Clínica y Salud (2021) 32(1) 23-28

Clínica y Salud

https://journals.copmadrid.org/clysa

# Effects of a Mindfulness Program for University Students

Jenny Moix, Marta Cladellas, Sílvia Gayete, Marina Guarch, Irina Heredia, Guillem Parpal, Alicia Toledo, David Torrent, and Adria Trujillo

*Universidad Autónoma de Barcelona, Spain*

ARTICLE INFO

*Article history:*
Received 10 January 2020
Accepted 23 July 2020
Available online 16 September 2020

*Keywords:*
Anxiety
Mindfulness
Mindful awareness
University students

A B S T R A C T

The aim of this study was to determine the effectiveness of a brief and flexible mindfulness program in reducing anxiety and increasing mindful awareness in psychology university students. The sample consisted of 72 psychology students who participated in four different studies. The first was a quasi-experimental study and the remaining three studies were randomized controlled trials (RCT). A mindfulness program was applied to intervention groups. Anxiety (STAI-T) and mindful awareness (FFMQ) were assessed before and immediately after the intervention. Anxiety was reduced and mindful awareness increased in the intervention groups ($p < .05$). In the three RCTs the magnitude of change (between groups) showed a moderate increase in mindful awareness in one study ($d = 0.68$) and a large increase in the remaining two ($d = 1.32$, 1.01), and as regards anxiety, large changes were observed in the three studies ($d = 0.80$, 1.04, 0.81). As a conclusion, this mindfulness program proved to be effective in reducing anxiety and increasing mindful awareness.

## Los efectos de un programa de mindfulness en estudiantes universitarios

*Palabras clave:*
Ansiedad
*Mindfulness*
Atención plena
Estudiantes universitarios

R E S U M E N

El objetivo de este estudio es determinar la eficacia de un programa de *mindfulness* breve y flexible para reducir la ansiedad y aumentar la conciencia plena en los estudiantes universitarios de psicología. La muestra comprende 72 estudiantes de psicología que participaron en cuatro estudios diferentes. El primero fue cuasi-experimental y los tres restantes fueron ensayos controlados aleatorizados (en inglés, RCT). Se aplicó un programa de *mindfulness* a los grupos de intervención. La ansiedad (STAI-T) y la conciencia plena (FFMQ) se evaluaron antes e inmediatamente después de la intervención. Se redujo la ansiedad y se incrementó la conciencia plena en los grupos de intervención ($p <. 05$). En los tres RCT la magnitud del cambio (entre grupos) mostró un aumento moderado de la conciencia plena en un estudio ($d = 0.68$) y un gran aumento de los dos restantes ($d = 1.32$, 1.01) y en lo que respecta a la ansiedad se observaron grandes cambios en los tres estudios ($d = 0.80$, 1.04, 0.81). Como conclusión, este programa de *mindfulness* demostró su eficacia en la reducción de la ansiedad y el aumento de la conciencia plena.

Evidence of the effectiveness of mindfulness programs is constantly increasing (Garcia-Campayo & Demarzo, 2018; Miró et al., 2011). Kabat-Zinn (1994) defines mindfulness as the awareness that springs from paying intentionally attention to experience exactly as it is perceived in the present moment, without judging it, without evaluating it, and without reacting to it. One of the fields in which the effectiveness of mindfulness programs is being demonstrated is the university setting (Bruin et al., 2015; De Vibe et al., 2013; Fuente-Arias et al., 2010; Gallego et al., 2014; Hindman et al., 2015; McConville et al., 2017; Yagüe et al., 2016).

Reduction of anxiety is one of the most observed benefits, and as such it is essential that mindfulness programs must be introduced into the academic field, since students—especially those in their first year—present high levels of anxiety (Balanza et al., 2009; Bayram & Bilgel, 2008; Bewick et al., 2010; Cardona-Arias et al., 2015; Martínez-Otero, 2014).

The aim of this research was to design and determine the effectiveness of a mindfulness program for first-year university students, based on three premises:

1. One of the reasons why students suffer from anxiety is lack of time. Nevertheless, programs often tend to take several weeks to complete. In the review carried out by McConville et al. (2017), 13 out of 18 studies assessed consisted of 8 o more sessions. In light of this, a brief program was designed, requiring only three sessions for completion.

2. Program effectiveness depends not only on the protocol itself, but also on how suitable this is as regards participants and instructors. A need for adaptable and flexible programs comes

Cite this article as: Moix, J., Cladellas, M., Gayete, S., Guarch, M. , Heredia, I. , Parpal, G., Toledo, A., Torrent, D., & Trujillo, A. (2021). Effects of a mindfulness program for university students. *Clínica y Salud, 32*(1), 23-28. https://doi.org/10.5093/clysa2020a24

Correspondence: Jenny.moix@uab.cat (J. Moix).

from this. Other studies have shown a need to adapt mindfulness programs for university students by including flexible elements in their sessions (Galante et al., 2018). A flexible program was therefore designed, in which a certain part of the protocol could be fully adapted to these characteristics, varying each time it was applied with different instructors and participants.

3. Focusing on a protocol may involve leaving the conceptual foundation of the program (Moix & Carmona, 2018). Consequently, the theoretical framework was highlighted. This consisted of the conception set out by Baer et al. (2006), which sees mindfulness as a set of five capacities: observing, describing, acting with awareness, non-judgement, and non-reactivity. The protocol was designed to specifically treat these five capacities in order to increase them.

Baer et al. (2006) administered five mindfulness questionnaires to two large samples of undergraduate students. Factor analyses from these questionnaires suggested that collectively they contain five facets of mindfulness: "observing", referring to a subject's ability to observe not only external stimuli (visual, auditory, tactile, etc.) but also to observe the effect of one's emotions on thought and behavior; "describing", referring to the ability to find suitable words to express feelings, sensations, and experiences; "acting with awareness", which is the ability to be present—and not on 'autopilot'—when performing any activity; "non-judgement", referring to the ability not to judge one's own emotions and thoughts; and, finally, "non-reactivity", being the ability not to act reflexively or instantly when experiencing certain thoughts or emotions.

Making up a protocol based on the premises of short duration, flexibility, and guidance through the conception set out by Baer et al. (2006) is a new approach that can help to introduce mindfulness within the university environment to a far greater extent than is currently the case.

More particularly, and bearing in mind the above considerations, the objective was to determine the effectiveness of a brief and flexible program based on the proposal of the five factors established by Baer et al. (2006) in order to reduce anxiety and increase mindful awareness.

## Method

### Participants

A total of 72 students participated in the global study. This consisted of a pilot quasi-experimental study without a control group and three experimental studies with a control group. In the three experimental studies, the participants were randomly assigned to the intervention group or the control group, balancing gender variable. All participants in the intervention groups completed the program. In the control groups, a total of three participants dropped out because of incompatibility with other activities.

All participants were first-year psychology students and the only criterion of exclusion was having previous experience in meditation.

The age and gender of all participants in the four studies are described in Table 1. There were no significant differences between intervention and control groups.

**Table 1.** Mean Age (*SD*) Values and Number of Female and Male Participants in Intervention and Control Groups

| | Intervention group | | Control group | |
|---|---|---|---|---|
| | Mean age (*SD*) | Female/male | Mean age (*SD*) | Female/Male |
| Pilot | 19.00 (1.18) | 7/4 | - | - |
| Study 1 | 19.20 (2.10) | 7/3 | 18.44 (0.73) | 7/2 |
| Study 2 | 20.25 (4.58) | 10/2 | 19.55 (3.39) | 10/1 |
| Study 3 | 18.20 (0.63) | 8/2 | 19.00 (1.00) | 7/2 |

### Instruments

The Spanish version of the two questionnaires was administered.

**Trait scale of the State-Trait Anxiety Inventory** (STAI; Spielberger et al., 1982). This scale contains 20 items with a Likert scale of 0-3 points. It presents a good test-retest reliability index (.87) and a high internal consistency ($\alpha$ = .90). Trait anxiety scores can range from 0 to 60 points. High scores indicate high anxiety.

**Five Facet Mindfulness Questionnaire** (FFMQ; Baer et al., 2006). This instrument evaluates personal disposition of awareness to daily life. It consists of 39 items grouped into five factors: observing, describing, acting with awareness, non-judgement, and non-reactivity. Validation of the Spanish version (Cebolla, et al., 2012) shows that the internal reliability of the scales ranges from acceptable to very good and that factor structure is the same as factor structure proposed by Baer et al. (2006). The first four dimensions are scored from 0 to 40 and the last (non-reactivity) is scored from 0 to 35. High scores indicate high mindfulness capacity.

**Semi-structured interview.** To obtain qualitative information from the intervention groups, a one-hour interview was conducted. The interview started with an initial question: "How do you feel compared to how you were before the program?". Changes concerning "anxiety" and "mindful awareness" variables were discussed during the interview.

### Procedure

Psychology students at the Universitat Autònoma de Barcelona (UAB), Spain, were recruited in four waves (2015/16, 2016/17, 2017/18, and 2018/19 academic years). Participation in the study was completely voluntary and there were no financial or academic incentives for participation. Once the nature of the study had been explained, participants signed an informed consent. The confidential and voluntary nature of participation was respected at all times. The study was adjusted to the ethical regulations of the degree-final projects at the UAB Faculty of Psychology. Once the research was completed, the possibility of attending the mindfulness program was offered to control groups subjects.

The pilot study (2015/2016 academic year) used a quasi-experimental pre-post design without a control group. The next three studies used a 2 (group: intervention, control) by 2 (time: baseline, post-treatment) mixed design with "group" as a between-subjects variable and "time" as a within-subjects factor. Intervention groups received the mindfulness program. The control groups did not receive any treatment. In the two groups, baseline assessment was carried out before the first session of the mindfulness program and post-treatment assessment was carried out three weeks later, immediately after completion of the program.

### Mindfulness Program

The mindfulness program consisted of three 120-minute weekly group sessions. The content of each session was focused on a different facet (Baer et al., 2006): observing, describing, acting with awareness, non-judgement, and non-reactivity. Homework consisted mainly of: a seated meditation with focus on breathing (5 min), mindfulness of routine activity, and 'three gifts' exercise (acknowledge three pleasant moments in the day).

The groups were led by three instructors. The main instructor for the program in the four studies was an expert in mindfulness who practised meditation regularly; the two assistant instructors were different in each study. The assistant instructors were psychology students in the last year of their degree and had been previously trained.

**Table 2.** Specific Session Content and Structure

| Session | Rationale | Structure |
|---|---|---|
| 1 | Mindfulness and its benefits<br>Observing: noticing or attending to internal and external experiences such as sensations, thoughts, or emotions. | Program orientation (welcome, intentions, ground rules, presentations)<br>Seated meditation with focus on breath (5')<br>Theoretical explanation<br>*Bonbon* exercise (eating meditation)<br>Sharing experiences with exercises<br>Explanation of homework |
| 2 | Describing: labelling internal experiences with words.<br>Non-judgement of inner experience: taking a non-evaluative stance toward thoughts and feelings. | Homework review<br>Seated meditation with focus on music (5')<br>Theoretical explanation<br>Exercise describing emotions<br>Each participant had to describe an emotion without naming it so that their peers could guess what it was.<br>Exercise: listening without interacting<br>In pairs, participants had to talk for five minutes to their partner, without answering, and observe what responses or interactions were suppressed.<br>Sharing experiences with exercises<br>Explanation of homework |
| 3 | Non-reactivity to inner experience: allowing thoughts and feelings to come and go, without getting caught up in or carried away by them.<br>Acting with awareness: focusing on one's activities in the moment as opposed to behaving mechanically. | Homework review<br>Theoretical explanation<br>Exercises for sharing strategies to avoid reacting<br>Each participant had to explain which everyday situations made it more difficult for them not to react. Discussion of strategies that could be implemented.<br>Forest exercise (movement meditation)<br>Sharing experiences with exercises |

The structure of the mindfulness program was the same throughout the four studies (Table 2). This fixed part of the program was carried out by the main instructor. Program flexibility was attained by allowing the assistant instructors—who were different in each study—to propose and take charge of certain exercises. For example, a musician played the piano in one of the studies to facilitate work on the "observing" scale by means of the music; in another, a painting was used with a similar goal.

Between the sessions, images with phrases related to the topics worked on were sent through WhatsApp to the whole group. This component of the program was also flexible, as these messages varied in each study. The phrases were chosen by the assistant instructors based on what the participants had expressed during the sessions.

## Data Analysis

STATA 13.1. for Windows was used.

To determine the effect of the program in the intervention group (of the four studies) the paired sample Students' t-test was used. Normal distribution between pre and post changes was checked for. In the few cases where distribution was not normal, the Wilcoxon non-parametric test was used.

To determine the presence of significant differences in the pre-post changes between the experimental and control groups (for the three experimental studies), the independent-sample Student's *t*-test was used. Homogeneity of variance and normal distribution in all analyses was checked for. Distribution was normal in all cases. As regards homogeneity of variance, in the few cases that this was not observed, the Welch test was used.

The clinical significance of observed changes within and between groups was assessed using effect-size estimates (Cohen's *d*).

As regards qualitative analysis, an interpretative subject analysis was performed on the information collected from the semi-structured interviews held for the intervention group. First, all interviews were transcribed and read in their entirety. Second, the information relating to the two main variables (anxiety and mindful awareness) was codified and organized. Subsequently, quotations that most represented the variables were selected. To improve rigor, a triangulation of the analysis was carried out by three researchers.

## Results

Tables 3, 4, 5 and 6 contain the results of the pilot study and of studies 1, 2, and 3, respectively.

Corresponding to the quasi-experimental study, Table 3 contains the median and standard deviation of each variable before and after intervention, differences, and Cohen's *d*.

**Table 3.** Pilot Study. Mean (*SD*) Values in Pre-treatment and Post-treatment Time Points. Differences between Means (Dif) and Size Effect (*d*)

| Variable | Intervention group ($n$ = 11) | | | |
|---|---|---|---|---|
| | Pre-test | Post-test | Dif | *d* |
| Anxiety | 24.18 (11.91) | 18.64 (6.86) | -5.54* | 0.57 |
| Mindfulness | 118.54 (20.51) | 135.36 (21.29) | 16.82* | 0.82 |
| Observing | 25.09 (4.37) | 30.55 (5.50) | 5.4* | 1.44 |
| Describing | 22.27 (5.83) | 23.45 (6.74) | 1.18 | 0.18 |
| Acting with awareness | 22.36 (5.71) | 25.00 (4.17) | 2.64 | 0.52 |
| Non-judgement | 24.55 (7.33) | 29.91 (6.88) | 5.36* | 1.03 |
| Non-reactivity | 24.27 (3.98) | 26.45 (5.50) | 2.18 | 0.45 |

*Note.* *d* = values 0.2 to 0.5 represent small changes, 0.5 to 0.8 moderate changes, and > 0.8 large changes.
*$p < .05$.

Table 3 shows that significant differences exist between pre and post intervention in the two variables studied (anxiety and mindfulness). An increase can be observed in all scales of the mindfulness questionnaire, reaching a significant level for "observing" and "non-judgement". As regards the magnitude of changes, these are moderate for anxiety and large for mindfulness.

In addition to the data from intervention groups, Tables 4, 5, and 6 contain data from control groups, differences between groups, and Cohen's *d* between groups.

As regards the intervention group, Table 4 reveals significant changes in anxiety and mindfulness between before and after the program, with large magnitudes of change. Differences between intervention and control groups are as expected in the two variables, but only reach a significant level in mindfulness. With respect to scales of mindfulness, there are significant increases throughout, except for "non-judgement". The fact that there are significant differences

**Table 4.** Study 1. Mean (*SD*) Values in Pre-treatment and Post-treatment Time Points in Intervention and Control groups. Differences between Means (Dif) and Size Effect (*d*) within Groups. Differences between Groups (Dif) and Size Effect between Groups (*d*)

| Variable | Intervention group (*n* = 10) | | | | Control group (*n* = 9) | | | | Differences between groups | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Pre-test | Post-test | Dif | *d* | Pre-test | Post-test | Dif | *d* | Dif | *d* |
| Anxiety | 23.40 (8) | 15.00 (3.43) | -8.4** | 1.36 | 26.11 (8.33) | 23.00 (9.06) | -3.11 | 0.36 | -5.29 | 0.80 |
| Mindfulness | 122.00 (14.45) | 142.50 (12.19) | 20.5** | 1.53 | 125.78 (22.88) | 125.78 (17.75) | 0.00 | 0.00 | 20.50** | 1.32 |
| Observing | 23.30 (6.15) | 29.70 (4.31) | 6.4** | 1.20 | 24.11 (6.31) | 25.78 (6.33) | 1.67 | 0.26 | 4.73* | 0.97 |
| Describing | 28.10 (6.28) | 30.30 (6.27) | 2.2* | 0.35 | 28.56 (7.14) | 28.00 (7.52) | -0.56 | 0.07 | 2.75* | 1.07 |
| Acting with awareness | 23.50 (5.58) | 30.40 (3.63) | 6.9** | 1.46 | 24.78 (4.55) | 24.89 (4.40) | 0.11 | 0.02 | 6.79* | 1.15 |
| Non-judgement | 25.90 (5.68) | 27.50 (4.45) | 1.6 | 0.31 | 26.56 (6.88) | 26.78 (5.76) | 0.22 | 0.03 | 1.38 | 0.22 |
| Non-reactivity | 21.20 (4.51) | 24.60 (3.56) | 3.4 | 0.83 | 21.78 (5.09) | 20.33 (4.58) | -1.44 | 0.30 | 4.84* | 1.03 |

*Note. d* = values 0.2 to 0.5 represent small changes; 0.5 to 0.8 moderate changes; and > 0.8 large changes.

**Table 5.** Study 2. Mean (*SD*) Values in Pre-treatment and Post-treatment Time Points in Intervention and Control groups. Differences between Means (Dif) and Size Effect (*d*) within Groups. Differences between Groups (Dif) and Size Effect between Groups (*d*)

| Variable | Intervention group (*n* = 12) | | | | Control group (*n* = 11) | | | | Differences between groups | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Pre-test | Post-test | Dif | *d* | Pre-test | Post-test | Dif | *d* | Dif | *d* |
| Anxiety | 20.17 (8.3) | 15.75 (7) | -4.42* | 0.58 | 21.91 (8.65) | 22.73 (8.99) | 0.82 | 0.09 | -5.24* | 1.04 |
| Mindfulness | 129.08 (20.97) | 143.83 (14.03) | 14.75* | 0.83 | 114.18 (17.67) | 113.27 (19.23) | -0.91 | 0.05 | 15.66* | 1.01 |
| Observing | 24.42 (6.27) | 29.08 (3.82) | 4.67* | 0.90 | 20.73 (6.23) | 20.64 (7.89) | -0.09 | 0.01 | 4.76* | 0.89 |
| Describing | 29.67 (5.16) | 31.92 (4.48) | 2.25 | 0.47 | 25.55 (6.93) | 25.45 (8.48) | -0.09 | 0.01 | 2.34 | 0.44 |
| Acting with awareness | 26.00 (5.94) | 26.92 (3.23) | 0.92 | 0.19 | 24.64 (7.39) | 24.00 (7.52) | -0.64 | 0.09 | 1.55 | 0.36 |
| Non-judgement | 28.17 (6) | 31.33 (5.25) | 3.17 | 0.56 | 24.67 (9.29) | 26.64 (7.72) | 2.00 | 0.23 | 1.17 | 0.24 |
| Non-reactivity | 20.83 (5.62) | 24.58 (5.04) | 3.75* | 0.70 | 18.64 (3.61) | 17.45 (4.39) | -1.18 | 0.29 | 4.93* | 0.96 |

*Note. d* = values 0.2 to 0.5 represent small changes; 0.5 to 0.8 moderate changes; and > 0.8 large changes.
$^{*}p < .05$.

in anxiety before and after in the intervention group, but these are not encountered when the intervention group and the control group are compared, is probably due to the fact that there is also a slight reduction in anxiety in the control group. As regards magnitude of change, large changes are observed in anxiety and mindfulness.

In the intervention group of study 2 (Table 5), significant changes between before and after can be observed in anxiety and mindfulness. As regards magnitude of change, this is moderate for anxiety and large for mindfulness. With respect to differences between control group and intervention group, these are significant. On the specific scales in the mindfulness questionnaire, significance is reached in "observing" and "non-reactivity". Cohen's *d* between groups shows large changes in anxiety and mindfulness.

As for the intervention group in study 3 (Table 6), significant changes are observed in mindfulness, with a moderate magnitude of change. These significant changes in the mindfulness variable are also observed between control and intervention groups. Significant changes are not observed in anxiety. Cohen's *d* between groups indicates large changes in anxiety and moderate changes in mindfulness.

All data obtained in the four studies draw attention to the same essential pattern: mindfulness is the variable that is always affected by intervention. Intervention groups show significant differences before and after in all cases. Similarly, significant differences are found between groups. In the three experimental studies, the magnitude of change indicates a moderate increase in one study and a large increase in the other two. Within the mindfulness variable, subjects present most changes in the "observing" scale. The other scales do not change to the same extent in different studies. As regards the anxiety variable, Cohen's *d* between groups from the three experimental studies indicates large changes. Significance of change in the intervention group before and after is observed for all the studies with the exception of the last, and significance between groups is observed only in study 2. In general, the results point to the fact that intervention leads to improvement, mainly in mindfulness, followed by the anxiety variable.

**Table 6.** Study 3. Mean (*SD*) Values in Pre-treatment and Post-treatment Time Points in Intervention and Control groups. Differences between Means (Dif) and Size Effect (*d*) within Groups. Differences between Groups (Dif) and Size Effect between Groups (*d*)

| Variable | Intervention group (*n* = 10) | | | | Control group (*n* = 9) | | | | Differences between groups | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Pre-test | Post-test | Dif | *d* | Pre-test | Post-test | Dif | *d* | Dif | *d* |
| Anxiety | 28.0 (9.65) | 24.3 (12.31) | -3.7 | 0.38 | 23.11 (13.95) | 25.44 (15.21) | 2.33 | 0.17 | -6.03 | 0.81 |
| Mindfulness | 121.6 (19.16) | 136.5 (23.03) | 14.9* | 0.70 | 108.78 (15.85) | 113.89 (15.67) | 5.11 | 0.32 | 9.79* | 0.68 |
| Observing | 25.5 (4.65) | 29.5 (5.13) | 4.0** | 0.86 | 20.56 (7.00) | 22.78 (7.68) | 2.22 | 0.32 | 1.78 | 0.56 |
| Describing | 28.3 (6.24) | 30.8 (5.85) | 2.5 | 0.40 | 24.33 (6.75) | 25.00 (6.46) | 0.67 | 0.1 | 1.83 | 0.34 |
| Acting with awareness | 23.6 (8.02) | 25.5 (5.91) | 1.9 | 0.24 | 18.11 (4.65) | 18.67 (3.87) | 0.56 | 0.12 | 1.34 | 0.29 |
| Non-judgement | 22.2 (7.66) | 27.4 (7.46) | 5.2 | 0.68 | 25.33 (5.68) | 25.89 (8.67) | 0.56 | 0.1 | 4.64 | 0.62 |
| Non-reactivity | 22.0 (5.05) | 23.3 (5.68) | 1.3 | 0.26 | 20.44 (5.10) | 21.56 (4.85) | 1.12 | 0.22 | 0.18 | 0.04 |

*Note. d* = values 0.2 to 0.5 represent small changes; 0.5 to 0.8 moderate changes; and > 0.8 large changes.
$^{*}p < .05$, $^{**}p < .01$.

**Table 7.** Quotes Referring to Each of the Variables

| | |
|---|---|
| Anxiety | "I'm more aware of myself and I can control my relaxation more and not get as nervous". (PS, Su1)<br>"Beforehand I got very anxious about studying, now I don't. I don't know. I have noticed a major change. I let things flow. I used to get very tense, I'd be exhausted, and I couldn't study because of headaches. That doesn't happen to me anymore. Like I said, I let things flow and I go with it". (S1, Su6)<br>"The course gave me great peace of mind". (S2, Su3)<br>"I have focused more on observing the feelings I have, my concerns, observing them without getting upset, but it has been hard. It isn't something that I had seen as a problem or as something that was causing me anxiety, but it was and now…it has helped me a lot." (S3, Su2) |
| Mindfulness | "They are just feelings…I notice them more. Before I was on automatic pilot and you lose out on pieces of life in general". (PS, Su6)<br>"I've realised that I have increasingly positive thoughts; I mean, I'm not as hard on myself and I don't judge myself for doing or not doing "x" things. I'm also more aware of the thoughts I have, and I find it much easier to identify and label them". (S1, Su9)<br>"Yesterday I was really stressed because I had a load of things to do. And I was doing them one after another, without thinking. I stopped and said –I'm on automatic pilot, I'm doing it all automatically without paying any attention-. And I said –stop and start again slowly. If you finish it today, you will but being really conscious of what you are doing". (S2, Su1)<br>"Above all I've noticed it in terms of the past, present and future. Before I used to think about the past and the future, and never about the present, and now I try to say: "okay, now I'm here, I'm here". (S3, Su3) |

*Note*. PS = pilot study; S1, S2, S3 = Study 1, 2, and 3; Su1, Su2, Su3...= Subject 1, 2, 3,...

Another result coinciding across all three experimental studies is that no significant differences were observed in any of the scales in the control groups.

As mentioned above, all participants in the intervention group were interviewed at the end of the program to provide additional information to available quantitative data.

Participants from the four studies revealed that they had benefitted from the program. To analyze the subjective experience of anxiety and mindfulness more specifically, quoted observations in which subjects referred more explicitly to these variables were marked.

Table 7 contains for each variable one of the quotes from each study by way of example.

Quotes collected in Table 7 are simply examples of subjective experiences from some participants. Subjective experiences are idiosyncratic in terms of their form. In other words, each participant probably lived the experience with different nuances. As such, these accounts are not generalizable. However, although the specific form of sensation experienced by each participant is unique, in its essence these experiences appear to point in the same direction, namely, a reduction in anxiety and an increase in mindful awareness.

## Discussion

The program designed was beneficial, as it reduced anxiety and increased mindful awareness.

In the intervention group, there is a reduction in anxiety after the program. This reduction is statistically significant in three of the studies. In the three studies with a control group, a difference between groups is observed as expected but it is statistically significant in only one of them. The magnitude of change (between groups) is large in the three RCT. These data, in addition to the qualitative information extracted from the interviews, lead us to the conclusion that the program was effective in terms of reducing anxiety. In the review by McConville et al. (2017), the authors perform a meta-analysis of 11 studies assessing anxiety on health-professional students. In this, effectiveness of mindfulness in reducing anxiety is demonstrated as in other studies (Hindman et al., 2015; Yagüe et al., 2016), supporting our results.

As regards mindful awareness, in the four studies a significant increase is observed in the intervention group, and significant differences are observed between intervention group and control group. The magnitude of change is moderate in one study and large in the others. In the interviews, participants described several examples that reflected this increase. All this appears to indicate the effectiveness of the program in increasing mindful awareness. These results corroborate results obtained by other studies evaluating mindful awareness through the FFMQ (Bruin et al., 2015; Hindman et al., 2015; McConville et al., 2017).

As regards the specific change in scores on the scales of mindfulness, it is observed that the scale modified to the greatest extent is "observing", consistent with the study by Coo and Salanova (2017) and Hindman et al., (2015). Likewise, in the research by De Vibe et al. (2013), the "observing" scale was one of two that showed significant changes. These results possibly indicate that the "observing" scale assesses a willingness or greater ability to learn. Taking performance of the five scales into account, a future re-designing of the program should place more emphasis on the four remaining scales in which less of an increase is observed.

It has been shown that the results point to the fact that intervention leads to improvement, mainly in mindfulness, followed by the anxiety variable. That is, some participants, despite having increased their mindfulness abilities, have not been able to reduce anxiety to the same degree. These results fit into the theoretical framework of mindfulness, as well as what is taught within the program used: to observe and accept emotions rather than to decrease them.

The program consisted of three sessions only and proved to be effective. This brevity may have contributed to the fact that none of the participants dropped out of the program, as occurred in other research studies (Franco et al., 2011). In the research by Coo and Salanova (2017), the program also consisted of three sessions and the results were similar, corroborating that programs can be both brief and effective. Such brevity may be an advantage for introducing mindfulness into highly demanding academic curricula.

The program was based on a protocol that provided a certain degree of flexibility. It varied in each study and benefits were observed in all four studies. Nevertheless, we cannot assert that this characteristic was the reason for program's effectiveness; if an identical protocol were always followed, the program might perhaps also show equally positive results. This flexibility also prevents us from knowing which specific elements in the program were responsible for its effectiveness; such a disadvantage, however, is present in any multi-component program. Authors' subjective feeling is that this type of flexibility serves to adapt to participants' characteristics to a greater extent, and particularly helps instructors to develop their creativity through proposing exercises. In doing so, they become more connected to the reality of the group.

Structuring the program following the proposal by Baer et al. (2006) with regard to the five facets of mindfulness showed itself to be effective. The fact that the program follows the same structure as the questionnaire through which the dependent variable of mindfulness was measured probably contributed to obtaining these results, since the program worked directly on what it sought to change.

Although the program has shown benefits, their duration in time has not been assessed, which is one of the main limitations to this current research. In future research, measurements would need to be taken at least one year after finishing the study.

Even though participants in each session were invited to carry out homework, adherence was not evaluated, which is another limitation. Data on adherence could have been useful to explain differences in the benefits obtained among participants.

Another limitation is the sample size of each study, which prevents us from asserting our conclusions with fuller certainty. However, we believe that having carried out four replications that produced similar results counteracts this limitation to some degree. Notwithstanding this, future studies with larger sample sizes are necessary.

Regarding the flexibility of the program, even though we consider it a positive aspect, it has the inconvenient that it makes it difficult to ensure instructors' adjustment to the protocol.

Another limitation is that the sample consists mainly of women; although this is representative of psychology students at the UAB, there is the need to be cautious when generalizing results to other degrees and disciplines for which gender ratio is different.

Similarly, in future research on this program it would be advisable to assess other variables relating to academic performance, since, as highlighted by other studies, this could be increased (McConville et al., 2017).

We hope that the results of this study contribute to opening university doors to mindfulness.

## Conflict of Interest

The authors of this article declare no conflict of interest.

## References


Baer, R., Smith, G., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*(1), 27-45. https://doi.org/10.1177/1073191105283504

Balanza, S., Morales, I., & Guerrero, J. (2009). Prevalencia de ansiedad y depresión en una población de estudiantes universitarios: factores académicos y sociofamiliares asociados [Prevalence of anxiety and depression in a population of university students: Academic and socialfamiliar associated factors]. *Clínica y Salud, 20*(2), 177-187.

Bayram, N., & Bilgel, N. (2008). The prevalence and socio-demographic correlations of depression, anxiety and stress among a group of university students. *Social Psychiatry and Psychiatric Epidemiology, 43*(8), 667-672. https://doi.org/10.1007/s00127-008-0345-x

Bewick, B., Koutsopoulou, G., Miles, J., Slaa E., & Barkham, M. (2010). Changes in undergraduate students' psychological well-being as they progress through university. *Studies in Higher Education, 35*(6), 633-645. https://doi.org/10.1080/03075070903216643

Bruin, E. I., Meppelink, R., & Bögels, S. M. (2015). A mindfulness-based intervention to increase resilience to stress in university students (the Mindful Student Study): A pragmatic randomised controlled trial. *Minfulness, 6*(5), 1137-1142. https://doir.org/10.1007/s12671-014-0364-5

Cardona-Arias, J., Perez-Restrepo, D., Rivera-Ocampo, S., Gómez-Martínez, J., & Reyes, A. (2015). Prevalencia de ansiedad en estudiantes universitarios [Prevalence of anxiety in university students]. *Diversitas: Perspectivas en Psicología, 11*(1), 79-89. https://doi.org/10.1186/1472-6920-13-107

Cebolla, A., García-Palacios, A. Soler, J., Guillen, V., Baños, R., & Botella, C. (2012). Psychometric properties of the Spanish validation of the Five Facets of Mindfulness Questionnaire (FFMQ). *The European Journal of Psychiatry, 26*(2), 118-126. https://doi.org/10.4321/S0213-61632012000200005

Coo, C., & Salanova, M. (2017). Mindfulness can make you happy-and-productive: A mindfulness controlled trial and its effects on happiness, work engagement and performance. *Journal of Happiness Studies, 19*(6), 1691-1711. https://doi.org/10.1007/s10902-017-9892-8

De Vibe, M., Solhaug, I., Tyssen, R., Friborg, O., Rosenvinge, J. H., Sørlie, T., & Bjorndal, A. (2013). Mindfulness training for stress management: A randomised controlled study of medical and psychology students. *BMC Medical Education, 13,* 107. https://doi.org/10.1186/1472-6920-13-107

Franco, C., Moreno, A., Salvador, M., & De la Fuente, M. (2011). Modificación de variables de personalidad mediante la aplicación de un programa psicoeducativo de conciencia plena (mindfulness) en estudiantes universitarios [Modification of personality variables through the application of a psychoeducational program of mindfulness in university students]. *Avances en Psicología Latinoamericana, 29*(1), 136-147.

Fuente-Arias, J., Franco-Justo, C., & Mañas, I. (2010). Efectos de un programa de entrenamiento en conciencia plena (mindfulness) en el estado emocional de estudiantes universitarios [Effects of a mindfulness training program on the emotional state of university students]. *Estudios sobre Educación, 19*, 31-52.

Galante, J., Dufour, G., Vainre, M., Wagner, A. P., Stochl, J., Benton, A., Lathia, N., Howarth, E., & Jones. P. B. (2018). A mindfulness-based intervention to increase resilience to stress in university students (the Mindful Student Study): A pragmatic randomised controlled trial. *Lancet Public Health, 3*, e72-e81. https://doi.org/10.1016/S2468-2667(17)30231-1

Gallego, J., Aguilar-Parra, J. M., Cangas, A., Langer, A., & Mañas, I. (2014). Effect of a mindfulness program on stress, anxiety and depression in university students. *The Spanish Journal of Psychology, 17,* 1-6. https://doi.org/10.1017/sjp.2014.102

Garcia-Campayo, J., & Demarzo, M. (2018). *¿Qué sabemos del mindfulness?* [What do we know about mindfulness?]. Kairos.

Hindman, R. K., Glass, C. R., Arnkoff, A. B., & Maron, D. D. (2015). A comparison of formal and informal mindfulness programs for stress reduction in university students. *Mindfulness, 6*(4),873-884. https://doi.org/10.1007/s12671-014-0331-1

Kabat-Zinn J. (1994). *Wherever you go, there you are: Mindfulness meditation in everyday life*. Hyperion.

Martínez-Otero, V. (2014). Ansiedad en estudiantes universitarios: estudio de una muestra de alumnos de la Facultad de Educación [Anxiety in university students: Study of a sample of students of the Faculty of Education]. *Revista de la Facultad de Educación de Albacete, 29*(2), 63-78. https://doi.org/10.17060/ijodaep.2014.n1.v1.392

McConville, J., Mcaleer, R., & Hahne, A. (2017). Mindfulness training for health profession students—the effect of mindfulness training on psychological well-being, learning and clinical performance of health professional students: a systematic review of randomized and non-randomized controlled trials. *Explore, 13*(1), 26-45. https://doi.org/10.1016/j.explore.2016.10.002

Miró, M. T., Perestelo-Pérez, L., Pérez, J., Rivero, A., González, M., De la Fuente, J., & Serrano, P. (2011). Eficacia de los tratamientos psicológicos basados en mindfulness para los trastornos de ansiedad y depresión: una revisión sistemática [Efficacy of psychological treatments based on mindfulness for anxiety and depression disorders: A systematic review]. *Revista de Psicopatología y Psicología Clínica, 16*(1), 1-14. https://doi.org/10.5944/rppc.vol.16.num.1.2011.10347

Moix, J., & Carmona, V. (2018). Los siete secretos mágicos de la efectividad terapéutica [The seven magical secrets of therapeutic effectiveness]. *Papeles del Psicólogo, 39*(1), 22-30. https://doi.org/10.23923/pap.psicol2018.2854

Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1982). *STAI: Cuestionario de ansiedad estado-rasgo* [State-trait anxiety questionnaire]. TEA.

Yagüe, L., Sánchez-Rodríguez, A. I., Mañas, I., Gómez-Becerra, I., & Franco, C. (2016). Reducción de los síntomas de ansiedad y sensibilidad a la ansiedad mediante la aplicación de un programa de meditación mindfulness [Reduction of anxiety symptoms and sensitivity to anxiety through the application of a mindfulness meditation program]. *Psychology, Society & Education, 8* (1), 23-37. https://doi.org/10.25115/psye.v8i1.545