 135.000$, $p = .029$), meaning that, at follow-up, children in the high-hyperactivity group are still seen by their mothers as having more hyperactive behaviors (although mean scores at follow-up are below the PACS clinical cut-off level) compared to the low-hyperactivity subgroup. Besides, at follow-up, 25% ($n = 7$) of children from the high-hyperactivity group were above the 95th percentile, while 39% ($n = 11$) were between the 80th and 95th on the WWPAS ADHD outcome measure, compared to 100% of children above the 95th percentile at baseline in this subgroup.

Table 2. Change in Outcome Measures From Baseline to Follow-Up in the High and Low Hyperactive Behaviors Subgroups: Means, Standard Deviations, and *p* Values.

	High hyperactivity (n = 28)			Low hyperactivity (n = 16)			
Variable	BL	FU	BL−FU	BL	FU	BL−FU	*p* value[a]
Child behavior (cut-off)							
WWPAS[b] (21)	36.40 ± 5.99	24.07 ± 9.35	12.33 ± 9.39	23.87 ± 2.24.87	18.87 ± 8.01	5.00 ± 6.70	.008*
PKBS: O/I (16)	19.23 ± 3.04	15.73 ± 4.13	3.29 ± 3.96	17.93 ± 4.38	15.43 ± 4.01	2.50 ± 3.72	.605
PKBS: O/A (19)	21.00 ± 4.03	16.65 ± 5.95	4.18 ± 4.73	20.31 ± 4.78	17.18 ± 5.91	3.12 ± 3.96	.488
Interview: PACS-HP[b,c] (16)	17.82 ± 6.01	11.25 ± 5.01	6.57 ± 7.14	12.13 ± 4.66	8.00 ± 5.22	4.12 ± 5.50	.055
PACS-CP	16.25 ± 6.88	10.25 ± 7.18	6.00 ± 6.80	17.38 ± 6.36	11.81 ± 3.88	5.56 ± 6.83	.835
Mother behavior							
PS total	3.58 ± 0.42	2.92 ± 0.42	0.66 ± 0.47	3.62 ± 0.50	3.12 ± 0.52	0.50 ± 0.46	.357
Laxness	2.88 ± 0.48	2.41 ± 0.62	0.47 ± 0.58	3.00 ± 0.96	2.51 ± 0.74	0.48 ± 0.56	.577
Overreactivity	3.65 ± 0.67	3.03 ± 0.55	0.62 ± 0.60	3.61 ± 0.69	3.46 ± 0.69	0.15 ± 0.85	.018*
Verbosity	4.33 ± 0.93	3.29 ± 0.81	1.04 ± 0.96	4.25 ± 0.84	3.73 ± 0.78	0.88 ± 0.89	.726
BDI	8.15 ± 5.65	5.88 ± 5.02	2.26 ± 4.01	8.37 ± 7.99	8.62 ± 8.18[d]	−0.25 ± 8.59	.032*

Note. Results are expressed as *M* ± *SD*. BL = baseline; FU = follow-up; WWPAS = Werry–Weiss–Peters Activity Scale; PKBS = Preschool and Kindergarten Behavior Scales; O/I = Overactivity/Inattention; O/A = Oppositional/Aggressive; PACS = Parental Account of Childhood Symptoms; HP = Hyperactivity subscale; CP = Conduct Problems subscale; PS = Parenting Scale; BDI = Beck Depression Inventory.

[a]Mann–Whitney *U*-test for BL−FU difference between groups.

[b]Significant baseline difference between groups in this measure.

[c]Significant follow-up difference between groups in this measure.

[d]All BL to FU within-group comparisons using the Wilcoxon test were statistically significant (all *p* values between <.001 and .025) except for BDI in the low-hyperactivity subgroup ($p = .569$).

*Significant result ($p < .05$).

Satisfaction With the Program

Of the 52 mothers involved in the intervention at baseline, 45 completed the program satisfaction questionnaire (high hyperactivity = 30; low hyperactivity = 15). Tables 3 and 4 show the percentage of highest positive ratings (rates 6 and 7 on a 7-point scale) regarding the ease and usefulness of the program's methods (eight items) and parenting strategies (seven items), and the means and standard deviations of mothers' ratings for each dimension. Overall, satisfaction with the program was high and similar for both groups (most mean ratings were above 5 [*somewhat easy/useful*], and above 6 in most of the usefulness items [*very easy/useful*]). Nevertheless, there was a significant difference between groups regarding the perceived usefulness of the program's methods (total for high hyperactivity > low hyperactivity: $U = 102.000$; $p = .051$): Compared to mothers in the low-hyperactivity subgroup, mothers in the high-hyperactivity group specifically considered role-plays ($U = 97.000$; $p = .027$) and leaders' phone calls ($U = 93.500$; $p = .020$) significantly more useful. In addition, these mothers (high-hyperactivity group) measured time-out ($U = 94.000$; $p = .063$) and the overall parenting strategies covered along the IY parent training ($U = 101.000$; $p = .079$) as easier (marginally significant difference). As regards the major problems that originally prompted mothers to join the IY program, a significant difference was also found ($U = 150.000$; $p = .040$), with 93% of mothers reporting these problems as *improved* or *greatly improved* in the high-hyperactivity subgroup compared with 80% in the low-hyperactivity subgroup (data not shown).

Discussion

We analyzed the progress made over a 12-month period between two groups of Portuguese preschoolers with different levels of ADHD behaviors at baseline (high and low hyperactivity levels), whose mothers attended a 14-week parent training intervention (IY).

Overall, there were improvements in both groups from baseline to 12-month follow-up, indicating the benefits of the IY program regardless of the severity of the initial hyperactive behaviors. However, preschoolers with higher initial hyperactivity levels made greater progress compared to preschoolers with lower levels of hyperactivity as regards the children's ADHD behaviors reported by mothers. Moreover, mothers of more impaired children saw a greater reduction in their negative overreactive practices and a greater improvement in their mood. Thus, in these specific outcomes, this group underwent a more marked change and seemed to have benefitted more from the IY program than the lower hyperactivity group.

Similar findings (although with different analyses) were described in other studies and in the meta-analytic review of Menting et al. (2013), suggesting that children with greater behavior problems tend to improve more after a PBT program (e.g., Beauchaine, Webster-Stratton, & Reid, 2005; Hautmann et al., 2010; Jones et al., 2008; Reid et al., 2004; Webster-Stratton et al., 2013). However, in the Multimodal Treatment of Attention Deficit-Hyperactivity Disorder study (MTA Cooperative Group, 1999), the initial severity of ADHD was associated with worse results for both pharmacological and behavioral treatment approaches (Hinshaw, 2007). These differences may be attributed to the way participants were selected (through a clinical diagnosis in the MTA study or based on questionnaires' cut-off scores in other studies, including ours). Besides, our children were younger than those in the MTA study, having therefore a shorter negative trajectory, which might have contributed to the amount of change observed in the most severe group (Hautmann et al., 2010; Jones, 2008).

The higher reduction of overreactive maternal practices observed in the severe ADHD group is particularly relevant, because less coercive and more positive and effective practices are associated with improvements in preschoolers disruptive behaviors (e.g., Beauchaine et al., 2005; Gardner, Burton, & Klimes, 2006; Gardner et al., 2010).

In spite of the more impressive changes observed in preschoolers with more severe hyperactive behaviors at baseline, they continue to be perceived by their mothers as more impaired regarding hyperactive behaviors at 12-month follow-up than children with less severe hyperactive behaviors, which may indicate the need for further monitoring and additional intervention.

Findings indicate a high and comparable level of mother's acceptance and satisfaction with the IY program in both groups, irrespective of hyperactivity severity. Even mothers of children with lower hyperactive behaviors (who might have less to change) were motivated and interested in the program, and had on average a slightly higher program attendance rate. Interestingly, compared with children with lower hyperactive behaviors, there were twice as many children with higher hyperactive behaviors who had two caregivers engaged in the IY intervention. We could speculate that the more the children are perceived as difficult by their parents, the greater the level of engagement in the program expected on the part of the family (Reid et al., 2004), especially from the father, who might also have more difficulties in parenting a particularly challenging child. Besides, fathers' involvement in PBT may contribute to the maintenance of PBT gains (Fabiano, 2007). In addition, a higher percentage of mothers of children with severe hyperactive behaviors were more satisfied with their preschoolers' improvements compared with mothers of children with lower ADHD behaviors. Mothers' improved parenting practices, their feelings of satisfaction about their child's behavioral changes, and the support of having a second caregiver attending the program may have contributed to improving the mother's mood over time in the high-hyperactivity subgroup. Moreover, an improvement in the mother's mental health (depression) has been described in the literature as a significant mediator of change in their child's behavior (e.g., Hutchings, Bywater, Williams, Lane, & Whitaker, 2012). Furthermore, mothers in this group evaluated the overall parenting strategies as easier to use (including specific nonviolent strategies, such as time-out) for decreasing children's negative behaviors and increasing children's self-control, and IY methods were rated as more useful, especially concerning parent support (leaders' weekly phone calls) and practicing new skills (role-plays). These have, indeed, been identified as key components of effective parent interventions (see Hutchings, Lane, & Gardner, 2004; Kaminski, Valle, Filene, & Boyle, 2008).

The study has several limitations, which should also be discussed, as they may reduce the generalizability of the findings. First, the sample size is small and groups are unequal, which can reduce the statistical power of the analyses. Second, the analyzed data were exclusively from mothers (who had attended the IY program) and thus reveal the mother's perception of children's behaviors, which might differ from that of other informants (e.g., Roskam et al., 2010), particularly from the father.

Moreover, although this study benefitted from a multimethod assessment approach (e.g., questionnaires and interview), which helps diminish possible mothers' rating bias, we must take into account that all the measures still relied on the mothers' perceptions, and these could be biased, given that all the mothers participated in the intervention. Finally, some of the measures used in this study had a worryingly low level of internal consistency (due to the limited availability of feasible instruments for preschoolers in Portugal). This issue should be addressed in further studies and calls for some caution in interpreting and generalizing these results (especially regarding parenting practices and ADHD behaviors as assessed by interview).

Implications for Researchers

Future analysis should include a larger Portuguese sample, comparable groups, and longer follow-up assessments. These will allow for the use of more specific analyses and will shed light on the generalizability of these findings and on which kind of children and families benefit more from the IY intervention (e.g., Gardner et al., 2010). Because, on average, children who have a higher ADHD score at baseline still present higher ADHD behaviors at 12-month follow-up,

Table 3. Mothers' Satisfaction With the Program's Methods: Mean Ratings of Ease and Usefulness of Methods and Percentage of Higher Ratings.

	High hyperactivity (n = 30)		Low hyperactivity (n = 15)	
Dimension	E + EE (%)	U + EU (%)	E + EE (%)	U + EU (%)
Program methods	Ease ($M \pm SD$)	Usefulness ($M \pm SD$)	Ease ($M \pm SD$)	Usefulness ($M \pm SD$)
(Total: eight items)	(5.30 ± 0.81)	**(6.52 ± 0.32)***	(5.44 ± 0.05)	**(6.33 ± 0.25)**
Information presented by the leader	77% (6.00 ± 0.91)	100% (6.93 ± 0.25)	73% (5.87 ± 1.30)	100% (6.93 ± 0.26)
Videotape vignettes	60% (5.73 ± 1.04)	97% (6.60 ± 0.56)	73% (5.87 ± 1.30)	100% (6.60 ± 0.51)
Group discussion	73% (5.83 ± 1.02)	100% (6.67 ± 0.48)	60% (6.00 ± 0.93)	93% (6.67 ± 0.62)
Practice of play skills at home	37% (4.93 ± 1.31)	100% (6.69 ± 0.47)	33% (4.73 ± 1.38)	92% (6.50 ± 0.67)
Other home activities	20% (4.53 ± 1.27)	91% (6.31 ± 0.89)	20% (4.93 ± 0.88)	100% (6.42 ± 0.51)
Buddy calls	28% (4.50 ± 1.74)	68% (5.84 ± 0.99)	29% (5.00 ± 1.04)	50% (5.42 ± 0.90)
Practice/role-plays	40% (5.13 ± 1.31)	90% **(6.38 ± 0.67)***	28% (4.73 ± 1.38)	75% **(5.75 ± 0.75)**
Phone calls from leader	67% (5.77 ± 1.43)	100% **(6.66 ± 0.48)***	57% (5.64 ± 1.08)	83% **(6.00 ± 0.85)**

Note. E = easy; EE = extremely easy; U = useful; EU = extremely useful.
*Statistically significant mean difference between groups (highlighted in bold) according to the Mann–Whitney U-test: $p > .01$ and $< .05$.

Table 4. Mothers' Satisfaction With Parenting Strategies: Mean Ratings of Ease and Usefulness of Strategies and Percentage of Higher Ratings.

	High hyperactivity (n = 30)		Low hyperactivity (n = 15)	
Dimension	E + EE (%)	U + EU (%)	E + EE (%)	U + EU (%)
Parenting strategies	Ease ($M \pm SD$)	Usefulness ($M \pm SD$)	Ease ($M \pm SD$)	Usefulness ($M \pm SD$)
(Total: seven items)	(5.29 ± 0.83)	(6.62 ± 0.46)	(5.03 ± 0.73)	(6.59 ± 0.47)
Play	65% (5.79 ± 1.05)	96% (6.82 ± 0.47)	75% (6.17 ± 0.83)	100% (7.00 ± 0.00)
Descriptive commenting/attention	41% (5.55 ± 1.21)	87% (6.60 ± 0.72)	50% (5.42 ± 0.99)	93% (6.40 ± 0.83)
Praise/reward	69% (6.21 ± 1.15)	87% (6.73 ± 0.69)	100% (6.42 ± 0.51)	100% (6.73 ± 0.46)
Ignoring	38% (4.93 ± 1.46)	93% (6.43 ± 0.63)	16% (4.58 ± 1.31)	87% (6.33 ± 0.72)
Clear commands	38% (5.03 ± 1.29)	97% (6.63 ± 0.56)	33% (4.58 ± 1.44)	93% (6.33 ± 0.72)
Time-out	28% (4.54 ± 1.57)	90% (6.38 ± 0.67)	18% (3.55 ± 1.69)	93% (6.47 ± 0.83)
Overall group of strategies	41% (5.21 ± 1.01)	100% (6.80 ± 0.41)	18% (4.45 ± 1.13)	93% (6.73 ± 0.59)

Note. E = easy; EE = extremely easy; U = useful; EU = extremely useful.

future studies should more thoroughly identify the characteristics of participants for whom this 14-session IY intervention was not sufficient (Webster-Stratton et al., 2013). Additional analyses of mediator (e.g., program dose, parenting practices) and moderator (e.g., engagement of one or two caregivers) variables will provide more precise information about the active ingredients of change and for whom this program works the best (e.g., Gardner et al., 2006, 2010). Besides, a comparison of the longer and shorter versions of the IY program in a head-to-head study would be useful to clarify the outcome differences found in children with higher levels of hyperactive behaviors at baseline. In this context, Webster-Stratton et al. (2011) used an IY version lasting 20 weeks, while our study and that carried out by Jones et al. (2008) reported IY effects using shorter versions of the program (14- and 12-week sessions, respectively).

The present study contributes with a more detailed evaluation of the IY effects in a Portuguese subsample of preschoolers with ADHD behaviors. It highlights the differences in the progress made by children and mothers over time between groups with different levels of initial hyperactive behaviors, and therefore adds valuable information to our previous knowledge about the effectiveness of the program with such children (Azevedo et al., 2013, 2014).

Implications for Practitioners

To sum up, these findings have important clinical and policy implications for a more tailored IY intervention. First, in response to our initial question, the findings showed considerable improvements in the more severe children, indicating the benefits of IY even for these children with higher risk, when implemented in the early years. Moreover, children with lower hyperactive behaviors at baseline who have similar risk factors (e.g., nearly half of them were clinically referred and most of them had comorbid oppositional/explosive behavior problems) also benefitted from the program. Besides, as different developmental trajectories can link risk to later ADHD disorder (Sonuga-Barke et al., 2005), these less symptomatic children are also important targets for early identification and intervention (Beauchaine & McNulty, 2013; Tandon, Si, & Luby, 2011). Community settings, such as schools (Sayal et al., 2012) and primary care centers (Perrin, Sheldrick, McMenamy, Henson, & Carter, 2014) could be preferential contexts for screening children with ADHD risk and comorbid behavioral problems (Lakes et al., 2009). Following NICE guidelines for ADHD in preschool-age children (National Institute for Health and Clinical Excellence, 2008) and considering this study's findings, a stepped care approach should be endorsed. Therefore, after offering an evidence-based parenting program such as the IY, clinicians should monitor children who were more severe at baseline, because these children are not only the ones who might benefit most from the program but also those whose risk might remain at a higher level. Further evaluation of these children may identify those for whom additional intervention is still necessary (Hautmann et al., 2010; Webster-Stratton, Gaspar, & Seabra-Santos, 2012).

There is now sufficient preliminary evidence in Portugal to offer the IY to parents of preschoolers with ADHD behaviors, thus minimizing the developmental risk and high service costs usually associated with significant negative outcomes in the academic, behavioral, and social functioning of children with ADHD (DuPaul et al., 2001; Sayal et al., 2012). Therefore, the dissemination of interventions that "work" among professionals and the increasing access of families to evidence-based intervention programs (Hutchings & Gardner, 2012) should be a priority for policy makers in Portugal.

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