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The Relative Contribution of Positive And Negative Academic Emotions In Predicting Cognitive Failure in University Students

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Abstract

The study aimed to detect the level of cognitive failure among King Khalid University students, as well as to find out the relative contribution of positive and negative academic emotions in predicting their cognitive failure. The research sample consisted of (185) randomly selected female students from King Khalid University with an average age of (21.88) years and a standard deviation of (2.44). A measure of achievement emotions and cognitive failure was applied to them. The results came to There is statistically significant differences at the level of (0,01) between the hypothetical mean and the experimental mean on the cognitive failure scale among the members of the research sample in favor of the hypothetical mean in the total score on the scale, this means that there is a lower than mean (low) level of cognitive failure among the sample members.- For the sub-dimensions :For the first dimension (memory errors), there are statistically significant differences at the level of (0,01) between the hypothetical mean and the experimental mean of the degrees of the first dimension in favor of the hypothetical mean, which means that there is a lower-than mean (low) level of memory errors among the sample members. For the second and third dimensions, there are no statistically significant differences between the hypothetical mean and the experimental mean of the degrees of the second and third dimensions, which means that there is an average level of attention errors and gross errors in the research sample. and Cognitive failure can be predicted significally through the variables of positive and negative academic emotions, where the value of F= (551.111) significant at the level of 0.01.The percentage of the contribution of the predictor variables (positive and negative academic emotions) to the variation in the dependent variable (with cognitive failure) = 85% (R2 value=0.85) .There is a statistical significance at the level of (0,01) for the regression coefficients of positive and negative academic emotions and reached a beta value, respectively (0.679,0.293), which indicates that positive academic emotions have a greater predictive ability (greater contribution) in predicting cognitive failure compared to negative academic emotions in predicting cognitive failure.

Keywords: cognitive failure, achievement emotions

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Introduction

Cognitive errors are part of our daily lives, and these errors include distraction, gross errors, memory lapses, omissions, and attentional and cognitive errors (Singh &Rattan, 2017). Making mistakes or failing at tasks is common in life, but how people deal with this failure has big differences in their happiness and success in the future. (Fredrickson & Joiner, 2002; Ryan & Deci,2000).

Also, an individual may sometimes find himself in a situation where it is difficult for him to explain his presence in that situation, or he fails to perform the requirements of a task that he used to do periodically and almost daily, and he may have read something and found himself did not understand or did not remember what he should do from reading that thing and needs to reread that text. Such mistakes and

failures that an individual makes in his daily life have been called failures or cognitive failures (Al-Saadi, 2017).

Many students suffer from failure to complete educational tasks despite their ability to complete them in general as a result of cognitive failure , which is associated with the emotions they feel during study, especially negative emotions such as anxiety, boredom, anger Wallace, 2004). The results of studies in the field of Learning confirmed that emotions affect most of the cognitive processes that contribute to learning, such as: attention, perception, decision-making and memory processes; those processes in which failure leads to cognitive failure; cognitive failure occurs when an individual's mind is busy and the mood is unstable. (Clore&Huntsinger,2007,2009; Loewenstein &Lerner ,2003; Yamanaka,2003).

emotions in general affect human learning, Good learning means recognizing the feelings, emotions, beliefs, desires, problems and orientations of students, and occurs with the full participation of feelings, emotions, mind and body (Shalabi, 2017). Students feel many emotions when they are present in the classroom and performing assignments and tests, including negative emotions such as anger, shame, or boredom, and positive emotions such as pride or enjoyment; as these emotions affect the learning and academic achievement of students and their academic integration. (Pekrun et al., 2002; Pekrun, 2011).

students experience a variety of emotions in the educational environment, some enjoy learning new subjects while others feel bored or shy in the classroom, while some are proud of their academic achievements, and others feel anxious before and during tests. These emotions that students feel in the educational environment are called achievement emotions or academic emotions. The results of the studies have supported the influence of these emotions on classroom interactions, learning, students ' academic achievement, their academic integration and the formation of their personality growth and development (Pekrun et al., 2002; Pekrun, et al., 2009; Pekrun et al., 2011; linnenbrink, 2007).

Academic emotions refer to those emotions related to achievement outcomes (e.g. anxiety, pride, shame associated with success or failure) or activities related to achievement and learning processes (e.g. enjoyment of learning, boredom, anger (pekrun et al.,2002).

Achievement emotions can be classified in the light of three dimensions Object focus, valence, activation .As for the Object focus, the individual may focus on achievement activities or focus on outputs . As for parity, emotions are classified into positive or pleasant (enjoyment, hope, pride, happiness, satisfaction), and negative emotions (anger, despair, anxiety, sadness, shame) . As for the degree of activation of emotions, which refers to a state of emotional activation that puts a person in physiological states when responding to emotional experiences. During the state of activation or activation emotions, we can refer to emotions of happiness, hope, pride, anxiety, anger, anxiety. Whereas in the case of emotional inactivity or de-energized emotions we can identify emotions such as satisfaction, contentment, despair, boredom. (Pekrun,et al.,2007)

Achievement emotions are one of the important foundations of learning for two reasons: First, They affect students ' interests, integration, achievement, and personal growth. Secondly, it is an essential pillar for mental health and happiness, which means that it should be taken into account as an important educational outcome in its own right (Pekrun,et al., 2006).Therefore, studying the learner's emotions during the acquisition of educational experiences is an important thing that cannot be separated from learning experiences, and understanding the nature of those emotions in the context of the educational process may lead to improving the educational and pedagogical strategies used (El Gamal, Rekha, 2015).

The control – Value theory of achievement emotions by (Pekrun,2006) provided the theoretical basis of academic emotions, through which the emotional dynamics was explained in relation to the characteristics that characterize educational situations, where it assumes that students ' emotions are influenced by their perceptions of efficiency and control /control during academic activities and outputs as well as their estimates of the value of these activities and outputs. This theory has developed an integrated theoretical framework for analyzing the impact of antecedents (previous events) and emotional experiences on achievement and academic contexts. The most important postulates and

foundations developed by the theory of (Pekrun,2006) to explain the collecting emotions can be summarized as follows:

The theory identified two groups of assessments that are important for achievement emotions:

1-self-control through achievement activities and their results (such as the expectation that perseverance in study can be activated and will lead to success) 2-the subjective value of these activities and outputs (example: perceived value of success). The following assessments of control and value are important for eliciting emotions of attainment. The theory assumes that emotions related to the expected output (e.g., hope, anxiety), emotions related to the retrospective effect of outputs, emotions related to achievement activities are determined by evaluating antecedents (past events).

Learning emotions can be momentary or temporary, occurring in a certain situation at a certain point in time (for example, the test anxiety state that we feel before the test), and they can also be a habit or trait (repetitive emotions) that an individual feels in connection with certain learning activities or outputs (for example, test anxiety as a trait).

The theory assumes that achievement emotions arise and are determined in the light of a set of factors and determinants, the most important of which are: achievement goals, personal past experiences, previous social and cultural experiences, cognitive sources as follows:

A-achievement goals: where goals affect knowledge and emotion, mastery goals make students focus their attention on learning activities while performance goals make them focus on learning outcomes.

B-personal experiences (antecedents): beliefs are acquired through repeated exposure to situations of achievement, and in the absence of sufficient experience, assessments can be based on more general expectations.

C-cultural and social experiences: the emotional impact of social environments is carried out through value assessments and control; the characteristics of the environment send information related to the possibility of control or control and academic assessments, which are of crucial importance for the emotions of students.

D-cognitive sources: positive and negative emotions can consume cognitive sources by focusing attention on the subject of emotion, which means that they can reduce the cognitive sources required for the objectives of the task and impair the cognitive performance that needs these sources.

The final effects of emotions on academic achievement depend on the interaction of these previous mechanisms on the one hand and the requirements of the task on the other (Pekrun,2006) On the other hand, cognitive failure is related to the inability of an individual to successfully perform tasks that he is usually able to do on a daily basis . this failure in daily activities is due to basic problems in general cognitive functions associated with distraction and memory, which is known as individual errors based on cognitive foundations, which sometimes hinder an individual from accomplishing a task that he used to accomplish in later times easily and conveniently (Paynt &Schnapp, 2014).

Al-Saadi (2017) emphasizes that an individual's failure to remember a piece of information, or his failure to produce an appropriate response to a particular stimulus, is often associated with cognitive failure in other areas such as perception and analysis, which are an important factor in producing a response .

Broadbent, in his theory of the interpretation of attention (filter theory), links cognitive failure with an excessive burden on attention and short-term memory as a result of the crowding of information from sensory channels to the selective filter; cognitive failure may occur through the failure of the individual to identify the most important stimulus so that the selective filter allows it to pass and instead cross another stimulus to short-term memory with limited capacity, and failure may also occur due to the difficulty of retrieving information as a result of the short period of time in which the information is processed.

Cognitive failure occurs when the procedural system fails to mediate between the cognitive system and the memory system, and this failure is due to many reasons, some related to the individual and others related to the information itself (Broadbent et al. 1982).

Kumke (2008) indicates that preoccupation with things unrelated to the task, negative self-assessment, immersion in negative thoughts and feeling negative emotions such as anxiety lead a person to inattention to information during the performance of the task and then a failure or cognitive failure, resulting in a feeling of anxiety about the task to be performed. Cognitive failure is often of an emotional nature, so it does not differ in nature from the rest of the other psychological variables that affect and are influenced by various cognitive processes.[6]]

Payne & Schnapp (2014) emphasize the need to explore the extent to which cognitive errors and failures are related to emotional experiences. The Cassady &Johnson study (2002) confirmed that students with high anxiety do not have the ability to retrieve important information and are not well prepared for the exam, which leads to cognitive failure. The results also supported a positive correlation between experiences of negative emotions and cognitive failure.

From the previous presentation, it is assumed that there is a relationship between the occurrence of cognitive failure in students and the emotions they feel during achievement, especially negative achievement emotions such as anxiety, boredom and anger.

Therefore, the current research adopted the idea of predicting cognitive failure from positive and negative academic emotions among university students.

The Arab psychological research heritage lacks – within the limits of the researcher's knowledge-studies that have dealt with the current research topic and that link academic emotions and cognitive failure. In their presentation of previous studies, the researchers focused on studies and research that have a direct correlation with the variables of research, achievement emotions, and cognitive failure.

In a study by Pekrun, et. al (2002) aimed to examine students ' emotional experiences in academic situations and their relationship to some variables using the identification of achievement emotions in the light of the cognitive-motivational model and the theory of control-value, the study used samples of university students (230, 222) .The analyses showed that students 'experience includes various emotions in academic situations such as hope, pride, satisfaction, anger, anxiety, shame, despair, and hope, and that these achievement emotions were significantly associated with students' motivation, learning strategies, cognitive sources and academic achievement .

The Yamanaka(2003) study aimed to examine the relationship between naturally occurring cognitive failures and mood, and the study was conducted on(36) adults. Cognitive failure has been classified into three types:(attentional failure, memory failure, and procedural failure). The results have shown the occurrence of procedural failures and memory failures in the case of depressed mood and high excitability.

The study of Al-far and Al-Subaie (2014) aimed to identify the predictive ability of executive cognitive functions and the five major factors of personality in cognitive failure in a sample of 184 female students at Umm Al-Qura University, a short list was applied to them to measure the disorder in executive functions and the five major factors of personality and identify cognitive failure .The results indicated that all executive cognitive functions and two of the five major factors (extraversion, mastery) predict the sample vocabulary scores in cognitive failure .The logistic regression analysis also indicated that the predictive model is represented by only four variables: cessation, emotional control and planning Follow-up can distinguish between low and high in cognitive failure .

The Payne & Schnapp study (2014) aimed to study the relationship between negative feelings and emotions (such as depression, anxiety, fear) and reported problems in jobs and daily activities, which were measured through the cognitive failure questionnaire, which was applied to(129) university

students in addition to the positive and negative emotion scale. The results found that negative emotion experiences were positively associated with memory and attention failures on the cognitive failure scale while positive emotions were negatively associated with distraction.

A Study(2017) by Adeneye & Odogwu explored cognitive failures in mathematics and their relationship to math anxiety and the study was conducted on a sample of(450) teachers from four public universities to whom the cognitive failures / errors in mathematics and the math anxiety scale were applied. The results showed that cognitive failure in mathematics is a multidimensional construct consisting of: lack of concentration, motor function, memory, distraction), and the results also found statistically significant differences in cognitive errors /failures depending on the level of math anxiety.

The study examined Nelson, et al.(2018) possible effects of emotional responses versus cognitive responses to failure on effort expended .The study was conducted on (88) university students .The study found that focusing on emotion after cognitive failure leads individuals to exert more effort compared to those who focus on knowledge.

The Konen & Karbach Study (2018) also aimed to examine the relationship between cognitive failure and the five major factors of personality and the factors of latent cognitive abilities (processing speed, memory, handedness) using the method of structural equation modeling .the study was conducted on a sample of 176 adults aged (19-39) years applied to a cognitive failure questionnaire and cognitive performance tasks to measure the three latent factors. The study found no correlation between the three factors of cognitive abilities and cognitive failure, and also found significant correlations with personality factors (conscience, neuroticism).

The study of Jamal et al. (2018) aimed to identify attention control and cognitive failure among high and low test anxiety of university students, the sample consisted of (541) students at the Faculty of Education –Zagazig University, the attention Control Scale, cognitive failure scale and test anxiety scale were applied to them, and the results of the study found the presence of cognitive failure with a high degree of high there were no significant differences in cognitive failure attributable to the type or specialty variable.

Research question

Q1-What is the level of cognitive failure among King Khalid University female students.

Q2-does the relative contribution of academic emotions differ in predicting cognitive failure among female students of King Khalid University.

Aimes of Research:

The current Research aimed to :

1- Identifying the level of cognitive failure among King Khalid University female students

2-revealing the relative contribution of positive and negative academic emotions in predicting cognitive failure among female students of King Khalid University

Research Hypothesis:

In the light of the results of previous studies, the research hypotheses can be formulated as follows:

1 There is no statistically significant differences between the hypothetical mean and the mean sample scores on the cognitive failure scale among students of King Khalid University.

2-the relative contribution of academic emotions (positive, negative) differs in predicting cognitive failure among students of King Khalid University.

Methods:

Participants:

A-the psychometric competence sample of the instruments and the basic research sample. The number of psychometric proficiency sample was (75) female students of King Khalid University Abha, and their average their average age was (21.2) with a standard deviation (1.69).

B- The main research sample consisted of (185) randomly selected female students of King Khalid University Abha, Abha, with an average age of (21.88) years with a standard deviation(2.44).

Measurers:

The research tools included: 1- Academic emotion scale: 2- Cognitive failure scale, the following is a detailed presentation of these tools and their psychometric characteristics

1- Academic emotion scale:

Description of the scale: the scale aims to assess emotions associated with achievement activities in academic situations and consists of (40) items answered according to the five-point Likert scale (fully applicable, highly applicable, moderately applicable, little applicable, never applicable) distributed over eight emotion sub-scales, three of which measure positive emotions (hope, pride, enjoyment) and five to measure negative emotions (despair, anxiety, anger, boredom, shyness) where each emotion is measured by a sub-scale consisting of five phrases. The scores of the three positive emotion sub-scales can be combined to obtain a total score for positive emotions, as well as combining the five negative emotion sub-scales to obtain a total score express negative emotions.

Psychometric characteristics

The scale was applied to the psychometric competence sample of (75) university female students

And the psychometric characteristics of the scale were verified as follows

A- Constructive validity:

The correlation coefficients were calculated between the degree of each item score and the total score on the scale after deleting the item score, and the values of the correlation coefficients ranged between (0.58 to 0.69) and were all statistically significant at the level of (0.01).

The correlation coefficients between the degree of the item and the degree of emotion to which it belongs after deleting the degree of the item were calculated as follows: 1 – enjoyment: the values of the coefficients ranged between (0.50-0.67), which is statistically significant, 2 – Hope: ranged between (0.51-0.72), which is a statistical function, 3 – pride : ranged between (0.59-0.69), which is a statistically significant, 4 – shyness: ranged between (0.67-0.78) which is statistically significant, 5-Elias: ranged between (0.52-0.66) which is statistically significant, 6 – anxiety ranged between (0.57 - 0.68) which is statistically significant, 7 – anger ranged between (0.55 - 0.69) which is statistically significant ,8 – boredom ranged between (0.52-0.69) which is statistically significant.

B- reliability of the scale:

The reliability of the scale was verified by calculating the stability coefficient of Alpha cronbach

for the scale as a whole, where its value was (0,88) and its value was for each of the eight sub-scales of positive and negative emotions,(0.77,0.75,0.75,0.79,0.85,0.78,0.76,0.87) respectively.

The reliability of the scale was also verified by the Spearman-Brown equation, where the coefficient of total stability of the scale reached (0.82).

2- Cognitive failure scale

Description of the scale: The scale consists of (27) items aimed to measuring cognitive failure or failure distributed over three dimensions, namely: memory errors, attention and distraction errors, gross errors, and each dimension includes (9) items and the response to the items is given in light of a five-fold gradient (always, often, sometimes, rarely, never) and grades are estimated(5,4,3,2,1)

Psychometric characteristics

The scale was applied to the psychometric competence sample of (75) university female students

And the psychometric characteristics of the scale were verified as follows:

A- Constructive validity:

The correlation coefficients were calculated between the degree of each item score and the total score on the scale after deleting the item score, and the values of the correlation coefficients ranged between (0.57, to 0.70) and were all statistically significant. the correlation coefficients were also calculated between the phrase score and the degree of the dimension to which it belongs after deleting the phrase score as follows :1. after memory errors, the coefficient values ranged between (0.69-0.77) and were all statistically significant, 2. after attention errors ranged between (0.59 – 0.75) and they were all a function statistically, 3 - after the critical errors ranged between (0.56 -0.69) and they were all statistically significant.

B- reliability of the scale:

The reliability of the scale was verified by calculating the stability coefficient of Alpha cronbach for the scale as a whole, where its value was (0,94) and its value for the three dimensions was, respectively: (0.86, 0.85, 0.76).

The reliability of the scale was also verified by the Spearman-Brown equation, where the coefficient of total stability of the scale reached (0.82).

The reliability of the scale was also checked by using the Spearman-Brown equation, where the coefficient of total stability of the scale reached (0.87) and its value for three dimensions, respectively: (0.83, 0.74, 0.75).

Search results:

Result of H1:

It states that: There is no statistically significant differences between the hypothetical mean and the experimental mean scores of the sample on the cognitive failure scale among King Khalid University students"

To test the validity of this hypothesis, the mean and standard deviations of the scores of the respondents were calculated on the cognitive failure scale and the hypothetical mean was calculated on the scale itself

The "T" test was used for one sample to verify the significance of the differences between the hypothetical mean and the experimental mean on the cognitive failure scale, and table (1) shows the results of this

Table (1) The results of the "T" test of one sample for the differences between the score of the experimental average and the hypothetical average on the cognitive failure scale (n=185)

Dimensions	Number of items	experimental mean	standard deviation	hypothetical mean	T	df	sig	level

Memory errors	9	23.227	7.150	27	7.171	184	0.01	low
Attention errors	9	26.7	7.267	27	7.49	184	no	Average
Gross errors	9	26.4	6.983	27	1.421	184	no	Average
Total	27	76.09	19.55	81	3.41	184	0.01	low

table (1) shows There is statistically significant differences at the level of (0,01) between the hypothetical mean and the experimental mean on the cognitive failure scale among the members of the research sample in favor of the hypothetical mean in the total score on the scale, this means that there is a lower than mean (low) level of cognitive failure among the sample members.

For the sub-dimensions:

* For the first dimension (memory errors), there are statistically significant differences at the level of (0,01) between the hypothetical mean and the experimental mean of the degrees of the first dimension in favor of the hypothetical mean, which means that there is a lower-than mean (low) level of memory errors among the sample members.

* For the second and third dimensions, there are no statistically significant differences between the hypothetical mean and the experimental mean of the degrees of the second and third dimensions, which means that there is an average level of attention errors and gross errors in the research sample.

discussion of the results of the first hypothesis

In the light of reason Reason theory(1988), which believes that cognitive failures occur due to a weakness in cognitive control, the result can be explained by the fact that students have a good level of cognitive control, which enhances the efficiency of attention, increases the efficiency of focusing on task requirements and inhibition of distractors, so they make fewer cognitive errors, and studies have shown that the advantages of cognitive control appear in a wide range of cognitive processes, contributing to increasing the efficiency of memory performance and increasing the number of items that can be retained in working memory, improving reading speed and comprehension by ignoring distractors during this, and processing speed(as cited in Amer, 2016), all of the above leads to a reduction in the likelihood of individuals In cognitive failures.

Broadbent et al. (1986) also explain the decrease in cognitive failure by the fact that low cognitive failures have different patterns of attention in anxiety States, than those of high cognitive failures.

The educational level ,good adaptation, the use of appropriate strategies to deal with stress, life and academic stresses, the ability to organize time, lack of procrastination, flexibility, stable emotional state and a decrease in depressive symptoms, as shown in the results of the second imposition, can also have a role in reducing cognitive failure in the subjects (Boals & Banks, 2012; Broadbent et al, 1982; Payne & schnapp, 2014; Santangelo et al, 2021).

Result of H2:

It states that: the relative contribution of academic emotions (positive, negative) differs in predicting cognitive failure among students of King Khalid University.

To test the validity of this assumption, a linear multiple Linear Regression analysis of the data was performed using the Enter method and table (2) shows the results of this

Table (2) Multiple Regression Analysis To Predict Cognitive Failure From Positive And Negative Academic Emotions

source of variance	R	R2	Sum of square	D f	mean square	F	sig
regression	0. 92	0.85	64710.125	2	32355.063	551.111	0.01
error			11800.463	201	58.709		
Total variance			76510.588	203			

table (2) shows Cognitive failure can be predicted significally through the variables of positive and negative academic emotions, where the value of F= (551.111) significant at the level of 0.01.

Table (3) Shows The Results Of The Relative Contribution Of Both Positive And Negative Academic emotions to the prediction of cognitive failure

variable	B	stand error	Beta	T	sig
constant	153.494	8.934		17.181	0.01
Positive academic emotions	-1.432	0.089	-0.679	-16.111	0.01
negative academic emotions	0.286	0.041	0.293	6.955	0.01

table (3) shows - The percentage of the contribution of the predictor variables (positive and negative academic emotions) to the variation in the dependent variable (with cognitive failure) = 85% (R2 value=0.85)

- There is a statistical significance at the level of (0,01) for the regression coefficients of positive and negative academic emotions and reached a beta value, respectively (0.679,0.293), which indicates that positive academic emotions have a greater predictive ability (greater contribution) in predicting cognitive failure compared to negative academic emotions in predicting cognitive failure.

The prediction (regression) equation can be written as:

Cognitive failure=153.494 - 0.679(positive academic emotions)+0.293(negative academic emotions)

discussion of the results of the second hypothesis

This is consistent with (Clore&Huntsinger,2007,2009; Loewenstein &Lerner ,2003; Yamanaka,2003). Which comes back failure to complete educational tasks despite their ability to complete them in general as a result of cognitive failure , which is associated with the emotions they feel during study, especially negative emotions such as anxiety, boredom, anger Wallace, 2004). The results of studies in the field of Learning confirmed that emotions affect most of the cognitive processes that contribute to learning, such as: attention, perception, decision-making and memory processes; those processes in which failure leads to cognitive failure; cognitive failure occurs when an individual's mind is busy and the mood is unstable.

students experience a variety of emotions in the educational environment, some enjoy learning new subjects while others feel bored or shy in the classroom, while some are proud of their academic achievements, and others feel anxious before and during tests. These emotions that students feel in the educational environment are called achievement emotions or academic emotions. The results of the studies have supported the influence of these emotions on classroom interactions, learning, students ' academic achievement, their academic integration and the formation of their personality growth and development (Pekrun et al., 2002; Pekrun, et al., 2009; Pekrun et al., 2011; linnenbrink, 2007).

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