

Article

Effectiveness of a Multimodal Intervention on Social Climate (School and Family) and Performance in Mathematics of Children with Attention Deficit/Hyperactivity Disorder

Laura Amado ¹ and Sonia Jarque ^{2,*}¹ Facultad de Psicología, CEU Universities, 08022 Barcelona, Spain² Facultad de Psicología, Universitat de Barcelona, 08035 Barcelona, Spain

* Correspondence: soniajarque@ub.edu; Tel.: +34-933-125-878

Abstract: This study analyzes the differential efficacy of a multimodal versus pharmacological intervention in isolation to improve the social climate (school and family) and the performance in mathematics of a sample of 20 children with ADHD aged 7 to 9 years. The multimodal intervention was based on a training program for 20 parents and 20 teachers in the management of ADHD during a school year, in combination with stimulant medication. The results evidenced the superiority of the multimodal intervention compared to the isolated pharmacological intervention to improve various variables of the family climate (Cohesion; Expressiveness; Autonomy and Control), of the school climate (Help; Tasks; Competitiveness; Organization, Clarity and Control), as well as their academic performance in the curricular area of mathematics. Our findings support the need to intervene in the significant contexts in which children with ADHD develop in order to improve their quality of life.

Keywords: ADHD children; teacher training; parent training; multimodal intervention; mathematics performance

MSC: 97-02; 97-11; 97B50; 97C10; 97C70; 97D40; 97D60; 97D70



Citation: Amado, L.; Jarque, S. Effectiveness of a Multimodal Intervention on Social Climate (School and Family) and Performance in Mathematics of Children with Attention Deficit/Hyperactivity Disorder. *Mathematics* **2022**, *10*, 3133. <https://doi.org/10.3390/math10173133>

Academic Editor: Jay Jahangiri

Received: 29 July 2022

Accepted: 29 August 2022

Published: 1 September 2022

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

ADHD is one of the neurodevelopmental disorders more frequent in children, with an average prevalence rate of 4% and is more frequent in males than in females (5.2% vs. 2.7%) [1]. In addition, around 70% of these children show some other associated disorder [1–4], especially anxiety disorders (37.9%), behavioural disorders (31%) and specific learning disorders (25–35%), especially in reading and mathematics [5–8]. Specific learning disability in mathematics is more prevalent in students with ADHD (31–60%) than in students without ADHD (6–7%) [9] and is five times higher in children with ADHD [10].

In the same vein, a review found that 70% of studies found a negative association between ADHD diagnosis and mathematical skills [11]. Inattention is the ADHD symptom most strongly associated with difficulties in mathematics, which means that attentional processing is especially relevant to mathematical skills [12–14].

On the other hand, although research indicates that the origin of the disorder is neurobiological, environmental factors are fundamental in the evolution of symptomatology and the associated comorbidity. We can clearly see, then, the importance of taking into account the most significant contexts for socialization of children with ADHD, their family and their school, as well as the climates generated in both contexts [15].

The family setting plays a fundamental modulating role on the biological predisposition to ADHD, influencing the way in which the symptomatology is understood and managed by the family [16]. Several studies have indicated that parents of children with ADHD show lower educational involvement, lower expectations of their children, a less

adequate family climate [17], and are more critical and less affectionate with their children [18].

It has also been observed that the parents of these children have more feelings of frustration, guilt, stress, low self-esteem, dissatisfaction with their parental role and lack of confidence in their parenting skills [16,19,20]. Furthermore, they consider themselves less self-efficacious in educating their children and claim they have poor quality of life [21,22].

Similarly, a greater use of inappropriate discipline methods has been observed in these families: the application of more aggressive strategies, the use of more critical feedback to their children [16], the use of more authoritarian disciplinary styles [23], less communication with the child [24], and greater parental-educational discrepancy [25].

In order to improve this family climate and the parenting skills of the parents of these children, parent training programmes on the management of ADHD have been formulated in recent decades with very positive results and are considered to be one of the go-to psychosocial treatments for everyday problems in child behaviour [26]. These include the Barkley Program [27], the Triple P-Positive Parent Program [28–33], The Incredible Years Program [34–36], the Miranda Program [37], and Parental Friendship Coaching [38].

More specifically, these programmes have contributed to reducing family stress, core ADHD symptoms and both externalizing and internalizing symptoms, as well as contributing to improving parenting skills and children's social skills [25,29,32,33,38–45].

On the other hand, it is also widely documented that a positive school climate is highly beneficial for children development [46,47], and has been associated with, among other variables, greater psychological well-being [48,49], with better academic achievement [50,51] and greater school adjustment and prosocial behaviours [52,53].

Longitudinal and retrospective studies show that a good school climate helps to prevent behavioural problems [54,55]. Conversely, the effects of a negative school climate can be very detrimental for pupils with impulse control difficulties. Somersalo et al. [56] found that students with emotional and behavioural difficulties may be more affected by an inadequate school climate.

Teachers are a key figure in both the diagnosis and intervention regarding ADHD, as they are often the first to identify the symptoms of children with ADHD for referral to a specialist [57,58], something which contributes to early detection and treatment of the disorder [59]. Psychoeducational training aimed at increasing teachers' knowledge of the disorder and its management in the classroom have been shown to be effective in optimizing the classroom climate and school functioning of these students, increasing their performance in the curricular areas of language and mathematics, and reducing their core and associated symptomatology [59–64].

However, the systematic review by Ward et al. [65] found that, although these programmes for teachers are effective in increasing their knowledge and management of ADHD in the classroom, there is inconsistent evidence regarding their effectiveness in reducing ADHD-related behaviours.

Although studies have sometimes yielded inconsistent results, several studies and clinical guidances on the management of ADHD endorse the efficacy of psychosocial interventions, in the absence or presence of medication [26,66–70]. Multimodal therapy—a term originally used by Lazarus [71]—is one of the intervention modalities of first choice. In this regard, the review of the specialized literature shows that research that has analyzed the efficacy of multimodal and multicomponential interventions with training for teachers and parents together, in combination with the administration of medication, is scarcer. These studies have also yielded positive results, concluding with an improvement in the symptomatology, school and family functioning, academic performance and socio-personal adjustment of these children in their daily contexts, even making it possible to reduce dosage of medication, obtaining the same benefits and reducing the adverse effects of the medication [72–76], with improvements in ADHD symptoms and behavioural problems [77–80].

This study has been designed with the objective of analyzing the effects of a multimodal and multicomponential intervention (medication plus intervention with parents and teachers) on:

- The school climate and family climate of a group of children with ADHD (multimodal group) compared to a group of children who only received stimulant medication (control group).
- The mathematical performance of students with ADHD in the multimodal group compared to children in the control group.

2. Materials and Methods

2.1. Participants

This study included three samples ($n = 100$): a group of pupils with ADHD ($n = 20$), their parents ($n = 40$) and their teachers (two teachers per child, $n = 40$). All participants gave their informed consent to participate in the study. This research was carried out in accordance with the Declaration of Helsinki and the protocol was approved by the Ethics Committee of Abat Oliba University, CEU Universities (007).

All students received stimulant medication during the research, but none of them nor their teachers or parents were participating in any other ADHD intervention at the start of the study. Teachers and parents of the multimodal group participated in psychoeducational training, while the teachers and parent of the control group did not receive training (wait-list group, medication only). Once the study was finished, the teachers and parents in the control group were offered to participate in a training on ADHD management.

2.2. Sample of Children

The sample of 20 children was divided into two non-randomly assigned groups, based on practical criteria: one group receiving medication alone (control group), and the other group receiving the multimodal intervention (experimental group).

The characteristics of the children who participated in the study are shown in Table 1. Children in the control group had an average age of 7.6 years, with a predominance of boys over girls (8/2). All of them had a diagnosis of ADHD of the combined subtype.

Table 1. Sociodemographic characteristics of the sample of children with ADHD.

Characteristics	Control Group	Multimodal Group
Age		
7 years	3 (30%)	3 (30%)
8 years	4 (40%)	4 (40%)
9 years	3 (30%)	3 (30%)
Mean age	7.6	7.8
Sex		
Male	8 (80%)	9 (90%)
Female	2 (20%)	1 (10%)

Note: Of "Differential impact of a multimodal versus pharmacological therapy on the core symptoms of attention deficit/hyperactivity disorder in childhood", L. Amado et al., 2016, *Research in Developmental Disabilities*, 59, p. 95. Copyright, 2016 by Elsevier.

The average age of the 10 children in the experimental group was 7.8 years, with males predominating over females in this case also (9/1). Of these children, 8 were diagnosed with ADHD of the combined subtype, one with inattentive subtype and one with hyperactive-impulsive subtype.

2.3. Sample of Parents

Twenty fathers and twenty mothers of the children described above participated in the study. Half of the pairs were in the control group and half in the multimodal group. In Table 2 we can see the socio-demographic characteristics of the parents.

Table 2. Sociodemographic characteristics of the sample of parents.

Characteristics	Control Group	Multimodal Group
Mean age	37.5	39.3
Sex		
Male	10 (50%)	10 (50%)
Female	10 (50%)	10 (50%)
Mean number of children	2.1	2.5
Educational level		
Basic Studies	2 (10%)	4 (20%)
Secondary	5 (25%)	8 (40%)
University	13 (65%)	8 (40%)

Note: Of “Differential impact of a multimodal versus pharmacological therapy on the core symptoms of attention deficit/hyperactivity disorder in childhood”, L. Amado et al., 2016, *Research in Developmental Disabilities*, 59, p. 95. Copyright, 2016 by Elsevier.

2.4. Sample of Teachers

Forty teachers (two teachers per student) also participated in the study. Table 3 shows the socio-demographic and career characteristics of the teachers for each group of children.

Table 3. Sociodemographic characteristics of the sample of teachers.

Characteristics	Control Group	Multimodal Group
Mean age	40.3	38.4
Sex		
Males	4 (20%)	7 (35%)
Females	16 (80%)	13 (65%)
Mean experience as a teacher	2.5	19.1
Mean experience with children with ADHD	9 (45%)	12 (60%)
Attendance of ADHD courses	0	1 (5%)

Note: Of “Differential impact of a multimodal versus pharmacological therapy on the core symptoms of attention deficit/hyperactivity disorder in childhood”, L. Amado et al., 2016, *Research in Developmental Disabilities*, 59, p. 96. Copyright, 2016 by Elsevier.

2.5. Measures

In order to assess the social climate of the children, this study used Social Climate Scales: Family and School by Moos, Moos and Trickett [81]. The School Social Climate Scale (SSCS) (see Figure 1) assesses the social climate in the classroom, student-teacher and student-student relationships and the organizational structure of the classroom. It consists of 90 items grouped into 9 subscales, which in turn are included in four scales (relationships, self-realization, stability and change).

The Family Social Climate Scale (FSCS) (see Figure 2) assesses the socio-environmental characteristics and interpersonal relationships in the family, the developmental aspects that are most important in the family and its basic structure. It comprises 90 items integrated into 10 subscales, which are grouped into three scales (relationships, development and stability).

Moreover, we evaluated the academic performance of the children through the final grade they obtained in the subject of mathematics of the Primary School, on a scale of 0 to 10, where from 5 was considered approved. In other words, the final score that the children obtained from the exams and other activities of mathematics throughout the entire academic year, and that their teachers provided us. The children’s mathematical skills included in the curriculum of these courses were evaluated: add and subtract with carried; begin with multiplication as addition of equal addends; know the concept of division as distribution or partition in equal parts; solve simple problems related to everyday situations and objects, in whose resolution a single operation is required, and this is an addition or a

subtraction; know the concept of measurement as a comparison of two magnitudes, taking one of them as a unit; use natural measures referring to length, weight and capacity; and start using conventional measures.

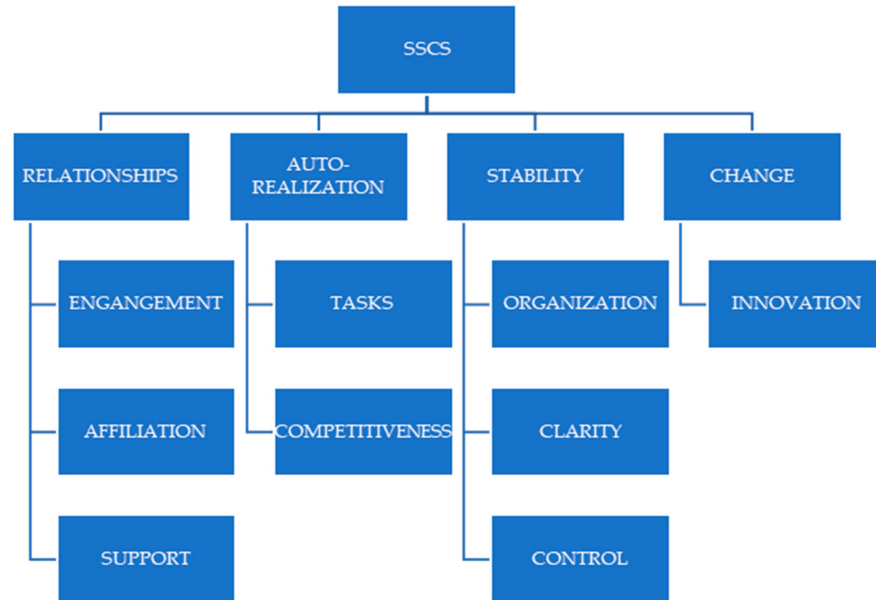


Figure 1. The School Social Climate Scale (SSCS).

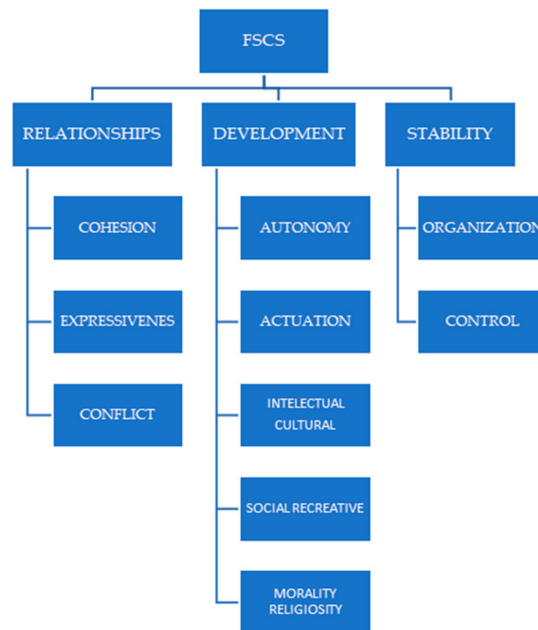


Figure 2. The Family Social Climate Scale (FSCS).

2.6. Procedure

As mentioned above, all children in our total sample were taking stimulant medication, and parents and teachers in the multimodal group also participated in a long-term (one full school year) psychoeducational training programme in ADHD management.

2.7. Teacher Training Programme

The programme for teachers consisted of 17 meetings of two hours, on a fortnightly basis. They attended a total of 34 h of training at the school, with a high attendance (98%).

The programme was adapted from other empirically validated programs [63,82,83]. The training was divided into seven thematic sections (see Table 4) [72,84–86]: (1) Knowledge about ADHD; (2) Treatment modalities in ADHD; (3) Guidelines for improving the behaviour problems and instructional management; (4) Guidelines to adapt teaching and learning activities. Teaching of the Solve It! Programme on self-instruction for understanding mathematical problems; (5) Strategies to reduce impulsivity; (6) Communication Skills; and (7) Closing session.

Table 4. Timing of Intervention Developed with Parents and Teachers.

Month	Session	Parents	Session	Teachers
September	0	Presentation and organization	0	ADHD seminar
October	1	INTRODUCE MYSELF: My child and I	1 2	INTRODUCE MYSELF: My student and I
November	2	I KNOW IT AND I UNDERSTAND: Knowledge about ADHD	3 4	I KNOW IT AND I UNDERSTAND: Knowledge about ADHD
December	3	ADHD IN SCHOOL: Difficulties in learning how to relate	5 6	WHAT WE CAN DO
January	4	ADHD IN MY FAMILY: Emotional implications	7 8	I VALUE HIM/HER POSITIVELY, she values and reinforces him/herself
February	5	ADHD IN MY FAMILY: Educational implications	9 10	I ORGANIZE HIM/HER, s/he organizes 10 him/herself and s/he listens
March	6		11 12	I ADAPT the classroom and activities
April	7	I IMPROVE MY COMMUNICATION	13	WE BUILD BRIDGES
May	8	I IMPROVE MY SELF CONTROL	14 15	I IMPROVE MY SELF CONTROL
June	9	FAREWELL: what I take with me	16 17	FAREWELL: what I take with me
Hours	18		34	

Note: Of “Differential impact of a multimodal versus pharmacological therapy on the core symptoms of attention deficit/hyperactivity disorder in childhood”, L. Amado et al., 2016, *Research in Developmental Disabilities*, 59, p. 97. Copyright, 2016 by Elsevier.

2.8. Parent Training Programme

The parent training program was conducted during 9 sessions of two hours, once a month. The times were adapted to parents’ preferences and their attendance was very high (97%). The program was adapted from other empirically validated programs [27,37].

The training was divided into six thematic sections (see Table 4) [72]: (1) Presentation of the family; (2) ADHD and school; (3) ADHD, family, and emotional implications; (4) ADHD, family, and educational implications; (5) Communication Skills; (6) Stress and conflict management skills; and (7) Closing session.

2.9. Statistical Analyses

A quasi-experimental mixed design (intra- and inter-group) was carried out, in which we collected pre- and post-treatment data. For statistical analyses, SPSS-27.0 software was used, with a confidence interval of 0.05 or less.

First, descriptive statistics were used to establish the sociodemographic characteristics of the samples, and the means and standard deviations of the various measurements.

Moreover, to carry out inter-group and intra-group comparisons, nonparametric tests were applied because parametric conditions were not satisfied (sample size was less than

30). The Wilcoxon test was used to perform comparisons between related samples (intra-group) between the pretreatment and posttreatment phases. Independent inter-group comparisons, that is, between the control and multimodal groups, were carry out in both phases using the Mann–Whitney U test.

The effect size was calculated using r , according to the adaptation to non-parametric tests, that is, the value of Z /the square root of N , where N is the sum of the scores with which the Wilcoxon Z has been obtained. Effect size values using r , are interpreted as: 0 to 0.4 being small, 0.4 to 0.6 being medium, and >0.6 large.

3. Results

We present below the results for social climate (school and family) and academic performance in mathematics obtained by each group, as well as the comparison between the two groups.

School Climate

As can be seen in Table 5, the control group improved in the post-test only in the variable Support, that is, degree of help and concern of the teacher for his students.

Table 5. Pre-post comparison of the control group. School climate.

		Pre Treatment		Post Treatment		z	p	r
		M	SD	M	SD			
Relationships	EN	42.6	2.96	42.5	3.26	−0.142	0.887	−0.022
	AF	45	4.63	45.7	4.32	−1.19	0.234	−0.188
	SU	22.45	6.12	25.25	5.95	−2.309	0.021 *	−0.365
Auto-Realization	TA	61.95	5.38	62.35	4.57	−0.73	0.465	−0.115
	CO	57.25	4.72	58.5	4.61	−1.387	0.166	−0.219
Stability	OR	46.75	4.6	46.5	4.72	−0.108	0.914	−0.017
	CL	37.9	4.3	37.75	3.5	−0.172	0.863	−0.027
	CN	59.15	6.19	57.85	4.76	−1.387	0.165	−0.219
Change	IN	50.35	4.79	50.2	5.16	−0.187	0.851	−0.029

Note. EN = Engagement; AF = Affiliation; SU = Support; TA = Task; CO = Competitiveness; OR = Organization CL = Clarity; CN = Control; IN = Innovation. * $p < 0.05$.

On the other hand, the multimodal group (see Table 6) improved after the intervention in almost all variables related to school climate (7 variables out of 9): Relationships (Engagement and Support, that is, the degree to which students participate in the class activities and degree of help and concern of the teacher for his students); Self-realization (Tasks and Competitiveness, that is, the degree of importance that the teacher gives to the students completing the tasks and to their effort during their completion); Stability (Organization, Clarity and Control, that is, the degree to which the teacher gives importance to the organization in carrying out the tasks, to the establishment of clear rules and to the application of consequences when these rules are not followed).

Finally, when we compare both groups in the post-test phase (see Table 7), we observe statistically significant differences in favour of the multimodal group, compared to the control group, in 8 of the 9 variables analyzed: Relationships (Engagement, Affiliation and Support); Self-actualization (Tasks and Competitiveness); Stability (Organization, Clarity and Control). Although the superiority of the multimodal group in terms of school climate can be confirmed in only 6 of these 8 variables, given that in two of the Relationship dimensions (Engagement and Affiliation), the multimodal group already had a significantly higher score than the control group in the pretest phase (see Table 8).

Table 6. Pre-post comparison of the multimodal group. School climate.

		Pre Treatment		Post Treatment		z	p	r
		M	SD	M	SD			
Relationships	EN	48.1	3.8	52.2	2.66	−2.997	0.003 **	−0.473
	AF	48.9	4.1	48.4	4.2	−1	0.317	−0.158
	SU	23.5	6.2	39.5	5.2	−3.953	0.000 **	−0.625
Auto-Realization	TA	63.7	4.3	53.6	4.6	−3.772	0.000 **	−0.596
	CO	58	4.7	63.75	2.44	−3.331	0.001 **	−0.526
Stability	OR	45.7	4.6	54.7	2.44	−3.785	0.000 **	−0.598
	CL	36.4	3.9	46.5	2.56	−3.847	0.000 **	−0.608
	CN	57.8	5.1	65.7	2.55	−3.745	0.000 **	−0.592
Change	IN	50.9	5.2	50.3	3.21	−0.612	0.541	−0.096

Note. EN = Engagement; AF = Affiliation; SU = Support; TA = Task; CO = Competitiveness; OR = Organization; CL = Clarity; CN = Control; IN = Innovation. ** $p < 0.01$.

Table 7. Comparison between control and multimodal groups in the post-test. School climate.

		Control Group		Multimodal Group		z	p	r
		M	SD	M	SD			
Relationships	EN	42.50	3.26	52.2	2.66	−5.402	0.000 **	−0.854
	AF	45.70	4.32	48.4	4.2	−1.945	0.052 *	−0.307
	SU	25.25	5.95	39.5	5.2	−5.256	0.000 **	−0.8310
Auto-Realization	TA	62.35	4.57	53.6	4.6	−4.370	0.000 **	−0.690
	CO	58.50	4.61	63.75	2.44	−3.706	0.000 **	−0.585
Stability	OR	46.50	4.72	54.7	2.44	−4.796	0.000 **	−0.758
	CL	37.75	3.50	46.5	2.56	−5.156	0.000	−0.815
	CN	57.85	4.76	65.7	2.55	−4.120	0.000 **	−0.651
Change	IN	50.2	5.16	50.3	3.21	−0.072	0.942	−0.011

Note. EN = Engagement; AF = Affiliation; SU = Support; TA = Task; CO = Competitiveness; OR = Organization; CL = Clarity; CN = Control; IN = Innovation. ** $p < 0.01$ * $p < 0.05$.

Table 8. Comparison between control and multimodal groups in the pre-test. School climate.

		Control Group		Multimodal Group		z	p	r
		M	SD	M	SD			
Relationships	EN	42.6	2.96	48.1	3.8	−4.016	0.000 **	−0.634
	AF	45	4.63	48.9	4.1	−2.628	0.009 **	−0.415
	SU	22.45	6.12	23.5	6.2	−0.358	0.72	−0.056
Auto-Realization	TA	61.95	5.38	63.7	4.3	−0.775	0.439	−0.122
	CO	57.25	4.72	58	4.7	−0.625	0.532	−0.098
Stability	OR	46.75	4.6	45.7	4.6	−0.803	0.422	−0.126
	CL	37.9	4.3	36.4	3.9	−0.779	0.436	−0.123
	CN	59.15	6.19	57.8	5.1	−0.584	0.559	−0.092
Change	IN	50.35	4.79	50.9	5.2	−0.412	0.681	−0.065

Note. EN = Engagement; AF = Affiliation; SU = Support; TA = Task; CO = Competitiveness; OR = Organization; CL = Clarity; CN = Control; IN = Innovation. ** $p < 0.01$.

4. Family Climate

The control group did not improve significantly in the post-test in any variable. In the dimensions of Relationships (Cohesion, that is, degree to which family members help each other) and Stability (Control, that is, degree to which the family follows agreed rules) it worsened when compared to the pre-test, and in the rest of the variables it remained the same (see Table 9).

Table 9. Pre-post comparison of the control group. Family climate.

		Pre-Treatment		Post-Treatment		z	p	r
		M	SD	M	SD			
Relationships	CH	45.25	3.58	43.45	3.51	−1.916	0.055 *	−0.302
	EX	41.95	8.77	44.55	5.5	−1.768	0.077	−0.279
	CT	67.75	8.2	66.85	15.48	−1.200	0.230	−0.189
Development	AU	46.65	8.82	45.9	8.73	−0.478	0.633	−0.075
	AC	53.3	7.4	52.7	6.44	−0.343	0.732	−0.054
	IC	50.15	7.87	49.45	7.66	−0.517	0.605	−0.081
	SR	49.75	3.27	49.45	3.13	−0.577	0.564	−0.091
	MR	56.8	6.1	57.1	5.59	−0.447	0.655	−0.070
Stability	OR	33.1	5.59	32.5	4.71	−0.632	0.527	−0.099
	CN	52	4.12	50.8	2.82	−2.000	0.046 *	−0.316

Note. CH = Cohesion; EX = Expressiveness; CT = Conflict; AU = Autonomy; AC = Actuation; IC = Intellectual cultural; SR = Social recreative; MR = Morality religiosity; OR = Organization; CN = Control. * $p < 0.05$.

The multimodal group improved in seven of the ten dimensions (see Table 10): Relationships (Cohesion, Expressiveness and Conflict, that is, the degree to which the family helps each other and express their emotions, including anger); Development (Autonomy and Social-Recreative, that is, the degree to which family members are self-sufficient and make their own decisions, and they participate in social activities); and Stability (Organization and Control, that is, the degree of importance given by the family to a clear organization when planning family activities and responsibilities, and the degree to which they follow agreed rules).

Table 10. Pre-post comparison of the multimodal group. Family climate.

		Pre-Treatment		Post-Treatment		z	p	r
		M	SD	M	SD			
Relationships	CH	44.8	4.7	57.8	4.8	−3.931	0.000 **	−0.621
	EX	41.9	9.4	55.1	5.9	−3.842	0.000 **	−0.607
	CT	68	8.3	73.5	4.3	−2.397	0.017 *	−0.378
Development	AU	50.1	9.5	64.6	5.2	−3.742	0.000 *	−0.591
	AC	54.3	7.7	55.6	4.8	−1.224	0.221	−0.193
	IC	51.3	6.3	52.8	4.09	−0.956	0.339	−0.151
	SR	54.2	5.7	64.8	6.1	−3.865	0.000 **	−0.611
	MR	53.5	7.5	53.2	6.1	−0.378	0.705	−0.059
Stability	OR	36.1	6.2	49.8	4.5	−3.741	0.000 **	−0.591
	CN	56.9	5.6	64.8	5	−3.213	0.001 **	−0.508

Note. CH = Cohesion; EX = Expressiveness; CT = Conflict; AU = Autonomy; AC = Actuation; IC = Intellectual cultural; SR = Social recreative; MR = Morality religiosity; OR = Organization; CN = Control. ** $p < 0.01$ * $p < 0.05$.

Finally, the comparison between the two groups in the post-test in terms of family climate showed statistically significant differences in favour of the multimodal group in 6 of the 10 variables (see Table 11): Relationships (Cohesion and Expressiveness); Development (Autonomy and Social-Recreative); and Stability (Organization and Control). However, in reality the superiority of the multimodal group can only be demonstrated in 4 of these 6 variables, given that in the pretest phase the multimodal group already had significantly higher scores than the control group in the Development (Social-Recreative) and Stability (Control) variables (see Table 12).

Table 11. Comparison between control and multimodal groups in the post-test. Family climate.

		Control Group		Multimodal Group		z	p	r
		M	SD	M	SD			
Relationships	CH	43.45	3.51	57.8	4.8	−5.383	0.000 **	−0.851
	EX	44.55	5.5	55.1	5.9	−4.503	0.000 **	−0.711
	CT	66.85	15.48	73.5	4.3	−1.772	0.076	−0.280
Development	AU	45.9	8.73	64.6	5.2	−5.057	0.000 **	−0.799
	AC	52.7	6.44	55.6	4.8	−1.579	0.114	−0.249
	IC	49.45	7.66	52.8	4.09	−1.175	0.240	−0.185
	SR	49.45	3.13	64.8	6.1	−5.435	0.000 **	−0.859
	MR	57.1	5.59	53.2	6.1	−1.835	0.067	−0.290
Stability	OR	32.5	4.71	49.8	4.5	−5.454	0.000 **	−0.862
	CN	50.8	2.82	64.8	5	−5.426	0.000 **	−0.857

Note. CH = Cohesion; EX = Expressiveness; CT = Conflict; AU = Autonomy; AC = Actuation; IC = Intellectual cultural; SR = Social recreative; MR = Morality religiosity; OR = Organization; CN = Control. ** $p < 0.01$.

Table 12. Comparison between control and multimodal groups in the pre-test. Family climate.

		Control Group		Multimodal Group		z	p	r
		M	SD	M	SD			
Relationships	CH	45.25	3.58	44.8	4.7	−0.255	0.799	−0.040
	EX	41.95	8.77	41.9	9.4	−0.042	0.967	−0.006
	CT	67.75	8.2	68	8.3	−0.138	0.890	−0.021
Development	AU	46.65	8.82	50.1	9.5	−1.173	0.241	−0.185
	AC	53.3	7.4	54.3	7.7	−0.420	0.675	−0.066
	IC	50.15	7.87	51.3	6.3	−0.321	0.749	−0.050
	SR	49.75	3.27	54.2	5.7	−2.814	0.005 *	−0.444
	MR	56.8	6.1	53.5	7.5	−1.274	0.203	−0.201
Stability	OR	33.1	5.59	36.1	6.2	−1.401	0.161	−0.221
	CN	52	4.12	56.9	5.6	−2.842	0.004 *	−0.449

Note. CH = Cohesion; EX = Expressiveness; CT = Conflict; AU = Autonomy; AC = Actuation; IC = Intellectual cultural; SR = Social recreative; MR = Morality religiosity; OR = Organization; CN = Control. * $p < 0.05$.

Academic Performance in Mathematics

Children’s academic performance in the curricular area of mathematics in the pre-test phase was similar and there were no statistically significant differences between the multimodal and control groups (see Table 13); however, in the post-test phase a statistically significant improvement was observed in the multimodal group compared to the control (see Table 14).

Table 13. Comparison between control and multimodal groups in the pre-test. Mathematics performance.

		Control Group		Multimodal Group		z	p	r
Mathematics	Performance	M	SD	M	SD			
		4.7	1.05	5.1	0.99	−1.088	0.277	0.192

Table 14. Comparison between control and multimodal groups in the post-test. Mathematics performance.

		Control Group		Multimodal Group		z	p	r
Mathematics	Performance	M	SD	M	SD			
		4.4	0.51	5.4	0.96	−2.408	0.016 *	0.545

* $p < 0.05$.

5. Discussion

Our data indicated that multimodal intervention combining psychoeducational training for parents and teachers with medication was shown to be significantly more effective than the use of medication alone in improving the school and family climate of children with ADHD, as well as their academic performance in mathematics.

In the school context, it was observed that the pupils in the control group, whose teachers did not participate in the psychoeducational training, did not improve their level of involvement in class, their level of friendship with each other or the degree of collaboration they offered each other in their tasks.

These results are consistent with other research that has found that medication improves core ADHD symptoms reasonably well, but when used as the sole treatment does not produce improvements in ADHD-associated problems such as peer relations [74,75,87,88].

Continuing with the data from our study, we found statistically significant improvements in the control group in the subscale “support”, which assesses the degree of communication between the teacher and the students and the trust placed in them. This result could be due to the trust that teachers tend to place in treatment, whatever its modality [89].

The multimodal group experienced a very significant improvement in the overall classroom climate after participation in the training. A more detailed analysis of the data makes clear the positive developments in several variables. In terms of the quality of “relationships”, teachers noted a statistically significant increase in the extent to which pupils were integrated in the class, supported each other, showed more interest in class activities and participated more in discussions. They also felt that it significantly improved their communication with and trust in their students.

These findings are most likely related to the continued effort of the group of teachers, who, accompanied by the group leader in the sessions, shared and applied different strategies to improve the quality of their relationships and positive communication with their students. Specifically, over the course of five sessions, we worked on different ways of improving self-esteem, positively motivating behavioural change in students, and fostering communication skills and confidence among them.

Our data are in agreement with those reported by Van der Oord, Prins, Oosterlaan & Emmelkamp [90], who also found improvements in the social skills of children with ADHD following their participation in a multi-modal, multi-componential intervention, in line with teachers’ estimates.

In terms of “self-realization”, teachers who participated in the training perceived a statistically significant decrease in the importance they placed on the completion of scheduled tasks, placing less emphasis on results and more on processes, as well as spending more time discussing things not directly related to the topic. They also perceived a statistically significant increase in the importance they placed on student effort in the completion of tasks. Again, we can link these results to the specific content addressed in the teacher training sessions in our study.

In relation to the “stability” of the group-class, teachers also perceived a statistically significant improvement after the intervention. Specifically, in the importance that teachers placed on order, organization and good manners in carrying out tasks, as well as to following clear rules and making pupils aware of the consequences of non-compliance. Again, our results are related to the five sessions of training on these topics in the intervention programme.

In terms of their degree of innovation or “change” in their approach to school activities, there was no statistically significant improvement after the multimodal intervention. These results may be related to the fact that this group of teachers was already quite creative in the use of new technologies and techniques to promote student creativity, as well as the fact that this content was not worked on very much in the sessions.

Finally, the comparison between the effectiveness of multimodal and pharmacological intervention in isolation allows us to conclude that the multimodal intervention is clearly superior in improving the school climate perceived by teachers for most of the variables an-

alyzed (“relationships”: support; “self-realization”: tasks and competitiveness; “stability”: organization, clarity and control).

Similarly, we also found a statistically significant increase in academic performance in mathematics in the multimodal intervention group of children in the post-test phase, compared to the children in the medication-only group.

These data are consistent with other studies that have also demonstrated the superiority of a multimodal intervention with parents and teachers on academic performance and school difficulties compared to medication used in isolation [79,91–94]. For example, Langberg et al. [91] found that in the MTA study only participants who received the behavioural treatment (behavioural group and multimodal group) made sustained improvements in their academic difficulties in comparison to routine community care.

Other studies have also shown that pharmacological treatment produced slight and short-lived improvements in academic performance, which may be mainly due to the reduction of the core symptoms of the disorder in the short term [87,93,94].

On the other hand, our results regarding the family context also allow us to conclude that there were statistically significant improvements in the multimodal group, showing clear superiority of this group when compared to the control group. Moreover, in the control group, not only was there no improvement in family climate, but there was even a significant worsening in the degree to which family members helped each other (“cohesion”) and in the degree to which family life adhered to established rules and procedures (“control”).

Previous studies also found that pharmacological intervention in isolation was insufficient to improve the family functioning of children with ADHD [87,95].

These findings are especially relevant if we take into account the fact that a family climate with low levels of cohesion, affection and support hinders the development of certain social skills in children, such as the ability to identify non-violent solutions to social difficulties [96,97].

Furthermore, research on protective and resilience factors, increasingly studied in the field of childhood and adolescent onset disorders, has shown that adequate family structuring is associated with individuals being better able to overcome difficulties and may be associated with a lower risk or a more favourable prognosis in these children [98–100].

Continuing with our study, the data indicated that in the multimodal intervention group there was a significant improvement in the family climate of these children, both in “relationships” and in the “development” and “stability” of the family. Specifically, the degree to which family members are empathetic and supportive of each other, and to which family members are encouraged to express their emotions. These results are related to the effort devoted during various sessions of the training programme to improving communication skills in families.

With regard to the personal development of the family, there was also a significant improvement following the training in the degree to which family members are self-confident, self-reliant and make their own decisions and in the degree of participation in social and recreational activities.

However, our programme was not effective in increasing the degree of family interest in political, social, intellectual or cultural activities, nor the importance placed on ethical and religious practices and values; possibly because the intervention programme did not include among its objectives the enhancement of these activities or values.

In terms of family stability, parents saw a statistically significant increase both in the importance given to organization in planning family activities and responsibilities, and in the degree to which family life adheres to established rules and procedures. Again, we can find a clear link between these results and the contents of some thematic blocks developed in the intervention programme for parents.

Our findings are consistent with those of one of the best studies to date on the efficacy of various treatment modalities for ADHD: the MTA [74,75]. This study also found that multimodal treatment led to improvements in parent-child relationships, as well as a reduction in harshness and inefficacy in parents’ treatment of their children. This intervention

helped families to educate their children with ADHD more effectively and to make the necessary accommodations in their lives to improve family functioning.

Finally, in our study, the comparison between both intervention groups in the post-test in terms of family climate also showed statistically significant differences in favour of the multimodal group in almost half of the variables analysed (“relationships”: cohesion and expressiveness; “development”: autonomy; and “stability”: organization).

Again, our data are consistent with the results of the MTA study [74,75], which found that pharmacological treatment implemented as the sole treatment did not produce improvements in family relationships compared to multimodal intervention.

6. Conclusions

Our results allow us to conclude that multimodal treatment is superior to pharmacological treatment used in isolation in improving the social climate (school and family) and the academic performance in mathematics of children with ADHD in primary school.

However, our study has some limitations that need to be taken into account for future research on the subject. One is that the small sample size has led us to use non-parametric data analysis tests, which may have less discriminant power. Another important limitation is that we have not been able to collect follow-up data, which would have allowed us to obtain information on the long-term effectiveness of the interventions. Finally, our study could be difficult to replicate because the intervention programs that we have implemented are not published and are based on other manualized programs.

Despite these limitations, our findings have important implications for educational practice, especially the importance of intervening in the most significant socialization contexts of children with ADHD (home and school) to improve their quality of life and that of the people they live with on a daily basis.

Author Contributions: Conceptualization, S.J. and L.A.; methodology, S.J. and L.A.; formal analysis, S.J. and L.A.; investigation, S.J. and L.A.; training, L.A.; resources, S.J. and L.A.; data curation, S.J. and L.A.; writing—original draft preparation, S.J. and L.A.; writing—review & editing, S.J. and L.A.; visualization, S.J. and L.A.; supervision, S.J. and L.A.; project administration, S.J. and L.A.; funding acquisition, S.J. and L.A. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by Plan Nacional I+D+I del Ministerio de Economía y Competitividad. Gobierno de España, grant number EDU2012-31402.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Ethics Committee of Universitat Abat Oliba CEU (protocol code 007, 2 June 2022).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Conflicts of Interest: The authors declared no potential conflict of interest with respect to the research, authorship, and/or publication of this article.

References

1. Mohammadi, M.R.; Zarafshan, H.; Khaleghi, A.; Ahmadi, N.; Hooshyari, Z.; Mostafavi, S.A.; Ahmadi, A.; Alavi, S.S.; Shakiba, A.; Salmanian, M. Prevalence of ADHD and Its Comorbidities in a Population-Based Sample. *J. Atten. Disord.* **2021**, *25*, 1058–1067. [[CrossRef](#)] [[PubMed](#)]
2. Álvarez, M.J.; Soutullo, C.; Díez, A.; Figueroa, A. TDAH y su comorbilidad psiquiátrica. In *Todo Sobre el TDAH. Guía Para la Vida Diaria*; Martínez Martín, M.A., Ed.; Altaria: Tarragona, Spain, 2013; pp. 81–130.
3. López, J. Estudio Descriptivo del Trastorno por Déficit de Atención con Hiperactividad (TDAH): Perfil Psicoeducativo y Comorbilidad en los Diferentes Subtipos. Ph.D. Thesis, Universidad de Murcia, Murcia, Spain, 2015.
4. Montoya, E.; Herrera-Gutiérrez, E. Manifestaciones del TDAH en la etapa de educación infantil y cómo afrontarlas. In *Claves para una Educación Diversa*; Navarro, J., Gracia, M.D., y Lineros, R., Soto, F.J., Eds.; Consejería de Educación, Cultura y Universidades: Murcia, Spain, 2014; pp. 1–11.
5. Avaria, M.A.; Kleinstaub, K. Dificultad de aprendizaje en el niño. *Rev. Esp. Pediatr.* **2014**, *11*, 18–35.
6. DuPaul, G.J.; Volpe, R.J. ADHD and learning disabilities: Research findings and clinical implications. *Curr. Atten. Disord. Rep.* **2009**, *1*, 152–155. [[CrossRef](#)]

7. Meliá de Alba, A. Dificultades en el Aprendizaje de las Matemáticas en Niños con TDAH: Comparación de los Perfiles Cognitivos y Metacognitivos. Ph.D. Thesis, Universidad de Valencia, Valencia, Spain, 2008.
8. Rosich, N.; Casajús, A. El alumnado con déficit de atención e hiperactividad (TDAH) en el aprendizaje de las matemáticas en los niveles obligatorios. *Rev. Mat. Iberoam.* **2008**, *16*, 63–83.
9. Mayes, S.D.; Calhoun, S.L. Frequency of reading, math, and writing disabilities in children with clinical disorders. *Learn. Individ. Differ.* **2006**, *16*, 145–157. [[CrossRef](#)]
10. Kercood, S.; Zentall, S.; Vinh, M.; Wright, K.T. Attentional cuing in math word problems for girls at-risk for ADHD and their peers in general education settings. *Contemp. Educ. Psychol.* **2012**, *37*, 106–112. [[CrossRef](#)]
11. Tosto, M.G.; Momi, S.; Asherson, P.; Malki, K. A systematic review of attention deficit hyperactivity disorder (ADHD) and mathematical ability: Current findings and future implications. *BMC Med.* **2015**, *13*, 204. [[CrossRef](#)]
12. Breslau, J.; Miller, E.; Breslau, N.; Bohnert, K.; Lucia, V.; Schweitzer, J. The impact of early behavior disturbances on academic achievement in high school. *Pediatrics* **2009**, *123*, 1472–1476. [[CrossRef](#)]
13. Calub, C.; Rapport, M.; Friedman, L.; Eckrich, S. IQ and academic achievement in children with ADHD: The differential effects of specific cognitive functions. *J. Psychopathol. Behav. Assess* **2019**, *41*, 639–651. [[CrossRef](#)]
14. Duncan, G.J.; Dowsett, C.J.; Claessens, A.; Magnuson, K.; Huston, A.C.; Klebanov, P.; Pagani, L.S.; Feinstein, L.; Engel, M.; Brooks-Gunn, J.; et al. School Readiness and Later Achievement. *Dev. Psychol.* **2007**, *43*, 1428–1446. [[CrossRef](#)]
15. Fogel, Y.; Rosenblum, S.; Josman, N. Environmental factors and daily functioning levels among adolescents with executive function deficits. *Br. J. Occup. Ther.* **2020**, *83*, 88–97. [[CrossRef](#)]
16. Miranda, A.; Grau, M.D.; Roselló, B.; Marco, R. Estilos de disciplina en familias con hijos con trastorno por déficit de atención/hiperactividad: Influencia en la evolución del trastorno. *Rev. Neurol.* **2007**, *44*, 23–25. [[CrossRef](#)]
17. Robledo, P.; García, J.N. Contexto familiar del alumnado con dificultades de aprendizaje o TDAH, percepciones de padres e hijos, ESE. *Estud. Sobre Educ.* **2014**, *26*, 149–173.
18. González, R.; Bakker, L.; Rubiales, J. Estilos parentales en niños y niñas con TDAH. *Rev. Latinoam. Cienc. Soc. Ninez Juv.* **2014**, *12*, 141–158. [[CrossRef](#)]
19. Roselló, B.; García, R.; Tárraga, R.; Mulas, F. El papel de los padres en el desarrollo y aprendizaje de los niños con TDAH. *Rev. Neurol.* **2003**, *36* (Suppl. S1), 79.
20. Theule, J.; Wiener, J.; Tannock, R.; Jenkins, J.M. Parenting Stress in Families of Children With ADHD: A Meta-Analysis. *J. Emot. Behav. Disord.* **2013**, *21*, 3–17. [[CrossRef](#)]
21. McLaughlin, D.P.; Harrison, C.A. Parenting practices of mothers of children with ADHD: The role of maternal and child factors. *Child Adolesc. Ment. Health* **2006**, *11*, 82–88. [[CrossRef](#)]
22. Miranda, A.; Presentación, M.J.; Colomer, C.; Roselló, B. Satisfacción con la vida de niños con trastorno por déficit de atención/hiperactividad: Estudio de posibles factores de riesgo y de protección. *Rev. Neurol.* **2011**, *52* (Suppl. S1), 119–126. [[CrossRef](#)]
23. Lange, G.; Sheerin, D.; Carr, A.; Dooley, B.; Barton, V.; Marshall, D.; Mulligan, A.; Lawlor, M.; Belton, M.; Doyle, M. Family factors associated with attention deficit hyperactivity disorder and emotional disorders in children. *J. Fam. Ther.* **2005**, *27*, 76–96. [[CrossRef](#)]
24. Keown, L.J.; Woodward, L.J. Early parent-child relations and family functioning of preschool boys with pervasive hyperactivity. *J. Abnorm. Child Psychol.* **2002**, *30*, 541–553. [[CrossRef](#)]
25. Sánchez, D.J. Discrepancia Educativa Parental y TDAH: Intervención Psicoeducativa a Través de un Programa de Entrenamiento a Padres. Ph.D. Thesis, Universidad de Murcia, Murcia, Spain, 2015.
26. Wolraich, M.L.; Hagan, J.F.; Allan, C.; Chan, E.; Davison, D.; Earls, M.; Evans, S.W.; Flinn, S.K.; Froehlich, T.; Frost, J.; et al. Subcommittee on children and adolescents with attention-deficit/hyperactive disorder. Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. *Pediatrics* **2019**, *144*, e20192528. [[CrossRef](#)]
27. Barkley, R.A. *Defiant Children: A Clinicians' Manual for Assessment and Parent Training*; Guilford Press: New York, NY, USA, 1997.
28. Aghebati, A.; Gharraee, B.; Hakim, M.; Gohari, M.R. Triple p-positive parenting program for mothers of ADHD children. *Iran J. Psychiatry Behav. Sci.* **2014**, *8*, 59–65.
29. Bor, W.; Sanders, M.R.; Markie-Dadds, C. The effects of the Triple P-Positive Parenting Program on preschool children with co-occurring disruptive behavior and attentional/hyperactive difficulties. *J. Abnorm. Child Psychol.* **2002**, *30*, 571–587. [[CrossRef](#)]
30. De Graaf, I.; Speetjens, P.; Smit, F.; de Wolff, M.; Tavecchio, L. Effectiveness of the Triple P Positive Parenting Program on behavioral problems in children: A meta-analysis. *Behav. Modif.* **2008**, *32*, 714–735. [[CrossRef](#)] [[PubMed](#)]
31. Ireland, J.L.; Sanders, M.R.; Markie-Dadds, C. The impact of parent training on marital functioning: A comparison of two group versions of the Triple P-Positive Parenting Program for parents of children with early-onset conduct problems. *Behav. Cogn. Psychother.* **2003**, *31*, 127–142. [[CrossRef](#)]
32. Moharreri, F.; Soltanifar, A.; Khalesi, H.; Eslami, N. The evaluation of efficacy of the positive parenting for parents in order improvement of relationship with their adolescents. *Iran J. Basic Med. Sci.* **2012**, *55*, 116–123.
33. Yusuf, Ö.; Gonka, Ö.; Pekcanlar, A. The effects of the triple P-positive parenting programme on parenting, family functioning and symptoms of attention-deficit/hyperactivity disorder. A randomized controlled trial. *Psychiatr. Clin. Psychopharmacol.* **2019**, *29*, 665–673. [[CrossRef](#)]

34. Jones, K.; Daley, D.; Hutchings, J.; Bywater, T.; Eames, C. Efficacy of the Incredible Years Programme as an early intervention for children with conduct problems and ADHD: Long-term follow-up. *Child Care Health Dev.* **2008**, *34*, 380–390. [[CrossRef](#)]
35. Murray, D.W.; Rabiner, D.L.; Kuhn, L.; Pan, Y.; Sabet, R.F. Investigating teacher and student effects of the Incredible Years Classroom Management Program in early elementary school. *Sch. Psychol.* **2018**, *67*, 119–133. [[CrossRef](#)]
36. Trillingsgaard, T.; Trillingsgaard, A.; Webster-Stratton, C. Assessing the effectiveness of the 'Incredible Years®parent training' to parents of young children with ADHD symptoms—A preliminary report. *Scand. J. Psychol.* **2014**, *55*, 538–545. [[CrossRef](#)]
37. Miranda, A.; Grau, D.; Melià, A.; Roselló, B. Fundamentación de un programa multicomponencial de asesoramiento a familias con TDAH [Multicomponent counselling programme rationale for families with ADHD]. *Rev. Neurol.* **2008**, *46* (Suppl. S1), 43–45.
38. Smit, S.; Mikami, A.Y.; Normand, S. Effects of the Parental Friendship Coaching Intervention on Parental Emotion Socialization of Children with ADHD. *Res. Child Adolesc. Psychopathol.* **2022**, *50*, 101–115. [[CrossRef](#)]
39. Chronis, A.; Chacko, A.; Fabiano, B.; Wymbs, B.; Pelham, W. Enhancements to the behavioral parent training paradigm for families of children with ADHD: Review and future directions. *Clin. Child Fam. Psychol. Rev.* **2004**, *7*, 1–27. [[CrossRef](#)]
40. Daly, B.P.; Creed, T.A.; Xanthopoulos, M.; Brown, R.T. Psychosocial treatments for children with attention deficit/hyperactivity disorder. *Neuropsychol. Rev.* **2007**, *17*, 73–89. [[CrossRef](#)]
41. Dekkers, J.; Hornstra, R.; Van der Oord, S.; Luman, M.; Hoekstra, P.J.; Groenman, A.P.; van den Hoofdakker, B.J. Meta-analysis: Which components of parent training work for children with attention-deficit/hyperactivity disorder? *J. Am. Acad. Child Adolesc.* **2022**, *61*, 478–494. [[CrossRef](#)]
42. Fabiano, G.; Pelham, W.E.; Coles, E.; Gnagy, E. A meta-analysis of behavioral treatments for ADHD. *Clin. Psychol. Rev.* **2009**, *29*, 129–140. [[CrossRef](#)]
43. Malik, T.A.; Rooney, M.; Chronis-Tuscano, A.; Tariq, N. Preliminary efficacy of a behavioral parent training program for children with ADHD in Pakistan. *J. Atten. Disord.* **2017**, *21*, 390–404. [[CrossRef](#)]
44. Sonuga-Barke, E.J.; Daley, D.; Thompson, M.; Laver-Bradbury, C.; Weeks, A. Parent-based therapies for preschool attention-deficit/hyperactivity disorder: A randomized, controlled trial with a community sample. *J. Am. Acad. Child Adolesc.* **2001**, *40*, 402–408. [[CrossRef](#)]
45. Solan, M.; Brunstein, A.; Ankori, G.; Bloch, A.; Apter, A.; Plishty, S. Impact of a new parent behavioral-schema training on children with ADHD: A pragmatic control trial. *J. Atten. Disord.* **2021**, *25*, 2048–2059. [[CrossRef](#)]
46. Maxwell, S.; Reynolds, K.J.; Lee, E.; Subasic, E.; Bromhead, D. The impact of school climate and school identification on academic achievement: Multilevel modeling with student and teacher data. *Front. Psychol.* **2017**, *8*, 2069. [[CrossRef](#)]
47. Thapa, A.; Cohen, J.; Guffey, S.; Higgins, A. A review of school climate research. *Rev. Educ. Res.* **2013**, *83*, 257–385. [[CrossRef](#)]
48. Newland, L.A.; De Cino, D.A.; Mourlam, D.J.; Strouse, G.A. School climate, emotions, and relationships: Children's experiences of well-being in the Midwestern US. *Int. J. Emot. Educ.* **2019**, *11*, 67–83.
49. Varela, J.J.; Sirlopú, D.; Melipillán, R.; Espelage, D.; Green, J.; Guzmán, J. Exploring the influence of school climate on the relationship between school violence and adolescent subjective well-being. *Child Indic. Res.* **2019**, *12*, 2095–2110. [[CrossRef](#)]
50. Daily, S.M.; Mann, M.J.; Kristjansson, A.L.; Smith, M.L.; Zullig, K.J. School climate and academic achievement in middle and high school students. *J. Sch. Health* **2019**, *89*, 173–180. [[CrossRef](#)]
51. López-González, L.; Oriol, X. La relación entre competencia emocional, clima de aula y rendimiento académico en estudiantes de secundaria. *Cult. Educ.* **2016**, *28*, 130–156. [[CrossRef](#)]
52. Herrera, K.; Rico, R. El clima escolar como elemento fundamental de la convivencia en la escuela. *Escenarios* **2014**, *12*, 7–18. [[CrossRef](#)]
53. Turner, I.; Reynolds, K.J.; Lee, E.; Subasic, E.; Bromhead, D. Well-being, school climate, and the social identity process: A latent growth model study of bullying perpetration and peer victimization. *Sch. Psychol.* **2014**, *29*, 320–335. [[CrossRef](#)] [[PubMed](#)]
54. Kuperminc, G.P.; Leadbeater, B.J.; Blatt, S.J. School Social Climate and Individual Differences in Vulnerability to Psychopathology among Middle School Students. *Sch. Psychol.* **2001**, *39*, 141–159. [[CrossRef](#)]
55. Martínez, G.; Gras, M. Atribuciones del comportamiento antisocial en el alumnado de educación secundaria: Aspectos destacables frente a la intervención. In *Las Conductas de Riesgo del Adolescente. Investigación y Soluciones*; Palacios, R., Ed.; Centro de Investigación e Innovación Biopsicosocial: Madrid, Spain, 2011; pp. 141–162.
56. Somersalo, H.; Solantaus, T.; Almqvist, F. Classroom climate and the mental health of primary school children. *Nord. J. Psychiatry* **2002**, *56*, 285–290. [[CrossRef](#)]
57. Both, F.; Schmiedeler, S.; Abelein, P.; Schneider, W. Wirksamkeit eines Workshops für Lehrkräfte über die Aufmerksamkeitsdefizit-/Hyperaktivitätsstörung (ADHS) [Effectiveness of an educator training about the Attention-Deficit/Hyperactivity Disorder (ADHD)]. *Prax. Kinderpsychol. Kinderpsychiatr.* **2016**, *65*, 315–327. [[CrossRef](#)]
58. Shelemy, L.; Harvey, K.; Waite, P. Supporting students' mental health in schools: What do teachers want and need? *Emot. Behav. Diffic.* **2019**, *24*, 100–116. [[CrossRef](#)]
59. Aguiar, A.P.; Kieling, R.R.; Costa, A.C.; Chardosim, N.; Dorneles, B.V.; Almeida, M.R.; Mazzuca, A.C.; Kieling, C.; Rohde, L.A. Increasing teachers' knowledge about ADHD and learning disorders. *J. Atten. Disord.* **2014**, *18*, 691–698. [[CrossRef](#)]
60. Anto, M.R.; Jacob, M.V. Effectiveness of self-instructional module on knowledge of teachers regarding childhood attention deficit hyperactivity disorder. *J. Nurs. Healthc.* **2014**, *3*, 33–36. [[CrossRef](#)]
61. Casajús, A.M. Resolución de Problemas Aritmético-Verbales por Alumnos con Déficit de Atención con Hiperactividad (TDAH). Ph.D. Thesis, Universidad de Barcelona, Barcelona, Spain, 2005.

62. Froelich, J.; Breuer, D.; Doepfner, M.; Amonn, F. Effects of a Teacher Training Programme on Symptoms of Attention Deficit Hyperactivity Disorder. *J. Spec. Educ.* **2012**, *27*, 76–87.
63. Miranda, A.; Jarque, S.; Rosel, J. Treatment of children with ADHD: Psychopedagogical program at school versus psychostimulant medication. *Psicothema* **2006**, *18*, 335–341.
64. Syed, E.U.; Hussein, S.A. Increase in teachers' knowledge about ADHD after a week-long training program: A pilot study. *J. Atten. Disord.* **2010**, *13*, 420–423. [[CrossRef](#)]
65. Ward, R.J.; Bristow, S.J.; Kovshoff, H.; Cortese, S.; Kreppner, J. The Effects of ADHD Teacher Training Programs on Teachers and Pupils: A Systematic Review and Meta-Analysis. *J. Atten. Disord.* **2022**, *26*, 225–244. [[CrossRef](#)] [[PubMed](#)]
66. DuPaul, G.J.; Stoner, G. *ADHD in the Schools: Assessment and Intervention Strategies*, 3rd ed.; Guilford Press: New York, NY, USA, 2016.
67. Evans, S.W.; Owens, J.S.; Wymbs, B.T.; Ray, A.R. Evidence-Based Psychosocial Treatments for Children and Adolescents With Attention Deficit/Hyperactivity Disorder. *J. Clin. Child Adolesc. Psychol.* **2018**, *47*, 157–198. [[CrossRef](#)]
68. National Institute for Health and Care Excellence. *Attention Deficit Hyperactivity Disorder: Diagnosis and Management; Guidance and Guidelines*; National Institute for Health and Care Excellence: London, UK, 2019.
69. Pelham, W.E.; Burrows-MacLean, L.; Gangy, E.M.; Fabiano, G.A.; Coles, E.K.; Wymbs, B.T.; Waschbusch, D.A. A Dose-Ranging Study of Behavioral and Pharmacological Treatment in Social Settings for Children with ADHD. *J. Abnorm. Child Psychol.* **2014**, *42*, 1019–1031. [[CrossRef](#)]
70. Pfiffner, L.J.; DePaul, G.J. Treatment of ADHD in school settings. In *Attention-Deficit Hyperactivity Disorder: A Handbook for Diagnosis and Treatment*, 4th ed.; Barkley, R.A., Ed.; Guilford Press: New York, NY, USA, 2015; pp. 596–629.
71. Lazarus, A.A. *The Practice of Multimodal Therapy: Systematic, Comprehensive and Effective Psychotherapy*; Johns Hopkins University Press: Baltimore, MD, USA, 1989.
72. Amado, L.; Jarque, S.; Ceccato, R. Differential impact of a multimodal versus pharmacological therapy on the core symptoms of attention deficit/hyperactivity disorder in childhood. *Res. Dev. Disabil.* **2016**, *59*, 93–104. [[CrossRef](#)] [[PubMed](#)]
73. Dahl, V.; Ramakrishnan, A.; Spears, A.P.; Jorge, A.; Lu, J.; Bigio, N.; Chacko, A. Psychoeducation Interventions for Parents and Teachers of Children and Adolescents with ADHD: A Systematic Review of the Literature. *J. Dev. Phys. Disabil.* **2020**, *32*, 257–292. [[CrossRef](#)]
74. The MTA Cooperative Group; Multimodal Treatment Study of Children with ADHD. A 14-month randomized clinical trial of treatment strategies for attention-deficit/hyperactivity disorder. *Arch. Gen. Psychiatry* **1999**, *56*, 1073–1086. [[CrossRef](#)]
75. Jensen, P.S.; Hinshaw, S.P.; Swanson, J.M.; Greenhill, L.L.; Conners, C.K.; Arnold, L.E.; Abikoff, H.B.; Elliott, B.; Hechtman, L.; Hoza, B.; et al. Findings from the NIMH Multimodal Treatment Study of ADHD (MTA): Implications and applications for primary care providers. *J. Dev. Behav. Pediatr.* **2001**, *22*, 60–73. [[CrossRef](#)]
76. Roy, A.; Hechtman, L. The Multimodal Treatment of Children with ADHD (MTA) follow-up study: Outcomes and their predictors. In *Attention Deficit Hyperactivity Disorder: Adult Outcome and Its Predictors*; Hechtman, L., Ed.; Oxford University Press: Oxford, UK, 2017; pp. 231–260.
77. Ostberg, M.; Rydell, A.M. An efficacy study of a combined parent and teacher management training programme for children with ADHD. *Nord. J. Psychiatry* **2012**, *66*, 123–130. [[CrossRef](#)] [[PubMed](#)]
78. Pfiffner, L.J.; Hinshaw, S.P.; Owens, E.; Zalecki, C.; Kaiser, N.M.; Villodas, M.; McBurnett, K. A two-site randomized clinical trial of integrated psychosocial treatment for ADHD-inattentive type. *J. Consult. Clin. Psychol.* **2014**, *82*, 1115–1127. [[CrossRef](#)]
79. Shen, L.; Wang, C.; Tian, Y.; Chen, J.; Wang, Y.; Yu, G. Effects of Parent-Teacher Training on Academic Performance and Parental Anxiety in School-Aged Children with Attention-Deficit/Hyperactivity Disorder: A Cluster Randomized Controlled Trial in Shanghai, China. *Front. Psychol.* **2021**, *9*, 733450. [[CrossRef](#)]
80. Villodas, M.T.; McBurnett, K.; Kaiser, N.; Rooney, M.; Pfiffner, L.J. Additive Effects of Parent Adherence on Social and Behavioral Outcomes of a Collaborative School–Home Behavioral Intervention for ADHD. *Child Psychiatry Hum. Dev.* **2014**, *45*, 348–360. [[CrossRef](#)]
81. Fernández-Ballesteros, R.; Sierra, B. Escalas de Clima Social: Familia, Trabajo, Instituciones Penitenciarias, Centro Escolar. In *Manual: Investigación y Publicaciones Psicológicas*; TEA Ediciones: Madrid, Spain, 1989.
82. Mena, B.; Nicolau, R.; Salat, L.; Tort, P.; Romero, B. *El Alumno con TDAH. Guía Práctica para Educadores*; Mayo Ediciones: Madrid, Spain, 2007.
83. Jarque, S.; Amado, L.; Oporto, M.; Fernández, M. Effectiveness of a Long-Term Training Programme for Teachers in Attention-Deficit/Hyperactivity Disorder on Knowledge and Self-Efficacy. *Mathematics* **2021**, *9*, 1414.
84. Amado, L.; Jarque, S.; Signes, M.T.; Acereda, A.; López, A. Propuesta de un programa de intervención psicosocial para maestros de niños con TDAH. *Rev. Int. Evaluación Med. Calid. Educ.* **2014**, *1*, 42.
85. Montague, M. *Solve It! A Practical Approach to Teaching Mathematical Problem Solving Skills*; Exceptional Innovations: Westville, OH, USA, 2003.
86. Montague, M.; Warger, C.; Morgan, T.H. Solve It! Strategy Instruction to Improve Mathematical Problem Solving. *Learn. Disabil. Res. Pract.* **2010**, *15*, 110–116. [[CrossRef](#)]
87. Chronis, A.; Jones, H.; Raggi, V. Evidence-based psychosocial treatments for children and adolescents with attention-deficit/hyperactivity disorder. *Clin. Psychol. Rev.* **2006**, *26*, 486–502. [[CrossRef](#)] [[PubMed](#)]

88. Hoza, B.; Kaiser, N.M.; Hurt, E. Multimodal treatment for childhood attention-deficit/hyperactivity disorder: Interpreting outcomes in the context of study designs. *Clin. Child Fam. Psychol. Rev.* **2007**, *10*, 318–334. [[CrossRef](#)] [[PubMed](#)]
89. Arcia, E.; Frank, R.; Sánchez-Lacay, A.; Fernández, M.C. Teacher understanding of ADHD as reflected in attributions and classroom strategies. *J. Atten. Disord.* **2000**, *4*, 91–101. [[CrossRef](#)]
90. Van der Oord, S.; Prins, P.J.; Oosterlaan, J.; Emmelkamp, P.M. Does brief, clinically based, intensive multimodal behavior therapy enhance the effects of methylphenidate in children with ADHD? *Eur. Child Adolesc. Psychiatry* **2007**, *16*, 48–57. [[CrossRef](#)] [[PubMed](#)]
91. Langberg, J.M.; Arnold, L.E.; Flowers, A.M.; Epstein, J.N.; Altaye, M.; Hinshaw, S.P.; Swanson, J.M.; Kotkin, R.; Simpson, S.; Molina, B.; et al. Parent-Reported Homework Problems in the MTA Study: Evidence for Sustained Improvement with Behavioral Treatment. *J. Clin. Child Psychol.* **2010**, *39*, 220–233. [[CrossRef](#)]
92. Langberg, J.M.; Becker, S.P. Does long-term medication use improve the academic outcomes of youth with attention-deficit/hyperactivity disorder? *Clin. Child Fam. Psychol. Rev.* **2012**, *15*, 215–233. [[CrossRef](#)]
93. Baweja, R.; Mattison, R.E.; Waxmonsky, J.G. Impact of attention-deficit hyperactivity disorder on school performance: What are the effects of medication? *Pediatric Drugs* **2015**, *17*, 459–477. [[CrossRef](#)]
94. Molina, B.S.G.; Hinshaw, S.P.; Swanson, J.M.; Arnold, L.E.; Vitiello, B.; Jensen, P.S.; Epstein, J.N.; Hoza, B.; Hechtman, L.; Abikoff, H.B.; et al. The MTA at 8 years: Prospective follow-up of children treated for combined-type ADHD in a multisite study. *J. Am. Acad. Child Adolesc. Psychiatry* **2009**, *48*, 484–500. [[CrossRef](#)]
95. Chronis, A.M.; Pelham, W.E.; Gnagy, E.M., Jr.; Roberts, J.E.; Aronoff, H.R. The impact of late-afternoon stimulant dosing for children with ADHD on parent and parent-child domains. *J. Clin. Child Adolesc. Psychol.* **2003**, *32*, 118–126. [[CrossRef](#)]
96. Demaray, M.P.; Malecky, C.K. The relationship between perceived social support and maladjustment for students at risk. *Psychol. Sch.* **2002**, *39*, 305–316. [[CrossRef](#)]
97. Lambert, S.F.; Cashwell, C.S. Preteens talking to parents: Perceived communication and school-based aggression. *Fam. J.* **2004**, *12*, 122–128. [[CrossRef](#)]
98. Martel, M.M.; Nigg, J.T. Child ADHD and personality/temperament traits of reactive and effortful control, resiliency, and emotionality. *J. Child Psychol. Psychiatry* **2006**, *47*, 1175–1183. [[CrossRef](#)]
99. Nigg, J.T.; Nikolas, M.; Friderici, K.; Park, L.; Zucher, R.A. Genotype and Neuropsychological Response Inhibition as Resilience Promoters for ADHD, ODD, and CD under Conditions of Psychosocial Adversity. *Dev. Psychopathol.* **2007**, *19*, 767–786. [[CrossRef](#)] [[PubMed](#)]
100. Regalla, M.A.; Rodrigues, G.P.; Serra-Pinheiro, M.A. Resiliência e transtorno do déficit de atenção/hiperatividade. *J. Bras. Psiquiatr.* **2007**, *56*, 45–49. [[CrossRef](#)]