

## The Factorial Structure of the Anhedonia List and its mediating role between Mindfulness and both Anxiety and Depression among University Students

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### **Abstract**

The current research aimed at identifying the factorial structure of the Anhedonia List (AL) and its mediating role between mindfulness and both anxiety and depression among university students. The first sample consisted of (250) students, males (n = 90) and females (n = 160), with (M=19.78, SD=2.95 years), from Sohag University students to calculate the factorial structure of the Anhedonia List (AL). The second sample consisted of 490 students Males (n=110) and females (n=380), average age (M= 20,21, SD=2,97), from Sohag University students to calculate the mediating role of anhedonia between mindfulness and symptoms of anxiety and depression. (Second search). The Beck Scales for Depression and Anxiety, the Mindfulness Scale, the Short Social and Physical Anhedonia Scales were used. For the purpose of the current research, an Anhedonia List (AL) was developed and tested for Validity and reliability. Using exploratory and confirmatory ( $\chi^2 / df= 1.625$ , RMSEA= 0.050, RMR= 0.032, IFI- 0.8, CFI= 0.8, TLI=0.8) factor analysis, it was found that anhedonia is a multi-dimensional construct with four dimensions: cognitive, emotional, social and physical. Each dimension has three levels: desire, effort, and experience. Regression Analysis revealed that anhedonia contributes to both anxiety (64.6%) and depression (71.7%), and mindfulness contributes to both

anxiety (42.1%) and depression (47.3%). It was also found - through a structural model - that anhedonia plays a mediating role between mindfulness and both anxiety and depression among university students. It was recommended that further research be conducted to verify the psychometric properties of the list of anhedonia on other samples and environments, and to validate the current structural model on other disorders. Based on the results of the current research, a new therapeutic approach was proposed under the name "Mindfulness Based Anhedonia Reduction (MBAR) Therapy" to treat or reduce anxiety and depression disorders.

**Keywords:** *Anhedonia, Anhedonia List, Mindfulness, Anxiety, Depression.*

## **Introduction (Review of literature)**

The term anhedonia has appeared in the psychiatric literature to refer to a loss of interest or enjoyment in usual activities, and is more common in schizophrenia and related disorders, as a symptom of depression and some types of anxiety, as well as substance abuse, and as a predictor of long-term negative outcomes. It is also associated with ineffective treatment outcomes.

In 1980, the term "anhedonia" was included in the third edition of the Diagnostic and Statistical Manual of Mental Disorders (APA, 1980) and was given a central role in its fourth edition (APA, 2000). In the fifth edition, it was maintained as one of the main symptoms of major depression, defined as loss of interest or pleasure (APA, 2013).

It was also mentioned in the manual for the diagnosis of mental disorders and its fifth count in several contexts, so it was mentioned in the negative symptoms of schizophrenia spectrum disorders and psychotic disorders, and defined as: a decreased ability to experience pleasure from positive stimuli or a degradation in the recollection of pleasure previously experienced. As an essential diagnostic feature of major depressive disorders, and Depressive symptoms were distinguished from somatic symptoms by anhedonia and low mood, as a symptom of stimulant withdrawal in stimulant-related disorders, and as a symptom of proposed pathological features of avoidant personality disorder. It is also defined in the context of personality traits as an aspect of dissociation as: lack of enjoyment, participation in, or energy for life experiences; and the deficit in the ability to feel pleasure and interest in things. (APA, 2013).

The term anhedonia was introduced in 1896 by Ribot, a French psychoanalyst, who defined it as the inability to experience pleasure; common in mental disorders and personality traits. In 1956, Rado defined anhedonia as

the inability to experience pleasure and a lack of motivation to pursue rewarding activities, through his model of schizophrenia (Di Giannantonio & Martinotti, 2012). Meehl (1962) considered anhedonia as one of the four main symptoms of schizophrenia and a major factor of social limitations in schizophrenia spectrum disorders. (In: Silvia & Kwapil, 2011).

Given the importance of the concept of anhedonia in the field of psychology and psychiatry, researchers began to develop tools to measure it, and among these tools are those developed by Chapman and his colleagues in 1976, in which he distinguished between social and physical anhedonia, which is considered one of the most widespread and useful tools in assessing anhedonia (Chapman et al., 1976). In the field of research, many other tools appeared, such as Fawcett-Clark Pleasure Scale (Fawcett et al., 1983), Snaith-Hamilton Pleasure Scale (Snaith et al., 1995), Temporal Experience of Pleasure Scale (Gard et al., 2006) and Dimensional Anhedonia Rating Scale (Rizvi et al., 2015).

Anhedonia appeared in the literature of psychology and psychiatry through social and physical anhedonia (Chapman et al., 1976), and this classification expresses a narrow or limited concept of anhedonia. Diener et al. (1998) criticized the Limited Concept of Anhedonia; stating that happiness cannot be reduced to physical hedonism, as it can be derived from the achievement of goals or valuable outcomes in a variety of areas. More recently, psychologists who have adopted the hedonistic view focused on a broad concept of hedonism including the preferences and pleasures of the mind and body (Kubovy, 1999).

From this point of view, the current research sought to expand the concept of anhedonia instead of being limited to social and physical anhedonia, to also include cognitive and emotional anhedonia, considering that these components are the most important. Accordingly, in the current research, it suggested that anhedonia is a multidimensional construct that is measured by the current

research tool " Anhedonia List " (AL). Cognitive deficits in mental disorders have been examined in many studies (Carvalho et al., 2014; Everaert et al., 2014; Müller et al., 2019; Platt et al., 2017; Sirota et al., 2018; Tariq et al. 2021a; Toren et al., 2000; Yüksel et al., 2019), as well as the cognitive aspect (Arrais et al., 2010; Campbell et al., 2009; Cisler & Olatunji, 2012; Onur et al., 2013; Paniccia et al., 2018; Sirota et al., 2018).

More specifically, the terms emotional and cognitive anhedonia may have been addressed in the context of research that dealt with enjoyment of life, happiness and enjoyment of play, positive and negative affection, cognitive flexibility, cognitive impairment and well-being, but in an indirect way, and this was within the dimensions of the measures used in the evaluation or the context of its items. In the Gaudiebility Scale for Adults of Morelia, to measure pleasurable experiences, among its dimensions were concentration and imagination (a cognitive aspect), also, enjoyment in solitude, sense of humor, irrational beliefs, and humor/laugh. (emotional aspect). (Padrós-Blázquez et al., 2021). Davidson's model (2018) showed that there are five factors for enjoying life, including: pleasure (emotional aspect), competence, challenge/improvement, and engagement (cognitive aspect). In the User Engagement Scale, O'brien and Thomas (2013) suggested focused attention dimension (cognitive aspect). It was suggested by Fang et al. (2010) in the Enjoyment of Computer Game Play scale three factors; cognitive, emotional and behavioral enjoyment. In the Game Experience Questionnaire, IJsselsteijn et al. (2008) suggested dimensions such as immersion, challenge, competence (cognitive aspect) and positive and negative affection (emotional aspect). In the EGame Flow Electronic Game Enjoyment Scale, Fu et al. (2009) suggested some factors that may measure enjoyment; concentration, goal clarity, feedback, challenge, autonomy, immersion, knowledge improvement, (cognitive aspect) and social Interaction (social aspect). In the Enjoyment of

Web Experiences Scale, Lin et al. (2008) suggested the immersion dimension (cognitive) and the positive affective dimension (emotional). In the Orientations to Happiness Scale, the life of pleasure dimension (emotional) was indicated, also, life of meaning and life of engagement (cognitive). (Peterson et al., 2005). The Quality-of-Life Enjoyment and Satisfaction Questionnaire included items measuring cognitive and emotional anhedonia; traveling to get things, focus and attention on the activity, problem solving under pressure, feeling happy or cheerful, ability to function in daily life, feeling affection for one or more people, jokes and laughter with others, general feeling of well-being. (Ritsner et al., 2005).

In the current research, anhedonia is considered as a broad, multi-field concept that includes cognitive, emotional, social and physical Anhedonia, and each field is viewed as an independent unit with three levels (desire, effort, experience). **Anhedonia** is defined as a decrease in pleasure (hedonism) in response to pleasurable stimuli, which manifests itself in three levels: desire, effort, and experience. Anhedonia has four sub-scales:(1) **Cognitive Anhedonia**: defined as: the inability of an individual to enjoy his cognitive abilities while performing tasks and activities in daily life. It is measured by not wanting the enjoyable activity, making an effort to get it, or experiencing the enjoyable experience as it should. (2) **Emotional Anhedonia**: defined as the inability to enjoy emotionally during tasks and activities of daily life; is measured by not wanting the enjoyable activity, making an effort to get it, or experiencing the enjoyable experience as it should. (3) **Social Anhedonia**: defined as the inability to enjoy socially during the practice of tasks and activities in daily life; is measured by not wanting the enjoyable activity, or making an effort to get it, or living the pleasant experience as it should, for example, refusing to socialize with others, or enjoying interaction with peers.

(4) **Physical Anhedonia**: defined as the inability to enjoy physically during the practicing tasks and activities in daily life; is measured by not wanting the enjoyable activity, or making an effort to get it, or living the pleasant experience as it should, for the sake of enjoying the taste of a particular fruit or wanting it, or keen to buy it.

### **Anhedonia and both depression and anxiety**

Anhedonia has been described with major depressive disorder (Loas, 1996; Shankman et al., 2010). and as a major symptom of depressed mood (APA, 2013). Beck's Depression List, 2<sup>nd</sup> Edition (Beck et al., 1996) included Anhedonia subscale with anhedonia presented in many depressive disorders. Anhedonia may be a barrier to recovery from clinical anxiety disorder, increasingly recognized as a prominent symptom in many individuals with increased anxiety. It may maintain anxiety and limited response to treatment. (Taylor et al., 2022). In the current research, the relationship between anhedonia in its broad concept (suggested) and both anxiety and depression are reviewed.

### **Mindfulness and Anhedonia**

Carlton et al. (2021) found a relationship between mindfulness and anhedonia, and it was proved that the improvement in mindfulness only was a mediator of improving the state of social anhedonia. Thomas and Garland (2017) found that mindfulness was associated with the ability to enjoy pleasure in a sample of people with chronic pain (n = 115 patients). Mindfulness can help increase enjoyment of pleasurable experiences. This applies, for example, to food enjoyment, which is higher with vigilant attention (Arch et al. 2016; Hong et al. 2014).

It seems that researching the relationship between mindfulness and anhedonia in a direct way may represent a scarcity in search engines, although what has been researched indicates that there is a relationship between

mindfulness and anhedonia, also mindfulness training reduces anhedonia, and may predict hedonistic. Therefore, in the current research, the relationship between mindfulness and anhedonia and its relationship to anxiety and depression is examined in a broader and more accurate way.

### **Mindfulness and both Anxiety and Depression**

Research results indicated that there is a relationship between mindfulness and both anxiety and depression. Sharma and Kumra (2022) found that mindfulness was negatively associated with anxiety, stress, and depression on an Indian sample of adults (n = 382).

Watkins et al. (2022) indicated that mindfulness may be a potential anxiety buffer in adolescent boys (n=1333 adolescents). The results of Bajaj et al. (2016) using Structural Equation Modeling (SEM) suggest that mindfulness exerts an indirect effect on anxiety and depression through self-esteem. Mindfulness is negatively associated with both anxiety and depression (n = 187 adults). (Cisler & Olatunji, 2012).

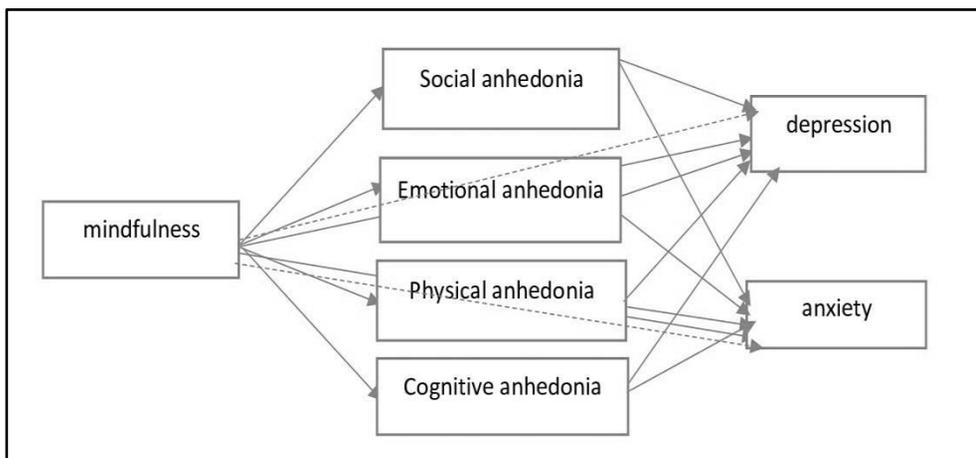
It is clear here that there is a relationship between mindfulness, anhedonia and both anxiety and depression, and in the current research the mediating role of anhedonia between mindfulness and both anxiety and depression is examined through the structural model proposed in the current research.

### **Research problem:**

More research has criticized the limited view of anhedonia, which is confined to social and physical anhedonia, and recommended the need to research the concept of anhedonia as a larger construct. (Diener et al. 1998; Kubovy, 1999). The researchers suggested that each structure for anhedonia includes different levels or multiple components. (Hamilton, 1960; Rizvi et al., 2016; Strauss & Gold, 2012; Gard et al., 2006; Gard et al., 2007; Treadway & Zald 2011).

Therefore, it has been suggested that anhedonia is a construct that consists of four sub-scales: Cognitive, Emotional, Social and Physical Anhedonia, and each sub-scale has three levels: Desire, Effort, and Experience. The problem of the first research is summarized in the following question: **What is the factorial structure of the Anhedonia List and its sub- scales?**

It was clear from the research literature that there is a relationship between anhedonia and depression (APA, 2013; Di Giannantonio & Martinotti, 2012; Shankman et al., 2010; Loonen & Ivanova, 2016; Hallford et al., 2020) and anxiety, (Brown et al. 1998 Taylor, et al., 2022; Naragon-Gainey et al. 2009; Kashdan & Steger, 2006). Also, a relationship between mindfulness and both anxiety and depression, but the mediating role of anhedonia between mindfulness and both anxiety and depression has not been adequately investigated, so the second part of the research problem is to answer the question: **What is the mediating role of anhedonia between mindfulness and both depression and anxiety? It is suggested in the following Figure (1):**



**Figure (1)** The proposed model for the relationship between the research variables  
**Method:**

**The exploratory research sample:** The exploratory research sample consisted of (90) students; (n males = 35) and females (n females = 55), average age (M= 18,69, SD=0,78), from Sohag University students, in order to calculate the validity and reliability of the tools (anxiety and depression).

**The basic research sample:** It was relied upon to verify the research hypotheses, and it consisted of two samples. The first sample: consisted of (250) students divided into males (n = 90) and females (n = 160), with an average age (M= 19,78, SD=2,95), from students Sohag University to calculate the exploratory and confirmatory factor analysis of the Anhedonia List (first research). The second sample consisted of 490 students divided into males (n = 110) and females (n = 380), average age (M= 20,21, SD=2,97), from Sohag University to calculate the mediating role of anhedonia between mindfulness and each of the symptoms of anxiety and depression. (Second search).

### **Search Tools:**

**The Beck Depression Scale**, 2<sup>nd</sup> ed., translated by Gharib (2000). The psychometric properties of the scale were calculated in the current research through validity and reliability. Criterion validity was measured: where the correlation coefficient was calculated between Beck Scale of Depression and Beck Scale of Anxiety and the correlation coefficient was  $r=0.852$ ;  $P \leq 0.01$  level. The reliability was calculated using Cronbach's reliability coefficient alpha (0.847), and the omega reliability coefficient (0.852).

**The Beck Scale for Anxiety** (1988) translated by Abouzaid (2022)

the psychometric properties of the scale were calculated in the current research through validity and reliability. The Criterion validity was measured: where the correlation coefficient was calculated between the Beck scale for depression and the Beck scale for anxiety, and the correlation coefficient was  $R=0.852$ ;  $P \leq 0.01$  level. Reliability: The reliability was calculated through Cronbach's reliability coefficient alpha (0.915), and the omega reliability coefficient (0.902).

**The Adolescent and Adult Mindfulness Scale** by Drouman et al. (2018) translated by Abdul Hamid (2018).

The psychometric properties of the scale were calculated in the current research through criterion validity; where the correlation coefficient was calculated between the Mindfulness scale and the Beck scale of anxiety was  $R=-0.758$ ;  $P \leq 0.01$  level and reliability; which was calculated through Cronbach's reliability coefficient alpha (0.822), and the omega reliability coefficient (0.830).

**Short Physical and Social Anhedonia Scale** (translated by both researchers)

Winterstein et al. (2011) developed short version of the Wisconsin Schizotypy Scales, including Social Anhedonia and Physical Anhedonia, each scale contains 15 items, and it was translated into Arabic, and after presentation to the experts, the validity was calculated using criterion validity, the correlation coefficient was calculated between the Beck Depression Scale Second Edition and each of the social and physical anhedonia scale, and the value was (0.885) for social anhedonia, and (0.897) for physical anhedonia, and reliability, Cronbach's alpha Reliability coefficient was calculated as (0.902) for social anhedonia and

(0.892) for physical anhedonia. (They were used to calculate Criterion validity for the current Anhedonia List).

### **Anhedonia List** (Prepared by the Researchers)

The anhedonia list was constructed based on research findings and relevant metrics (established in the current research literature). As a multiple construct, four Subscales have been formulated; cognitive anhedonia (20 items), emotional anhedonia (23 items), social anhedonia (22 items), and physical anhedonia (23 items), Each subscale has three levels: desire, effort, and experience. The Anhedonia List was presented to experts to modify the necessary, and then administered to the exploratory research sample (university students), and the psychometric properties of the Anhedonia List were verified by following the following methods:

**-Item-total correlations:** the items' correlation coefficients were calculated with the total score of the sub-scale to which they belong. As well as the correlation coefficients of each sub-scale with the total score of the list, and the values ranged between (0.866 - 0.932). (Appendix 1).

**-Construction validity:** The anhedonia list was applied with the short physical and social anhedonia scales (Winterstein et al., 2011)). To calculate the construct validity of the current list of anhedonia, table (1) shows the correlation values and their statistical significance:

**Table (1)** values of the correlation coefficients of the anhedonia list with each of the short social and physical anhedonia scales (n = 90)

AL Sub-Scales	Short Social Anhedonia		Short Physical Anhedonia	
	R.	Sig.	R.	Sig.
CA (18items)	0.852	0.01	0.841	0.01
EA (17items)	0.862	0.01	0.812	0.01
SA (17items)	0.901	0.01	0.812	0.01
PA (17items)	0.821	0.01	0.895	0.01

*Note:* AL= anhedonia list, CA=Cognitive anhedonia, EA=Emotional anhedonia, SA= Social anhedonia, PA=physical anhedonia, R = Pearson's correlation coefficient, sig= significant,

**Reliability:** The Reliability was verified using Cronbach's alpha and McDonald's Omega Reliability coefficients; table (2) shows the reliability values:

**Table (2)** Reliability coefficients of the anhedonia list using Cronbach's alpha and omega Reliability coefficients (n = 90)

Subscales, levels and total score	CA		EA		SA		PA	
	$\alpha$	$\omega$	A	$\omega$	$\alpha$	$\omega$	$\alpha$	$\omega$
Desire	0.845	0.909	0.886	0,886	0.740	0.743	0.844	0,849
Effort	0.813	0.814	0.881	0,886	0.733	0.735	0.718	0,722
Experience	0.903	0.850	0.880	0,882	0.766	0.770	0.734	0,733
Total degree	0.937	0.938	0.935	0,936	0,819	0,813	0,842	0,812

*Notes:*  $\alpha$ = Cronbach alpha reliability coefficient,  $\omega$  = Omega Reliability Coefficient.

**Description Anhedonia List:** items, Correction System, and Inverse Phrases in Appendix 1

**Statistical Methods:** The following statistical methods were used: first- and second-degree exploratory factor analysis, first, second- and third-degree confirmatory factor analysis, simple and multiple regression analysis, and structural modeling.

### Research Results:

**The First Hypothesis:** *There are many factors that consist the factorial structure of the subscale of Cognitive Anhedonia among university students.* It used Exploratory factor analysis with oblique Promax rotation with Kaiser normalization. The factorial analysis of the scale items resulted in the presence of 3 scale factors that accommodate (64.267%) of the total variance, and 18 items are saturated with them, considering the minimum loading of the items is (0.3). Table (3) shows the Eigen Value and variance ratios of the factors:

**Table (3)** *Estimated factorial loadings for the three-factor model through exploratory structural for the subscale dimensions Cognitive Anhedonia (n = 250)*

Items	FI (Experience)	FII (Effort)	FIII (Desire)	Communality
14	0.902			0.789
20	0.787			0.686
19	0.781			0.730
15	0.780			0.720
13	0.763			0.802
5	0.715			0.527
4	0.517			0.585
12	0.463			0.468
1		0.802		0.754
7		0.796		0.537
17		0.589		0.515
6		0.485		0.672
3		0.461		0.537
9			0.802	0.717
8			0.761	0.690
11			0.715	0.557
2			0.574	0.650
18			0.467	0.634
Eigen Value	7.610	5.934	5.837	Total Variance
variance	49.383%	7.638%	7.246%	64.247%
KMO=0.862				
Bartlett test = 700,592			Sig. Level=0.000	

**Notes:** *KMO = Kaiser-Meyer-Olkin Test, FI= The first factor, FII =The second factor, FIII =The third factor.*

It is clear from table (3) that 18 items are *loading* with three factors with the deletion of two items: 10-16 whose loadings were less than 0.3, so the first dimension became consisted of 8 items, which are the number 13-18-17-14-12-5 4-11 was named experience, and the second dimension consisted of 5 items: 1-3-6-7 15 and was called (effort), and the third dimension consisted of 5 items: 2- 8- 9-10-16 and was named (desire). A high score on the scale indicates cognitive anhedonia, and a low score indicates low cognitive anhedonia.

**The second Hypothesis:** *There are many factors that consist the factorial structure of the subscale of emotional Anhedonia among university students.* It used Exploratory factor analysis with oblique Promax rotation with Kaiser normalization. The factorial analysis of the scale items resulted in the presence of 3 scale factors that accommodate 69.084% of the total variance, it is *loading* with 17 items, taking into account the minimum loading of the expressions is 0.3, and Table (4) shows the Eigen Value and variance ratios of the factors:

**Table (4)** Estimated factorial loadings for the three-factor model through exploratory structural for the subscale dimensions Cognitive Anhedonia (n = 250)

Items	FI (Experience)	FII (Effort)	FIII (Desire)	Communality
6	0.889			0.820
12	0.874			0.814
22	0.838			0.528
3	0.750			0.721
10	0.651			0.493
8	0.620			0.556
20	0.460			0.567
2		0.925		0.826
1		0.850		0.701
5		0.784		0.561
16		0.705		0.847
19		0.481		0.611
13			0.907	0.573
17			0.763	0.855
15			0.749	0.549
23			0.704	0.728
14			0.642	0.798
Eigen Value	6.819	6.429	6.691	Total Variance
Variance	51.392%	10.465%	7.227%	69.084%
KMO=0.799				
Sig. Level = 0,000		Bartlett test = 572,630		

It is clear from table (4) that 17 items are *loading* with three factors with the deletion of 6 items which are the number: 4-7 -9-11 -18-21 whose *loadings* were less than 0.3, so the first dimension consisted of 7 items which are the number 3-5 - 8-16 - 7-6-15 it was called the experience, and the second dimension: it consisted of 5 items: 1- 2- 4-12- 14 and it was called (effort), and the third dimension consisted of 5 items: 9-10 11-13-17 and it was called (desire). A high score on the scale indicates emotional anhedonia, and a low score indicates low emotional anhedonia.

**The Third Hypothesis:** *There are many factors that consist the factorial structure of the subscale of Social Anhedonia among university students.*

It used Exploratory factor analysis with oblique Promax rotation with Kaiser normalization. The factorial analysis of the scale items resulted in the presence of 3 scale factors that accommodate 50.053% of the total variance, and 17 items are saturated with them, considering the minimum loading of the items is 0.3. Table (5) shows the Eigen Value and variance ratios of the factors:

**Table (5)** *Estimated factorial loadings for the three-factor model through exploratory structural for the subscale dimensions social Anhedonia (n = 250)*

Items	FI (Experience)	FII (Effort)	FIII (Desire)	Communality
21	0.761			0.738
16	0.713			0.445
2	0.694			0.381
10	0.552			0.432
5	0.547			0.470
7	0.543			0.616
11		0.759		0.597
9		0.700		0.484
13		0.696		0.489
8		0.671		0.420
12		0.630		0.447
4			0.746	0.511
17			0.681	0.536
18			0.638	0.517
22			0.588	0.309
20			0.534	0.535
19			0.526	0.581
Eigen Value	3.832	3.382	3.111	Total Variance
Variance	27.769%	12.914%	9.370%	50.053%
KMO=0.750				
Sig. Level = 0,000		Bartlett test = 577, 193		

It is clear from table (5) that 17 items are *loading* with three factors with the deletion of 5 items, which are the number: 1-3-6-14-15. Its *loadings* were less than 0.3, so the first dimension became consisted of 6

items, which are the number 1-3-4- 7-11-16 was called (experience), and the second dimension consisted of 5 items: 5-6-8-9-10 and was called (effort), and the third dimension consisted of 6 items: 2-12-13-14- 17 15 and was named (desire). A high score on the scale indicates high social anhedonia, and a low score indicates low social anhedonia.

**The Fourth Hypothesis:** *There are many factors that consist the factorial structure of the subscale of Physical Anhedonia among university students.* It used Exploratory factor analysis with oblique Promax rotation with Kaiser normalization. The factorial analysis of the scale items resulted in the presence of 3 scale factors that accommodate 53.333% of the total variance, and 17 items are saturated with them, considering the minimum loading of the items is 0.3. Table (6) shows the Eigen Value and variance ratios of the factors:

**Table (6)** Estimated factorial loadings for the three-factor model through exploratory structural for the subscale dimensions Physical Anhedonia (n = 250).

Items	FI (Experience)	FII (Effort)	FIII (Desire)	Communality
3	0.832			0.604
1	0.757			0.488
23	0.738			0.540
19	0.704			0.609
17	0.652			0.689
13	0.651			0.517
22	0.609			0.512
14		0.754		0.482
11		0.739		0.542
12		0.677		0.554
21		0.584		0.333
15		0.568		0.517
7			0.823	0.731
8			0.754	0.552
4			0.681	0.554
6			0.665	0.510
18			0.500	0.332
Eigen Value	4.267	3.281	2.955	Total Variance
Variance	28.695%	13.369%	11.269%	53.333%
KMO = 0.6				
Sig. Level = 0,000		Bartlett test = 295.859		

It is clear from table (6) that 17 items are *loading* with three factors with the deletion of 6 items, which are the number: 10-16 - 2 -5-9 -20 whose *loadings* was less than 0.3, so the first dimension consisted of 7 items which are the number 1-2-9 - 12-14-16-17 was called (experience), and the second dimension consisted of 5 items: 7-8 -10-11-15 and was called (effort), and the third dimension consisted of 5 items: 3-4-5 - 6-13 and was named (desire). A high score on the scale indicates high Physical anhedonia, and a low score indicates low Physical anhedonia.

**The Fifth Hypothesis:** *The subscales of the Anhedonia List fall under one factor among university students.*

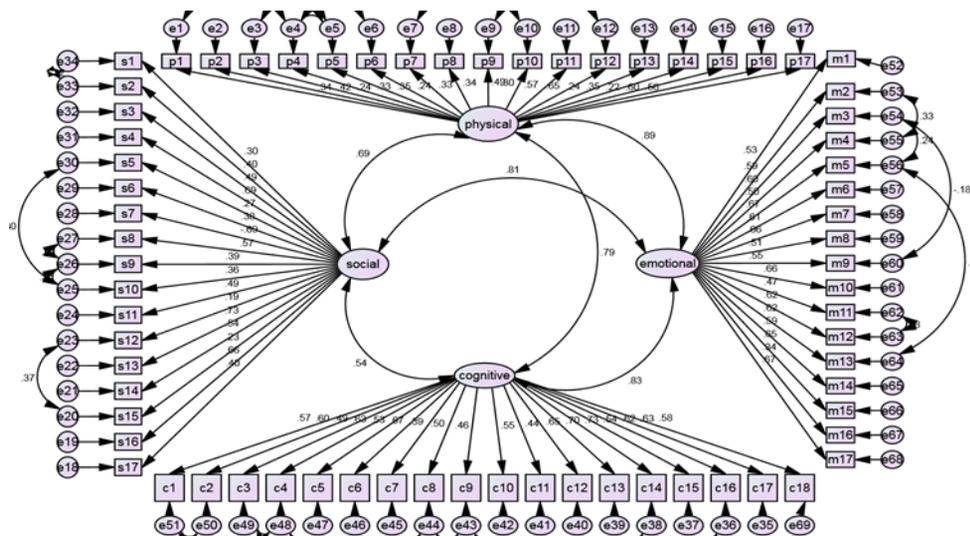
**Second-Order Exploratory Factor Analysis:** In order to verify the validity of this hypothesis, second-order exploratory factor analysis was used, using the principal components method with oblique rotation of the factors using the Promax method, and the results are shown as the following table (7):

**Table (7)** Results of the second-order exploratory factor analysis for the list of anhedonia (n = 250)

AL sub-scales	loading	Communality
CA (18items)	0.826	0.682
EA (17items)	0.846	0.715
SA (17items)	0.909	0.826
PA (17items)	0.760	0.577
Eigen Value =2.800	Total Variance = 69,993	
KMO=0.782		
Bartlett test = 473.556		Sig. Level=0.000

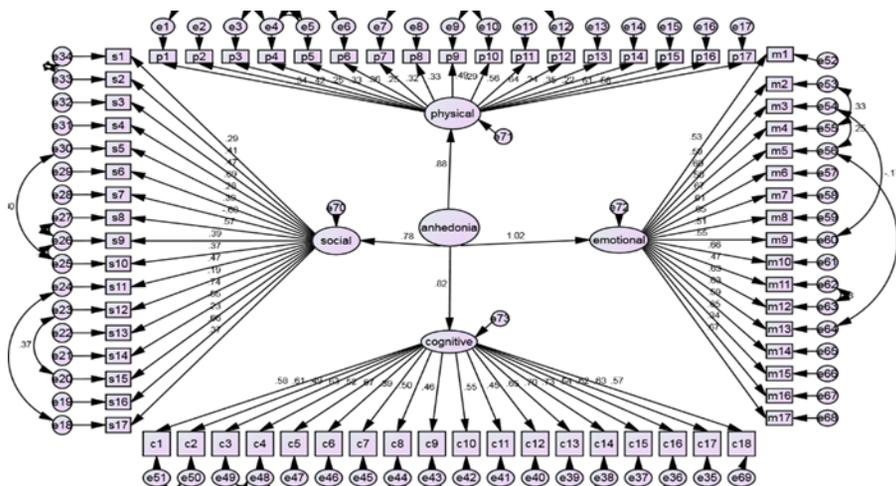
It is clear from the results of the *second-order* exploratory factor analysis in Table (7) that the Anhedonia List consists of four sub-measures that are combined by a general factor of the second degree, which indicates the multiplicity of the factor structure of the Anhedonia List.

**First-Order Confirmatory factor analysis:** The confirmatory factor analysis was calculated for the anhedonia list, by using the Amos program (24) using the Maximum Likelihood method and the model achieved the best quality of data matching, as most of the indicators fell in the ideal range, and figure (2) shows the first- order confirmatory factor analysis model for the Anhedonia List:



**Figure (2)** First-order confirmatory factor analysis model for the Anhedonia List. ( $\chi^2 / df = 1.563$ ,  $RMSEA = 0.048$ ,  $RMR = 0.033$ ,  $IFI = 0.807$ ,  $CFI = 0.803$ ,  $TLI = 0.802$ ), Notes:  $\chi^2 =$  chi square,  $df =$  degrees of freedom,  $RMSEA =$  root mean square error of approximation,  $RMR =$  root mean square residual,  $IFI =$  Incremental Fit Index,  $CFI =$  comparative fit index,  $TLI =$  Tucker-Lewis's index.

**Second-Order Confirmatory Factor Analysis:** The matching indicators were calculated by second-order confirmatory factor analysis (items and subscales) for the list of anhedonia by using the Amos program (24) using the Maximum Likelihood method. The model achieved the best quality of matching with the data, as most of the indicators occurred in the ideal range, and figure (3) shows the second-order confirmatory factor analysis model for the Anhedonia List:



**Figure (3)** second-order confirmatory factor analysis model for the Anhedonia List. ( $\chi^2 / df = 1.525$ ,  $RMSEA = 0.046$ ,  $RMR = 0.033$ ,  $IFI = 0.807$ ,  $CFI = 0.802$ ,  $TLI = 0.800$ ,  $GFI = 0.800$ ). Notes: *GFI = Goodness of Fit Index.*

### Third-Order Confirmatory Factor Analysis:

The matching indicators were calculated by means of the third-order confirmatory factor analysis (items and sub-scales) for the Anhedonia List by using the Amos program (24) using the Maximum Likelihood method. The model achieved the best quality of matching with the data, as most of the indexes occurred in the ideal range, and figure (4) shows the third-order confirmatory factor analysis model for the anhedonia list:

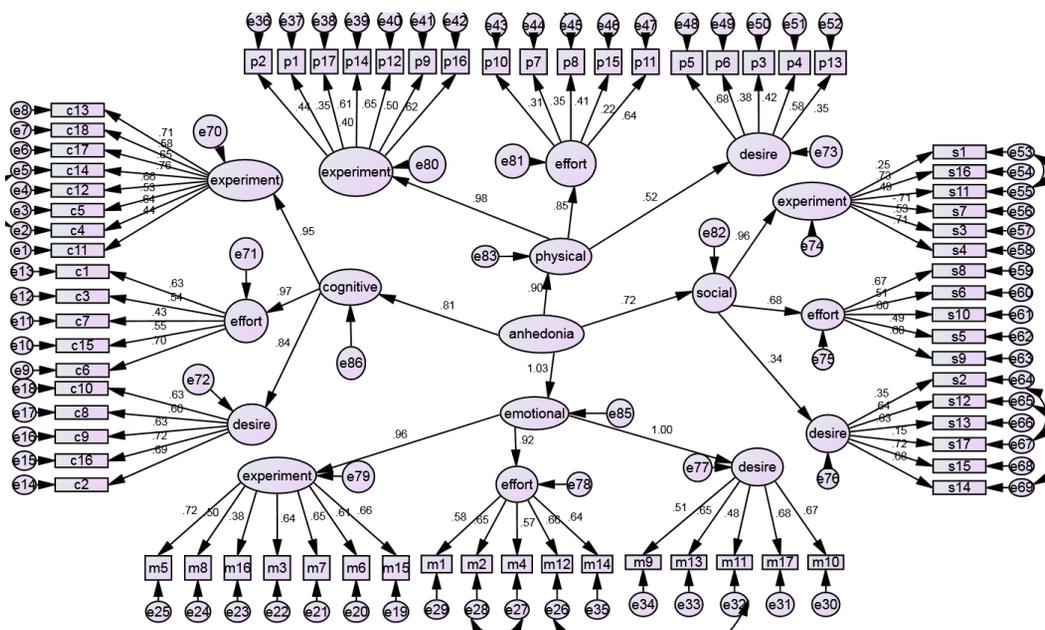


Figure (4) third-order confirmatory factor analysis model for the Anhedonia List.

( $\chi^2 / df=1.625$ ,  $RMSEA=0.050$ ,  $RMR=0.032$ ,  $IFI=0.80$ ,  $CFI=0.80$ ,  $TLI=0.80$ ).

It is clear from the results of the exploratory factor analysis of its degree (the first to verify the factorial structure of the sub-scale of the Anhedonia List, and the second for the total degree of the list) and the confirmatory factor analysis of the second and third degree that the factor structure of anhedonia consists of four distinct sub-scales that are combined by a general factor of the second and third degree. Thus, the scales can be expressed in four sub-degrees (cognitive, emotional, social, physical), and each scale is divided into three levels (desire, effort, experience).

**The results of the second search**

**Sixth Hypothesis:** *Anhedonia (anhedonia subscales and total score)*

*contribute to predicting depression in university students.* To verify the validity of this hypothesis, a Stepwise Multiple Regression Analysis was used, and simple regression analysis was used to detect the prediction of the total degree of anhedonia in depression, and table (8) shows this:

**Table (8)** Results of the analysis of variance and multiple regression analysis for the subscales of the anhedonia list in predicting depression (n = 490)

Model	Subscale	F- value	Sig.	R	R <sup>2</sup>	B	Constant	beta	t-value	Sig.		
First	SA	850.580	0.000	0.797	0.635	0.914	1.378-	0.797	29.165	0.000		
Second	SA	569.834	0.000	0.837	0.701	0.611	4.190-	0.533	14.963	0.000		
	CA					0.414		0.367			10.297	0.000
Third	SA	407.618	0.000	0.846	0.716	0.489	6.231-	0.427	10.482	0.000		
	CA					0.396		0.352			10.069	0.000
	EA					0.198		0.170			5.060	0.000
Fourth	SA	324.523	0.000	0.853	0.728	0.442	12.541-	0.385	9.449	0.000		
	CA					0.404		0.359			10.483	0.000
	EA					0.195		0.168			5.094	0.000
	PA					0.261		0.118			4.702	0.000

**Notes:** CA=Cognitive anhedonia, EA=Emotional anhedonia, SA= Social anhedonia, PA=physical anhedonia, R<sup>2</sup> = Coefficient of Determination, Sig. = level of significance, R= Multiple correlation coefficient, B = regression coefficient, beta= Standard Regression Coefficient.

It is clear from Table (8) that the sub-scales of the list of anhedonia contribute to predicting depression among university students, as the F- value is significance  $p \leq 0.01$ , It is also clear that social anhedonia explains 63.5% of the variance in depression, and social and cognitive anhedonia explains 70.1% of the variance in depression, just as social, cognitive and emotional anhedonia explains 71.6% of the variance in depression, and Social, cognitive, emotional, and physical anhedonia explains 72.8% of the variance in depression, and this indicates that social anhedonia is the strongest dimension in predicting depression, as it explains 63.5% of the variance in depression, followed by cognitive anhedonia that explains 6.6% of the variance in depression, followed by emotional anhedonia It explains 1.5% of the variance in depression. It is followed by Physical anhedonia, which explains 1.2% of the variance in depression.

**The total score of the Anhedonia List:** a simple regression analysis was calculated for the total score of the Anhedonia List on depression and the table (9) shows this:

**Table (9)** Simple regression analysis to predict depression from the total score of the anhedonia list (n = 490).

Variables	r	R <sup>2</sup>	F- value	Sig.	Constant	B	beta	t-value	Sig.
anhedonia	0.847	0.717	1234.513	0.000	15.137-	0.344	0.847	35.136	0.000

**Notes:** r= correlation coefficient, R<sup>2</sup> = Coefficient of Determination, Sig. = level of significance, B = regression coefficient, beta= Standard Regression Coefficient.

It is clear from table (9) that the independent variable anhedonia explains (71.7%) of the variance in the dependent variable depression among the research sample of university students, which means the validity of this hypothesis. The regression equation can be formulated as:

$$\text{Depression} = -15.137 + 0.344 \text{ total score of anhedonia.}$$

**The Seventh Hypothesis:** Anhedonia (anhedonia subscales and total score) contributes to predicting anxiety in university students. To verify the validity of this hypothesis, A Stepwise Multiple Regression Analysis was used, and simple regression analysis was used to detect the prediction of the total degree of anhedonia in anxiety, and table (10) shows this:

**Table (10)** Results of the analysis of variance and multiple regression analysis for the subscales of the anhedonia list in predicting anxiety (n = 490).

Model	Subscale	F- value	Sig.	R	R <sup>2</sup>	B	Constant	beta	t-value	Sig.
First	EA	532.234	0.000	0.722	0.522	0.679	6.490	0.722	23.070	0.000
Second	EA	367.793	0.000	0.776	0.602	0.424	2.410	0.451	11.365	0.000
	SA					0.374		0.392	9.889	0.000
Third	EA	289.811	0.000	0.801	0.641	0.245	0.854	0.261	5.706	0.000
	SA					0.351		0.368	9.728	0.000
	CA					0.266		0.288	7.343	0.000
Fourth	EA	226.956	0.000	0.807	0.652	0.210	3.876-	0.223	4.835	0.000
	SA					0.349		0.366	9.800	0.000
	CA					0.272		0.294	7.604	0.000
	PA					0.196		0.107	3.796	0.000

**Notes:** CA=Cognitive anhedonia, EA=Emotional anhedonia, SA= Social anhedonia, PA=physical anhedonia, R<sup>2</sup> = Coefficient of Determination, Sig. = level of significance, R=

Multiple correlation coefficient, B = regression coefficient, beta= Standard Regression Coefficient.

It is clear from table (10) that the dimensions of anhedonia contribute to predicting anxiety among university students, as the F- value was significance  $P \leq 0.01$  level. It is also clear that emotional anhedonia explains (52.2%) of the variance in anxiety, and emotional and social anhedonia explains (60.2%) of the variance in anxiety, just as emotional, social and cognitive anhedonia explains (64.1%) of the variance in anxiety, and emotional Social, cognitive and physical anhedonia explain (65.2%) of the variance in anxiety, and this indicates that emotional anhedonia has the strongest dimensions, as it explains (52.2%) of the variance in anxiety, followed by social anhedonia that explains (8%) of the variance in anxiety, followed by cognitive anhedonia, which explains (3.9%) of the Variation in anxiety. It is followed by Physical anhedonia, which explains 1.1% of the variance in anxiety.

**The total score of the list of anhedonia:** a simple regression analysis was calculated for the total score of the list of anhedonia on anxiety and the table (11) shows this:

**Table (11)** Simple regression analysis to predict anxiety from the total score of the anhedonia list (n = 490).

Variables	r	R <sup>2</sup>	F- value	Sig.	Constant	B	Beta	t-value	Sig.
<b>anhedonia</b>	0.804	0.646	892.445	0.000	4.978-	0.268	0.804	29.874	0.000

**Notes:** r= correlation coefficient, R<sup>2</sup> = Coefficient of Determination, Sig. = level of significance, B = regression coefficient, beta= Standard Regression Coefficient

It is clear from table (11) that the independent variable anhedonia explains (64.6%) of the variance in the anxiety variable among the research sample of university students, which indicates the validity of this hypothesis. The regression equation can be formulated as:

$$\text{Anxiety} = -4.978 + 0.268 \text{ total anhedonia score.}$$

**The Eighth Hypothesis:** *Mindfulness contributes to predicting depression among university students.* To verify the validity of this hypothesis, the equation of simple regression analysis was used as shown in table (12):

**Table (12)** Simple regression analysis to predict depression through Mindfulness (n = 490)

Variables	r	R <sup>2</sup>	F- value	Sig.	Constant	B	Beta	t-value	Sig.
Mindfulness	0.686	0.473	437.775	0.000	49.065	-0.711	-0.688	-20.923	0.000

*Notes:* r= correlation coefficient, R<sup>2</sup> = Coefficient of Determination, Sig. = level of significance, B = regression coefficient, beta= Standard Regression Coefficient.

It is clear from Table (12) that the independent variable Mindfulness explains (47.3%) of the variance in the dependent variable depression among the research sample of university students, which means the validity of this hypothesis. The regression equation can be formulated as:

$$\text{Depression} = 49.065 - 0.711 \text{ Mindfulness}$$

**The Ninth Hypothesis:** *Mindfulness contributes to predicting anxiety among university students in the research sample.* To verify the validity of this hypothesis, the equation of simple regression analysis was used, as shown in table (13):

**Table (13)** Simple regression analysis to predict anxiety through Mindfulness (n = 490)

Variables	r	R <sup>2</sup>	F- value	Sig.	Constant	B	beta	t-value	Sig.
Mindfulness	0.649	0.421	354.341	0.000	44.905	-0.551	-0.649	-18.824	0.000

*Notes:* r= correlation coefficient, R<sup>2</sup> = Coefficient of Determination, Sig. = level of significance, B = regression coefficient, beta= Standard Regression Coefficient.

It is clear from table (13) that the independent variable Mindfulness explains (42.1%) of the variance in the anxious dependent variable among the research sample of university students, which means the validity of this hypothesis. The regression equation can be formulated as:

**Anxiety = 44.905-0.551 Mindfulness**

**The results of the tenth hypothesis:** *there is a structural model that explains the relationship between Mindfulness and both anxiety and depression in the presence of anhedonia as a mediating variable among university students.* To test the validity of this hypothesis, the Amos 26 program was used to analyze the course of the relationship between the research variables, considering that anhedonia as a mediating variable between Mindfulness (an independent variable) and both anxiety and depression (the dependent variable). To verify the validity of the model, the following steps were taken:

**Concerning anxiety**

**1) Calculating the Fit Indexes to the proposed model (n = 490).**

The proposed parameters were revised to achieve conformance to the proposed model; these parameters do not conflict with the hypotheses of the model, and they must be logical and not contradict the theoretical framework and the results of previous research. The Fit Indexes to the proposed model can be clarified using the total sample of the current research (n = 490) using the Maximum Likelihood method. The results are shown as in the following table (14):

**Table (14)** values of Fit Indexes to the proposed structure model of anhedonia as a mediating variable between Mindfulness and anxiety (n = 490).

Fit Indexes	Indexes value	The perfect range	Values Fit
$\chi^2$	1.888		
DF	2	P is not significance	Fit
P	0.339		
( $\chi^2 / df$ )	0.944	between (0-3)	Fit
RMSEA	0.000	less than 0.08	Fit
RFI	0.992	From 0.90-1	Fit
AGFI	0.987	From 0.90-1	Fit
GFI	0.999	From 0.90-1	Fit
IFI	1	From 0.90-1	Fit
CFI	1	From 1-0.90	Fit
NFI	0.999	From 1-0.90	Fit
TLI	1	From 1-0.90	Fit

**Notes:**  $\chi^2$ = chi square,  $df$ = degrees of freedom, RMSEA= root mean square error of approximation, IFI= Incremental Fit Index, CFI= comparative fit index, TLI= Tucker-Lewis's index, NFI =Normed Fit Index, RFI= Relative Fit Index, AGFI= Adjusted Goodness of Fit Index.

It is clear from table (14) that the proposed model fitted to the ideal range for all fit indexes.

**2) Calculate the regression weight, measurement errors, critical ratio and significance level for the model variables:**

**Table (15)** Regression weight, measurement errors, and critical ratio of the model variables corresponding to the proposed constructivist model of anhedonia as a mediating variable between mindfulness and anxiety (n = 490).

effect path		Regression weight		S.E.	C.R.	Sig.
From	To	Stand.	Unstand.			
Mindfulness	EA	-0.439	-0.396	0.027	-14.572	0.000
Mindfulness	SA	-0.576	-0.513	0.033	-15.576	0.000
Mindfulness	CA	-0.413	-0.379	0.039	-9.701	0.000
Mindfulness	PA	-0.316	-0.148	0.020	-7.373	0.000
Mindfulness	Anxiety	-0.149	-0.126	0.037	-3.413	0.000
EA	Anxiety	0.120	0.113	0.051	2.196	0.03
SA	Anxiety	0.359	0.341	0.035	9.741	0.000
CA	Anxiety	0.289	0.266	0.035	7.544	0.000
PA	Anxiety	0.097	0.176	0.051	3.460	0.000
SA	CA	0.304	0.313	0.044	7.136	0.000
PA	EA	0.060	0.116	0.045	2.599	0.009
SA	EA	0.260	0.263	0.029	9.226	0.000
CA	EA	0.308	0.303	0.028	10.830	0.000

**Notes:** C.R.= critical ratio, S.E.= Standard Error, Sig. = level of significance, stand = standardized, unstand = unstandardized.

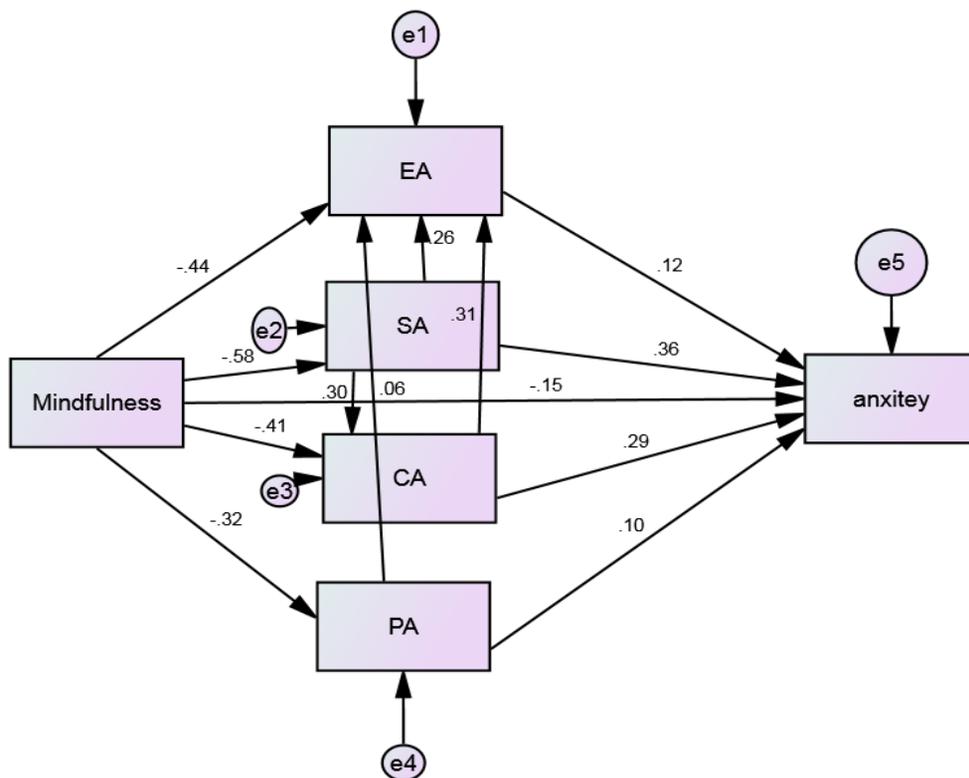
It is clear from Table (15) that the critical ratio is more than (1.96), which indicates the acceptance of the model.

**3) Calculate the direct and indirect effects of the model variables.**

**Table (16)** *The direct and indirect effects of the model variables corresponding to the proposed constructivist model of anhedonia as a mediating variable between mindfulness and anxiety (n = 490).*

Variables	Effect	Mindfulness	sig	EA	sig	SA	sig	CA	sig	PA	sig
EA	Direct	-0.439	0.01			0.260	0.01	0.308	0.01	0.060	0.01
	indirect	-0.350	0.01			0.094	0.01				
	Total	-0.789	0.01			0.353	0.01	0.308	0.01	0.060	0.01
SA	Direct	-0.576									
	indirect										
	Total	-0.576	0.01								
CA	Direct	-0.413	0.01			0.304	0.01				
	indirect	-0.175	0.01								
	Total	-0.588	0.01			0.304	0.01				
PA	Direct	-0.316	0.02								
	indirect										
	Total	-0.316	0.02								
anxiety	Direct	-0.149	0.01	0.120	0.03	0.359	0.01	0.289	0.01	0.097	0.01
	indirect	-0.501	0.02			0.130	0.01	0.037	0.04	0.007	0.03
	Total	-0.650	0.01	0.120	0.03	0.489	0.01	0.325	0.01	0.104	0.01

It is clear from table (16) that there are direct effects statistically significant for the relationship between the research variables, where the percentage of the direct effect of Mindfulness on anxiety was (-14.9%), the percentage of the direct effect of Mindfulness on EA was (-43.9%), the percentage of the direct effect of Mindfulness on SA was (-57.6%), the percentage of the direct effect of Mindfulness on CA was (-41.3%)the percentage of the direct effect of Mindfulness on PA was (-31.6%),and indirect effects of Mindfulness on anxiety were found through anhedonia as a mediating variable with a percentage of (-50.1%),and the total effects of Mindfulness on anxiety were found through anhedonia as a mediating variable with a percentage of (-65 %). The model can be illustrated by Figure (5):



**Figure (5)** The structural model of anhedonia as a mediating variable between Mindfulness and anxiety.

**Concerning Depression**

**1) Calculating the Fit Indexes to the proposed model (n = 490).**

The proposed parameters were revised to achieve conformance to the proposed model; these parameters do not conflict with the hypotheses of the model, and they must be logical and not contradict the theoretical framework and the results of previous research. The Fit Indexes to the proposed model can be clarified using the total sample of the current research (n = 490) using the Maximum Likelihood method. The results are shown as in the following table (17):

**Table (17)** values of Fit Indexes to the proposed structure model of anhedonia as a mediating variable between Mindfulness and depression (n = 490).

Fit Indexes	Indexes value	The perfect range	Values Fit
$\chi^2$	1.888		
DF	2	P is not significance	Fit
P	0.389		
( $\chi^2 / df$ )	0.944	between (0-3)	Fit
RMSEA	0.000	less than 0.08	Fit
RFI	0.992	From 0.90-1	Fit
AGFI	0.987	From 0.90-1	Fit
GFI	0.999	From 0.90-1	Fit
IFI	1	From 0.90-1	Fit
CFI	1	From 1-0.90	Fit
NFI	0.999	From 1-0.90	Fit
TLI	1	From 1-0.90	Fit

**Notes:**  $\chi^2$ = chi square, *df*= degrees of freedom, *RMSEA*= root mean square error of approximation, *IFI*= Incremental Fit Index, *CFI*= comparative fit index, *TLI*= Tucker-Lewis’s index, *NFI* =Normed Fit Index, *RFI*= Relative Fit Index, *AGFI*= Adjusted Goodness of Fit Index.

It is clear from table (17) that the proposed model fitted to the ideal range for all fit indexes.

**Calculate the regression weight, measurement errors, critical ratio and significance level for the model variables:**

**Table (18)** Regression weight, measurement errors, and critical ratio of the model variables corresponding to the proposed constructivist model of anhedonia as a mediating variable between mindfulness and depression (n = 490).

effect path		Regression weight		S.E.	C.R.	Sig.
From	To	Stand.	Unstand.			
Mindfulness	EA	-0.576	-0.513	0.033	-15.576	0.000
Mindfulness	SA	-0.439	-0.396	0.027	-14.572	0.000
Mindfulness	CA	-0.413	-0.379	0.039	-9.701	0.000
Mindfulness	PA	-0.316	-0.148	0.020	-7.373	0.000
Mindfulness	depression	-0.105	-0.109	0.040	-2.724	0.006
EA	depression	0.163	0.189	0.038	4.982	0.000
SA	depression	0.313	0.358	0.055	6.451	0.000
CA	depression	0.355	0.399	0.038	10.456	0.000
PA	depression	0.110	0.244	0.055	4.434	0.000
CA	SA	0.308	0.303	0.028	10.830	0.000
EA	SA	0.260	0.263	0.029	9.226	0.000
PA	SA	0.060	0.116	0.045	2.599	0.009
EA	CA	0.304	0.313	0.044	7.136	0.000

**Notes:** C.R.= critical ratio, S.E.= Standard Error, Sig. = level of significance, stand = standardized, unstand = unstandardized.

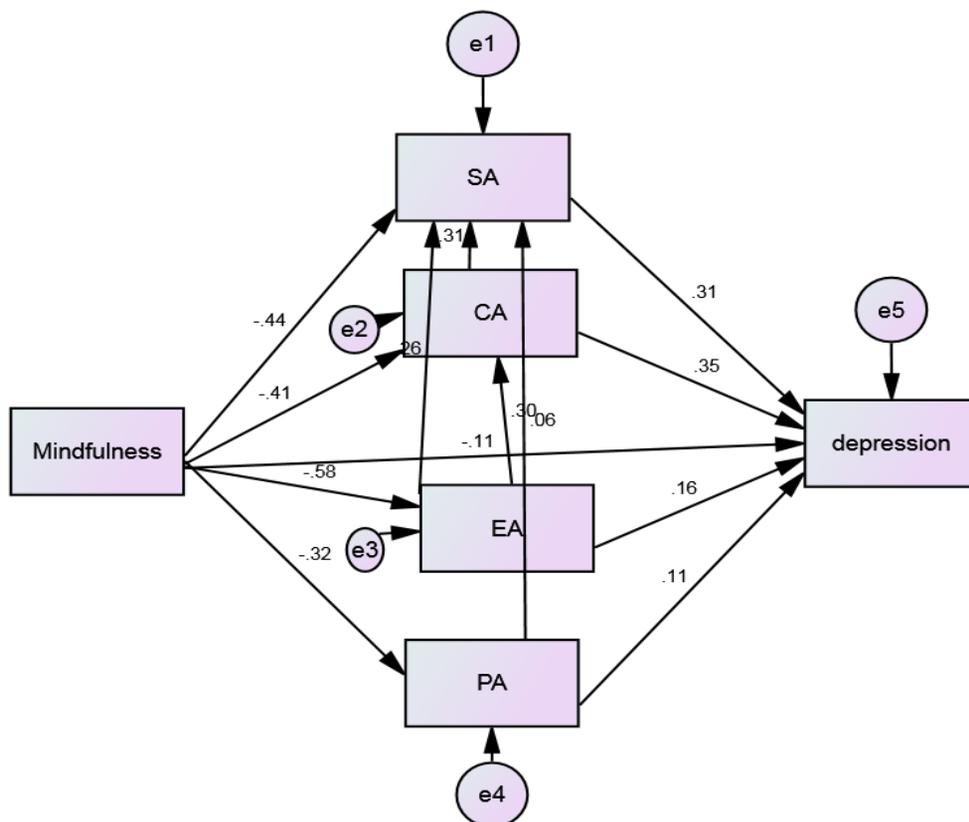
It is clear from Table (18) that the critical ratio is more than (1.96), which indicates the acceptance of the model.

**2) Calculate the direct and indirect effects of the model variables.**

**Table (19)** The direct and indirect effects of the model variables corresponding to the proposed constructivist model of anhedonia as a mediating variable between mindfulness and depression (n = 490).

Variables	Effect	mindfulness	sig	EA	sig	SA	sig	CA	sig	PA	sig
EA	Direct	-0.576	0.02								
	indirect										
	Total	-0.576	0.02								
SA	Direct	-0.439	0.01	0.260	0.01			0.308	0.01	0.060	0.01
	indirect	-0.350	0.01	0.094	0.01						
	Total	-0.789	0.02	0.353	0.01			0.308	0.01	0.060	0.01
CA	Direct	-0.413	0.01	0.304	0.01						
	indirect	-.175	0.02								
	Total	-0.588	0.01	0.304	0.01						
PA	Direct	-0.316	0.02								
	indirect										
	Total	-0.316	0.02								
depression	Direct	-0.105	0.02	0.163	0.01	0.313	0.02	0.355	0.01	0.110	0.01
	indirect	-0.584	0.03	0.218	0.01			0.096	0.01	0.019	0.01
	Total	-0.689	0.03	0.381	0.02	0.313	0.02	0.451	0.01	0.129	0.02

It is clear from table (19) that there are direct effects statistically significant for the relationship between the research variables, where the percentage of the direct effect of Mindfulness on EA was (-57.6%), the percentage of the direct effect of Mindfulness on SA was (-43.9%), the percentage of the direct effect of Mindfulness on CA was (-41.3%), the percentage of the direct effect of Mindfulness on PA was (-31.6%), the percentage of the direct effect of Mindfulness on depression was (-10.5%), and indirect effects of Mindfulness on depression were found through anhedonia as a mediating variable with a percentage of (-58.4%), and the total effects of Mindfulness on depression were found through anhedonia as a mediating variable with a percentage of (-68.9%). The model can be illustrated by Figure (6):



**Figure (6)** The structural model of anhedonia as a mediating variable between Mindfulness and depression.

**Discussion:**

**Discussion of the results of the first research: (the results of the first to fifth hypotheses):**

The results of the first to fourth hypotheses indicate the multiplicity of factors that consist of the factorial structure for each sub-scale of the Anhedonia List (cognitive, emotional, social, physical), and the results of the factor analysis indicate that there are three factors (levels) for each sub-scale, which were named desire, effort and experience.

This result is consistent with the internal description of the structure of anhedonia described by the Diagnostic and Statistical Manual of Mental

Disorders Fifth (2013) and 5-TR (2022), where anhedonia was described at three levels: the lack of enjoyment or participation in life experiences (experience) or expend energy for it (effort); and the inability to feel pleasure and interest in things (desire). (APA, 2013).

The result of the hypotheses can be explained in the light of the theoretical literature of the concept of anhedonia, which indicates that the construction of anhedonia includes multiple levels. (Rizvi et al., 2015; Snaith et al., 1995, Gard et al., 2006;). The depression scales included many of the features that are indicative of depression and anhedonia as a main symptom, which is measured based on multiple levels. (Hamilton, 1960; Rizvi et al., 2016). They can be reduced to the levels emphasized in the current research (Desire, Effort, Experience).

The deficiency may be in one or all of the three stages, depending on the nature of the problem or disorder that the individual suffers from. For example, in schizophrenia, anhedonia is not characterized by decreased pleasure experience (experience), but decreased pleasure-seeking behavior (effort) and decreased pleasure beliefs (desire). Instead, anhedonia reflects a set of low-pleasure beliefs that emerge when patients are asked to report their non-current feelings. Encryption and retrieval processes may maintain these beliefs despite pleasurable real-world experiences (Strauss & Gold, 2012). Hence the term "anhedonia" as the former as experiencing the pleasurable experience; Being in two dimensions (physical and social) is no longer appropriate in describing a schizophrenic person, because schizophrenia is not characterized by a lack of experiential pleasure.

A depressed patient may be deficient in almost all levels of anhedonia, as evidenced by the diagnosis of anhedonia in the Hamilton Depression Rating Scale, where the anhedonia component is measured as a structure with dimensions that represent desire, effort and consummatory pleasure: "Loss of

desire, effort and consummatory pleasure: interest in activities”, “reduction in real time spent in activities”, “experience of pleasure”. (Hamilton, 1960; Rizvi et al., 2016). the Beck Depression List included (Beck et al., 1996) multiple levels of anhedonia diagnosis include: loss of pleasure (item 4), loss of interest in people (item 12), loss of energy (item 15), and loss of interest in sex (item 21). Thus, the representation of levels of anhedonia in three levels (desire, effort, experience) may be in agreement with the results of research that sees the different nature of anhedonia from one disorder to another. (Strauss & Gold, 2012; Hamilton, 1960; Rizvi et al., 2016; Beck et al., 1996).

The current classification of anhedonia levels (desire, effort, experience) supports the presentation of anhedonia from one patient to another, and from one disorder to another, as many prominent clinicians have noted the marked variation in how anhedonia appears from one patient to another. (Whitton & Pizzagalli, 2022). Results from neuropsychological and neurobiological studies revealed a multifaceted re-concept emphasizing different aspects of the hedonic function, including desire, effort/motivation, expectation, and total pleasure. (Rizvi, et al., 2016). The opinion of Jordan et al. (2018) that two relatively distinct aspects of anhedonia are: (1) a lack of looking forward to pleasurable events (i.e. anticipatory anhedonia) and (2) a lack of pleasure from momentary experiences (consummatory anhedonia).

The results of the **fifth hypothesis** indicated that the factors constituting the global structure of the list of anhedonia fall under one year among university students, and these factors (sub-scales) are: cognitive, emotional, social, and physical anhedonia. These results may contradict the results of research that reduced human enjoyment to two dimensions (Rizvi et al., 2015; Chapman et al., 1976) and focused on the social and physical aspect for many years, and neglected the cognitive and emotional aspect, which revealed their importance in the course of the disorder. or disease. (Toren et al; Sirota et al., 2018; Tariq

et al. 2021; Platt et al., 2017; Müller et al., 2019; Yüksel et al., 2019; Capobianco et al., 2020; Watson & Naragon -Gainy, 2010; Onur et al., 2013; Palm et al., 2011; Paniccia et al., 2018; Cisler & Olatunji, 2012; Sirota et al., 2018).

Diener et al. (1998) have criticized the Limited Concept of Anhedonia; they stated that happiness cannot be reduced to physical hedonism, as it can be derived from the achievement of goals or valuable outcomes in a variety of areas. More recently, psychologists who have adopted the hedonistic view have focused on a broad concept of hedonism that includes the preferences and pleasures of the mind and body (Kubovy, 1999). This is expressed in the current research by the components of the anhedonia list. It was recommended by Gourion et al. (2016) as the importance of assessing anhedonia in primary care.

The results of the fifth hypothesis are consistent with the results of the research that indicated the expansion of the concept of anhedonia to include multiple fields that include various aspects of the individual. (Strauss & Gold, 2012; Kubovy, 1999). Strauss and Gold (2012) emphasized the presence of three components of anhedonia: the behavioral, cognitive, and emotional component. Barkus (2021) recommended that anhedonia should be developed beyond explanations of reward processing to provide cognitive, social, and emotional processes applicable to the general human experience.

The current research settled on representing these aspects in the four domains that make up the current list of anhedonia, which includes four sub-scales: (1) the cognitive anhedonia scale, (2) the emotional anhedonia scale, (3) the social anhedonia scale, (4) the physical anhedonia, each sub-scale included three levels (desire, effort, experience), which the results of the current research revealed its validity and reliability on a sample of university students.

## **Discussion of the results of the second research: (the results of the hypotheses from the sixth to the tenth):**

The results of the **Sixth Hypothesis** indicated that anhedonia contributes to predicting depression among university students, as social anhedonia explains 63.5 % of the variance in depression, and cognitive anhedonia explains 6,6 % of the variance in depression, and emotional anhedonia explains 1.5 % of the variance. The variance in depression, as physical anhedonia explains 1.2% of the variance in depression, while the total degree of anhedonia explains 71.7% of the variance in depression.

The result of this hypothesis is consistent with the results of researchers indicating that anhedonia is a major symptom of depression (Shankman et al., 2010; APA, 2013; 2022), and is consistent with the results of research indicating that people with depression experience less happiness and pleasure. They have an inability to express feelings, and difficulty anticipating pleasure (Rottenberg et al., 2005; Taqavi et al., 2013; Bamonti et al., 2010; Loonen & Ivanova, 2016).

The result of this hypothesis can be explained in the light of the concept of anhedonia, which includes cognitive anhedonia, which prevents the individual from noticing and appreciating pleasant events and experiences, directing her/him to pay attention to negative emotion and unpleasant experiences that increase emotional anhedonia, isolating individual from others, leading to exacerbation social anhedonia, poor relationships with others, and inability to enjoy the environment in which s/he lives, indicating physical anhedonia, leading to more depression.

The result of this hypothesis can also be explained in the light of Beck's cognitive theory, which emphasizes the role of negative life events that have a prominent role in activating the depressive schema in the form of inflexible beliefs about self, the world and the future. This leads to more cognitive

assessments that increase their awareness and perception of life events in a way negative results in major depressive symptoms such as anhedonia and loss of activity and energy.

The results of the **Seventh Hypothesis** indicated that the sub-scales of anhedonia contribute to predicting anxiety among university students, as emotional anhedonia explains 52.2% of the variance in anxiety, social anhedonia explains 8% of the variance in anxiety, and cognitive anhedonia explains 3.9% of the variance. Variation in anxiety, Physical anhedonia explains 1.1% of the variance in anxiety, and the total degree of anhedonia explains 64.6% of the variance in anxiety.

The result of this hypothesis is consistent with the results of other research indicating that anhedonia is an indicator of anxiety, but rather a prominent symptom of individuals who suffer from anxiety and limits their response to treatment (Taylor et al., 2022; Clark & Watson, 1991). It also agrees with research findings that found a positive relationship between anhedonia and anxiety (Taylor et al., 2022; Winer, et al. 2017).

The result of the hypothesis can be explained in the light of the concept of anhedonia, which includes a lack of emotional response to the experiences of an individual (emotional anhedonia), which makes her/him unable to enjoy them, and consequently poor social communication with those around her/him and the inability to adapt to them (social anhedonia). This leads to a lower appreciation of life's pleasant events and pleasurable situations (cognitive anhedonia), which leads to a decrease in the desire to enjoy the joys of life and the environment in which the individual lives and the activities s/he practices (Physical anhedonia), which increases the individual's stress and anxiety.

This hypothesis can be explained in the light of the Acceptance-based (AB) model that explains anxiety, which indicates that the development and maintenance of anxiety results from the acceptance of traumatic internal

events, making them more prevalent, which generates more unpleasant negative feelings and exacerbates anhedonia, which is the main symptoms of anxiety.

It is clear from the results of the sixth and seventh hypotheses that anhedonia contributes significantly to the prediction of both anxiety and depression. This may be due to the high positive association between anxiety and depression, or the fact that anhedonia is a diagnostic or causative component of both disorders. This was confirmed by the findings of Winer, et al. (2017) in their first research reaching that symptoms of anxiety and depression are positively correlated only in individuals who have given up potential enjoyment because of their anxiety-related avoidance. In the second research, the indirect effect of anhedonia helped in explaining how anxiety symptoms transfer risk to depressive symptoms. In Research 3, anxiety led to anhedonia and later to depression over time, and anhedonia led to anxiety and then depression at both 5 and 11 months. Anhedonia mediates the relationship between anxiety and depression transversely and over time, so some individuals avoid potentially enjoyable activities because of anxiety, resulting in a loss of pleasure and other depressive symptoms.

The presence of anhedonia in both anxiety and depression can be explained by the fact that both conditions are stress-induced, and stress - acute or chronic - is regularly accompanied and followed by anhedonia in humans. (Van't Veer & Carlezon, 2013; Pizzagalli et al., 2007; Kashdan et al., 2006).

The results of the **Eighth Hypothesis** indicated that Mindfulness contributes to predicting depression among university students, as it explains 47.3% of the variance in depression, in agreement with the results of research that indicated the existence of a relationship between Mindfulness and depression (Cisler & Olatunji, 2012; Sharma & Kumra, 2022). The result of this hypothesis is in

agreement with the findings of Barcaccia et al. (2022) which indicated that Mindfulness explains 30% of depression.

The result of this hypothesis can be explained in the light of the cognitive factors that contribute to the explanation of depression, as it arises from distorted cognitive experiences that the individual acquires as a result of her/his interpretation of the events and life situations s/he is going through, and this contradicts the practices of mental vigilance that arise from awareness, concentration in the moment, enjoying it and not making judgments on it, which leads to It makes it a negative predictor of depression.

The results of the **Ninth Hypothesis** indicated that Mindfulness contributes to predicting anxiety among university students, as it explains 42.1% of the variance in anxiety. The result of this hypothesis is combined with the results of the research of Barcaccia et al. (2022) which indicated that Mindfulness explains 40% of anxiety.

The result of this hypothesis can be explained in the light of the metacognitive model, indicating that anxiety occurs as a result of response to external events that are perceived as threatening, and is opposed to the concept of Mindfulness, which refers to increased awareness and focuses on the current situation and not making judgments on it.

The results of the **Tenth Hypothesis** indicate the existence of a structural model explaining the relationship between Mindfulness, depression and anxiety in the presence of anhedonia as a mediating variable among university students, where direct effects were found for the relationship between the research variables; the percentage of the direct effect of Mindfulness on anxiety was (-14.9%), and indirect effects of Mindfulness on anxiety were found through anhedonia as a mediating variable with a percentage of (-50.1%),and the total effects of Mindfulness on anxiety were found through anhedonia as a mediating variable with a percentage of (-65 %).

Concerning depression, the percentage of the direct effect of Mindfulness on depression was (-10.5%), and indirect effects of Mindfulness on depression were found through anhedonia as a mediating variable with a percentage of (-58.4%), and the total effects of Mindfulness on depression were found through anhedonia as a mediating variable with a percentage of (-68.9%).

It also means that whenever Mindfulness is (1%), the level of anxiety decreases by (14,9 %), and that reducing anhedonia as a mediating variable in the relationship between them contributes to reducing anxiety by (50,1 %), which indicates that increasing Mindfulness contributes to reducing anxiety by (65%). Reducing anhedonia contributes to (50,1%) of the total.

This result means that whenever Mindfulness is (1%), the level of depression decreases by (10,5%), and reducing anhedonia as a mediating variable in the relationship between them contributes to reducing depression by (58,4 %), which indicates that increasing Mindfulness contributes to reducing depression by (68.9%). Reducing anhedonia contributes (58,4 %) of the total.

The result of this hypothesis confirms that the higher level of Mindfulness contributes to a decrease in depression and anxiety among university students, and the reduction of anhedonia increases the indirect effects of Mindfulness on depression and anxiety.

The result of this hypothesis is consistent with the findings of Barcaccia et al. (2022), indicating that Mindfulness is the strongest protective factor against depressive tendencies and anxiety, and is in agreement with the results of Bajaj et al. (2016) which indicated a direct effect of Mindfulness on depression and anxiety. The result of this hypothesis is consistent with the findings of Watkins et al. (2022) which indicated that Mindfulness may act as an anxiety buffer. It also agrees with the findings of Parmentier et al. (2019) which indicated that there is a direct statistically significant effect of Mindfulness on anxiety and depression, and a statistically significant indirect effect through strategies for

regulating emotions, suppression, re-evaluation, rumination, and stress. The results also confirmed that increasing Mindfulness contributes to lower levels of anxiety and depression.

The result of this hypothesis is also consistent with the results of research by Thomas and Garland (2017), which indicated that there is a positive relationship between Mindfulness and the ability to enjoy, and that interventions that increase Mindfulness enhance the ability to enjoy and thus reduce pain.

The result of this hypothesis can be explained by considering Mindfulness as a protective mechanism that contributes to reducing depression by reducing the anhedonia experienced by the individual. Living in an enjoyable situation and a pleasant experience, contributes to reducing anhedonia, and consequently, decreases the severity of depression. Mindfulness also improves the individual's ability to regulate her/his emotions and cognitive functions, such as paying attention to the pleasant situations experienced by the individual, and then enhancing openness and sensitivity to emotional changes, and then enjoying pleasure and reducing anxiety.

Anhedonia played a mediating role between Mindfulness and both anxiety and depression in the current research, and this is consistent with the results of research that confirmed the mediating role of anhedonia between anxiety and depression and other variables, where the results of Gorwood (2008) research confirmed that anhedonia plays an intermediate role as an intermediate phenotype (endotype) between the respective risk factors and depression. In the findings of Nagata and Kono (2022), mediation analyzes showed that the relationship between depression and leisure-time meaning-making was fully mediated by anhedonia. The results of the research by Gourion et al. (2016) as well indicated that improvement in anhedonia is an important mediating

variable between the development of depressive symptoms and social functioning, explaining about a third of the model variance (35.37%).

This can be explained from a behavioral perspective as it indicates that anhedonia may be due to decreased motivation to take goal-directed actions, where decreased awareness of pleasurable experiences contributes to increased depression and anxiety, so mindfulness-oriented interventions contribute to increasing an individual's focus on pleasurable experiences and reward response. Naturalness and the ability to regulate its emotions in reducing anhedonia and reducing anxiety and depression, which is a major symptom of depression and other various psychological disorders.

Accordingly, individuals with high Mindfulness are more able to enjoy life by increasing awareness of pleasant experiences by paying attention to the current situation and dealing effectively with negative intrusive thoughts and feelings and stressful events that provoke negative feelings and then increase participation in the behavior of searching for reward that leads to the pleasure of pleasure, and their ability to regulate their emotions grows and multiplies instead of directing their attention to past events and painful internal experiences that lead to a lack of pleasure in pleasurable situations and that contributes to reduce anxiety and depression.

In light of this, it can be said that the practices of Mindfulness are like lighting a lamp that generates new insight that represents a shift in perception, not a shift in thinking. Awareness of pleasant situations, stimulates the desire for pleasure, and exerts effort to experience pleasant experiences, thus reducing anxiety and depression to which a person is exposed.

## **Applications:**

In the current research, an Anhedonia List was built and developed based on the researchers' recommendations and what was indicated by the Diagnostic Manual of Mental Disorders and its fifth (2013) and 5-TR (2022), and its validity, reliability and construction were verified on a sample of university students to be an important measurement tool. It is used for research, diagnostic and therapeutic purposes. The Anhedonia List is an accurate tool for evaluating all aspects of hedonic and across various levels, making it an appropriate tool in distinguishing between one person and another, as well as between one disorder and another, with its large extent of anhedonia.

In the current research, a structural model was reached that explains the mediating role of anhedonia between Mindfulness and both depression and anxiety, which can be used to explain other structures of anxiety disorders, depression, personality disorders, and others.

The results of the current research indicate that Mindfulness has a direct and indirect effect on both anxiety and depression in the research sample, and that anhedonia played an important mediating role in the development of this relationship, and this was proven through the theoretical framework. It may be useful to suggest a new treatment approach based on the results of this model, which could be called Mindfulness Based Anhedonia Reduction (MBAR) Therapy as a suggested therapeutic approach to treat or reduce both anxiety and depression disorders.

This is confirmed by several researchers, as Vinckier et al. (2017) found that using multivariate regression improvement in anhedonia was the strongest predictor of improvement in psychosocial functioning. In addition, mediation tests confirmed that the association between improvement in depressive symptoms and improved social functioning was significantly supported by improvement in anhedonia over time. Separation was highly anticipated by

persistence of anhedonia. Thomas and Garland (2017) recommended that interventions that increase Mindfulness may reduce pain-related impairment among opioid-using patients by enhancing hedonic capacity. Where anhedonia was associated with pain-related interference, mindfulness was protected against such interference by being associated with a greater capacity for pleasure.

Some research findings have suggested that Mindfulness can help increase enjoyment of pleasurable experiences. (Arch et al. 2016; Hong et al. 2014) which may result in decreased anxiety and depression, as anhedonia is a major component of both. The results of the research of Watkins et al. (2022) who concluded that Mindfulness may act as a potential buffer against anxiety and is one of the strongest and most relevant protective factors against both depressive and anxious tendencies.

### **Recommendations:**

- Conducting researches to verify the psychometric properties of Abouzaid and Abdelhamid’s Anhedonia List and factor structure on other samples, and in other environments.
- Further research to verify the proposed model on other sub-disorders of anxiety and depression.
- Conducting research to verify the model on other disorders, such as personality disorders.
- Verification of the proposed therapeutic approach “Mindfulness Based Anhedonia Reduction” (MBAR) Therapy to treat or reduce anxiety and depression disorders.

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Appendix 1  
 Abouzaid – Abdelhamid Anhedonia List (AAAL)

name		Today's date	
age		job	
marital status		problem or disease you suffer from	

Dear reader:

in front of you are a set of statements that may or may not describe your feelings, please read the statement well, and explain the extent to which the statement applies to you by choosing from the alternatives presented in front of each statement, knowing that there is no right or wrong statement, but the correct one is what actually applies to you.

The first subscale: Cognitive Anhedonia Scale

Items	no	rarely	sometimes	a lot	very much
1. Enjoy picking out important details from difficult or complex tasks.	5	4	3	2	1
2. Enjoy with high-capacity activities	5	4	3	2	1
3. I enjoy my ability to act in emergency situations.	5	4	3	2	1
4. Enjoy some of my unique abilities in performing tasks and activities.	5	4	3	2	1
5. Enjoy order and organization, whether at home, work or an activity.	5	4	3	2	1
6. I can do my work with great energy and concentration.	5	4	3	2	1
7. Others praise my efficiency in performing tasks that require high mental abilities.	5	4	3	2	1
8. Enjoy performing tasks or activities even under stressful situations.	5	4	3	2	1
9. I seek to participate in contests that are challenging.	5	4	3	2	1
10. I prefer simple, detail-free activities (R)	1	2	3	4	5
11. Seek to solve difficult problems.	5	4	3	2	1
12. I am interested in employing my cognitive abilities while performing a specific activity.	5	4	3	2	1
13. I seek to participate in activities that improve the quality of my performance.	5	4	3	2	1
14. I prefer tasks that develop my mental abilities.	5	4	3	2	1
15. I feel bored when faced with a situation that demands high abilities. (R)	1	2	3	4	5
16. I prefer difficult activities or tasks.	5	4	3	2	1
17. I have the desire to search for all that is new.	5	4	3	2	1
18. Planning for new tasks is important.	5	4	3	2	1

The second subscale: the emotional anhedonia scale

items	no	rarely	sometimes	a lot	very much
1. Positive in dealing with situations.	5	4	3	2	1
2. Take care of others.	5	4	3	2	1
3. Be happy when you help the needy (the poor, the sick, or...).	5	4	3	2	1
4. I feel happy when I care about others.	5	4	3	2	1
5. Feel the excitement associated with the activities.	5	4	3	2	1
6. Enjoy the love others give me.	5	4	3	2	1
7. Enjoy the excitement that accompanies important activities. (R)	1	2	3	4	5
8. Do more to please others.	5	4	3	2	1
9. Find activities or situations that spark joy.	5	4	3	2	1
10. I try to make you happy, even if it's a boring routine.	5	4	3	2	1
11. I look forward to seeing the joyful aspects of seeing things.	5	4	3	2	1
12. Find people who need help to help them.	5	4	3	2	1
13. Repetition of activities that bring happiness are important.	5	4	3	2	1
14. People place an exaggerated importance on pleasant situations. (R)	1	2	3	4	5
15. Positive feelings are not good feelings. (R)	1	2	3	4	5
16. A smile is a defining feature in my interactions.	5	4	3	2	1
17. Ambiguity of feelings is important when dealing with others. (R)	1	2	3	4	5

The third subscale: social anhedonia scale

items	no	rarely	sometimes	a lot	very much
1. I set strong boundaries for my peers. (R)	1	2	3	4	5
2. Enjoy interacting with others.	5	4	3	2	1
3. I pretend to be happy when some of my close ones visit me. (R)	1	2	3	4	5
4. I resent being with my friends. (R)	1	2	3	4	5
5. I have a few friends. (R)	1	2	3	4	5
6. Enjoy talking with my colleagues.	5	4	3	2	1
7. I seek to contribute to social activities (charities - institutions - associations).	5	4	3	2	1
8. Make time to connect with others.	5	4	3	2	1
9. Mind the social niceties.	5	4	3	2	1
10. Make an effort to get along with others in social activities.	5	4	3	2	1
11. I try to understand other people's feelings	5	4	3	2	1
12. Group work is stressful and tiring. (R)	1	2	3	4	5
13. I think working alone is better than working with others. (R)	1	2	3	4	5
14. I miss the desire to spend the vacation with my relatives. (R)	1	2	3	4	5
15. I lose interest in attending social gatherings with others. (R)	1	2	3	4	5
16. I miss wanting to call and talk to my friends(R)	1	2	3	4	5
17. Meeting with friends or relatives is a waste of time. (R)	1	2	3	4	5

The fourth subscale: physical anhedonia

items	no	rarely	sometimes	a lot	very much
1. I enjoy meditating on the elements of nature surrounding me (sunset - stars - rain,....etc).	5	4	3	2	1
2. Enjoy the vigor and energy that overwhelms me.	5	4	3	2	1
3. I get along while doing things that excite my senses.	5	4	3	2	1
4. I miss enjoying my favorite food. (R)	1	2	3	4	5
5. I feel the enjoyment of water while taking a shower.	5	4	3	2	1
6. I miss having fun with my hobbies. (R)	1	2	3	4	5
7. Enjoy the lather in the shower.	5	4	3	2	1
8. I do my best to enjoy physical activities (ie: a walk, a home workout, a game, etc.).	5	4	3	2	1
9. Make sure I have time to relax.	5	4	3	2	1
10. Look for places with attractive natural appearances.	5	4	3	2	1
11. Allocate time for natural walks (walking, going to public places,....etc).	5	4	3	2	1
12. I try to appear aesthetically appropriate.	5	4	3	2	1
13. Enjoying nature is essential for physical well-being.	5	4	3	2	1
14. I miss hugging those close to me. (R)	1	2	3	4	5
15. Going for a walk is not as fun as it used to be. (R).	1	2	3	4	5
16. Massage or massage is an unnecessary imitation. (R)	1	2	3	4	5
17. I always look at beautiful things.	5	4	3	2	1

Assessment Summary

Subscale and levels	Experience	Sum1	Effort	Sum2	desire	Sum3	1+2+3= total
CA	items 1-8		Items from 9 -13		Items 14-18		
EA	Items 1-7		Items 8-12		Items from 13-17		
SA	Items 1-6		Items from 7 -11		Items from 12-17		
PA	Items 1-7		Items 8-12		Items from 13-17		