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# Mindfulness-Based Stress Reduction (MBSR) and Self Compassion (SC) training for parents of children with Autism Spectrum Disorders: A Pilot Trial in community services in Spain

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## Abstract:

This study aims to develop a clinical trial to test the efficacy of a Mindfulness Based Stress Reduction (MBSR) and Self Compassion (SC) Program on self-reported values of anxiety, depression, and stress in parents of children with Autism Spectrum Disorder (ASD) in primary school, in order to assess their integration into the framework of community intervention programs in Spain.

## Methods:

A brief 8-week training program using Mindfulness based intervention (MBSR) and self-compassion (SC) has been applied to ten parents from the Valencian ASD parents'. Participants were assigned to two groups, both groups received the same treatment but at two different measurement moments. Depression, Anxiety, Stress, Satisfaction with Life and Mindful Attention Awareness measurements were assessed, in all participants, in three testing moments.

## Results:

Analysis of Variance results suggested that MBSR and SC training reduces stress and anxiety and increases Mindful Attention Awareness. No significant changes were found in Life Satisfaction measurements.

## Conclusions:

The small number of participants prevents us from generalising the results found. More MBSR and SC clinical trials are needed in parents of ASD with results on anxiety, depression and stress in order to demonstrate the relevance of the inclusion of these programmes in community-based early intervention services.

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**Keywords:** Mindfulness; Autism Spectrum Disorders; Parental Stress; Parent Anxiety.

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## 1. Introduction

In the last decade, interest in Mindfulness effects studies has increased significantly, as reflected in the number of recent publications [1, 2]. Mindfulness is a theoretical construct that can be understood as the capacity related to mindful attention, and the attentive and reflective being in a non-judgmental way [3]. To analyze the positive effects produced by the development in mindful capacity, numerous clinical trials and intervention programs have been developed, as exposed in successful meta-analysis studies [4, 5, 6, 7, 8].

Likewise, neurological studies that show the relationship with Mindfulness practice are especially relevant. For instance, on meta-analysis research, Falcone & Jerram [9] found that with meditation practice, brain activity increased on the frontal, anterior and insular regions, showing different results in experienced meditation practitioners compared to those who were non experienced in meditation. They also studied the possible genetic mechanisms that underlie in the Oxytocin receptors and their relationship with

executive functions and the empathic network (including the right angular gyrus, the medial prefrontal cortex and the anterior cingulate cortex) and the development of self-compassionate attention [10]. These findings, still preliminary, advance our understanding of how the improvement of mindfulness skills can enhance a person's well-being and the prevention of any related psychological or physical conditions.

The Mindfulness-based intervention techniques that have received the majority of support from the research community are the ones that aimed to achieve stress reduction [11]. It is worth noting the two main research lines followed: MBSR (Mindfulness-Based Stress Reduction; e.g. [12]) and MBCT (Mindfulness-Based Cognitive Therapy; e.g. [13]). Both mindfulness based approaches can be classified as brief therapies (8 sessions), typically including mindfulness based practices along with other stress reduction and cognitive therapy approaches. Habitually, these interventions mainly focus on objectives centered on teaching participants to observe, recognize and let go of their judgemental thoughts, feelings and emotions that come to mind during mindfulness practice [14, 15, 16, 17]. Although Mindfulness techniques have their roots in the Eastern Vipassana meditation tradition (for a review see [18]), they are also part of the theory and practice of Dialectical Behavior Therapy (DBT; [19]), Person-Based Cognitive Therapy (PBCT; [20]; [21]) and Acceptance and Commitment Therapy (ACT; [22]). Currently, the term "Mindfulness Integrated Cognitive Behavioural Therapy" (MiCBT) has been created [23] in order to make explicit the integration of the theoretical principles of both mindfulness and Cognitive based techniques.

Parenting in modern society represents a source of stress for parents who must adjust their work responsibilities to those of upbringing. Consequently, psychological distress and discomfort can be found at the base of multiple alterations in family life and child-rearing [24]. Parents who are facing the demands of raising a child with some type of developmental disorder, cope with a greater number of stress sources [25, 26] that are present from the first developmental disorder related warning signs [27]. Parents often report disturbances in their psychological well-being [28, 29, 30, 31] or high levels of stress [32, 33]. For instance, one of the most documented consequences of high stress are altered patterns of parent-child interaction [34, 35]. It is worth mentioning that sources of stress experienced by parents are not only due to the changes they must make on the family dynamic or the amount of time they must invest in meeting their children's needs, but also due to their participation in intervention or treatment activities [36]. Parental stress also feeds back into personal stress, having consequences not only for parents (i.e: on their personal stability, and family relationships, e.g. [37], but also has a clear impact on children's psychological well-being and possible reduction of the effectiveness of an intervention or treatment programs (e.g. [28]).

Therefore, many mindfulness-focused intervention programs aim to develop parents or primary caregivers psychological well-being [38, 39]. By optimizing psychological happiness in parents or caregivers, we can get benefits on the well-being of Autism Spectrum Disorders (ASD) diagnosed children [28]. It must be pointed out that there are two main parents of children with ASD intervention focused therapies: the interventions ruled to be done with parents only and the ones that were planned to be applied simultaneously with parents and children (i.e. aimed at solving parent-child interaction problems). On the parents only group, PCIT (Parent-Child Interaction Therapy; [40]), PACT (Preschool Autism Communication Trial; [41]), and TP (Triple P: Positive Parenting Program; Sanders, [42]; [43]), are some examples that can be noted. On the other hand, we have the second group of parents interventions regarding Mindfulness programs that combined approaches addressed not only for children and youth with ASD, but also to their parents or caregivers. For instance, MYmind [44], is a Mindfulness-based program developed specifically for young people diagnosed with neurodevelopmental disorders and their parents. In this program, children and youths with ASD, and their parents follow parallel

sessions in which they practice Mindfulness meditation exercises and then train the abilities to apply them in difficult situations [45]. As an example, Ridderinkhoff et al. [46] studied a group of forty, 9 to 17-year-old children (and their parents, they apply MYmind proposing an interdependence of the model between abilities like knowing and connecting with peers, pausing their impulses, being aware of the present moment, and let go in a nonjudgmental way, coping strategies, responding calmly to other's demands, etc.). Similarly, Salen-Guergis et al. [47] studied a 23-day parent-child trial, finding improvements in ASD symptoms, emotional regulation, and adaptive skills in young people and their parents. According to the data, MYmind has proven to be a program that can give an improvement in emotional regulation and the adaptability of young people with autism and parental care.

With regard to the aforementioned parent intervention methodologies, it can be noted that recent research has also shown that Mindfulness-based programs have achieved positive changes in parents of children with neurodevelopmental disorders [28]. In particular, these programs offer benefits on stress and anxiety coping abilities on ASD parents [37, 36, 28, 48]. Overall, these studies showed positive improvements in the parent's well-being by reducing stress and increasing their levels of happiness [12]. They also report that caregivers exhibited an improvement of positive children's demand responses in the sense that their feedback turned out to be more empathetic and proper, with greater levels of focused attention, cognitive flexibility, and emotional regulation, being all the abilities that are trained and reinforced on Mindfulness-based interventions [48].

In the same way, Singh et al. [49] used a modified version of MBSR named Mindfulness-Based Positive Behavior Support (MBPBS). They found better results by applying the therapeutic combination of MBSR and MBPBS than by using them separately. These results have been verified not only for families with children with ASD, but also with ID (Intellectual Disabilities) children's families. In summary, previous scientific studies that have applied intervention programs based on contemplative practices (e.g. Mindfulness-Based Stress Reduction or variants, Self-Compassion) or based on emotional regulation (e.g. [44]) have focused primarily on developing psychological well-being for parents or primary caregivers of children with ASD by studying the impact of mindfulness-based training on either stress, anxiety, or depression, but have not studied all three aspects at once in an ASD child's parents or caregivers sample. Therefore, the clearest background results have been reported with stress factors. Cheung, Leung & Mak [50] found that parental stress could be seen as a mediating factor in relation to the exercise of more mindfulness-focused parenting that could affect the internalization of existing social stigmas concerning autism. On the other hand, Singh et al. [51] found that mothers of adolescents with ASD reduced their stress levels as a result of an intervention in MBSR. Finally, Torbet, Proeve & Roberts [52] found that self-compassion (SC) training could introduce a protective reason for the development of parental stress in parents of children diagnosed with ASD. Secondly, in relation to depression, Blackledge & Hayes [53] found an improvement in symptoms following SC and acceptance training. Finally, in relation to self-reported anxiety, we have found no previous studies that stated results in relation to the reduction of anxiety values as a product of a Mindfulness-based interventions. Therefore, and in order to fulfill the existing gap in earlier research, in the present study we propose to evaluate the impact of Mindfulness and Self-Compassion training on anxiety, depression, and stress values, of a sample of parents with children diagnosed with ASD. To our knowledge, there are no studies that evaluate these three psychological aspects in the same ASD children's parents or caregivers sample, at ages that are close to the communication of their child's ASD diagnosis.

Autism Spectrum Disorders are neurodevelopmental disorders characterized by persistent deficits in communication and social interaction and restricted, repetitive patterns of behaviors, activities, and interests that cause significant impairment in social, occupational, or other areas of functioning. Such symptoms are typically present in the early developmental period [54]. In children, the development of the nervous system is influenced

by the interaction with the environment [55]. A child with ASD has deficits in skills for basic communication and social interaction, which can generate inadequate patterns of interaction, due to stress caused by the new situation, among other reasons [35, 56]; this negatively effects neuropsychological development, producing a cascade effect [57, 58, 59]. Inappropriate interactions have two negative effects: they continue to feed back into the child's developing nervous system, increasingly diverting it from normative development, and they generate a high level of tension and discomfort in the parents, which in turn feeds the inappropriate interactions [60].

In the present research, we aim to evaluate the effectiveness of a mindfulness-based and self-compassion program on self-reported values of anxiety, depression and stress in parents of children with ASD in primary school. We think that results obtained in the present study can be relevant for the inclusion of mindfulness-based interventions as a tool to be used on community centers programs in order to help parents coping with stress, depression and anxiety.

## 2. Methods

### 2.1. Procedure

The trial was conducted from February to May of 2019. It was designed with a control group (waiting list). Parents were recruited from a call for participation made to all members of ASPAU (Asociación Proyecto Autismo de Valencia). The conditions of participation were to have a son or daughter with an ASD diagnosis under 12 years of age (see figure 1). This project was approved by the University of Valencia's Committee on Ethics in Research with Humans, which guarantees compliance with the principles of the Helsinki agreement. (Code: H1541505018986).

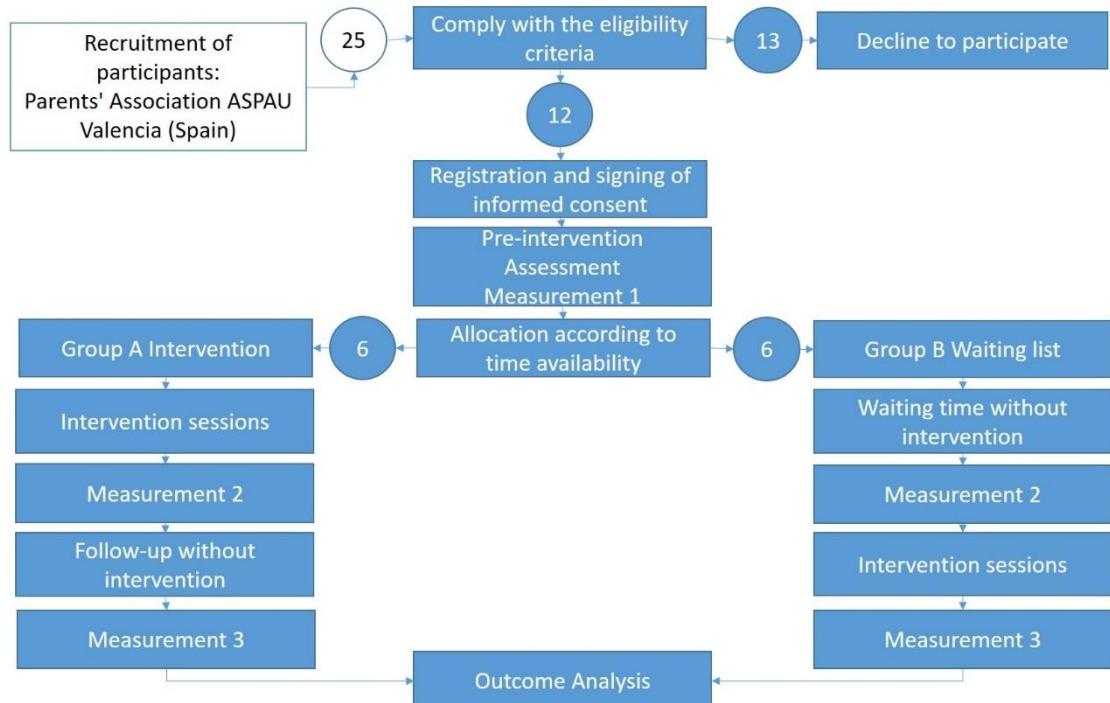


Figure 1 Distribution of the groups and description of the procedure.

### 2.2. Participants

Twenty-five parents answered our call but after the first interview, 13 declined to take part due to an overload of tasks and responsibilities and scheduling problems. The rest (twelve participants) were assigned to two groups according to their time availability

(mornings or afternoons). Only one participant had minor previous experience in body relaxation practices, and the rest of them had never been involved in meditation, relaxation, or yoga exercises before the intervention. It is worth noting that none of the participants had participated in a ruled Mindfulness and Self-compassion based program before, and they were all naive to all the methods proposed during the training. The first group developed the program in January-March, leaving the second group on a waiting list. Once the program was finished in the first group, the intervention was developed in the second group. The descriptive data of the participants are shown in table 1.

*Table 1 Distribution of parents age and children in the groups.*

Fathers		Mothers		Children		
	Age		Mean (SD)		Age	Mean (SD)
Group A	40-45	37-43	43.33(1.75)	39.83(2.48)	3-12	5.33(0.63)
Group B	37-48	33-46	42.25(4.14)	40.00(5.10)	4-10	6.90(3.10)

### 2.3. Characteristics of children

All the children were diagnosed with Autism Spectrum Disorder according to DSM-5 [54], been diagnosed between 3 to 5 years old. In some cases, due to the child's age, the official diagnosis was TGD- Unspecified (DSM-IV T/R, APA, [61])

### 2.4. Measures

In order to provide evidence of the results of our Mindfulness and Self Compassion based program, different evaluation tools commonly used in meditation practice have been analyzed. As many earlier studies reported (e.g. [5]), the mindfulness concept has multidimensional and complex meanings, not only related to the theoretical facet but also on the applied dimensions. Mindfulness conceptualization and measurement are always changing and growing [62]. Accordingly, Sauer et al. [63], reviewed eleven different intervention tools for measuring Mindfulness, classifying them into two large groups according to the concept they rate, whether Mindfulness is treated as a one-dimensional or a multidimensional construct. At the same time, and depending on the results, it also determines their suitability depending on whether they evaluate experts or novices in the practice of Mindfulness or target specific populations or specific intervention goals. To this regard, one of the most widely used and highly rated instruments is the MASS (Mindful Attention Awareness Scale; [64]), a short questionnaire (15 items) that measures the general tendency to pay attention or be aware of the present experience in daily life. It has a one-dimensional structure that provides a total score that is the result of the sum of the item scores. The original version reaches an internal consistency of .82 (Cronbach's Alpha). The MASS has been selected for the present study mainly because it is indicated for populations without previous experience in Mindfulness training [62]. We used the MASS Spanish version adapted by Soler et al. [65] with an internal consistency of .89 (Cronbach's Alpha).

For measuring Anxiety Stress, and Depression indexes we used DASS-21 (Depression, Anxiety and Stress Scale; [66]). This version is the short form derived from the 42-item DASS scale [66]. The DASS-21 is a self-report composed of 21 items, which evaluates the three dimensions (Anxiety, Stress, and Depression). The score for each scale is obtained by adding up the scores of each item (multiplying it by 2 to equate it with the score of the long version DASS) and the results for each dimension vary between 0 and 42 points [67]. The DASS-21 has been validated in the Spanish population showing adequate psychometric properties for the adult population [68] and for the clinical population [67]. For the present study, we used the Spanish version developed by Bados, Solanas and Andrés

[69] which showed acceptable internal consistency indices (Cronbach's Alpha, according to scale: Depression .84, Anxiety .70 and Stress .82)

Lastly, to study the general consequences of the program, we used SWLS (Satisfaction with Life Scale; [70]) for assessing satisfaction, psychological well-being and happiness dimensions. Previous research [71, 72] shows that Satisfaction with Life correlates with mental health measures, and predicts future behaviors, such as suicide attempts. The version used in this study is the Spanish version of SWLS of Atienza, Pons, Balaguer & García-Merita [73], with an internal consistency of .84 (Cronbach's Alpha).

#### 2.5.- *Mindfulness and Self Compasion based Intervention program*

The intervention proposed for the present work was inspired by MBSR [74, 75, 16], and MSC Mindful Self-Compassion training programs [76, 77, 78] and the characteristics of the sessions were adapted to the particular needs of the population we were addressing (i.e. ASD parents).

We mainly organize the sessions based on an MBSR standardized program (i.e. based on the integration of meditation techniques, body awareness, and yoga and the understanding of the neuropsychological functioning of stress). At the end of the 8 weeks of MBSR training (e.g. [75]) the participant is expected to increase their ability to manage stress and daily life challenges, face disturbing events in a more adaptive way, increase their sensation of remaining fully present at every moment, all with the goal of improving their well-being. It is worth remarking that previous to mindfulness training, participants reported anxiety as a consequence of the social stigmatization that the society puts on them and the consequent daily self-criticism that they experienced. This outcome, also verified by previous research (e.g. [50]), encourages us to include a specific psycho-educational session to cope with ASD social stigmatization for reducing daily stress. Additionally, we also integrated some aspects that we believe fundamental for ASD parents, based on MSC training [79] that focuses on the development of self-compassion skills to overcome self-criticism and prevent them from anxiety or depression. Self-compassion [77] involves the ability to cope without mercilessly judging and criticizing ourselves by learning to be kind, self-comforting and understanding when confronted with personal failings or when feeling frustrated. Additional modifications (following recommendations addressed by [80] and [81]) were made in aspects of the organization of the sessions (i.e., their duration, environmental conditions, etc.) and in their content to adapt the sessions to the population.

In general terms, the program that we performed consisted of 8 sessions of about 90 minutes (1 per week). In addition to the face-to-face session, participants were asked to do exercises at home (between 15 and 30 minutes per day). Each session was divided into two parts, the first consisted of the development and training on Mindfulness exercises, being moderated by one of the authors of this article. The second part consisted on developing psycho-educational sessions about the ASD disorder, based on active listening [82, 83], and mediated by one of the authors, an expert on the ASD research area.

According to the recommendations of many current publications of the line inspired by MBSR and MSC (e.g. [80]) accompanied the weekly sessions with tasks to do at home. We support the homework with different resources such as videos, readings, and targeted practices that aimed to enable participants to build up autonomy and self-management coping tools for everyday situations. Typically, each session had the same pre-set structure order that is detailed as follows: a) shared group thoughts about videos or documents that were assigned before (duration: 15 minutes); b) shared group thoughts about day-to-day homework tasks (duration: 15 minutes); c) participant's individual relevant insights achieved during the accomplishment of the home-tasks (duration: 35 minutes); d) explanation of the session and homework activities (i.e. formal and informal practices) of the current week (duration: 25 minutes); e) joint mindfulness practice conducted by the mindfulness trainer. This last part of the session aims not only as a mindfulness practice, but also as a practical explanation of the formal task of the current

week that the participants typically must do on their own before the next joint session (duration: 30 minutes). The general topics and practices are done in both mindfulness and psychoeducational parts of the face-to-face sessions are explained in figure 2.

It is worth mentioning that previous to the mindful and self-compassion training, participants reported anxiety as a consequence of the social stigmatization that society puts on them and their ASD child. This finding is also verified by previous research [50] it encourages us to include a specific session to cope with ASD social stigmatization for reducing daily stress.

WEEK N	Part 1: Mindfulness session	Part 2: Psycho-educational
1	<b>Topic:</b> Introduction to Mindfulness <b>Practice:</b> "Grape meditation"	What is autism?
2	<b>Topic:</b> Basic awareness <b>Practice:</b> Introduction to body mapping technique	Causes of autism
3	<b>Topic:</b> The importance of mindfulness to "change" our brain. <b>Practice:</b> Sitting Meditation	Intervention Methods in ASD
4	<b>Topic:</b> Self-control of thoughts. <b>Practice:</b> Introduction to yoga as a intervention in ASD. How and who? technique of mind-body integration.	Intensity or quality of the
5	<b>Topic:</b> How to "own" our own stress. <b>Practice:</b> Intermediation of automatic reactions through mindfulness	Primary and secondary school for ASD patients and parents
6	<b>Topic:</b> How to be aware of our difficult emotions or sensations before they generate consequences? <b>Practice:</b> Meditation to Calm, Allow and Accept	ASD Adolescence
7	<b>Topic:</b> Mindfulness and improving our communication <b>Practice:</b> meditation on conscious and present communication	Access to Work for ASD
8	<b>Topic:</b> Mindfulness and Self-Compassion Empathy <b>Practice:</b> Meditation on empathy and compassion to reduce the consequences of self-centredness in stress	Autonomy Development and Self-Determination in ASD

Figure 2 Topics and practices done in both mindfulness and parts of the face-to-face sessions.

#### 2.6. Weekly/daily qualitative assessment:

Following MBSR program recommendations (e.g. [16]) a set of ad hoc daily homework activities sheets were included, specially adjusted to each session. They typically included both formal and informal Practice Sheets (PS). Formal homework practice consisted of applying at home the methods learned during the previous session, and the informal homework practices involved tasks related to bringing mindful awareness to some

daily routine activity. The Formal Daybook accordingly contained PS for documenting impressions after the formal activity was completed at home. The Informal Daybook was where the participants were asked to record on the PS any daily activity that could transform into a moment of full attention by applying what was learned in the previous session of each week. Typically, the formal and informal Daybook charts had six boxes in order to dedicate one to each day of the week. On the last day of the week, prior to the group session, participants received the multimedia material and preparatory documents for the face-to-face session through the WhatsApp group or by accessing the course website. All participants were required to attend the session having read, heard, or seen the material submitted before WhatsApp.

During the first 15 minutes of each session, the participants expressed their thoughts about the material sent analyzed the records they made, and then the moderator therapist explained the activities for the following week. Once the more explanatory part was concluded, a joint contemplative practice was carried out (i.e. guided meditation, yoga session, etc.) modeled by the therapist and adapted to the aims of each session.

#### 2.7. Support materials:

For the development of the program, there was a website (Moodle) that was used as a repository of documents and multimedia material that were used needed throughout the group sessions and during the individual practice performed by each participant as homework (Formal and Informal). Fluid and constant communication were also maintained through a WhatsApp group that also allowed the distribution of documents and multimedia material. The material was distributed on a weekly basis, and questions raised by participants were reported or answered on a daily basis.

#### 2.8. Adherence to treatment:

We only had two waivers throughout the program (one in each group). One of them (group A) occurred after treatment in the follow-up phase. The second (Group B) occurred during treatment. Both cases were excluded from data analysis. As for the measurement of adherence using daily activity recording, it can be concluded that it was satisfactory, more than 80% of the participants recorded the PS daily and the rest did so in a high percentage of sessions (67%). There was no case in which all the weekly sessions were without any record.

#### 2.9. Design and Data Analysis

A repeated measures variance analysis with two crossed groups was performed [84]. The first group received the Mindfulness and Self Compassion based training while the second group remains on the waiting list. At a second stage, the first group remains on the waiting list without receiving treatment in the follow-up phase while the second group received the same Mindfulness and Self Compassion based treatment. (see Figure 3).

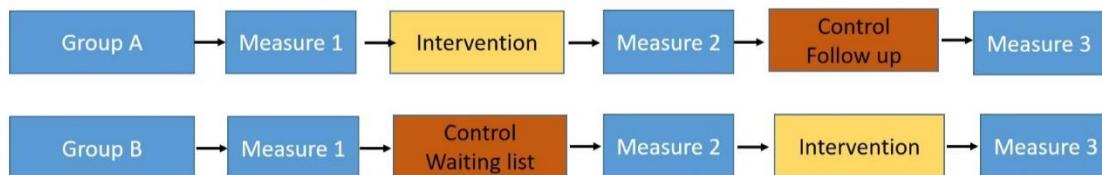


Figure 3 Diagram of the design of repeated measures with alternate treatment-control groups.

The variance analysis was performed to analyze the effects within-subjects (on the differences between the three observed measures in all participants) and between subjects (on the evaluation group to which they were assigned, 1 or 2). All the calculations were made with SPSS, version 26, licensed by the University of Valencia.

*Table 1 Means and standard deviations of the three scales of the DASS-21 for the two groups in the three measurements made*

		Measure 1	Measure 2	Measure 3
		Mean (SD)	Mean (SD)	Mean (SD)
Stress	A	31.2 ( 4.1)	22.0 ( 4.0)	19.2 (4.1)
	B	18.4 ( 7.4)	17.6 ( 9.0)	12.0 (3.2)
Anxiety	A	21.2 ( 6.4)	13.0 ( 6.4)	15.2 (4.8)
	B	14.4 (12.6)	13.2 ( 8.3)	6.4 (5.2)
Depression	A	16.8 ( 6.9)	13.6 ( 9.7)	13.2 (9.7)
	B	12.4 (14.6)	11.6 (13.7)	6.4 (5.2)
MASS	A	2.5 ( .86)	4.1 ( .43)	3.5 ( .61)
	B	3.2 ( .35)	3.5 ( .35)	4.6 ( .19)
SWLS	A	16.0 ( 3.7)	16.8 (3.1)	13.0 (3.9)
	B	10.6 ( 4.3)	11.8 (3.9)	13.6 (5.2)

### 3. Results

Table 2 presents the descriptive data of the three scales used in the three measures and for the two groups. Regarding indexes obtained on the subscales of depression, anxiety, and stress, measured by the DASS-21, a decrease on all three indicators were observed after the treatment, both in group A and group B. During the follow-up phase, a slight increase was observed in group A (see figure 1). The results of the ANOVA reached significance on the changes in Anxiety and Stress values, but not in Depression values (see table 3). The "post hoc" overall contrasts showed that the differences are always found between the groups when they are in the control and treatment phase. We additionally performed univariate tests of significance for planned comparisons to see the variances that arise from the combination of the between and within-subjects factors and their contrast coefficients.

In the first place, concerning the univariate contrasts for Anxiety scale, about Group 1 between subject's factor, DASS Anxiety-measurement 1 and DASS Anxiety-measurement 2 as within-subject's factors selected for the contrast, in the sense that in this group it represents the training phase, we obtained  $F=8,74 (1,8)$ ;  $MSE =18,3$ ;  $p= 0,02$ . On the other hand, regarding the Anxiety scale - Group 2 between-subject factors, DASS Anxiety-measurement 2 and DASS Anxiety-measurement 3 as within-subjects factors selected for the contrast, in the sense that in this group represents the training phase, we obtained  $F=4,5 (1,8)$ ,  $MSE =25,8$ ;  $p= 0,06$ . To sum up, regarding the DASS anxiety scale, we found a significant improvement between the evaluation measurements comprising the training phase (pre-post) in both groups.

In the second place, pertaining to the univariate contrasts for the Anxiety scale, about Group 1 between-subject factors, DASS Stress-measurement 1 and DASS Stress-measurement 2 as within-subject factors selected for the contrast, in the sense that in this group represents the training phase, we obtained  $F = 23,25 (1,8)$ ;  $MSE = 9,1$ ;  $p= 0,001$ . Conversely, with reference to Group 2 between subject factors, DASS-Stress-measurement 2, and DASS-Stress-measurement 3 as within subject factors selected for the contrast, in the sense that this group represents the training phase, we obtained a visible improvement, but the contrast didn't reach significance,  $p= ns$ . To sum up, we found a significant improvement between the evaluation measurements comprising the training phase (pre-post) in group 1 and with a non-statistically significant effect, but a visible improvement in the expected direction that clearly could have reached significance with more participants involved.

Table 2 Results of the ANOVA of all scales

	ANOVA GLM				ANOVA Reaped Measures										
					Measures		Measures group		Effect Sizes and Powers						
	F		p		Eta <sup>2</sup>		Power		F		p		Partial eta-squared	Observed power (alpha= 0.05)	
	F		p		Eta <sup>2</sup>		Power		F		p		Measures group	Measures group	Measures group
<b>Stress</b>	175.6		.00	.96	1.00		14.5		.00	3.1	.07	.64	.28	.99	.52
<b>Anxiety</b>	53.0		.00	.87	.99		3.6		.05	1.5	.25	.31	.16	.58	.27
<b>Depression</b>	16.0		.00	.67	.94		2.5		.11	.62	.55	.24	.07	.43	.14
<b>MASS</b>	611.7		.00	.99	1.00		50.4		.00	27.6	.0	.86	.77	1.00	.99
<b>SWLS</b>	147.9		.00	.94	1.00		0.55		.58	4.7	.02	.06	.13	.37	.70

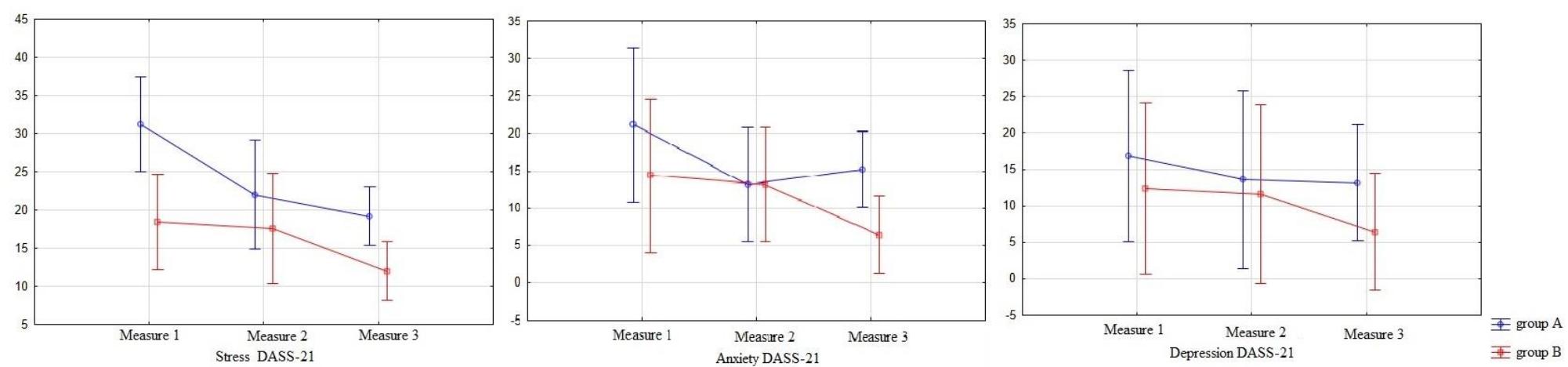


Figure 4 Graphical representation of DASS-21 (Stress, Anxiety and Depression) test results

As a direct result of the intervention, an increase in the tendency to pay attention in the present moment of everyday life as measured by the MAAS was also observed [64]. In other words, the ANOVA results (see table 3) showed that the increase in full attention capacity after the treatment is significant in both groups, although a slight decrease is observed during the follow-up phase of group A, as it was observed in the rest of the variables. The "post hoc" overall contrast shows that differences are found between the control and treatment phases in both groups.

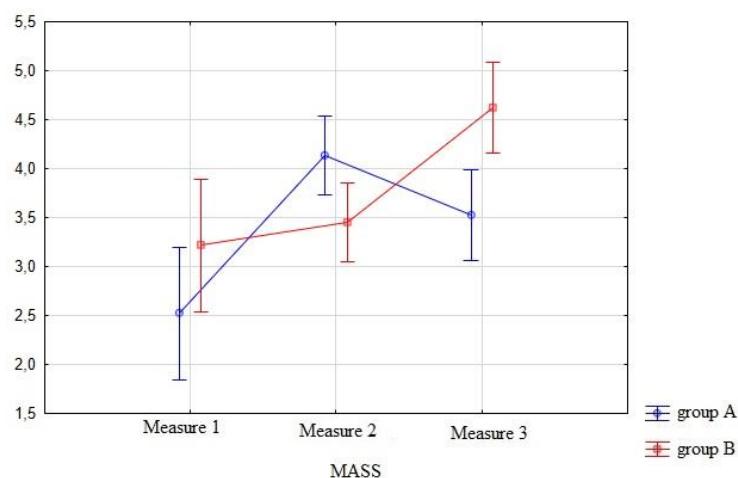


Figure 5 Graphical representation of MASS test results

Finally, life satisfaction measured by SWLS [70] has also been evaluated, taking into account that the largest score is 25 and that in the adaptation study [73], the average score of 19.24 was reached in the youth population. In our study, the effect of the treatment in both group A and group B produces a slight improvement in this value. This improvement disappears during the follow-up phase of group A once the intervention is over. The results of the ANOVA showed (see table 3) that there are no differences due to the treatment, although there are differences between the groups.

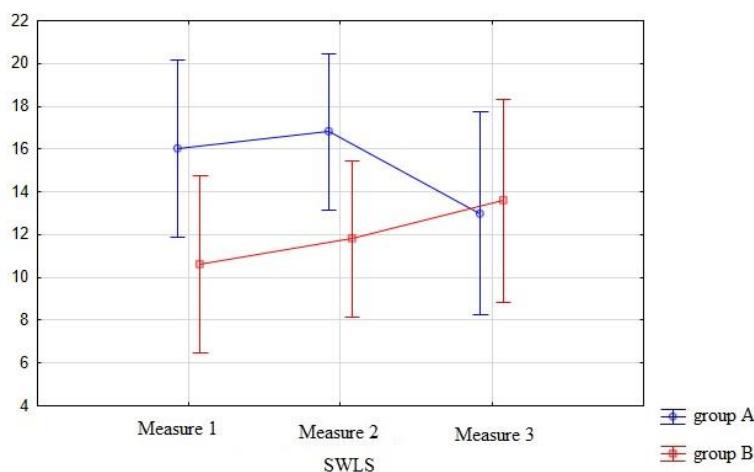


Figure 6 Graphical representation of SWLS test results

#### 4. Discussion

Childbirth implies a change and reorganization of the family context [85] and the most common sources of parental stress are related to the child's health. All parents want to have a healthy child with normal development. In fact, any health disorders, typically related to possible lifelong consequences of disability in many psychological and physical areas, are logically a source of parental stress [86]. There is a great variety of parenting and parental stress that may be suffered by parents of children with neurodevelopmental problems. On other hand, the amount of special care that a child with a developmental disorder demands may generate an extra source of stress in parents, and so it can affect their well-being and quality of life [87].

Parental stress can be also related to diagnosis timing. Sometimes, at birth or early age, the child does not present any symptoms and it is during the first months/years of life when the ASD symptoms emerge, and subsequently, parental stress emerges too. There is a range of emotional states that parents can present when the ASD symptoms arise. Climent Giné [88], describes the characteristics of these situations as strong psychological and emotional impact, the process of adaptation and redefinition of family functioning, changes in the couple's relationship, and need for help and advice. This stressful situation can be momentary and satisfactorily resolved or can stay in time in which case could cause a more serious post-traumatic stress anxiety disorder.

Most parents find themselves in an unfamiliar situation to which they are not ready to cope. One of the best possible well-known supports is providing them with quality, scientifically proven information about ASD [94, 95]. However, the diagnosis news, the uncertainty about the future of their son or daughter, and the increased demand for raising them increase the stress. Parents need additional strong support to cognitively restructure the situation, assume their new reality, and for developing new coping strategies. In this content, CBT with Mindfulness and Self Compassion based programs have shown to be effective in reducing stress in parents, but these types of interventions had been scarcely studied and were not yet addressed to the time window that is closer to the ASD diagnosis. The main goal of this article was to find the feasibility of implementing brief interventions based on mindfulness and self-compassion within the framework of parental care received in the community early care centers.

The results intervention program presented here prove a post-treatment decrease in self-reported values in anxiety, stress, and depression of parents that might generate positive changes in the psychological well-being and quality of life of families as evidence in the literature [53, 45, 96, 97]. It is worth noting that it is not a widespread practice in ECCs in Spain to apply therapies both to ASD children and to their parents to achieve a better well-being state in the family, since it is seen as a complex and unitary system. The reason why this practice is not more widely developed is due to the lack of regulation of mindfulness training for professionals and the practice itself as a health intervention. This lack of regulation has led to the emergence of multiple professionals with dubious training, which in turn generates dubious results, in some cases even considering full care techniques as pseudo-therapies. As more research is being developed that provides evidence, and the more Mindfulness is understood as an integrated part of the cognitive-behavioral programs MiCBT [23], the acceptance of this practice is gaining more space in the field of ASD intervention (for a review see, [5]).

In the present study, a short intervention program for parents of children with ASD based on Mindfulness Self Compassion, and with cognitive-behavioral and emotional regulation components have shown to be effective not only related to quantitative, but also in qualitative aspects. In relation to the quantitative data, it should be noted that this study presents a set of relevant data that, to our knowledge, have not been reported in previous studies. Regarding the mindfulness training used, background studies on parents of children with ASD who have implemented intervention programs focusing on contemplative practices have focused on MBSR with variants (e.g. [50]), or on self-compassion (e.g. [52] or emotional regulation (e.g. [44]). In our study, we conducted mindful training that includes both aspects of MBSR and SC, as well as emotional self-regulation and psychoeducation as a tool for social stigma reduction. In other words, we

developed a more holistic and a systematic approach, taking into account previous studies and their successful interventions, all of them in a single intervention. On the other hand, concerning to the data obtained, previous studies have reported the impact of contemplative training on measures of stress (e.g. [50, 52, 49]), depression (e.g. [53]), but did not evaluate self-reported measures of stress, anxiety, and depression in the same study. We believe that all three indicators can be informative in assessing the impact of holistic MBSR and SC-based programs conducted in the time window near the communication of the ASD diagnosis to parents.

The dimensions to which the life satisfaction construct is typically related to the feelings of happiness and loneliness (affective dimensions) and personal satisfaction (as a cognitive dimension). It seems that this dimension is affected by many other external variables that produce covariant effects. However, with regard to life satisfaction, it is important to note that during the treatment phases, slight positive changes are observed in both groups. However, it is also worth mentioning that the intervention is brief and is normally assessed in the context of a stressful situation. During the training, a certain psychological well-being improvement can be achieved, but it later deteriorates when losing contact with the group and exposing themselves to cope with new stressful situations. So it is possible that, if therapeutic care is prolonged by generating a group of supportive parents in a complementary way, the changes in their psychological well-being can only be observed by prolonging the sessions over time. We think that, by extending the periods of intervention and follow-up with psychological support, more significant changes can be produced.

The first main limitation of the present study is related mostly to the analysis of a reduced sample of participants. In future studies, we believe that it would be convenient to analyze a larger sample. Second, it would be desirable to include other measures, such as MPQ (Mindfulness in Parenting Questionnaire; [98]) or the PSI-4 (Parental Stress Inventory Fourth Edition; [99]) that we couldn't introduce in this study because both instruments were in the process of validation to Spanish samples, when we performed the present research.

The relevance of the present clinical trial relies mainly on the relationships shown between mindfulness and Self Compassion interventions and Anxiety, depression, and stress self-report indexes. The potential extent of these findings depends on the application of the mindfulness-based programs on community Early Care Center in Spain, mainly in a time window close to the communication of ASD diagnosis to parents.

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