



Research Article

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The Relative Contribution of Mindfulness and Gratitude in Predicting Happiness among University Students

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Abstract

The present study aims at identifying the separate and interactive contribution of gratitude and mindfulness in predicting happiness; examining the relationship between these variables; identifying differences between students with high happiness and students with low happiness in gratitude and mindfulness; and identifying the levels of gratitude, mindfulness, and happiness among the students of Princess Nourah Bint Abdulrahman University. The research sample consisted of 447 female students aged 18-25 years. The research instruments included the Toronto Mindfulness Scale, the Oxford Happiness Questionnaire, as well as the Gratitude, Resentment, and Appreciation Test-Short form. The study found out that gratitude and mindfulness had a significant contribution in predicting happiness among university students (31% and 41.5%, respectively). The interaction between the total scores of mindfulness and gratitude contributed 51.5% of the variance in happiness among university students. The interaction between mindfulness, sense of abundance, and simple appreciation contributed 54.4% of the variance in happiness among university students. The study found a positive correlation between mindfulness, gratitude (sense of abundance, simple appreciation, appreciation of others), and happiness. Additionally, it was found that students at Nourah Bint Abdulrahman University had moderate levels of mindfulness and moderate to high levels of gratitude and happiness. The sense of abundance domain was moderate, the simple appreciation domain was high, and the appreciation of others domain was moderate. Mindfulness, gratitude, sense of abundance, simple appreciation, and appreciation of others increased among the students with high happiness.

Keywords: Gratitude, Sense of abundance, Mindfulness, Happiness, University students

1. Introduction

Based on the Saudi Vision 2030 and enhancing a healthy lifestyle according to the Quality of life program 2020, Princess Nourah Bint Abdulrahman University seeks to enhance the psychological health and university life quality of its students through the Happiness, Positivity, and University Life Quality Enhancement Initiative among the university's affiliates. It creates a positive and happy university environment that takes "happiness means productivity and change" as a slogan and endorses benevolence, satisfaction, and gratitude as its values. Therefore, Princess Nourah Bint Abdulrahman University's administration is keen to observe the real levels of happiness, positivity, mindfulness, and gratitude among its students. Additionally, the Healthy Cities Program in the Ministry of Health coordinated a consultative meeting with the World Health Organization team and Nourah Health team represented by the program's mental health committee to discuss the establishment of a mental health observatory and to develop a strategy for promoting the students' health (@PNU_Live, 2020).

The present study aims at identifying the levels of gratitude, mindfulness, and happiness among Princess Nourah Bint Abdulrahman University students. It also aims at identifying the separate and interactive contribution of gratitude (emotional) and mindfulness (cognitive) in predicting happiness among university students; examining the relationships between these variables; defining differences between students with high happiness and students with low happiness in gratitude and mindfulness. This topic falls within the domain of positive psychology.

Happiness falls under the umbrella of positive psychology, which argues that the individual has internal strengths and weaknesses that determine one's life (AlAbdaely, 2018). It is defined as a state of internal equilibrium accompanied by several positive emotions, such as satisfaction, joy, and pleasure, which are connected to life's core aspects, e.g., social relationships, family, and work (Al-Enzi, 2001). A happy individual has positive energy and tends to be more active, passionate, and lively compared to less happy individuals (Csikszentmihalyi and Hunter, 2003).

Seligman, Steen, Park, and Peterson (2005) focus on psychological interventions that increase one's happiness and make life more meaningful. They gave an overarching vision to reach sustainable happiness that includes psychological well-being. This step was the first in developing a real happiness theory into the Well-being Theory. Well-being can be explained through two general perspectives: *The hedonic approach* focuses on happiness and defines well-being in terms of attaining pleasure and avoiding pain, whereas *the eudaimonic approach* emphasizes meaning and self-awareness and determines well-being in terms of the level one fully functions with (Ryan and Deci, 2001).

According to the Broaden-and-Build Theory, positive emotions broaden people's thinking and allow them to build psychological, intellectual, and social resources. Positive emotions, especially gratitude, may also play a role in stimulating individuals' engagement in positive behaviors that leads to their improvement (Armenta, Fritz, and Lyubomirsky, 2017). It was shown that grateful thinking improves the individual's temperament (Watkins, Woodward, Stone, and Kolts, 2003).

In this regard, Safaria (2014) found out that gratitude was the most predictive variable of happiness among university students as it was rated 58%. Gratitude can be defined as a feeling of thankfulness and appreciation of a benefit one receives. Trait gratitude is the tendency to experience this state (Basha and AbdAlstr, 2015; Watkins et al., 2003). Gratitude includes a sense of abundance (SOA), which refers to the absence of feeling deprived and a general appreciation of life in general; appreciation of others (AO) as the feeling of others' contribution to one's achievements or well-being; and simple appreciation (SA) or the ability to appreciate or think about small things; full awareness of the present moment, and admiration of nature, beauty or life (Simons et al., 2020).

Thus, happiness can be understood as an emotion that was developed to stimulate individuals to move towards stimuli that facilitate survival or reproductive success. Gratitude developed with respect to our strong tendencies toward mutual altruism, which helps individuals stay in positive contact with others in small social groups (Geher and Wedberg, 2019).

Gratitude is a moral emotion equal to other moral emotions such as empathy and guilt. Individuals typically experience gratitude when they feel the benevolent acted to enhance their

psychological well-being. Thus, gratitude can be illustrated as a moral barometer – a response to others' noble manners. Gratitude drives beneficiaries to participate in pro-social behavior (moral motive). Also when one's gratitude is expressed to the benevolent, it motivates the benevolent to act in a more pro-social manner in the future (moral incentive) (Basha and AbdAlstar, 2015; Froh et al., 2011; McCullough, Kilpatrick, Emmons, and Larson, 2001).

Measuring and developing happiness, mindfulness, and gratitude among the youth is important for several reasons, including association with positive emotional functioning (Froh et al., 2011). In other words, a happy person is young, healthy, open-minded, optimistic, married with great self-esteem, functional morale, free of anxiety, and religious with modest requirements, of either gender (Diener, Suh, Lucas, and Smith, 1999). Peterson, Ruch, Beermann, Park, and Seligman (2007) pointed out that gratitude was the strongest predictor of life satisfaction in an American sample. Additionally, the therapeutic interventions based on mindfulness and gratitude are effective in limiting depression and tension and increasing happiness (Leary, 2015). Mindfulness is linked to better mental health, the ability to self-soothe when feeling upset, resilient responses to distress, and awareness of one's emotional state (Basha, 2018).

Mindfulness can be defined as the ability to listen and become aware without making judgments or avoidance in the present moment (Brown and Ryan, 2008). It is also a targeted specific concern at the present moment free of prejudice and judgments (Fakhri, Bahar, and Amini, 2017). Mindfulness is significantly correlated to gratitude, and both gratitude and perceived support mediate the relationship between mindfulness and mood (Swickert et al., 2019).

Four mindfulness skills can be taught or practiced: (1) mindful description, or the experiential expression of observations without judgment or conceptual analysis; (2) mindful observation, which means the careful attention to internal and external phenomena, such as ideas, scents, or deep feelings; (3) act with awareness, which refers to the full engagement of undivided attention in a current activity without judgments; (4) non-judgmental acceptance, which means that the individual should not evaluate his/her experiences at the present moment (Basha and AbdAlstar, 2015; Dekeyser, Raes, Leijssen, Leysen, and Dewulf, 2008). The theoretical explanations highlight cognitive, attentive, and behavioral resilience as components and results of mindfulness. The opposite pattern endorsing a narrow perspective and automatic, habitual, and rigid response is linked to poor problem solving and more distress (Basha, 2018; Feldman, Hayes, Kumar, Greeson, and Laurenceau, 2007).

Mindfulness can be explained in terms of the reassessment of the meaning model. Individuals have a global internal framework of meaning that consists of their values, beliefs, and rooted patterns in viewing the world. This resembles Piaget's scheme concept, which is the core of his cognitive development theory. The individuals' global framework of meaning forms how they explain life experiences when situations occur. Thus, individuals are in a constant state of assessing meanings, matching the situational meaning to their global meaning framework (Bellin, 2015). Mindfulness is also a form of meditation, which is linked to emotional processing. Meditation in practice means making something familiar. Focusing on meditation practices is becoming more aware, familiar, and reflective in one's mental processes (Basha, 2018; Gilbert et al., 2019). Brown and Ryan (2003) found high correlations between mindful attention awareness and self-esteem.

In this regard, individuals reporting low levels of mindfulness are more vulnerable to higher levels of internal symptoms, while lower levels of gratitude are connected to higher depression symptoms (Duprey, McKee, O'Neal, and Algoe, 2018). Swain et al. (2020) offered support in their empirical study to both gratitude and mindfulness as suitable interventions for physical health conditions and showed how they could be used together. Fuller-Tyszkiewicz et al., (2019) reported that the intervention group had access to an e-health platform that contained a series of brief video activities (e.g. gratitude, breathing, and relaxation tasks) that were shown in previous studies to improve body satisfaction. The study found greater improvement in body satisfaction after the intervention in the intervention group. The use of the intervention content was linked to instant increases in body satisfaction evaluations similar to the case. The size of improvement in the present moment was predictive of greater improvement in post-intervention symptoms and maintaining it.

The aforementioned review shows that mindfulness and gratitude may play an important role in attaining individuals' happiness and psychological well-being. Therefore, this study primarily seeks to identify the separate and interactive contribution of gratitude (emotional) and mindfulness (cognitive) in predicting happiness among university students; and examine the relationships between these variables. It also aims to identify the level of gratitude, mindfulness, and happiness among university students. It identifies differences between students with high happiness and those with low happiness in gratitude and mindfulness.

2. Objectives

Thus, the empirical objectives of the study are:

- Evaluating the level of mindfulness, gratitude, and happiness among university students.
- Examining the relationship between gratitude, mindfulness, and happiness among university students.
- Identifying the separate and interactive contribution of gratitude and mindfulness in predicting happiness among university students.
- Examining the differences between students with high happiness and students with low happiness in gratitude and mindfulness.

3. Significance

The theoretical and applied significance of the study can be summarized, as follows:

- It found the contribution of mindfulness and gratitude to predicting happiness among university students in an attempt to understand the nature of happiness and its predictors, the contribution of interaction among these variables, and the importance of understanding the nature of happiness among university students.
- The findings of the present study can be employed in improving happiness development programs among university students.
- The scales used in the present research can be utilized in examining, diagnosing, predicting, and following-up the results of psychological rehabilitation and therapy and preventive programs.

4. Questions

The study seeks for answering the following questions:

1. What are the levels of gratitude, mindfulness, and happiness among university students?
2. What is the size and type of relationship between gratitude, mindfulness, and happiness among university students?
3. Does gratitude contribute to predicting happiness among university students?
4. Does mindfulness contribute to predicting happiness among university students?
5. Does the interaction between gratitude and mindfulness contribute to predicting happiness among university students?
6. How much do university students with high happiness and with low happiness vary in gratitude and mindfulness?

The relevance of the present study is due to the relevance of the studied variables, which can be detailed, as follows:

1. Mindfulness offers an alternative method to cope with negative self-thoughts by challenging their importance. Mindfulness also has an additional benefit because breathing exercises may reduce the emotional disturbance that arises during periods of non-satisfaction (Fuller-Tyszkiewicz et al., 2019).
2. Studying gratitude is important as previous studies pointed out its importance to individuals.

Being grateful is one of the highly-appreciated qualities (Watkins et al., 2003). Recent findings showed that mood gratitude mediates the relationship between the positive past time framework and the various psychological well-being indicators (Przepiorka et al., 2020).

3. The applied relevance of the study and a deeper understanding of the relationships between gratitude, mindfulness, and happiness is developing counseling programs or practical proposals to help university students raise their level of happiness. The findings of the study can be used in teaching university students the application of adaptive mindful strategies when they have a problem to reduce their feelings of distress.

5. Materials and Methods

5.1 Method

Since the present study aims at identifying the level of gratitude, mindfulness, and happiness among Princess Nourah Bint Abdulrahman University students, the separate and interactive contribution of gratitude and mindfulness to predicting happiness, examining the differences in mindfulness and gratitude among students with high happiness and students with low happiness, and identifying the mutual relationships among these variables, the descriptive method (both correlative and comparative) is deemed the most appropriate for the nature and objectives of the present study, as well as testing and verifying its hypotheses. This method quantitatively describes the measured phenomenon by determining the relationship between the variables.

5.2 Sampling

The final research sample consisted of 447 female university students aged 18 to 25 years. Table 1 details the sample's preliminary data.

Table 1: Distribution of the research sample in terms of preliminary data

Variables	Category	Number	Percentage
Marital status	Single	410	91.7
	Married	34	7.6
	Divorced	3	0.7
GPA	Less than 3	57	12.8
	3-4	110	24.6
	4-5	280	62.6
Type of Study	College of Humanities	176	39.4
	Scientific Colleges	218	48.8
	Health Colleges	53	11.9
Total		447	100.0

5.3 Instruments: Psychometric properties

The validation of instruments was conducted in a sample of 175 participants aged 18-25 years. The data of this sample were used to verify the validity and reliability of the instruments of the present study. The present study used three main instruments, namely, the Toronto Mindfulness Scale (TMS), the Oxford Happiness Questionnaire (OHQ), and the Gratitude Resentment and Appreciation Scale (GRAT)-short form. Additionally, the researchers conducted a preliminary interview to collect data, including name, age, and other relevant data.

- The Toronto Mindfulness Scale (TMS)

The researchers applied the TMS, which was originally developed by Lau et al. 2006. The

original scale consists of 30 items. It includes three domains: Attention, alertness, and mindful awareness. Each domain contains 10 items. The researchers reviewed the scale and ensured it was appropriate for application to the research sample. The TMS validity and reliability coefficients were calculated by applying it in an exploratory sample from the population. The final version of the scale consisted of 28 items, and a 1-4 Likert-type responses: always applies to me (4), applies to me (3); doesn't apply to me (2); never applies to me (1) for affirmative items and the reverse for negative items. Thus, the lowest score was 28 points representing a low level of mindfulness, and the highest score was 112 points representing a high level of mindfulness.

In the present study, the psychometric efficiency of the instrument was verified using internal consistency and Cronbach's alpha coefficients. With respect to internal consistency, the correlation coefficient between the item score and the domain's total score, and the correlation coefficient between the total score of each subscale and the TMS total score were calculated. The correlation coefficients of the item score and the total score of the subscale ranged from 0.30 to 0.61, which are acceptable values. Additionally, the correlation coefficients between the subscale total score and the TMS total score ranged from 0.82 to 0.85. Consequently, no items were deleted, and all the items were retained. The Cronbach's alpha coefficient was calculated for the full TMS that was 0.73. That is, all items measured the same content.

- The Oxford Happiness Questionnaire (OHQ)

The OHQ was originally developed by Argyle, Martin, and Lu in 1995. The original questionnaire consisted of 29 items that measured the feelings of happiness (i.e., positive emotions, feeling in control, self-satisfaction, kindness, and sense of humor). It had a high level of validity reached using criterion validity. It also enjoyed a good level of internal consistency reliability and retest reliability. It did not have sub-domains. Abdul Khaliq developed the Arabic version with some modifications. The Arabic version consists of 29 items with five response choices. The lowest score was 29 and the highest score was 145. The validity and reliability of the Arabic version were calculated in the Kuwaiti environment. In the present study, the authors used the OHQ applied in the Saudi environment (Jan, 2008). The final version of the scale consisted of 30 items, with a 1-4 Likert-type response, namely: absolutely applies to me (4), applies to me (3), doesn't apply to me (2); and never applies to me (1). The lowest score (30) indicates a low level of happiness, while the highest score (120) indicates a high level of happiness.

In the present study, the psychometric efficiency of the instrument was checked using internal consistency and Cronbach's alpha coefficients. The internal consistency was calculated by calculating the correlation coefficient between the item score and full-scale total score and ranged from 0.43 to 0.78, which are acceptable values. Therefore, no items were removed and all items were retained. The scale Cronbach's alpha coefficient was calculated for the full scale and was 0.94, indicating that all items measured the same content.

- The Gratitude Resentment and Appreciation Scale (GRAT)-Short form

GRAT was originally developed by Thomas and Watkins (2003). It is based on a theory emphasizing that grateful persons have a sense of abundance, appreciate others' contributions to the quality of their life, and are ready to appreciate the small pleasures of life. They also appreciate the importance of expressing gratitude. The original scale consisted of 44 items in three domains: The sense of abundance (SOA), simple appreciation (SA), and appreciation of others (AO). Authors prepared a short version of the original scale that consisted of 16 items covering the same domains of the original scale and has an acceptable level of reliability. Six items measured SOA, six measured SA, and four items measured AO. The GRAT-short form was used in studies in foreign settings, whereas no Arabic study used the short form of this scale. Therefore, the authors arabized it, presented it to experts to review the items after translation, then retranslated the items to check their correctness. The

reviewers recommended eliminating an item in the SA domain as it was not suitable and vague. Thus, the final Arabic version of GRAT consisted of 15 items: 6 measured SOA, 5 measured SA, and 4 measured AO. The scale used four Likert-type responses, namely: always applies to me (4), applies to me (3), doesn't apply to me (2), and never applies to me (1). Five items are scored reversely, and 10 items are scored in the other direction. The lowest score (15 points) indicates a low level of gratitude, while the highest score (60 points) indicates a high level of gratitude.

In the present study, the psychometric efficiency of the scale was checked using internal consistency and Cronbach's alpha coefficients. With respect to internal consistency, the correlation coefficients between the item score and the total subscale score ranged from 0.51 to 0.80, which are acceptable values. Additionally, the correlation coefficients between the subscale scores and the total score ranged from 0.27 to 0.61, which are acceptable values. Therefore, all items were retained, and no items were removed. Cronbach's alpha coefficient was calculated for the full scale and was 0.73, indicating that all items measured the same content. Cronbach's Alpha for the SOA domain was 0.75, for the SA domain was 0.70, and for the AO domain was 0.74.

Table 2: Statistical description of the research sample's data in the used instruments

Statistical indicators Scales	Mean	SD	Skewness	Highest score in the sample	Lowest score in the sample	Maximum score	Minimum score
- TMS total score	76.557	7.994	-.226	99	43	112	28
- GRAT total score	44.854	5.800	-.345	57	25	60	15
- SOA	15.711	3.583	-.103	24	6	24	6
- SA	17.319	2.474	-1.09	20	5	20	5
- AO	11.823	2.505	-.302		4	16	4
- OHQ total score	87.733	14.810	-.342	118	41	120	30

A value of 2.58 or more indicates skewness.

Table 2 shows the normality of distribution of participants' score to the TMS total score, GRAT total score, GRAT subscales, and OHQ total score.

6. Results

6.1 Hypothesis 1: Mindfulness, gratitude, and happiness among Princess Nourah Bint Abdulrahman University students are moderate.

The total score of the TMS ranged from 28 to 112 ($M = 76.56$; $SD = 7.99$). The participants were divided in terms of the total TMS score into three groups: Low (28-55), moderate (56-84), and high (85-112). The results showed that most participants (85.9%) had a moderate level of mindfulness, whereas 12.8% reported a high level of mindfulness.

The total GRAT score ranged from 15 to 60 ($M = 44.85$; $SD = 5.80$). The participants were divided into three groups in terms of their GRAT total score: Low (15-29), moderate (30-45), and high (46-60). The results showed that almost half of the participants (49.9%) reported a moderate level of gratitude, whereas the other half of the participants (49.7%) reported a high level of gratitude. The SOA domain was moderate, SA was high, and AO was moderate.

The total OHQ score ranged from 30 to 120 ($M = 87.73$; $SD = 14.81$). Accordingly, The participants were divided into three groups: Low (30-59), moderate (60-90), and high (91-120). The results indicated that 53.7% of the participants reported a moderate level of happiness, while 42.7% reported a high level of happiness.

Table 3: The level of mindfulness, gratitude, and happiness among university students (N = 447)

Level Variables	High		Moderate		Low	
	Number	Percentage	Number	Percentage	Number	Percentage
Mindfulness	57	12.8%	384	85.9%	6	1.3%
Gratitude total score	222	49.7%	223	49.9%	2	0.4%
SOA	92	20.6%	290	64.9%	65	14.5%
SA	343	76.7%	102	22.8%	2	0.4%
AO	167	37.4%	252	57.0%	25	5.6%
Happiness	191	42.7%	240	53.7%	16	3.6%

6.2 Hypothesis 2: A significant positive correlation exists between happiness scores and mindful and gratitude scores among university students.

The following table shows the correlation coefficients between the variables among university students.

Table 4: Correlation coefficients among the variables (N = 447)

Variables	1	2	3	4	5	6
1. Mindfulness	---	0.42**	0.26**	0.43**	0.18**	0.64**
2. Gratitude total score		---	---	---	---	0.56**
3. SOA			---	---	---	0.48**
4. SA				---	---	0.44**
5. AO					---	0.17**
6. Happiness						---

** p<0.01

Table 4 shows a positive significant correlation between the students' scores on the TMS and GRAT (SOA, SA, and AO) and their scores on the OHQ. These correlation coefficients are 0.17, 0.44, 0.48, 0.56, and 0.64, respectively. There is a significant positive correlation between the TMS scores and the GRAT scores (SOA, SA, and AO). These coefficients are 0.26, 0.42, 0.18, and 0.43 (p ≤ 0.01).

6.3 Hypothesis 3: Mindfulness significantly contributes to the prediction of happiness among university students.

To examine this hypothesis, a simple linear regression coefficient was calculated to find the contribution of mindfulness to predicting happiness among university students.

Table 5: A simple regression analysis of predicting the level of happiness among university students

Dependent variable	Independent variable	Contribution	Regression coefficient B	Standard regression coefficient Beta	Fixed value	F- value	Sig.	t-value	Sig.
Happiness (N = 447)	Mindfulness	0.415	1.193	0.644	-3.628	315.603	0.000	14.765	0.000

Table (5) shows that mindfulness predicted 41.5% of the variance in happiness manifestations among university students. This finding shows that the increase in mindfulness levels, the increase in attention, alertness, and mindful awareness of students increases their likelihood of feeling happy.

6.4 Hypothesis 4: Gratitude significantly contributes to predicting happiness among university students.

A simple linear regression analysis was conducted to examine this hypothesis by calculating the contribution of the GRAT and each one of its domains' total scores to predicting happiness among university students.

Table 6: A simple linear regression analysis of predicting the level of happiness among university students

Dependent variable	Independent variables	Contribution	Regression coefficient B	Standard regression coefficient Beta	Fixed value	F- value	Sig.	t-value	Sig.
Happiness (N = 447)	Mindfulness	0.311	1.423	0.557	23.891	200.663	0.000	5.257	0.000
	SOA	0.234	2.001	0.484	56.297	136.188	0.000	11.670	0.000
	SA	0.191	2.613	0.437	42.475	104.818	0.000	10.238	0.000
	AO	0.028	0.989	0.167	67.046	12.800	0.000	3.578	0.000

Table (6) shows that the GRAT total score predicted 31.1% of the variance in happiness among university students. The SOA domain accounted for 23.4% of the variance in happiness, the SA domain accounted for 19.1% of the variance in happiness, whereas the AO domain accounted for 2.8% of the variance in happiness. This finding shows that the increase in gratitude levels (SOA, SA, and AO) among university students increases their likelihood of feeling happy.

6.5 Hypothesis 5: The interaction between mindfulness and gratitude significantly contributes to predicting happiness among university students

To examine this hypothesis, a stepwise multiple regression coefficient was calculated for mindfulness and gratitude in predicting happiness among university students.

Table 7: A stepwise multiple regression analysis of the interaction between mindfulness and gratitude total scores in predicting happiness among university students

Dependent variable	Predictive models	r ² - value	Standard regression coefficient Beta	Fixed value	f-value	Sig.	t-value	Sig.
Happiness (N = 447)	Mindfulness + gratitude	0.515	0.498	-22.887	236.153	0.000	13.694	0.000
			0.349				9.597	0.000
	Mindfulness + SOA +SA	0.544	0.492	-19.614	176.113	0.000	13.562	0.000
			0.327				9.789	0.000
			0.158				4.400	0.000

Table (7) shows that the contribution of the interaction between the mindfulness and gratitude total scores was about 51.5% of the variance in happiness among university students, whereas the interaction between mindfulness, SOA, and SA was about 54.4% of the variance in happiness among university students. However, the AO domain's total score did not interact with SOA and SA variables in predicting happiness. This finding shows that the increase in both mindfulness and gratitude among university students increases their likelihood of feeling happy. It indicates the important contribution of the interaction among predictive variables compared to the separate contribution of each variable to predicting happiness.

6.6 Hypothesis 6: There are fundamental differences in mindfulness and gratitude among university students with high happiness and with low happiness.

To examine this hypothesis, the research sample was divided into two groups according to the OHQ total score median. The first group was students with low happiness, which consisted of students who had a score equal to or less than the median. The other group was students with high happiness which consisted of students who scored higher than the median. The T-test of the statistically significant differences between the two sets was used to identify the differences between the scores of the two groups (students with high happiness and students with low happiness) in terms of the TMS total score, GRAT total score, and the total score of its domains. The following table demonstrates the findings.

Table 8: T-test of the significance of differences between the scores of students with low happiness and students with high happiness

Variables	Groups	Number	Mean	SD	t-value	Sig.	η^2	D	Effect size**
SOA	Students with low happiness	228	14.31	3.21	9.22	0.000	0.16	0.9	Large
	Students with high happiness	219	17.17	3.36					
SA	Students with low happiness	228	16.52	2.55	7.39	0.000	0.11	0.7	Medium
	Students with high happiness	219	18.15	2.09					
AO	Students with low happiness	228	11.49	2.38	2.88	0.004	0.02	0.3	Small
	Students with high happiness	219	12.17	2.59					
GRAT total score	Students with low happiness	228	42.32	5.25	10.52	0.000	0.19	0.9	Large
	Students with high happiness	219	47.49	5.14					
TMS total score	Students with low happiness	228	72.61	7.17	12.30	0.000	0.25	1.16	Large
	Students with high happiness	219	80.66	6.63					

Table 8 shows that the t-value is significant at the level of 0.01 in the domains of SOA, SA, and AO, as well as the GRAT total score (large effect size of these differences), and the TMS total score (large effect size of these differences). Thus, significant differences exist between the scores of students with low happiness and students with high happiness in the GRAT domains, the GRAT total score, and the TMS total score. These differences were in favor of students with high happiness.

7. Discussion

In this section, the findings are discussed in the light of the findings of previous studies. The results related to hypothesis 1, as shown in table 3, revealed that mindfulness was moderate in 58.9% of the research sample, and the level of gratitude was moderate to high in 49.9% and 49.7%, respectively. The SOA domain was moderate, the SA was high, and the AO was moderate. Additionally, happiness was of moderate to a high level in 53.7% and 42.7% of the research sample, respectively.

This result indicates that the Princess Nourah Bint Abdulrahman University students have a moderate level of mindfulness and a moderate to a high level of gratitude and happiness. The moderate level of mindfulness among students can be explained by the developmental phase of the students as they identify their role and lifestyle, look forward to becoming adults, and enhance their insight of the self and the surrounding world. This is what Eriksson calls *productivity* (Al Harthy, 2019). This finding is consistent with the study of Hj Ramli, Alavi, Mehrinezhad, and Ahmadi (2018), which found a moderate level of mindfulness among the participants aged 18-30 years. However, it differs from the findings of Al Shlwey (2018) that showed high mindfulness among university students.

The moderate to high levels of gratitude and happiness can be explained by the educational, social, or health services the students enjoy in the university setting. This finding is consistent with what Al-Rabee and Ababneh (2018) pointed out that the individual's acknowledgment of others' contribution to his/her well-being made the individual feel a high level of gratitude, which leads to

happiness, and reflected their positive emotions. This finding indicates that students received benefits. It is also an indicator of their good intentions toward their environment. Students in the undergraduate stage also feel positive about their achievements and aspirations (Shawaqfeh and Almahaireh, 2019). This result is also consistent with Shawaqfeh and Almahaireh's study (2019) that found a moderate level of happiness closer to high among university students.

According to table 4, the results of hypothesis 2 showed a significant positive correlation between the gratitude and mindfulness scores and happiness scores of students. This means that the higher gratitude and mindfulness, the higher the students' happiness scores become. The significant positive relationship between the mindfulness scores and happiness scores among university students can be explained in terms of what the results revealed that mindfulness is related to psychological adaptation variables. It was found that self-compassion was a determinant factor in the relationship between mindfulness and happiness (Hollis-Walker and Colosimo, 2011). Additionally, mindfulness training resulted in an improvement in happiness average scores and average blood sugar levels (Fakhri et al., 2017).

Furthermore, the significant positive relationship between the gratitude scores (SOA, SA, and AO) and happiness scores among university students can be explained by two experiments which showed that grateful thinking improves the mood and the results supported the validity of the gratitude test's predictive ability of happiness (Watkins et al., 2003). The grateful recalling state stimulated large increases in the state of hope and happiness. That study recommended grateful recalling as a practice that can enhance present happiness and hope in the future (Witvilet et al., 2019). Simons et al. (2020) also found that SOA only was largely correlated with positive instant experiences (positive correlation) in daily life.

This result can also be explained according to the broaden-and-build theory, which pointed out that positive emotions can broaden individuals' thinking and allow them to build psychological, intellectual, and social resources. Additionally, positive emotions, especially gratitude, may play a role in motivating individuals to engage in positive behaviors that lead to their improvement (Armenta et al., 2017; Froh, Yurkewicz, and Kashdan, 2009).

This result is also consistent with the findings of Kavaklı, Özteke Kozan, Kesici, and Ak (2019) and Abid (2017) that a significant positive association exists between happiness, mindfulness, and forgiveness. Moreover, hierarchical regression analysis showed that forgiveness and mindfulness predicted happiness. Bagheri and Gharehbaghi (2019) found a positive correlation between mindfulness, happiness, and healthy development. This result is also consistent with Sapmaz, Yıldırım, Topçuoğlu, Nalbant, and Sızır (2016) and Kausar (2018) who found a significant positive correlation between gratitude and happiness. Alarcón and Caycho Rodríguez (2015) also found that the factors of gratitude, reciprocal treatment, and moral obligation had a positive association with happiness, and the factors of positive feelings toward life, life satisfaction, and personal devotion had a positive correlation to happiness.

As shown in table 5, the results of hypothesis 3 revealed the significant contribution of mindfulness to predicting happiness among university students. Mindfulness predicted 41.5% of the variance in happiness manifestations among university students. This result indicates that higher mindfulness levels and the increase in students' attention, alertness, and mindful awareness increases the likelihood of feeling happy.

This finding is consistent with the study of Campos et al. (2016) that found two facets of mindfulness (observing and awareness) and two aspects of self-compassion (self-kindness and common humanity) were the highest predictors of happiness. Their results also revealed the mediating role of an indirect effect of observing, awareness, self-kindness, and common humanity in the relationship between meditation and happiness. They supported the mindfulness model and self-compassion facets as mediators in the meditation-happiness relationship.

Previous studies and interpreting models of mindfulness emphasized cognitive, attention, and behavioral flexibility as components and consequences of mindfulness. The opposite pattern of adopting a narrow perspective and automatic responses, which are mostly habitual and inflexible, is

often associated with poor problem solving and higher distress (Basha, 2018). The present results are also consistent with the results of Chavan, Deshmukh, and Singh (2017) that pointed out gratitude and mindfulness as two of the highest predictors of happiness, as gratitude contributed 36% and mindfulness contributed 13% in predicting happiness.

With respect to hypothesis 4, as shown in table 6, gratitude significantly contributed to predicting happiness among university students. Grateful persons were found to have a sense of abundance, appreciate the contributions of others to the quality of their life, and have a predisposition to appreciate the simple pleasures of life. They also appreciate the importance of expressing gratitude (Thomas and Watkins, 2003), which makes them happier.

In this regard, Chavan et al. (2017) found out that gratitude and mindfulness were two of the highest predictors of happiness as gratitude contributed 36% and mindfulness contributed 13% to predicting happiness. Additionally, gratitude significantly contributed to predicting life satisfaction by 27% (Ibrahim, 2019). Trait gratitude was also found to exceed forgiveness, patience, and self-control in predicting trait hope and happiness (Witvliet, Richie, Luna, and Van Tongeren, 2019). Furthermore, gratitude had a significant contribution to predicting happiness by 18% (Sapmaz et al., 2016). In the study of Kardas Cam, Eskisu, and Gelibolu (2019), gratitude only predicted 36% of the variance in well-being and was one of the highest predictors of well-being.

The results of hypothesis 5 showed the contribution of the interaction between the research variables in predicting happiness among university students, as follows:

- The interaction between mindfulness and gratitude total scores contributed almost 51.5% of the variance in happiness among university students,
- The interaction between mindfulness and SOA and SA contributed almost 54.4% of the variance in happiness among university students; but
- The total score of the AO domain did not interact with SOA and SA variables in predicting happiness.

This finding shows that higher levels of both mindfulness and gratitude among university students increase the likelihood of feeling happy.

The relationships between each of the predictors (mindfulness, gratitude, SOA, SA, and AO) and happiness among university students, the interpretation of these relationships, and the previous studies supporting the current findings were mentioned above. The results of the interaction among predictors correspond with the complex nature of human behavior, and they offer a more comprehensive understanding of the factors affecting this behavior. Consequently, the results of interaction among the present research variables provide a more comprehensive understanding of happiness among university students.

In the light of the simple linear regression results for each predictor in predicting happiness among university students, the results of the stepwise multiple regression analysis among these variables, and the reviewed literature and theoretical frameworks related to the research variables, the authors developed a theoretical conceptualization of the relationships among the research predictors (mindfulness, gratitude, SOA, and SA) and happiness (criterion variable) among university students. The study proposes a theoretical model that mindfulness affects happiness cognitively, whereas gratitude affects happiness emotionally. The findings of the study and the relevant literature point out that mindfulness and gratitude are associated with a high level of happiness, and they significantly contribute to predicting happiness among university students. When comparing students with high happiness and students with low happiness, it was found that students with high happiness had higher mindfulness, gratitude, SOA, SA, and AO.

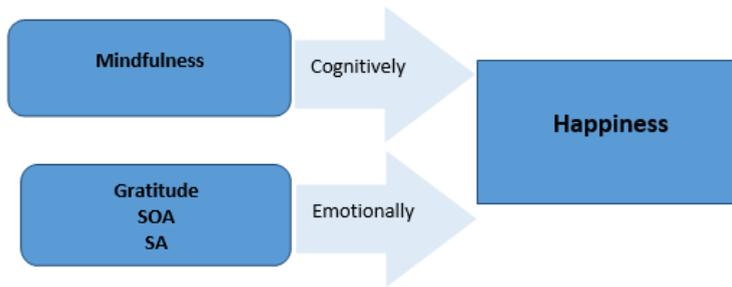


Figure 1: The proposed theoretical model

The results of hypothesis 6 found significant differences between the mean scores of students with low happiness and students with high happiness in mindfulness in favor of students with high happiness. Significant differences were also found between the mean scores of students with low happiness and students with high happiness in gratitude in favor of students with high happiness. In this regard, it can be said that mindfulness led to an increase in emotion regulation, a decline in emotional fatigue, and an increase in functional satisfaction (De la Fuente, Mañas, Franco, Cangas, and Soriano, 2018). Dispositional and state mindfulness also predicted self-regulated behavior and positive emotional states (Brown and Ryan, 2003). Therefore, students with high happiness had higher mindfulness compared to students with low happiness.

Gratitude has benefits on the societal level, such as mutual altruism and social cohesion. On the individual level, gratitude enhances personal well-being and personal relations. Recent literature reveals causal links between gratitude and one's well-being (Yüksel and Oğuz Duran, 2012). Gratitude is a positive act linked to well-being as results confirmed the association between gratitude and personal well-being (Lin, 2015). Grateful states result from the acknowledgment that (a) the person received a positive result; (b) there is an external source for this positive result; (c) the benevolent made an effort to provide them with the benefit. Therefore, gratitude is an empathic emotion (Froh et al., 2009) that leads to feelings of happiness.

8. Conclusion

The findings of the present study answered its main questions. The statistical analyses revealed that gratitude had a significant contribution of 31% and mindfulness had a significant contribution of 41.5% to predicting happiness among university students. Additionally, the interaction between the total scores of mindfulness and gratitude contributed 51.5% of the variance in happiness among university students, and the interaction between mindfulness, SOA, and SA contributed 54.5% of the variance in happiness among university students. However, the total score of the AO domain did not interact with the variables of SOA and SA in predicting happiness. The study also found a positive correlation between mindfulness, gratitude (SOA, SA, and AO), and happiness. It revealed that Princess Nourah Bint Abdulrahman University students had moderate levels of mindfulness and moderate to high levels of gratitude and happiness. The SOA domain was moderate, SA was high, and AO was moderate. Students with high happiness were higher in mindfulness, gratitude, SOA, SA, and AO compared to students with low happiness.

9. Recommendations

Based on the results of the present study, the following recommendations are made:

- Gratitude can improve students' happiness.
- Therapeutic interventions based on gratitude can be used efficiently to improve the level of

- happiness.
- More research about the predictors of happiness among university students and the interaction among these factors should be conducted as the attainment of happiness has great importance in an individual's life.
 - Preventive programs should be offered to adults where mindfulness is developed as a means to reduce suffering and enhance happiness.
 - The pathways that link Alexithymia, mindfulness, gratitude, and psychological well-being should be investigated.
 - The proposed model about the association between mindfulness (cognitively) and gratitude (emotionally) and their role in attaining individuals' happiness for the various age groups should be verified.
 - Programs should be developed for university students to target developing their cognitive, attentional, and behavioral flexibility as components and consequences of mindfulness to increase their ability to effectively manage complicated challenges and competitive requirements of university life.

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