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# Differential impact of a multimodal versus pharmacological therapy on the core symptoms of attention deficit/hyperactivity disorder in childhood

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ABSTRACT

The aim of this study was to analyze the relative and differential efficacy of a combined versus medical treatment to reduce the symptoms of ADHD children in the school and family environment.

A total of 100 subjects participated: 20 children with ADHD, their 40 parents and their 40 teachers. Half of the subjects were assigned to the drug group and half to the combined (drug plus psychosocial, psychoeducational intervention with teachers and mothers/fathers).
*Results:* The group analyses indicated that both treatments were effective, without significant differences between them. Individualized clinical analyses indicated that higher percentages of improvement and normalization were obtained in the children in the combined group than in the drug only group. Our findings point to the desirability of implementing long-lasting multimodal, multicontextual interventions for ADHD in childhood.



## 1. Introduction

ADHD is a neurodevelopmental disorder characterized by inattention, impulsivity and/or motor activity, which significantly interfere in the social, emotional and cognitive levels of affected children in their natural developmental contexts (APA, 2013).

Its high prevalence, along with its negative impact, frequent comorbidity and chronic nature, make it one of the most researched and treated childhood disorders in the last decade. Indeed, the number of children diagnosed with ADHD increased by 24% from 2001 to 2010 (Getahun, Jacobsen, & Fasset, 2013) so that between 3% and 7% of school-age children present the disorder (Polanczyk, Lima, Horta, Biederman, & Rohde, 2007). Often associations with behavioral problems, learning difficulties, socio-affective deficits and risk behaviors occur (Humphreys, Eng, & Lee, 2013; McQuade, Hoza, Waschbusch, Murray-Close, & Owens, 2011; Sexton, Gelhorn, Bell, & Classi, 2012).

The etiology of ADHD is multifactorial. Its origin is genetic and neurobiological, but its clinical course and prognosis are greatly influenced by environmental factors (Bralten et al., 2013; Owens & Hinshaw, 2013). In keeping with the nature of

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the disorder, interventions that have been validated empirically include psychostimulants, psychosocial interventions, and treatments that combine both types of intervention (American Academy of Pediatrics, 2011; Coghill et al., 2013).

Stimulant medication, in the form of methylphenidate, is the pharmacological treatment of choice for managing ADHD, having been endorsed by hundreds of efficacy studies to reduce core symptoms (Charach & Fernández, 2013; Coghill et al., 2013).

These benefits are generally maintained over several years, although most children relapse when medication is discontinued (Abikoff et al., 2004; Buitelaar et al., 2007; Charack, Ickowicz, & Schachar, 2004; Swanson et al., 2008).

The potential benefits of psychostimulants in the short term must be weighed up against their limitations and risks, such as adverse side effects, especially in preschool children (Charach et al., 2013; Swanson et al., 2007, 2008).

Moreover, medication dropout rates ranging from 13% to 64% have been observed, especially in immediate action stimulants (Adler & Nierenberg, 2010).

These drawbacks justify the implementation of psychosocial interventions that have been empirically validated as parents' and teachers' training in behavior management techniques, and cognitive behavioral techniques (Fabiano, Pelham, Coles, & Gnagy, 2009; Hodgson, Hutchinson, & Denson, 2014; Miranda, Jarque, & Tárraga, 2006; Presentación, Siegenthaler, Jara, & Miranda, 2010).

In the school environment, these interventions were shown to be effective in reducing the core symptoms of ADHD, difficulties in cognition, and disruptive and aggressive behaviors (Antshel & Barkley, 2008; Miranda, Jarque, & Rosel, 2006; Miranda, Presentación, & Jara, 2011). They have also have been shown to be effective in increasing academic productivity, social competence and rules compliance (Abikoff et al., 2013).

Similarly, in the family context various training programs for parents of children with ADHD have been implemented, and were found to be effective in reducing the core symptoms and family distress, and improving parenting skills (Ferrin et al., 2014; Jones, Daley, Hutchings, Bywater, & Eames, 2008; Mikami, Lerner, Griggs, McGrath, & Calhoun, 2010).

Moreover, studies that have implemented psychosocial intervention programs in both settings have shown they can result in more successful outcomes than its use alone (Miranda et al., 2011; Siegenthaler, 2009).

However, as with medication, these interventions are not exempt from limitations, including limited evidence of maintenance of the improvements, or the generalization of learned behavior in other situations (Fabiano et al., 2009).

In addition, dropout rates in these cases are also high, reaching up to 50%, particularly in parents suffering a lot of stress, who do not agree with the principles of training, or who perceived their child as a difficult person and/or with severe behavior problems (Friars & Mellor, 2007).

Recognizing the limitations of both interventions applied in isolation, different clinical practice guidelines on ADHD support the use of multimodal treatments (Institute for Clinical Systems Improvement, 2007; National Institute for Health and Clinical Excellence, 2008).

Along this vein, some studies have found that the dose of medication can be reduced when prescribed in combination with psychosocial interventions whilst obtaining the same results. Furthermore, a reduction of the possible side effects of long-term medication is also observed (Antshel & Barkley, 2008; Pelham, Burrows, Gnagy, & Fabiano, 2005; So, Leung, & Hung, 2008; Van der Oord, Prins, Oosterlaan, & Emmelkamp, 2012).

In conclusion, the three interventions that have shown efficacy are pharmacological, psychosocial and combined. However, there are still few studies that have compared the differential effectiveness of these interventions.

Indeed, the objective of this research was to analyze the effects of a combined intervention versus pharmacological treatment in reducing the core symptoms of ADHD children in the school and family environment.

The specific objectives and hypotheses of this study are:

1. To analyze the relative and differential efficacy of pharmacological intervention versus a combined one on the core symptoms of ADHD in the school environment.

We hypothesized that both treatments would be effective, but that the combined intervention would produce a significantly greater reduction in symptoms compared with medication alone.

2. To analyze the relative and differential efficacy of pharmacological intervention versus a combined one on the core symptoms of ADHD in the family environment

We hypothesized that both would be effective, but that the combined intervention would produce a significantly greater reduction in symptoms, compared with medication alone.

## 2. Method

### *2.1. Setting and participants*

This study involved three related samples (N = 100): a group of children with ADHD (N = 20), their families (mothers/fathers, N = 40) and teachers (tutors, specialists, N = 40).

Half of the children received stimulant medication exclusively (control group), while the other half received a combined treatment (stimulant medication plus psychosocial intervention; experimental group). The children were not randomly assigned to the experimental or control groups. The reasons for the choice of children who participated in the experimental group were: