Mindfulness' effects on undergraduates' perception of self-knowledge and stress levels☆

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ABSTRACT

In this study, mindfulness was applied in the university to help students reach a higher self-knowledge and reduce stress levels. The general goals are for students to identify their role in every situation and moment of their everyday routine and to teach them how to control their emotions, thus increasing their motivation and tolerance to frustration. The sample consisted of 64 students of Business Administration and International Business degrees. The method involved multiple sessions and exercises that took place for eight weeks. Using data from an initial questionnaire and a final, long-term questionnaire, this study assesses stress determinants. The conclusions indicate that participants' stress levels are up to 15% lower, and they feel more relaxed. Mindfulness is an additional tool for self-knowledge acquisition that increases motivation and enables analysis of the environment through a more objective viewpoint.

1. Introduction

Among emotional competences (Goleman, 1995), leadership is the art of influencing others to give up their personal goals and focus their efforts on the organisation's goals (Kotter, 1988). The development of emotional abilities and the continuous practice of mindfulness (Kabat-Zinn, Lipworth & Burney, 1985) reduce frustration resistance and improve resilience to overcome the barriers to the set goal.

Self-knowledge refers to the knowledge of the self, the set of ideas about who we are and how we behave (Goleman, 1995). Self-knowledge is the guide that helps us hone all kinds of social performance, control our rebellious

feelings, and keep us motivated. At the same time, it helps us correctly perceive the feelings of those around us and develop social skills related to the actions that help us succeed such as those essential for leadership and teamwork.

Over the past few years, research on mindfulness has been growing rapidly in relation to organizational psychology and organizational behavior (Bennett & Lemoine, 2014). In particular, two bodies of research have surged: one on intrapsychic processes of full individual attention and the other on the social processes of conscious collective attention (Sutcliffe, Vogus, & Dane, 2016). Mindfulness is a meditation technique that enables one to be in the moment and to be aware of the

present. Mindfulness is a skill that all human beings have, but ignore; therefore, learning that skill is possible. Mindfulness focuses on a stimulus, breathing, the smell, the surrounding sounds, body sensations, people who are talking to us, what we are eating, and so forth. Kabat-Zinn (2003) aims at transmitting mindfulness as a state of mind in which we are aware of ourselves, trying to transform us and build us; in other words, mindfulness is about getting to know ourselves better.

Notably, personal development's importance has been growing over the last few years. That development has brought positive aspects such as communication improvement, ITC development, higher life standards, and greater information access. Personal development has increased people's incentives to grow by themselves and to adapt to new and rapid changes in a flexible way. However, personal development has also had negative consequences such as an increase in illnesses, pollution, and the number of political malpractices, hence the importance of analyzing negative and positive variables. Sušnik and van der Zaag (2017) identify a significant two-way causality between the Human Development Index and three variables: politics, economy, and society. This idea suggests a strong feedback that policy-makers may exploit. In addition, L. Popescu, Iancu, Vasile, and Popescu (2018) studied a negative consequence of human development under the impact of economic, political and social factors, namely stress and burnout. Where they had relied on the Maslach Burnout Inventory

(MBI).

2. Review of the literature

A part of self-knowledge is emotional awareness. Research stresses the importance of helping children to develop their emotional awareness, which is necessary in order to delve into other emotional competences (Bar-On & Parker, 2000; Ciarrochi, Chan, Caputi, & Roberts, 2001; Freedman, Jensen, Rideout, & Freedman, 1998; Goleman, 1995; Mayer & Salovey, 1993, 1995, 1997; Mayer, Caruso, & Salovey, 1999; Saarni, 1990, 1993, 1997, 2000; Salovey & Sluyter, 1997; Shapiro, 1997; Stone-McCown, Freedman, Jensen, & Rideout, 1998). Cooper and Sawaf (1997) developed a measure of emotional intelligence based on Salovey and Mayer's (1990) model. Their model comprised 62 variables that represent the dimensions of the model and they used a factor analysis to assess 346 participants' responses. Their variables measured attention to feelings, clarity of feelings, mood improvement, optimism, impulse control, and first year pre-university qualifications, among others. Their results show greater improvements for women, which supports previous research on emotional abilities.

Emotional awareness allows being aware of and identifying emotions and moods as they appear, which helps their management and redirection (Averill & Thomas-Knowles, 1991; Gardner, 1983, 1998; Salovey & Mayer, 1990; Shepard, Fasko, & Osborne, 1999). Our feelings are always with us, but they are rarely the focus of attention. Analyzing emotions would allow for a fuller and more subtle experience before they appear in full force. People who cannot recognize their feelings are at a disadvantage (Goleman, 1995).

Lyubomirsky and Nolen (1995) focus on developing sympathy, trust and personal development capabilities. However, in "Mindfulness-based stress reduction and health benefits," Grossman, Nieman, Schmidt, and Walach (2004) drew their studies from meta-analysis. Their study drew on a sample of 64 students, although the total amount of quality reports is 20, and their results support the relationship between physical and mental pain and their variables. Also, Klein, Babey, and Sherman (1997) detected that people who made self-descriptiveness judgments about trait words were no faster than people who performed a control task to subsequently retrieve behavioral memories about the same traits. Therefore, these trait judgments and behavioral retrieval are mediated by functionally independent memory systems.

Stress has been a highly relevant topic both for scientists in general and for doctors due to its effects on human behavior. Stress affects physical and mental health, and school and job performance. According to Martínez and Díaz (2007, p.11), "the underlying problem refers to the demands of modernity, which focus on results and ignore the effects on quality of life and hence on people's physical and mental health." Human beings should learn to manage or prevent stress to reach wellbeing and avoid health risks. Typically, stress generates sleep disorders, causing drowsiness, higher need for sleep and even nightmares (Martínez & Díaz, 2007). This situation leads to an excessive tiredness for a long period of time even with the adequate amount of sleep, and to a lack of energy and initiative. Stress also causes eating disorders such as higher need for food or the opposite, a lack of appetite. This uneasiness with oneself leads to higher irritability levels, whereby the person needs to be alone. On the other hand, that state of mind generates physical alterations such as increased heart rhythm, trembling, higher breathing rate, headaches, and itchiness (Rossi, 2001).

Regarding personal purpose, previous studies analyze from a cognitive perspective the stress' effects on the brain. D'Argembeau et al. (2010) analyzed the neural bases of the sample during the simulation of future events. The individuals undergo a scanning process while they imagine events related to their personal goals and plausible future events unrelated to those goals. Their results indicate that images of future personal events cause a stronger activation in the medial prefrontal cortex and the posterior cingulate cortex (PCC) in comparison to images of non-personal future events.

Multiple bodies of research related to leadership, wellbeing, and leadership development programs include leadership psychology, organizational development, and stress reduction based on mindfulness (Brendel, Hankerson, Byun, & Cunningham, 2016). Neuroscientists state that chronic stress reduces cognitive capacity and renders meta-cognitive exercises like full attention training ineffective for many (Rodgers & Kettering, 2017). This study uses a sample of 147 people and tests an intervention using tools to regulate stress response before involving metacognitive stress management techniques. Three weeks into the program, participants show a higher score in conscious attention, while wellbeing and training explained 16% of the variation in the test score.

This study aims at applying mindfulness to a university class to confirm the relationship between mindfulness and self-knowledge. First, a pilot program applying mindfulness to the class ensures the objective interpretation of the results. The second part of the program, consisting of four hour-long sessions (one per week) with university students (n = 74) shows the effectiveness of mindfulness as a tool to deal with stress (Shearer, Hunt, Chowdhury, & Nicol, 2016).

The program's aims are: (1) to help students learn their role at all times in any everyday situation, (2) to teach students to control their emotions and impulses, thus increasing their tolerance to frustration, and (3) to help them perceive the present to develop strategies to achieve their goals.

3. Method and hypotheses

Regarding the method, the study is descriptive given the mediation level of the variables; the technique for gathering the data was a questionnaire. An initial and final questionnaire allowed identifying any variations in the variables under study. Through the self-knowledge and stress evaluation tests, participants assessed their emotional competences on self-knowledge and symptoms.

H1. The activities of the mindfulness program in the university classroom increase the student's self-knowledge.

H2. Higher self-knowledge levels reduce anxiety and increase wellbeing.

H3. Students' self-knowledge development increases their self-motivation.

Following Kabat-Zinn (2003), the program comprised four hour-long sessions focused on student's individual development through practice. Other studies had applied mindfulness programs to a sample of business executives and managers (Rodgers & Kettering, 2017).

The program took place from September 18 to October 31, 2017. The activities of the program included introductory breathing exercises, formal and informal mindfulness practice, meditation guidelines, body balance exercises, and muscular relaxation techniques. The goal was to help students understand the concept and importance of mindfulness so that they could autonomously apply this technique to their everyday life.

During the first session, the students received the initial self-knowledge and stress evaluation test. At the beginning of each session the students performed a breathing exercise, which they also performed at home. The last session consisted in obtaining the final conclusions, both the individual and collective ones. The students received a new self-knowledge and stress evaluation test and they perform the nominal group technique. The goal was to obtain information about participants' opinion: areas for improvement, suggestions, new ideas, sensations, and so forth. The last part of the study comprised the analysis and comparison of the results. Table 1 shows a summary of the exercises performed during the program.

The self-knowledge and stress evaluation test consisted of two parts. The first part included 26 variables related to individual knowledge and role consciousness and the second part comprised nine variables related

Table 1
Summary of sessions of the mindfulness program.
Source: Own elaboration.

Sessions	Activities
Session 1	■ Introduction to the program. ■ Initial long-term self-knowledge and stress evaluation test. ■ Exercises on breathing control. Exercise 1: Basic breathing "sitting with breathing and the body." Exercise 2: "sitting with the sound." Exercise 3: "Sitting in everyday life." Exercise 4: "Sitting with thoughts and feelings."
Session 2	■ Routine breathing exercise. Exercise 1: Basic breathing: "sitting with breathing and the body." ■ Extra breathing exercise. Exercise 2: "sitting with the sound." ■ Jacobson's progressive muscular relaxation practice.
Session 3	■ Meditation in breathing. ■ Practice difficulties during the week. ■ Informal mindfulness. ■ Introduction to body exploration practice. ■ Body scan. ■ Plenary. ■ End of session with a short three-minute focus on breathing.
Session 4	■ Meditation in breathing and the sounds. ■ Experiences during the week. Conscious dialog in pairs (10 min) and a plenary. ■ Introduction to *metta* meditation ■ Metta meditation: compassion. ■ Plenary about compassion. Group definition of the concept. ■ Conscious stretching. ■ Plenary. End of cycle. Participants' conclusions. ■ End of session with a three-minute focus on breathing
Session 5	■ Routine breathing exercise. Exercise 1: Basic breathing: "sitting with breathing and the body." ■ Extra breathing exercise. Exercise 2: "Breathing in everyday life." ■ Jacobson's progressive muscular relaxation practice. ■ Learning to meditate.
Session 6	■ Meditation in breathing and the sounds. ■ Experiences during the week. Conscious dialog in pairs (10 min) and a plenary. ■ Introduction to *metta* meditation ■ Metta meditation: compassion. ■ Plenary about compassion. Group definition of the concept. ■ Conscious stretching. ■ Plenary. End of cycle. Participants' conclusions. ■ End of session with a three-minute focus on breathing.
Session 7	■ Routine breathing exercise. Exercise 1: Basic breathing: "sitting with breathing and the body." ■ Extra breathing exercise. Exercise 4: "Sitting with thoughts and feelings". ■ Guided mindfulness meditation practice. Visualization of the video created.
Session 8	■ Self-knowledge and stress evaluation test. ■ Nominal Group Technique (TGN). ■ Relaxation technique: Mindfulness.

Table 2
Variables of the self-knowledge and stress evaluation test.
Source: Own elaboration based on STAI, Spielberger et al. (2008).

Behavior and role awareness

V1. I am an enthusiastic and energetic person who is eager to enjoy every situation.
V2. When I encounter a problem, I usually blame others or the situation.
V3. I have the need to be surrounded by people and to be advised.
V4. I seldom have negative thoughts (e.g., I am going to fail at this, I will never achieve that)
V5. I perceive my feelings and emotions without having to react to them.
V6. I am good at finding the words to describe my feelings and emotions.
V7. I criticize myself for having irrational or inappropriate emotions.
V8. I perceive my feelings and emotions without needing to respond to them.
V9. I do not pay any attention to the tasks I perform, I do them hastily and automatically.
V10. I lack self-confidence.
V11. I enjoy being in contact with others.
V12. Disillusions affect me so much I cannot forget them.
V13. When I face a problem, I avoid arguing.
V14. Uneasiness and impossibility to relax and calm down.
V15. I get distracted easily.
V16. Feeling undecisive and trying to set problems aside to solve them at another time. Taking a lot of time in making a decision.
V17. Performance problems, I find it difficult to speak in public, deadlines stress me.
V18. Aggressiveness feelings or higher irritability in the event of conflict.
V19. Being especially sensitive. People hurt your feelings easily.
V20. I lose opportunities because I cannot decide quickly
V21. I find it difficult to face the crises or problems.
V22. When I have perturbing thoughts or images I judge myself as good or bad according to the content.
V23. My job and family activities are usually very routine-based.
V24. I am a highly perfectionist person.
V25. I am aware at all times and I adapt easily to every role.
V26. I define my everyday life as exciting.

Symptoms

S1. Drowsiness higher need for sleep. Sleeping disorders: nightmares.
S2. I am prone to suffering from eating disorders (loss of appetite, higher need for food)
S3. Being excessively tired over a long period of time even with the right amount of sleep and not feeling rested
S4. Irritability. You need to be alone without anybody bothering you.
S5. Need to sigh, tension, tight chest and shortness of breath.
S6. Increased heart rhythm, trembling, excessive perspiration, and so forth. Tight chest.
S7. Tendency to suffering headaches or migraines, digestive discomfort.
S8. Scratching, biting my nails, rubbing myself, and so forth.
S9. Lack of energy and initiative. You need to use all your energy reserves to perform everyday tasks

two blocks.

4. Results

The study employed a sample of 64 students Business Management and Administration and International Business at the Universidad de Alcalá (Spain). The average age was between 21 and 22 years old; 75% (=48) were women and 25% (=16) were men.

The comparison between the initial and final tests of self-knowledge and stress showed that the variables with the greater variation were the following:

I find it difficult to face the crises or problems (54.8%), *Performance problems, I find it difficult to speak in public, deadlines stress me* (50%), *Being especially sensitive. People hurt your feelings easily* (48.5%), *I criticize myself for having irrational or inappropriate emotions* (46.9%), *Aggressiveness feelings or higher irritability in the event of conflict* (45.4%), *Do not pay any attention to the tasks I perform* (42.2%), *I seldom have negative thoughts* (e.g., *I am going to fail at this, I will never achieve that*) (42.2%), *Uneasiness and impossibility to relax and calm down* (40.7%), *I perceive my feelings and emotions without needing to respond to them* (40.6%). Regarding symptoms variables: *Being excessively tired over a long period of time even with the right amount of sleep and not feeling rested* (48.6%), *Irritability. You need to be alone without anybody bothering you*

to symptoms. The tests were in Spanish because the program took place in the Universidad de Alcalá (Spain) and the majority of the participants were Spanish. Some Erasmus students received English versions of the test, but the program remained the same.

The assessment of the variables consisted of a Likert scale where 1 = not at all, 2 = to a small extent, 3 = to a moderate extent, 4 = to a great extent. This scale is the most common in the Social Science and market research (Dawes, 1975; Lee Rasmussen, 1989). The goal of the section about behavior and role consciousness was to understand the participant as an individual and his or her behavior under particular circumstances. The topics covered enthusiasm, negative thinking, feelings about being alone, relationship with others, avoiding problems, getting distracted, and so forth. The symptoms section had a medical approach and aims to identify pathologies that the participants may develop under situations of high stress. The variables of the test draw from the State-Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch, & Lushene, 2008). A factor analysis of the main components allowed the grouping of the variables into five components, thus facilitating their analytic comprehension. Table 2 shows the variables that form these
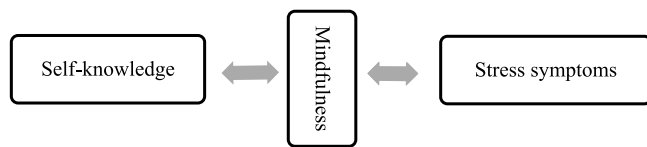
Fig. 1. Tested relationship.

(45.3%), *Lack of energy and initiative. You need to use all your energy reserves to perform everyday tasks* (42.2%). On the other hand, the following variables had experienced small or no changes: *I enjoy being in contact with others* (7.8%)*, When I face a problem, I avoid arguing* (6.2%)*, My job and family activities are usually very routine-based* (1.6%)*, I am a highly perfectionist person* (3.8%)*, I am prone to suffering from eating disorders* (*loss of appetite, higher need for food*) (3.9%). Fig. 1 shows the different groups together with the group of variables according to their variation percentage.

In sum, the variable with the highest variation (54.8%) was *I find it difficult to face the crises or problems*. This result also showed a higher tolerance to frustration. Furthermore, variable (42.2%) *I seldom have negative thoughts* (e.g., *I'm going to fail at this, I will never achieve that*) and *I lack self-confidence* (26.6%) refer to the improvement of positive thinking and the development of participants' self-motivation. Variable

I perceive my feelings and emotions without needing to respond to them (40.6%) refers to the improvement of self-knowledge, and variable *I am aware at all times and I adapt easily to every role* (35.9%) reflects the student's role awareness and perception of the present.

After the data analysis, the next step was the factor analysis of main elements. The creation of five large groups allows distributing the elements according to the percentage of variation between the first and final tests. This procedure involved the five variables for self-knowledge and role awareness: (1) self-management of emotions and thoughts, (2) facing problems and motivation, (3) decision-making and effect on feelings, (4) waste of time and distractions, and (5) accurate self-assessment. The procedure involved the rotation method Varimax. Table 3 shows the rotated matrix and the corresponding variation percentage.

Table 4 presents the variables that correspond to each component after performing the rotated matrix.

Self-management of emotions and role acceptance comprises variables 6, 7, and 25; the results indicated a variation relationship. Participants improved their ability to express their feelings, and they were not so self-critical. In addition, participants were aware of every moment and cannot adapt easily. Therefore, these variables showed that one of the main goals of this study, role and present awareness, improved (Fig. 2).

Facing problems and motivation consists of variables 2, 4, and 21.

Table 3
Rotated component matrix.
Source: Own elaboration.

	Component				
	1. Self-management of emotions and thoughts	2. Facing problems and motivation	3. Decision-making and impact on feelings	4. Waste of time and distractions	5. Accurate self-evaluation
V. 25	0.675				
V.7	−0.641				
V.6	0.556				
V.2		0.665			
V. 21		0.587			
V. 4		0.584			
V. 13			0.559		
V.20			0.546		
V. 17			0.544		
V. 19			0.527		
V. 15				0.737	
V. 16				0.623	
V. 26					0.650
V. 8					0.613
V. 22					0.611
% variation	8.816	8.153	8.061	7.831	7.763

Table 4
Factor analysis of the variables.
Source: Own elaboration.

| Components	Variables	Results
Self-management of emotions and acceptance of role.	V.25: I am aware at all times and I adapt easily to every role.	0.675
	V.7: I criticize myself for having irrational or inappropriate emotions.	−0.641
	V.6: I am good at finding the words to describe my feelings and emotions.	0.556
Facing the problems and motivation.	V.2: When I encounter a problem, I usually blame others or the situation.	0.665
	V.21: I find it difficult to face the crises or problems.	0.587
	V.4: I seldom have negative thoughts (e.g., I'm going to fail at this, I will never achieve that).	0.584
Decision-making and effects on feelings.	V.13: When I face a problem, I avoid arguing.	0.559
	V.20: I lose opportunities because I cannot decide quickly.	0.546
	V.17: Performance problems, I find it difficult to speak in public, deadlines stress me.	0.544
	V.19: Being especially sensitive. People hurt your feelings easily.	0.527
Waste of time and distractions.	V.15: I get distracted easily.	0.737
	V.16: Feeling undecisive and trying to set problems aside to solve them at another time. Taking a lot of time in making a decision.	0.623
Accurate self-representation.	V.26: I define my everyday life as exciting.	0.650
	V.8: I perceive my feelings and emotions without needing to respond to them.	0.613
	V.22: When I have perturbing thoughts or images I judge myself as good or bad according to the content.	0.611
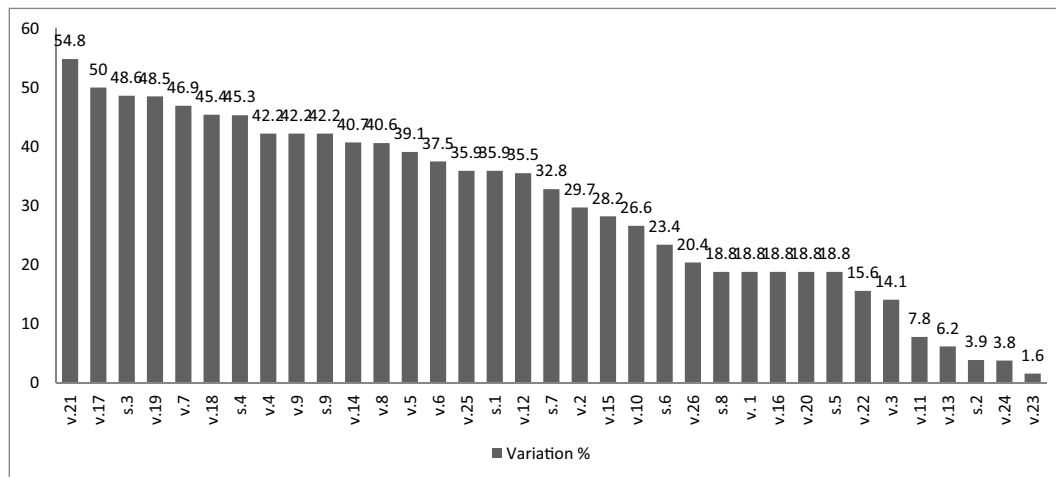
Fig. 2. Variables' variation percentage.
Source: Own elaboration.

These variables relate to facing continuous everyday problems and motivation. Participants' attitude changed positively and they face their problems instead of blaming others; that is, they assume their responsibility.

The variables that form *decision-making and effects on feelings* are variables 13, 17, 19, and 20. In this case, the variables refer to decision-making and performance. The results showed an improvement in participants' awareness of the opportunities lost due to fear of the new. In this case, the variables deal with decision-making and task performance. Their inexperience made participants insecure; therefore, they became aware of their role and improved their conflict-resolution capacity.

Waste of time and distraction comprises variables 15 and 16, which showed the existence of a variation in distractions and time waste when performing an activity or taking a decision.

Finally, *accurate self-evaluation* comprises variables 8, 22, and 26. These variables showed that participants were able to perceive, observe, accept, and ignore a circumstance. They did not criticize and martyrize themselves when they failed at something. Thus, they were able to accept their role without judging themselves and they learnt to control their emotions and moods so that they do not affect their personal goals.

5. Conclusions

This study applied an eight-session mindfulness program in the university classroom to assess whether this practice increased self-knowledge (Goleman, 1995) and reduced stress levels. The quantitative results showed a reduction of stress levels of 15%. The results showed that participants slept better and had higher energy levels to face the day. In addition, most had ceased to suffer eating and sleeping disorders.

On the other hand, the variables with higher changes were those that dealt with reducing negative thinking and generating a more positive life attitude that increased motivation and awareness of the present, so they could understand their role. Finally, participants showed an improved ability to face problems and responsibilities, overcoming obstacles and excuses that prevented them from making every effort to reach their goals.

At the beginning, participants experienced tension with small everyday problems that had relative relevance, which made them waste time and opportunities. However, 10% of participants experienced an improvement, while 36% of participants gained awareness of the present and of the role to fulfill their personal purpose. Furthermore, 29,7% became more self-critical.

The descriptive and factor analyses showed a correlation between self-knowledge and stress reduction, where the variables *I seldom have negative thoughts* (e.g., *I'm going to fail at this, I will never achieve that*) and *I find it difficult to face the crises or problems* coincided in both analyses. A higher self-knowledge and lower stress levels may lead to higher self-motivation and perseverance in goal achievement. However, changes in some variables were small or non-existent, as in *interpersonal relationships improvement, self-control of anger, everyday life changes,* or *perfectionating task performance.*

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