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ORIGINAL PAPER

Mindfulness-Based Intervention to Reduce Sensitivity to Anxiety in a Spanish Primary Education Setting

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Abstract

Objectives Mindfulness involves the ability to pay full and conscious attention to what is happening in the present moment. Scientific evidence supports its benefits in the educational field, contributing to the development of strategies that help students cope academically, socially and emotionally. Meta-analyses on mindfulness in the Spanish educational context reported significant improvements along the same lines. The aim of this study was to determine whether a mindfulness-based intervention for primary school students improved their sensitivity to anxiety.

Method A total of 352 students (170 boys, 182 girls) aged 6 to 12 years participated in Spain. A quasi-experimental pre-test-post-test design was used, with experimental group (266 students) and control group (86 students). Anxiety sensitivity was measured with the Anxiety Sensitivity Index for Children. The intervention followed a sequential learning order based on the Mindfulness-Based Stress Reduction (MBSR) programme.

Results A significant decrease in anxiety sensitivity was observed in the post-intervention measure. Additionally, comparisons of pre-test and posttest scores in the control group revealed significant differences. In terms of effect size, the difference between pre- and post-intervention scores was close to medium (Cohen's $d = 0.43$).

Conclusions The efficacy of the programme was confirmed, and it was shown that the mindfulness intervention was beneficial; in the experimental group, anxiety sensitivity decreased significantly compared to that in the control group after participation in the programme.

Keywords Anxiety sensitivity; Intervention · Mindfulness · Primary Education

Mindfulness has roots in Eastern Buddhism, dating back more than 2500 years, and involves keeping awareness alive, as well as an attentive and reflective presence to what is happening in the present moment (Díez & Castellanos, 2022; Ruiz, 2023). It is defined as "the awareness that emerges through paying attention on purpose, in the present moment, andnonjudgmentally to the unfolding of experience moment by moment" (Kabat-Zinn, 2003, p. 145).

The first mindfulness-based intervention on record was the Mindfulness-Based Stress Reduction (MBSR) programme designed by Kabat-Zinn (1982, 1990) of the University of Massachusetts. It was implemented in the USA with the aim of treating pain and stress generated by various chronic pathologies. It was based on vipassana meditation and was framed within behavioural medicine (Arenilla, 2023).

Mindfulness-based interventions (MBIs) have generated great interest, and a large number of studies—both basic and applied—have proven useful in the treatment of both physical and psychological problems, with a high rate of efficacy in patients with symptoms of stress, anxiety or depression (Gallego et al., 2016; Hervás et al., 2016; Soriano et al., 2020). The concept of anxiety, although not synonymous, was related to the concept of anxiety sensitivity. Anxiety

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sensitivity had been proposed as a predisposing factor for the development of anxiety disorders (Reiss, 1991) and depression (Xie et al., 2023), and was considered to be a trait-like cognitive vulnerability distinct from trait anxiety, which could have amplified pre-existing anxiety levels (Olatunji & Wolitzky-Taylor, 2009). Anxiety sensitivity was considered a central aspect of the expectancy theory of anxiety (Reiss & McNally, 1985). Trait Anxiety and AS were different but related constructs as they both referred to the propensity to experience anxiety or fear (Fernández-Valdés, 2015), implying that fear of anxiety symptoms causes anxiety and its sensations to be regarded as dangerous.

The practice of mindfulness in adolescence improved well-being and reduced symptoms of perceived stress and negative thoughts (Díaz-González et al., 2018). It had even been established as a suitable treatment for reducing anxiety, as it promoted a reduction in the symptoms of this pathology in adult populations (Dzido, 2020).

Mindfulness had proven effective as a component of psychological treatments for diverse populations (Cebolla et al., 2017). Mindfulness intervention programmes had shown significant effects on symptom reduction, improvement of executive functions and a positive impact on emotional skills, both in children and in adolescents (Porter et al., 2022). In addition, they improved the ability to focus attention and psychological functioning by reducing mental wandering (Levinson et al., 2014).

Although the initial focus of mindfulness research had been on its clinical applications, different Mindfulness Based Intervention programmes (MBI) also had been consolidated in the educational context. Mindfulness had been shown to improve mental health in adult populations, and was increasingly being implemented in schools (Kuyken et al., 2022).

One of the most important school intervention programmes is My Resilience In ADolescent (MYRIAD), which demonstrated the effectiveness of Mindfulness in British schools (Kuyken et al., 2022). There is also the Compassionate Mindfulness Training (CMT) programme, which sought to promote personal well-being in schools and improve prosocial behaviours (Maratos et al., 2024).

In addition, the studies supported the benefits of these interventions in children, and these findings corroborated the importance of introducing mindfulness practices in the school environment (González-Mesa & Amigo-Vázquez, 2018), showing that mindfulness practices could have had a positive impact on metacognition, self-regulation and global executive control (Kaiser, 2013). Recent meta-analyses of these studies in the Spanish educational context had revealed significant improvements in dimensions such as mindfulness and emotional and behavioural adjustment (Arenilla et al., 2022). The implementation of MBI from infancy enabled children to live more consciously, and to grow up freer, more responsible and happier (Sánchez-Gómez et al., 2020). On the other hand, and linked to the school context, researchers such as Mischenko et al. (2024) had reviewed the training of teachers who provide training to students in schools within the Flourish curriculum: the Compassionate Schools Project under the conceptual framework of Mindfully Teaching Mindfulness-Elementary (MTM-E), although studies such as Strohmaier and Bailey (2023) pointed out that there was no convincing evidence that mindfulness programmes in schools were effective, especially if students did not continue the practice outside the school.

The practice of mindfulness has become widespread in addressing children's mental health problems and is applied in the school context with the aim of providing students with certain skills that allow them to better manage stress, reduce anxiety, improve resilience, and improve their socioemotional, cognitive and behavioural skills (Felver et al., 2016; Maratos et al., 2024; Odgers et al., 2020; Zenner et al., 2014). In addition, González-Cortez and Martín (2022) stated that it allowed for better adaptations of students in relation to the demands of the classroom and improved students' attention. On the other hand, studies in education suggested that children who receive MBI improved attention and social skills, reduced test anxiety and were better able to remain calm (Baena-Extremera et al., 2021; Ruiz et al., 2014).

The aim of the study was to explore the effectiveness of this programme in the Spanish educational context and contribute to understanding how meditation produced its effects (Loizzo, 2014; Sedlmeier et al., 2012). Considering that anxiety sensitivity is a trait that predicts the eventuality of future anxiety-related pathologies (Sandin et al., 2002), a study was carried out with the aim of determining whether an intervention based on mindfulness in primary school students improved their anxiety sensitivity. Recognising that this improvement would have had a positive impact on the control of anxiety, the aim was to examine the results for the variable "Anxiety Sensitivity" and to determine whether there were significant changes before and after the intergroup and intragroup interventions.

Method

Participants

The sample initially consisted of 438 participants from the Autonomous Community of Castilla-León, Spain. Four participants were excluded as they completed only the post-test and did not participate in the pre-test because they were sick, and 15 participants were excluded because they completed only the pre-test and did not complete the instrument in the post-test phase, because the parents and tutors withdrew their permission. Sixty-seven additional

subjects were excluded from the database because they did not complete all the items of the instrument (more than 25% of the items were unanswered) because the measurement instrument was answered on paper (Fig. 1), and finally, 352 participants (170 boys; 182 girls), aged between 6 and 12 years ($M = 8.75$; $SD = 1.86$), primary school students who were studying between first and sixth grade (15.63% of first; 17.61% of second; 16.76% of third; 19.03% of fourth; 10.51% of fifth and 20.45% of sixth).

The criteria for inclusion in the sample were that students were from first to sixth grade of Primary Education and that they had sufficient oral and written comprehension in Spanish to answer the instruments and carry out the activities designed for the mindfulness-based intervention. The exclusion criteria consisted only of failure to meet the inclusion requirements.

Procedure

A quasi-experimental pre-test-post-test design was used, with experimental group (266 students; 46.6% boys and 53.4% girls; $M = 8.82$; $SD = 1.89$) and control group (86 students; 53.5% boys and 46.5% girls; $M = 8.56$; $SD = 1.75$). Both groups are equivalent in terms of age as there are no significant differences between them (experimental: $M = 8.73$, $SD = 1.85$; control: $M = 8.42$, $SD = 1.65$; $p > 0.05$). Moreover, as shown by a chi-square test of independence, both groups are equivalent with respect to gender χ^2 (1, $n = 352$) = 1.22, $p = 0.268$.

The class groups were randomly assigned to experimental and control groups. One class was assigned to the control group for each grade, and the rest of the students of the same age were assigned to the experimental group.

The study was planned in compliance with ethical and data protection regulations and with the authorisation of

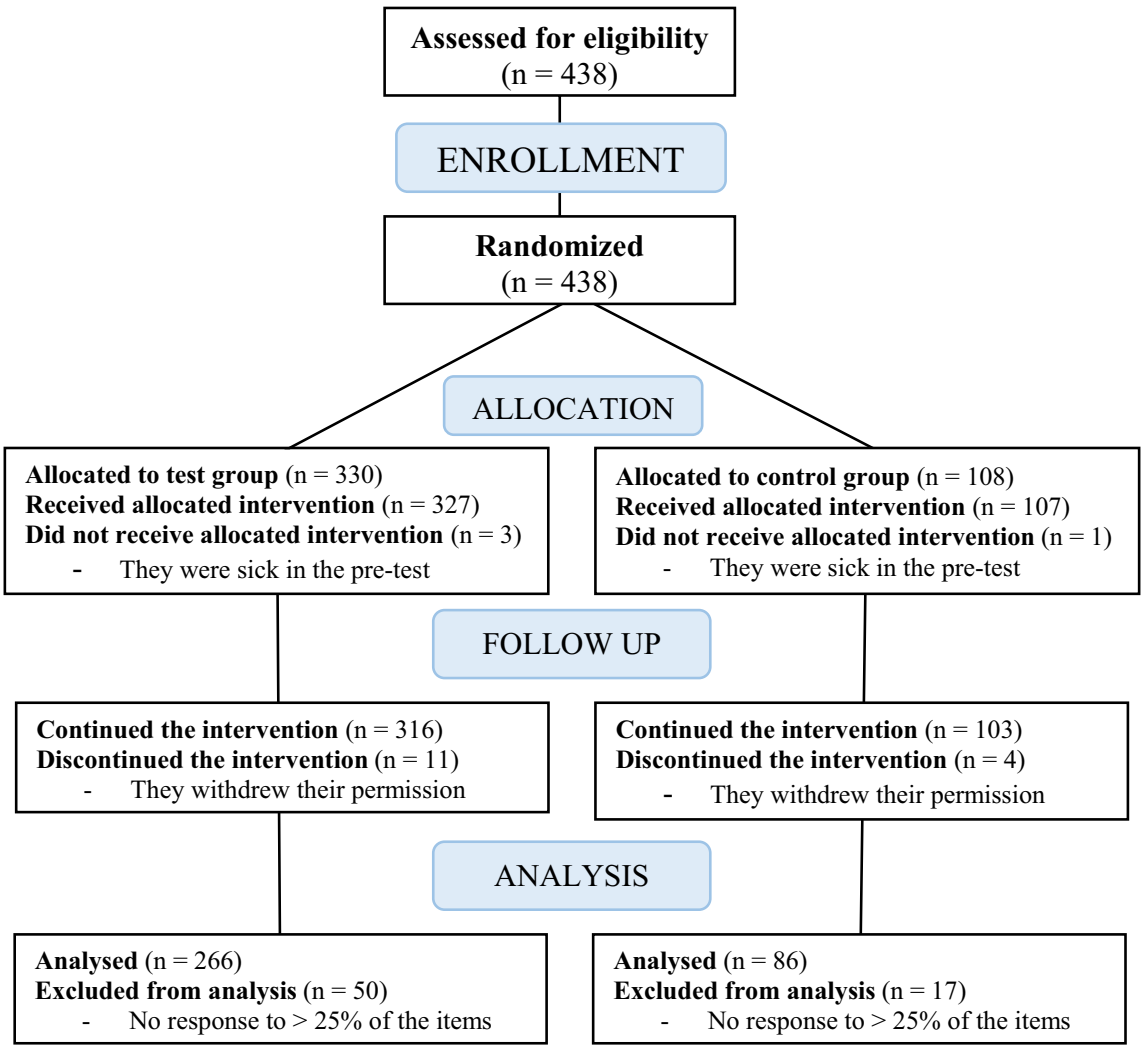

Fig. 1 Consort diagram illustrating participant flow

the Castile and Leon Regional Ministry of Education. Permission was then obtained from the management team and teaching staff, and after their acceptance, informed consent was obtained from the parents or legal guardians of the pupils, who informed them of the voluntary nature of their children's participation, the objectives of the study, the procedure, and the confidentiality and anonymity of the data, which were used exclusively for the purpose of the research.

Once informed consent was collected, the intervention programme was implemented by the teachers, who were previously trained by an external mindfulness instructor with experience in the practical application of mindfulness with children.

The programme was presented to the students, with an adapted language, as a journey into their own mind. The students had the possibility of receiving explanations of those items or terms that were difficult to understand, as they were accompanied by the teaching and research staff of this work. In each session, the aim was for students to learn resources and strategies related to different themes (learning about the practice of meditation, learning about cognitive management, learning about emotional management, learning about the proprioception of bodily sensations, learning about the practice of compassion and learning about mindfulness).

The intervention consisted of six sessions where the six themes were worked on a weekly basis, lasting 60 min during school classes, with an average of 25 students per session (see Description of a typical session in the Appendix). They were designed following a sequential learning order based on the MBSR programme for the reduction of stress and anxiety, which has robust scientific evidence regarding its efficacy (García, 2023).

Each student carried out the weekly session in the classroom and a daily practice at home on what was learned during the session on the remaining days of each week. A "travel notebook" was designed for the students, which grouped the worksheets with the activities to be performed at home.

To receive feedback from the students on the different activities and to improve/optimise the activities and training sessions, a set of cards was designed for this purpose, consisting of different questions such as: Do I feel my breathing? Do I feel calm? Do I concentrate on my meditation practice? The answers were recorded on a 4-point Likert-type quantitative scale (1 = *not at all*; 2 = *a little*; 3 = *quite a lot*; and 4 = *a lot*).

The sessions were held in a specific classroom at the centre designed specifically for the activity. The room was equipped with mats, lamps with dimmed lighting, sound equipment and various elements necessary for the different practices: cushions, wool, sheets of paper and pens, rain sticks, lava lamps, etc.

The pre-test evaluation was conducted 1 week before the start of the intervention, and the post-test evaluation was conducted 1 week after the end of the intervention.

The phases of the intervention programme are presented as follows:

In the first phase, an interview was held with the school's management team and teaching staff to explain the objectives of the intervention programme, seeking their involvement and participation. They were informed that the programme is part of a research project of the Department of Psychology of the University of Valladolid within the PhD in Transdisciplinary Research in Education. Informed consent was subsequently obtained from the families of the students participating in the programme. Finally, the students of each class group were randomly assigned to the control or experimental group. The teachers/tutors in charge of carrying out the intervention programme in each group were assigned, and a follow-up was carried out through training seminars on the mindfulness intervention programme with the tutors of the experimental group (three seminars of 2-hr duration). They consisted, in the first place, in the theoretical explanation of the concepts to be worked on, related to anxiety sensitivity, marking developmental differences between the different ages of the students and the possible effects of the anxiety sensitivity on school performance. In addition, it was explained how to administer the instrument, how to resolve doubts and not to influence the answers, and clear and concise instructions were provided on how to carry out each of the tasks reflected in the worksheets, both in terms of verbal instructions and the time to be devoted to each one of them.

The second phase consisted of the implementation of the mindfulness programme—whose study protocol was not registered. In the first week, the measurement instrument was distributed to teachers in the control and experimental groups before the intervention (pre-test), and students completed the questionnaire during school hours. Between the second and seventh week, the implementation of the mindfulness intervention programme began with a meeting with the school management team, who were responsible for collecting and distributing the documentation among the teaching staff. They were given weekly work guides for the tutors of the experimental group, in paper and digital format, as well as two worksheets for the students, and the intervention sessions began. Each week, feedback from the previous session was collected, doubts were resolved, and the activity was adapted according to the specific needs of the participants. During the eighth week, the measurement instrument was distributed again to carry out the post-test data collection in the experimental and control groups. In the ninth, mindfulness training seminars were held with the teachers in the control group. Between the tenth and the sixteenth, for ethical reasons,

the intervention programme was applied to participants in the control group. Finally, the third phase included documentation collection and data analysis.

Measures

For the measurement of the variable "anxiety sensitivity", the Anxiety Sensitivity Index for Children (ASIC) of Laurent et al. (1998), which is a modification that Laurent initiated in 1989 of the Anxiety Sensitivity Index (ASI) for adults (Reiss et al., 1986), was used. The Spanish adaptation is provided in Fernández-Valdés (2015). Among the modifications proposed, it is reduced from 16 to 12 items, improving its psychometric properties. It has a hierarchical structure with a higher-order factor, sensitivity to anxiety and two primary factors, psychological awareness and mental worry. The scale consists of 12 items (Table 1) with a 4-point Likert scale response format: *almost never true* (0); *sometimes true* (1); *often true* (2); and *almost always true* (3). It has simple instructions that invite respondents to respond honestly to the proposed statements and to select the answers they consider most appropriate. The instrument has good internal consistency (between $\alpha = 0.85$ and $\alpha = 0.90$).

Deacon et al. (2002) concluded that the ASIC can be considered a psychometrically sound and valid measure of anxiety sensitivity. They examined the psychometric properties of the ASIC (12 items) for the hierarchical structure proposed by Laurent (1998) and concluded that the factor loadings of the ASIC were similar to those obtained by Laurent et al. (1998), showing a superior and a secondary two-factor structure. The internal consistency obtained by Cronbach's alpha was $\alpha = 0.84$. Fernández-Valdés et al. (2017) reported that the instrument has high internal consistency and test–retest reliability.

In the present study, the scale obtained a value of 0.81 for Cronbach's alpha, as well as a McDonald's omega of 0.95.

Data Analyses

The statistical package SPSS v.28 was used for statistical analysis. Firstly, missing values (0.87%) were imputed using the linear trend estimation at the point method, having previously verified through Little's test that the data met the MCAR assumption ($p = 0.29$).

Univariate analysis of normality was performed on the basis of the Q-Q plots and the Kolmogorov–Smirnov coefficient ($p < 0.05$); in both cases, values very close to what is considered normal were obtained. Likewise, a visual inspection of the histograms of the variables under study was carried out to verify their similarity to the Gaussian bell, which is typical of a normal distribution, in addition to an analysis of skewness (pre-test = 0.37; post-test = 0.33) and kurtosis (pre-test = −0.37; post-test = −0.96). The histograms were found to be remarkably symmetrical, and the skewness and kurtosis showed contained values, so this evidence is taken as another proof of normality.

Therefore, taking into consideration the robustness of parametric tests to a nonsevere violation of normality assumptions in mean comparisons (Edgell & Noon, 1984; Montilla & Kromrey, 2010; Schmider et al., 2010), the decision is made to make use of them. To determine the effectiveness of the mindfulness intervention in terms of its influence on student anxiety sensitivity, different means were compared using Student's *t*-test.

First, the pre-test scores of the experimental group were compared with those of the control group to determine whether they were equivalent; that is, before any type of intervention, both groups started from the same level of anxiety sensitivity. To carry out this pre-test intergroup comparison, the *t*-test for independent samples was used,

Table 1 ASIC instrument items (Laurent et al., 1998)

Items
1. When I cannot keep my mind on what I'm doing I worry that I might be going crazy
2. It scares me when I feel ''shaky'' (trembling)
3. It scares me when I feel like I'm going to faint
4. It scares me when my heart beats rapidly
5. It scares me when I am sick to my stomach
6. When I notice that my heart is beating fast, I worry that something really bad is going to happen to me
7. It scares me when I can't catch my breath
8. When my stomach is upset, I worry that I might be seriously ill
9. It scares me when I am unable to keep my mind on what I'm doing
10. When my body feels strange it scares me
11. When I am nervous I worry that I might be crazy
12. I scares me when I am nervous

taking into account Levene's test of equality of variances when interpreting the results.

Second, the differences in the scores before the intervention (pre-test) and after the intervention (post-test) were calculated for the experimental group. The same procedure was followed for the control group, although they did not receive the intervention, and their means obtained at the pre-test and post-test time points were compared. For these intragroup comparisons, *t*-tests for related samples were performed.

Third, intergroup comparisons were again performed, comparing the post-test scores of the experimental group and the control group by means of a *t*-test for independent samples using Levene's test. This analysis complements the pre-test intergroup comparison performed first, as it allows for a comparison of scores with the group that did not participate in the intervention, which may be helpful in determining whether the change in scores of the experimental group may have been affected by other external factors.

In addition, together with the level of significance obtained in the differences, it is necessary to know the magnitude of the differences to be able to assess their importance. Consequently, for the Student's *t*-tests, and Cohen's *d* criterion (Cohen, 1988) was used.

Finally, a two-way mixed ANOVA was performed to evaluate whether time (pre-test and post-test), groups (experimental group and control group) and time within each group interactions (Time × Intervention) existed for anxiety sensitivity. The intervention (experimental or control) was regarded as between-subject factor, while time (pre-test or post-test) as within-subject factor. Statistical significance was established at $p < 0.05$ and the effect size was calculated with the Eta-Squared (η^2).

Results

To acquire evidence about the equivalence between the pre-test scores of the experimental and control groups with respect to the anxiety sensitivity, independent mean contrasts were performed using Student's *t*-test at the 95% confidence level. The data relating to these mean differences are presented in Table 2. First, Levene's test for homogeneity of variances was performed and revealed that it is not possible to assume equality of variances. However, given the evidence for the robustness of parametric analyses such as the *t*-test against violations of statistical assumptions (Montilla & Kromrey, 2010; Schmider et al., 2010), the results from the t-tests were still considered. The subsequent mean comparison revealed no significant differences in pre-test anxiety sensitivity between the control and experimental groups ($t = -0.80$, $p > 0.05$).

Thus, the data show that before the intervention, the control group and the experimental group started with an equivalent level of sensitivity to anxiety. To contrast possible differences between the pre-test and post-test scores in both the experimental and control groups, a *t*-test for related samples was used. The results of both intragroup comparisons are shown in Table 3.

Again, Levene's test indicates that it is not possible to assume homogeneity of variances in either group. The contrast of means in the experimental group revealed a significant decrease in post-test anxiety sensitivity compared to pre-test scores ($t = 11.25$, $p < 0.001$). That is, there was a significant decrease in the anxiety sensitivity in the post-intervention measure. Furthermore, the effect size (Cohen's $d = 0.80$) suggests a large effect.

The results obtained when comparing the pre-test and post-test scores for the control group also showed significant differences ($t = -12.25$, $p < 0.001$). In this case, on the contrary, there is an increase in the levels obtained in the post-test scores. That is, without any intervention, the anxiety sensitivity increased significantly in the control group. In terms of effect size, the difference between pre- and post-intervention scores was close to moderate ($d = 0.43$).

In addition, intergroup analyses were performed between the experimental and control groups with respect to the post-test using an independent-samples *t*-test to complement the first pre-test intergroup analysis. The evidence obtained is shown in Table 4.

After verifying that the assumption of homogeneity of variances was not met by means of Levene's test, we proceeded to compare the intergroup means. The data indicated a significant difference, with the experimental group showing lower anxiety sensitivity than the control group ($t = -25.49$, $p < 0.001$), which indicates that, unlike the results of the first test, in the second test, the group that participated in the intervention

Table 2 Pre-test intergroup analysis of anxiety sensitivity

Variable	Group	*M*	*SD*	*(t) p*
Anxiety sensitivity	Experimental	1.30	0.65	(−0.80) 0.21
	Control	1.36	0.56	

Table 3 Intragroup pre-test and post-test analyses of anxiety sensitivity in the experimental and control groups

		Experimental group				Control group			
Variable	Test	*M*	*DT*	*(t) p*	*Cohen's d*	*M*	*SD*	*(t) p*	*Cohen's d*
Anxiety sensitivity	Pre	1.30	0.65	(11.25)	0.79	1.36	0.56	(−12.25)	0.43
	Post	0.76	0.53	< 0.001		1.92	0.30	< 0.001	

Table 4 Intergroup analysis of anxiety sensitivity at post-test

Variable	Group	*M*	*SD*	*(t) p*	*Cohen's d*
Anxiety sensitivity	Experimental	0.76	0.53	(−25.49) < 0.001	0.48
	Control	1.92	0.30		

Table 5 Two-way mixed ANOVA results for anxiety sensitivity

	df	*F*	*p*	n^2
Between-subject effects				
Intervention	1	130.80	0.001	0.27
Error (intervention)	350			
Within-subject effects				
Time	1	0.058	0.810	0.00
Time × intervention	1	155.30	0.001	0.31
Error (time)	350			

shows a significantly lower value of sensitivity to anxiety. In terms of effect size, this difference between groups was moderate effect size ($d = 0.48$).

Later, a two-way mixed ANOVA was performed to evaluate the impact of the variables time (pre-test and post-test) and intervention (experimental group and control group) on anxiety sensitivity.

As shown in Table 5, there is no significant effect of time on anxiety sensitivity ($F = 0.06$, $p = 0.81$). That is, without considering the rest of the variables, there are no significant differences in anxiety sensitivity between the pre-test ($M = 1.33$, $SD = 0.04$) and post-test ($M = 1.34$, $SD = 0.03$) moments. On the contrary, there is a significant effect of the intervention on anxiety sensitivity ($F = 130.80$, $p < 0.001$, $\eta^2 = 0.27$), explaining 27% of the variance ($\eta^2 = 0.27$). If these statistically significant differences are analysed, it can be observed that they are in favour of the experimental group ($M = 1.03$, $SD = 0.026$) compared to the control group ($M = 1.64$, $SD = 0.046$). A significant interaction between time and intervention was found ($F = 155.30$, $p < 0.001$, $\eta^2 = 0.31$), explaining 31% of the variance.

Finally, statistical analyses revealed no significant gender differences among the participants.

Discussion

An intervention using mindfulness was carried out in a formal educational context with primary school students to reduce anxiety sensitivity and teach coping strategies. The results of this research provide evidence in favour of the effectiveness of the intervention, in accordance with Díaz-González et al. (2018), Dzido (2020), Gallego et al. (2016), Hervás et al. (2016), Maratos et al. (2024), Soriano et al. (2020), and Zhou et al. (2020), who noted the high rate of effectiveness of mindfulness in patients with symptoms of stress, anxiety or depression, given that it improves emotional well-being and reduces symptoms of perceived stress and even their anxiety. In addition, anxiety sensitivity is a useful construct in explaining anxiety disorders and through the review by Martínez-Escribano et al. (2017) it can be concluded that mindfulness-based interventions can be effective in children and adolescents with anxiety symptoms. Specifically, in the research by Yagüe et al. (2016), the subjects in the experimental group obtained a significant reduction in anxiety sensitivity measures in the post-test phase, which was not found in the control group. This is consistent with the studies conducted by Siegel (2017), psychiatrist and codirector of the Mindful Awareness Research Center, who showed that putting mindfulness practices into action activates certain neural circuits in the brain that allow a greater connection with oneself, promoting an increase in physical, psychological and social well-being (García & Rodríguez-Vega, 2019).

Statistical analyses supported the influence of the program and, therefore, confirmed the initial hypothesis. Furthermore, it was shown that the mindfulness intervention programme was beneficial, given that the anxiety sensitivity scores of the experimental group decreased significantly with respect to those of the control group. These results are related with the study of Yagüe et al. (2016) and the recent Arenilla's (2023) meta-analysis on the effectiveness of mindfulness intervention programmes in Spanish schools. Anxiety sensitivity is a predisposing factor for the development of anxiety disorders (Reiss, 1991), and the meta-analysis Borquist-Conlon et al. (2019) assessed the positive effects of mindfulness-based interventions (MBI) on cognition and mental health in children and adolescents, likewise that MBI are effective in young people with anxiety disorders.

The results were congruent with the theoretical basis of the study, in accordance with previous literature on the positive effects of these interventions in the school setting (Arenilla et al., 2022). Research revealed that the implementation of mindfulness-based interventions in schools could have benefited students in terms of their stress level (Yañez-Sepúlveda et al., 2022), prevent the emergence of potential mental difficulties among their students (McKeering & Hwang, 2019) and have positive effects on student anxiety (Bazzano et al., 2018; Strohmaier & Bailey, 2023), academic performance and the development of a good classroom climate (Bellver-Pérez & Menescardi, 2022). This research showed how a mindfulness-based intervention conducted in

the educational context, between the age of 6–12 years, and extended to the family context, might result in the reduction in anxiety sensitivity score, contrary to Strohmaier and Bailey (2023) who stated that there was no convincing evidence that mindfulness programmes in schools were effective, as they did not practice or implement what they learn in schools outside the classroom.

In conclusion, this study confirmed that mindfulness-based interventions with primary school students, of the Autonomous Community of Castilla-León in Spain, had an impact on the improvement of their anxiety sensitivity score. This study supports the idea that mindfulness programmes in schools can enhance socioemotional skills and promote emotional adjustment.

However, although mindfulness intervention programmes had been shown to have a positive effect on behavioural regulation (Dunning et al., 2019; Klingbeil et al., 2017), emotional intelligence (Maynard et al., 2017), executive functions and academic performance (Dunning et al., 2019; Klingbeil et al., 2017; Maynard et al., 2017), reviews of these programmes pointed to a high risk of publication bias. This bias could be explained by the widespread tendency to publish studies with significant results (Thornton & Lee, 2000). In addition, evaluation biases had been found, which might have been due to the diversity of instruments used (Arenilla et al., 2022).

Limitations and Future Directions

In future studies, in accordance with the impressions of Arenilla et al. (2022), it is necessary to increase the number of mindfulness intervention programmes using similar intervention designs (minimum number of sessions, duration of the intervention, appropriate spaces for its development, etc.), which will allow the results to be compared and replicated. It may be possible to design mindfulness programmes for children using virtual reality in the school context, as it has been proven useful in the adult population (Gentile & Kim, 2024). In addition, it is necessary to increase the number of participants in different types of schools in rural and urban areas, seeking to find significant and concrete differences in the impact of reducing anxiety sensitivity in the school context. Future studies should consider the potential influence of unexamined school-related variables. In addition, assessment of the mindfulness variable should be incorporated into future works. Finally, reading comprehension difficulties in younger participants (e.g., 6-year-olds) should be addressed by complementing paper-and-pencil tests with other assessments, such as teacher or parent reports (e.g. a test that could be answered by teachers or parents, such as an external informant). It is also necessary to confirm whether the improvements obtained in the experimental group are maintained over time.

Appendix

Description of a Typical Session

The teacher's session guide includes the following: first of all, an introduction that is a space in which the topic of the day is described to the students. Later, formal mindfulness practice that consists of a meditative type of activity, sitting or lying down, in which a specific and predetermined time is dedicated to focusing attention on a specific anchor point, such as the breath, body or senses, while observing and letting go of any mental phenomena that could lead to distraction, such as thoughts or emotions. Subsequently, class reflection worksheets were handed to guide the students. It is then carried out; informal mindfulness practice consists of meditation that is performed without adopting a specific meditation posture or dedicating a specific amount of time to it. It consists of being aware of what you are doing moment by moment, directing your attention towards some daily activity such as walking or getting dressed (Campayo, 2022). In addition, teachers have at their disposal a reflection worksheet who collect information about the answers given by the students during the reflection spaces after the practicals, as well as a space for observations. Finally, the students receive home practice instructions detailing the objective of the week, based on the theme of the session, with a description of the activity to be carried out at home (coinciding with the informal practice previously carried out during the class session). It is accompanied by a worksheet for carrying out this practice at home.

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Declarations

Ethics Statement This study involving a human population was authorized by the Department of Education of Castilla y León. This research has well as the approval of the management of the schools that participated in the study. The studies were conducted in accordance with local legislation and institutional requirement.

Informed Consent This research has informed consent of each family of each of the participants involved and the informed consent was obtained from all subjects involved in the study.

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Artificial Intelligence AI was not used.

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