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Mindfulness and its relationship to academic achievement among university students

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The primary objective of this study was to assess the degree of mindfulness among university students based on their gender and academic achievement level. To accomplish this, the Five Facet Mindfulness Questionnaire (FFMQ) was employed, consisting of 39 items categorized into five factors: observation, description, acting with awareness, nonjudging, and nonreactivity. The questionnaire was initially translated into Arabic and applied to a pilot sample of 60 male and female students to assess item characteristics and verify the validity and reliability of the scale. Following the finalization of the questionnaire, it was administered to a cluster sample of 489 male and female students from public universities. The results indicated a moderate level of mindfulness across all five domains, with no significant gender differences. Furthermore, the study revealed that students with higher academic achievement displayed greater mindfulness. However, the relationship between mindfulness and academic achievement was weak, explaining less than 1% of the variance in academic performance.

KEYWORDS

questionnaire of the five factors of mindfulness, mindfulness, universities, students, achievement

Introduction

In the past decade, the concept of mindfulness has gained significant popularity at the individual, university, and organizational levels due to its importance as a fundamental skill in the workplace. Mindfulness is a crucial factor for enhancing an individual's focus and reducing distractions, which can lead to increased productivity and improved overall performance. Additionally, mindfulness practices have been shown to alleviate stress by promoting mental clarity and calmness, suppressing negative thoughts, and stimulating creative ideas. These attributes are highly sought after by universities and companies as they strive to promote peak performance and well-being among their students and employees.

Baer et al. (2006) defined mindfulness as a mental state that allows individuals to concentrate on the present moment, the surrounding environment and the activities they are engaged in without being distracted by past or future events. This state is often associated with meditation practices and involves accepting things as they are. Kabat-Zinn (1994) and Van Dam et al. (2018) characterized mindfulness as the act of paying attention in a specific way, without intention and with non-judgmental awareness of the present moment. In contrast, Walsh (1980) has defined mindfulness as a "system of awareness."

Mindfulness has also been considered a psychological state. Brown and Ryan (2004) described it as a state of heightened awareness and alert attention to everything happening in the present moment. Similarly, Cardaciotto et al. (2008) defined mindfulness as a state in which

individuals are aware of their internal and external experiences and accept them without judgment.

Moreover, Mindfulness has been conceptualized in various ways in the academic literature. Some researchers view it as a psychological feature that comprises attitudes and abilities, thereby characterizing it as a developmental trait (Ritchhart and Perkins, 2000). Others view mindfulness as a technique that can be practiced and developed over time through various means such as relaxation, meditation, yoga, and so on. According to this view, the cultivation of mindfulness can lead to significant improvements in mental well-being within a relatively short period, with some estimates suggesting an 8-week period of practice (Shapiro et al., 2008). Kabat-Zinn and Hanh (2009) has applied the concept of mindfulness in the context of health through the development of the mindfulness-based stress reduction (MBSR) program, which is designed to help individuals cope with psychological stress. The program involves the practice of mindfulness through meditation and clearing the mind.

The importance of mindfulness

Mindfulness holds immense significance and finds its application across a wide range of therapeutic interventions, spanning medical and psychological domains. Its primary objective is to alleviate stress and tension while fostering a positive sense of self-acceptance. Moreover, mindfulness serves as a therapeutic approach to addressing disabilities and disorders, and it also functions as an educational strategy. Research suggests that individuals with heightened mindfulness exhibit enhanced creative problem-solving abilities (Stoops, 2005).

Furthermore, mindfulness contributes to an individual's concentration and self-confidence, fostering a sense of control and management of one's surroundings, and enhancing one's sense of life's meaning by facilitating a broader exploration of life. It also works on the development of emotional regulation through its focus on the development of metacognitive awareness and the enhancement of attentional abilities (Davis and Hayes, 2011). Mindfulness has been used as a preventive treatment against depression (Al-Zubaidi, 2012) and assists in practicing self-regulation resulting from focusing attention and awareness of the interactive effects of mental processes. It enables these processes to become subject to the control of the mind (Shapiro et al., 2008) and contributes to providing insight into patterns of thinking, emotions, and interaction with others, allowing the choice of appropriate responses instead of habitual automatic responses (Parto and Besharat, 2011).

Mindfulness and achievement

The potential relationship between mindfulness and achievement has been the subject of investigation in numerous studies, providing insights into the potential benefits of mindfulness practices for enhancing academic performance and overall success in higher education. Extensive research suggests that mindfulness may have a positive influence on academic achievement by enhancing cognitive and emotional processes (MacKenzie et al., 2019). Studies have indicated that mindfulness is associated with improvements in attention and concentration (MacKenzie et al., 2019), enhanced working memory (Mrazek et al., 2013), and reduced mind wandering (Mrazek et al., 2012). These cognitive enhancements play a crucial role in effective learning and information processing, resulting in better academic outcomes.

Furthermore, mindfulness practices have demonstrated the potential to reduce stress and enhance psychological well-being among university students (Shapiro et al., 2007). By cultivating self-awareness and promoting stress reduction, mindfulness may enable students to effectively cope with academic challenges, manage test anxiety, and improve overall mental health, indirectly contributing to academic achievement.

Several studies have explored the association between mindfulness and academic performance in the university setting. For example, a meta-analytic review by Schutte and Malouff (2019) found a small-to-moderate positive correlation between mindfulness and academic performance, drawing upon the synthesis of findings from multiple studies. Additionally, a systematic review by MacKenzie et al. (2019) examined the link between mindfulness and academic performance in undergraduate students, identifying various empirical studies that supported a positive association between mindfulness and academic outcomes, including grade point average, exam performance, and overall academic success.

In addition to its potential benefits for academic achievement, mindfulness has also been found to have significant benefits for mental health. University students often experience high levels of stress, anxiety, and depression, which can have a negative impact on academic performance and overall well-being. Mindfulness practices have been shown to reduce symptoms of anxiety and depression (Hofmann et al., 2010) and improve emotional regulation (Garland et al., 2015), suggesting that they may be an effective tool for promoting mental health in university students.

While these studies indicate a promising relationship between mindfulness and achievement at the university level, further research is required to establish causal links and understand the underlying mechanisms. Moreover, investigating the effectiveness of mindfulness-based interventions specifically tailored for university students could provide valuable insights into practical applications aimed at enhancing academic achievement.

It is important to acknowledge that the nature of the relationship between mindfulness and achievement may vary among individuals and across different contexts. Factors such as the specific mindfulness practices employed, the duration and intensity of practice, and individual differences may influence the strength and consistency of this relationship.

Mindfulness and gender

Some evidence suggests that mindfulness may exhibit gender differences, although the findings are not entirely consistent. Several studies have investigated potential gender variations in mindfulness and reported mixed results. For example, a study by Hölzel et al. (2011) examined gender differences in mindfulness among a large sample of participants and found that women exhibited slightly higher levels of mindfulness compared to men. Similarly, a study by Zhang et al. (2016) also reported that females scored higher on measures of mindfulness than males. However, it is important to note that other studies have not found significant gender differences in mindfulness.

For instance, Carmody and Baer (2008) found no significant gender variation in mindfulness among a sample of meditators.

Overall, while some studies suggest potential gender differences in mindfulness, the findings are inconsistent across all studies. Further investigation is required to understand the nature and extent of gender-related variations in mindfulness.

Measuring mindfulness

Measuring mindfulness involves the use of various assessment tools and methodologies, drawing on both self-report and objective measures. Self-reported measures typically include well-established questionnaires and scales that capture individuals' subjective experiences of mindfulness. The Five Facet Mindfulness Questionnaire (FFMQ) developed by Baer et al. (2006) and the Mindful Attention Awareness Scale (MAAS) by Brown and Ryan (2004) are examples of widely used self-report measures in the field. These measures assess different facets of mindfulness, such as the ability to pay attention to the present moment, non-judgmental awareness, and the acceptance of experiences.

In addition to self-report measures, objective measures were also employed to complement and validate self-reported data. These objective measures include behavioral observations, where researchers observe individuals' mindful behaviors during specific tasks or activities.

Overall, the integration of self-report measures, behavioral observations, and physiological indicators provides a more comprehensive understanding of mindfulness. These diverse measurement approaches enable researchers and practitioners to assess mindfulness and its effects on various aspects of human functioning, including well-being, cognitive processes, and emotional regulation.

Study problem and questions

The present study addresses a problem that has emerged from the researcher's observations during his recent years of teaching academic courses. Specifically, many students display poor concentration in lectures and a clear weakness in their ability to follow up during lectures, often forgetting to perform homework and not bringing the necessary materials, such as pens, notebooks, and calculators. This issue has been similarly observed by a group of fellow teachers. When asked about the reason for these behaviors, students often cited forgetfulness or lack of attention during lectures. This problem has a direct negative impact on the academic performance and achievement of students. Consequently, the researcher seeks to investigate the levels of mindfulness among University of Jordan students and their relationship with academic achievement, particularly given contradictory findings in the existing literature. Thus, this study aims to answer the following research questions:

- What are the levels of mindfulness among University of Jordan students?
- Do the levels of mindfulness among University of Jordan students differ by gender and academic achievement?
- What is the predictive capacity of mindfulness in predicting academic achievement among University of Jordan students?

The importance of the study

The theoretical importance of this study appears to be that it is one of the studies that deals with the concept of mindfulness and its levels among university students, as it will contribute to providing an analysis and theoretical framework on the concept of mindfulness and provides theoretical data and information about its levels among students of different sexes and different levels of achievement, in addition to providing information about the correlation between mindfulness and academic achievement and the difference in their achievement explained by alertness.

One of the primary reasons for studying mindfulness among university students is its potential impact on academic achievement. Numerous studies have shown that mindfulness practices can improve cognitive functioning and academic performance. A study conducted by Schonert-Reichl et al. (2015) found that mindfulness training significantly improved executive functioning and working memory in elementary school students. Similarly, a meta-analysis by May et al. (2014) revealed that mindfulness interventions have a small but significant positive effect on academic achievement. These findings suggest that mindfulness training may be a valuable tool for enhancing the cognitive functioning and academic performance of university students.

The practical importance of this study is that it forms a basis for prompting teachers at the university to pay attention to mindfulness, so that it becomes one of the focus areas of their interest in academic courses, such as critical thinking and creative thinking, as a method for raising students' abilities to focus and reflect, which is reflected in their academic achievement. in addition to dealing with other programs. Academic counseling is a method for treating underachieving students who suffer from academic problems and is subject to supervision. This study also contributes to the guidance of teacher preparation programs.

Methods

Population and sample

The study was conducted at the University of Jordan during the first semester of the academic year 2022/2023, and the population comprised all undergraduate students, estimated to be 55,000 individuals. The sample for this study, consisting of 489 students, was selected using the cluster method. The sample size was determined based on the guidelines provided by Krejcie and Morgan (1970) with a Confidence Level of 95%. Among the selected participants, 107 were male, and 382 were female, representing various colleges within the university.

Measuring mindfulness with the FFMQ

The Five Factors of Mindfulness Questionnaire (FFMQ) is a self-rating scale used to measure mindfulness. The questionnaire

was developed by Baer et al. (2006) through a factorial analysis of various mindfulness measures, including the Kentuky Inventory of Mindfulness Skills (KIMS), Freiburg Mindfulness Checklist (FMI), Mindful Attention Awareness Scale (MAAS), Cognitive and Affective Mindfulness Scale (CAMS), and Southampton Mindfulness Questionnaire (SMQ). The FFMQ has been standardized for use in different societies, including Korean, Swedish, Norwegian, Chinese, Spanish, Dutch, Italian, Portuguese, French, Japanese, Argentine, Mexican, and others, and has been found to have good validity and reliability (Karl et al., 2020).

The FFMQ consists of 39 items that are distributed across five factors: observe, describe, act aware, non-judgment, and non-reacting with inner experiences. Observe represents the ability to attend to internal and external experiences, describe refers to the ability to describe these experiences with words, act aware represents conscious actions, non-judgment represents the absence of evaluative judgments of inner experiences, and non-reacting refers to the ability to let thoughts and feelings come and go without becoming preoccupied with them.

The FFMQ items are answered on a five-point Likert scale ranging from "not completely applicable" to "completely applicable." The questionnaire contains both positively and negatively worded items, with higher scores indicating greater mindfulness. The development of the FFMQ involved exploratory and confirmatory factor analyses with sample sizes of 613 and 268, respectively. The initial sample included 112 items from the previous mindfulness measures, and as a result of the analysis, 39 items were selected for inclusion in the final version of the questionnaire (Baer et al., 2006).

Psychometric properties of FFMQ in original version

According to Baer et al. (2006), the FFMQ questionnaire has good content validity because its items were derived from previously established mindfulness scales that have been thoroughly reviewed by expert judges (FMI, MAAS, SMQ, CAMS, and KIMS). Construct validity was assessed by examining the correlation coefficients between the FFMQ and the other measures. Positive correlations were found with emotional intelligence and self-compassion scales, which are similar to the mindfulness trait. Negative associations were observed with dissociation and thought suppression measures.

To assess the reliability of the FFMQ, Cronbach's alpha coefficient was computed for each dimension of the questionnaire. The non-reacting with inner experiences and observation dimensions had Cronbach's alpha coefficients of 0.75 and 0.87, respectively, while acting consciously had a coefficient of 0.87, description had a coefficient of 0.91, and non-judgment had a coefficient of 0.87. Additional indicators of reliability were obtained by administering the questionnaire to four different samples: meditators, non-meditators, the general population, and university students. Cronbach's alpha coefficients ranged from 0.72 to 0.92 (Baer et al., 2006).

Validity and reliability of the FFMQ in this study

An Arabic translation of the initial version of the questionnaire was prepared and reviewed by three translation specialists and nine educational psychology experts. Subsequently, a pilot study was conducted on a sample of 20 male and female students to ensure the clarity of the questionnaire items, instructions, and linguistic expressions as well as to estimate the response time. The final version of the questionnaire was administered to a separate sample of 70 male and female students, who were not included in the study sample, to obtain measures of validity and reliability. The construction validity of the questionnaire was assessed by calculating the correlation between each item and the total score, as shown in Table 1.

According to Table 1, all items in the questionnaire were deemed acceptable, as their correlation coefficients were greater than 0.3, which is consistent with Thorndike's (1982) criterion. Additionally, the internal consistency of the questionnaire was examined using internal correlation coefficients between the five dimensions. The corresponding coefficients are listed in Table 2.

Table 2 illustrates that all dimensions of the questionnaire showed positive and statistically significant correlation coefficients, with the highest correlation coefficient found between description and acting with awareness ($r = 0.60$, $p < 0.05$). Additionally, all dimensions demonstrated significant correlations with the total score of the questionnaire, ranging from 0.65 to 0.81.

Furthermore, the reliability of the questionnaire was assessed by estimating the internal consistency coefficient using Cronbach's alpha as well as by evaluating the test–retest reliability. Table 3 presents the results of these analyses.

Table 3 presents the reliability values of the scale, which were deemed acceptable according to Hambelton's (1985) criteria, as the stability coefficient should exceed 0.7, which is considered acceptable.

Results

Table 4 shows that the arithmetic means for the domains of mindfulness ranged from 2.68 to 3.51, all of which are moderate. The observation domain had the highest mean score of 3.51, while the non-judgment domain had the lowest mean score of 2.68. The overall level of mindfulness, as assessed by the scale, was found to be at a moderate level, with a mean score of 3.10.

To examine the significant differences according to gender and achievement, a multivariate analysis of variance (MANOVA) was performed, utilizing Hotelling's Trace test for gender and Wilk's Lambda test for academic achievement at a significance level of $\alpha = 0.05$. The results of MANOVA are presented in Table 5.

Table 5 shows that there were no statistically significant differences in the total degree of mindfulness due to the gender variable at the significance level (0.05); differences in dimensions exist only in the dimension of nonjudging and in favor of males. The table also indicates that there are differences in the total degree of mindfulness due to the variable level of achievement and on all dimensions except for non-reactivity, and these differences are in favor of those with high achievement.

TABLE 1 Corrected item-total correlation for 39 items of the questionnaire (N=60).

Item#	r	r	Item#	r	Item#	r	Item#	r	Item#	r	Item#
1	0.60	0.58	33	0.60	25	0.53	17	0.37	9	0.58	33
2	0.62	0.51	34	0.51	26	0.64	18	0.49	10	0.51	34
3	0.44	0.37	35	0.50	27	0.55	19	0.43	11	0.37	35
4	0.52	0.55	36	0.45	28	0.49	20	0.61	12	0.55	36
5	0.53	0.49	37	0.52	29	0.49	21	0.65	13	0.49	37
6	0.50	0.59	38	0.45	30	0.52	22	0.58	14	0.59	38
7	0.52	0.55	39	0.53	31	0.54	23	0.39	15	0.55	39
8	0.51	0.58	33	0.49	32	0.41	24	0.59	16	0.58	33

TABLE 2 Correlation matrix between the five facet mindfulness questionnaire (FFMQ) domains and total score (N=489).

	Nonjudging	Describing	Nonreactivity	Observing	Total score
Acting with awareness	0.43*	0.60*	0.43*	0.38*	0.76*
Nonjudging		0.52*	0.48*	0.40*	0.65*
Describing			0.56*	0.51*	0.81*
Nonreactivity				0.54*	0.73*
Observing					0.69*

*$p < 0.05$.

Mindfulness has been positively associated with academic achievement among students. Studies have shown that practicing mindfulness can enhance cognitive processes, attention regulation, and working memory, which are critical for effective learning and academic performance (Moore and Malinowski, 2009; Keng et al., 2011). Furthermore, mindfulness interventions have been found to reduce test anxiety and improve students' ability to manage stress, allowing them to focus better on their studies and perform optimally in academic settings (Chiesa et al., 2011; Hölzel et al., 2011).

The findings of the current study are consistent with those of previous research, which has shown a positive correlation between mindfulness and academic achievement. This is not surprising, given the components of mindfulness, such as observation, description, and conscious action, which require high levels of concentration and are typically more accessible to individuals with higher levels of achievement. The results of the current study indicate that high achievers outperformed low achievers on the mindfulness questionnaire and its dimensions, except for a lack of interaction with internal experiences. These results suggest that mindfulness may be a predictor of academic achievement.

Table 6 presents the results of a simple regression analysis conducted to explore the relationship between the cumulative average of the students and their level of mindfulness. The analysis revealed a statistically significant, yet weak correlation coefficient between the two variables ($r = 0.133$, $p < 0.05$), according to the design proposed by Guilford (1973). Moreover, the explanatory power of mindfulness in predicting students' cumulative averages, which accounted for only 1% of the total variance, was low, as indicated by Cohen's (1988) standard. This finding implies that mindfulness is a poor predictor of academic achievement among university students. Therefore, the simple regression equation is as follows:

$$\hat{y} = -3.42 + 0.102\,(\text{mindfulness}).$$

Discussion

The present study's findings are in line with prior research indicating that mindfulness tends to increase with age, as evidenced by previous studies conducted by Weinstein et al. (2009), Hashem (2017), and Davis and Humphrey (2012). As undergraduate students are still in their teenage years, it is expected that their mindfulness level will be average. Moreover, the academic and life pressures that this group faced may have reduced their concentration abilities and self-awareness, leading to a decrease in mindfulness. The present findings support the medium level of mindfulness reported in previous studies conducted by Hashem (2017) and Walidy (2017), but contradict the high level of mindfulness reported by Al-Zubaidi (2012).

The results also indicated that gender did not have a significant effect on mindfulness level. This may be attributed to the university's acceptance criterion, which is based on academic achievement rather than on gender. This finding is consistent with previous studies conducted by Al-Mamouri and Abd (2018), Salahat and Al-Zaghoul (2018), Shaheen and Rayan (2019), Al-Buhairy et al. (2014), and Tan and Martin (2016), which found no significant differences in mindfulness based on gender. However, this finding is in contrast to Abdullah's (2012) study, which found significant gender differences in favor of females, as well as Shambuliyya (2019) and Issa's (2018) studies, which found significant gender differences in favor of males.

TABLE 3 Reliability coefficients using Cronbach alpha and test–retest (*N*=60).

	Cronbach alpha	Test–retest reliability
Acting with awareness	0.87	0.84
Nonjudging	0.72	0.84
Describing	0.770	0.87
Nonreactivity	0.74	083
Observing	741.0	0.79

TABLE 4 Means and standards deviations for FFMQ domains and total score.

	Mean*	St deviation	Level of mindfulness
Observing	3.51	1.02	Moderate
Describing	3.42	0.87	Moderate
Nonjudging	3.14	0.98	Moderate
Nonreactivity	2.68	0.96	Moderate
Total	3.16	0.96	Moderate

*(1–2.33) low level of mindfulness, (2.34–3.66) moderate, and (5–3.67) high.

Regarding the dimensions of the questionnaire, the present study found significant gender differences in the observation domain, with females exhibiting higher scores. This finding is in line with previous research conducted by Lilja et al. (2019), Salahat and Al-Zaghoul (2018), and Al-Buhairy et al. (2014) which also reported significant gender differences, favoring females in the observational dimension. In addition, the current study revealed significant gender differences favoring males in the dimensions of description and lack of interaction with internal experiences; however, no significant gender differences were found in the dimensions of acting with awareness and non-judgment.

However, it is important to note that not all studies have found gender differences in mindfulness practice and outcomes. For example, one study found no gender differences in self-reported mindfulness or the effects of a mindfulness intervention on stress reduction (Greeson et al., 2011).Overall, while some evidence suggests that women may be more likely to engage in mindfulness practices and report greater benefits, further research is needed to better understand the nature and extent of gender differences in mindfulness and their underlying mechanisms.

While some studies have found that individuals who achieve higher levels may approach mindfulness practices differently and derive greater benefits from them, others have found no significant differences in mindfulness between high- and low-achieving individuals. For example, one study found no significant differences in mindfulness, as measured by the Five Facet Mindfulness Questionnaire (FFMQ), between high- and low-achieving college students (Sears and Kraus, 2009). Similarly, a study of high-achieving athletes found no significant differences in mindfulness, as measured by the Mindful Attention Awareness Scale (MAAS), between high- and low-achieving athletes (De Petrillo et al., 2009). Another study found that mindfulness was positively associated with academic achievement, as measured by grade point average (GPA), but this relationship was partially mediated by study habits and coping strategies, suggesting that other factors may be at play (Johnson et al., 2013).

The results of this study are consistent with research results indicating a relationship between mindfulness and academic achievement. The literature reports significant discrepancies and inconsistencies in findings concerning this association, particularly when relying on self-reported academic achievement measures, which may suffer from inflated levels of accuracy. Shaw et al. (2009) highlighted that students with high or low mindfulness tended to overestimate or underestimate their academic achievement levels when measured by self-perceptions. Therefore, they stressed the need for new studies that employ robust assessments to measure the relationship between achievement and mindfulness instead of relying on self-reported data, which may hinder the accurate prediction of this relationship same as what happened in Shaw et al. (2009) examined academic mindfulness and achievement and calculated academic achievement based on students' self-estimates of their grades in school.

However, it is important to note that not all studies have found consistent associations between mindfulness and achievement. For example, one study found no significant differences in mindfulness between high- and low-achieving students as measured by GPA (Martín-Asuero et al., 2014). Overall, while there is some evidence to suggest that individuals who achieve higher levels may approach mindfulness practices differently and derive greater benefits from them, further research is needed to better understand the nature and extent of these differences.

Recent experimental research has attempted to fill this research gap regarding the relationship between mindfulness and academic achievement. Frank et al. (2017) conducted a study on the link between mindfulness and academic performance in a school yoga program that included mindfulness exercises. They measured academic performance through grades in math and English; however, the results did not indicate a significant change in grades after the intervention. However, student absenteeism from lectures without excuses significantly decreased in the experimental intervention group. Additionally, research conducted by Bakosh et al. (2016) on academic grades before and after mindfulness intervention found improvements in reading and science grades, with 54% of the variance explained in reading and an additional 5% in science grades. Some high-quality experimental studies have shown that interventions designed to increase mindfulness in students can enhance relevant cognitive abilities related to academic achievement such as reading comprehension and working memory (Napoli et al., 2005; Corbett, 2011). There is also some evidence that mindfulness can enhance academic achievement, but there is no direct evidence that mindfulness in itself is linked relation to academic performance. In addition, some randomized and quasi-experimental designs have shown an increase in vocabulary and grades in pre-kindergarten and kindergarten classes (Thierry et al., 2016) and an increase in reading grades in third grade (Bakosh et al., 2016). An improvement in math achievement in the fourth and fifth grades was also shown in a study by Schonert-Reichl et al. (2015). Two quasi-experimental studies also found that elementary and middle school students' standardized math scores improved (Nidich et al., 2011).

TABLE 5 Results of the Hotelling and Wilkes Lambda test and multivariate analysis of variance for the averages on the five dimensions of the questionnaire, and the total score according to the variables of gender and achievement.

	Domains	Sum of squares	df	Mean of squares	*F*	*p*
Gender Hotelling's Trace = 2.999 $p = 0.007$*	Acting with Awareness	1.577	1	1.577	1.756	0.186
	Nonjudging	4.672	1	4.672	5.297	0.022*
	Describing	0.420	1	0.420	0.555	0.457
	Nonreactivity	0.950	1	0.950	1.055	0.305
	Observing	1.278	1	1.278	1.292	0.256
	total	0.394	1	0.394	1.405	0.236
Achievement level Wilks' Lambda = 2.190 $p = 0.001$*	Acting with Awareness	30.888	4	7.722	8.598	0.00*1
	Nonjudging	16.315	4	4.079	4.624	0.001*
	Describing	11.937	4	2.984	3.939	0.004*
	Nonreactivity	4.607	4	1.152	1.280	0.277
	Observing	10.071	4	2.518	2.546	0.039*
	total	8.536	4	2.134	7.615	0.001*

*$p < 0.05$.

TABLE 6 Results of a simple regression analysis of mindfulness on the university cumulative average (Achievement).

	Unstandardized b	*T* value	*F* value	Cor	Explained variance	Sig
Constant	3.420*	37.62*	6.88	*0.133	0.018	*0.00
mindfulness	*0.102	2.62*				

*$p < (0.05)$ dependent variable: mindfulness.

Recommendations

Based on the findings of this study, it is recommended that further experimental research should be conducted to explore the correlation between mindfulness and academic achievement, especially by collecting student achievement data through university admissions and registration rather than relying on self-reported data, as self-esteem tends to inflate achievement values.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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