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# Cognitive flexibility as a predictor of subjective vitality among university students

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**Abstract**
This study aimed to identify the differences between cognitive flexibility and subjective vitality according to specialisation background (scientific and literary), gender (male and female) and the ability of cognitive flexibility as a predictor of subjective vitality. The cognitive flexibility inventory and subjective vitality scale were applied to 189 undergraduate students in Jordan. The results showed that the highest mean of cognitive flexibility dimensions belonged to alternative flexibility, whereas control flexibility came in the second rank. The results indicated that there were statistically significant differences in alternative flexibility according to specialisation background in favour of literary background students, but no significant differences were found in control flexibility, total cognitive flexibility and total score of subjective vitality. The results also indicated that there were significant differences in alternative flexibility and the total score of cognitive flexibility according to gender for males' benefit, but no significant differences in control flexibility and the total score of subjective vitality according to gender were found. Furthermore, the subjective vitality could be predicted by cognitive flexibility.

**Keywords:** Cognitive flexibility, subjective vitality, undergraduate students, AL-Balqa Applied University, educational psychology.

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## 1. Introduction

Subjective vitality concept was used in many scientific contexts, but the main area in which this concept hesitates at present is the field of positive psychology (Selim, 2016). Self-vital is one of the main motivating characteristics towards self-realisation and self-esteem (Nix, Ryan, Manly & Deci, 1999). The concept of vitality was addressed in the light of motivation theories until the studies of Deci and Ryan (1985) on the internal motivation theory to present a new concept of self-vital have its distinct structure for it from many similar concepts.

Self-vital is defined as a state of positive alertness, efficacy, energy and positive activity (Ryan & Frederick, 1997). Peterson and Seligman (2004) defined self-vitality as a state of enjoying a high level of morale, effectiveness, vigour and euphoria, and it stimulates and motivates others to seek a life with vigour and vitality. Self-vital is an internal psychological energy that enables an individual to control and organise his thoughts, feelings and behaviours, to act in purposeful ways based on the spirit of initiative, self-efficacy, mental alertness and self-commitment and, at the same time, to positively confront the pressures and daily stressful events steadfastly and ably (Jones, Hanton & Connaughton, 2007).

Subjective vitality is seen as the logical opposite of chronic psychological fatigue syndrome, a condition in which an individual feels weak ability to resist, low motivation to live with a feeling of fatigue, general physical weakness, weak wellness, lack of desire to work and an inability to decision-making and sluggish social activity (Reeves et al., 2005). The lack of subjective vitality also increases the odds of individual suffering (Maslach, Schaufeli, Michael & Liiter, 2001).

The results of the studies have shown that learners with a high degree of subjectivity use a variety of learning strategies that increase the likelihood of academic excellence (Lepper, 1988). The results of the studies also showed a negative relationship between subjective vitality and anxiety, nervousness and external locus of control (Ryan & Frederick, 1997). Despite there is an apparent increase in the studies dealing with self-vitality around the world, the Arab studies in the field of self-vital are still few.

Self-vitality is associated with certain parts of the brain and emotional responses, and this means that when individuals are full of vitality, they are more active and productive, which contributes to coping with stress and facing challenges (Barrett, Della-Maggiore, Chouinard & Paus, 2004). Self-vital is a state characterised by positive mental energy, and it is an originated energy (Fini, Kavousian, Beigy & Emami, 2010). An individual who is self-vital feels vigilant, alert and high internal motivated, whose implications are not only evident in his productivity but also passed on to everyone who communicates with him (Peterson & Seligman, 2004).

Self-vitality requires a great deal of mental health for the individual, in addition to the other features such as contentment and ambition (Fini et al., 2010). With subject vitality, there is enough mental energy to think, withstand stress and deal with problems effectively. Self-vitality is related to both mental and physical sides (Mustafa, 2018).

Cognitive flexibility is one of the aspects of thinking that helps an individual to adapt to environmental changes, solve daily problems and generate new ideas that drive innovation. Cognitive flexibility reflects the adaptation of behaviour and thinking and promotes the

generation of ideas fluently (Barbey, Colom & Grafman, 2013). Cognitive flexibility is the ability of an individual to automatically reconnect to adapt to changing situations and demands (Chieu, 2007).

Deak and Wiseheart (2015) indicated that cognitive flexibility is the ability of an individual to build cognitive representations, constantly modify them and generate responses based on all the information available in the situation. Canas, Fajardo, Antoli and Salmeron (2005) defined it as the ability to change the cognitive strategies of an individual, which are used to address new situations. Dennis and Vander Wal (2010) also defined it as the ability to mentally transform to adapt to changing environmental influences and to produce multiple alternative solutions to difficult situations.

Cognitive flexibility expresses the individual's ability to transfer knowledge and skills across different situations and areas (Rashwan & Abdulsamie, 2017) as it is the factor that facilitates the individual to adapt situations and events and contributes to solve problems and proper social interaction (Bilgin, 2009). It includes the ability of an individual to adjust his ideas to adapt to new situations, and this includes abandoning old beliefs and habits to adapt to the new situation (Canas et al., 2005). Students who are described as high cognitive flexibility are those who generate self-knowledge and experience necessary to achieve specific goals they seek (Zimmerman & Schunk, 1989). Furthermore, they pay attention effectively to the experiences provided to them and integrate the experience and training in it to summon them in a manner appropriate to the situation. They also modify and organise the knowledge to achieve the expected results (Zimmerman & Schunk, 1989).

Higher cognitive flexibility enhances the positive aspects of the individual and increases his ability to sound social interaction, whereas lower cognitive flexibility reduces the individual's ability to use social and emotional information (Gokeen, Petrides, Hudry, Frederickson & Smillie, 2014). Students with high cognitive flexibility generate self-knowledge to achieve specific goals by adjusting the knowledge that they receive in light of their past experiences. They easily adapt to new situations (Anderson, 2002), can cope with stress (Altunkol, 2011), can cope with their fears to diminish (Oz, 2012), have the ability to problem-solving (Stevens, 2009), anger management (Dennis & Vander Wal, 2009) and can increasingly employ cognitive strategies for self-regulation and actively pay attention to the experiences they provide, integrate expertise and train them to summon them in a picture appropriate to the situation (Dennis & Vander Wal, 2009). More benefits from feeding feedback that they receive from the teacher are considered valuable (Malachowski, Martin & Vallade, 2011), and the cognitive flexibility has positively correlated with helping skills, self-efficacy and self-efficacy (Malkoc & Sunbul, 2020).

The individuals with cognitive flexibility skills also have better skills in attention and behaviour regulation and can also switch between tasks in a way that facilitate the control of their attention and behaviour (Farrant, Maybery & Fletcher, 2012; Kim & Omizo, 2003). Cognitive flexibility distances the individual from intellectual stagnation, allows him to change the angles of his thinking and accepts the views of the other different and contradicting views, and all these reflect on his life success and his psychological happiness feeling (Qasim & Abdullat, 2018). The cognitive flexibility of an individual's behaviour provides control over his cognitive strategies, encouraging him to continue to face difficulties, and it has a positive role in

his ability to manage time and positive communication with others (Bergamin, Werlen & Siegenthaler, 2012).

One of the basic principles of cognitive flexibility theory is the transfer of the acquired knowledge in the early stages of learning to the more advanced stages. For this to happen, knowledge and information must be presented to students from multiple mental and intellectual perspectives. It then enhances the emergence of knowledge building based on the strength of the text (Carvolho & Moreira, 2005).

Cognitive flexibility can be understood in multiple ways. Cragg and Chevalier (2012) viewed it as a specific cognitive skill or cognitive ability, whereas Deak (2003) considered it as a synthesis of many cognitive processes or cognitive system. Stevens (2009) asserted that cognitive flexibility is one of the types of fluid intelligence that requires problem-solving, whereas Heather (2004) believed that it is unrelated to intelligence because smart people can be inflexible in their cognitive view of the world. Using a factor analysis, Dennis and Vander Wal (2010) concluded that there are two dimensions of cognitive flexibility: the first dimension is control, which is the tendency to perceive the complexities of the difficult situation, and the second dimension is alternatives, which means the ability to perceive multiple and alternative interpretations of difficult situations and the ability to produce alternatives.

Schopp, Shigaki, Johnstone and Kirkpatrick (2001) found that males have a weakness in cognitive flexibility compared to females. This can be explained by the fact that the progesterone hormone in females has a protective role and protects the brain in case of injury and that males have a lower working memory, as working memory contributes to improve cognitive flexibility. It leads to a greater understanding and interpretation of cognitive flexibility, and there is a relationship between cognitive flexibility and working memory as two of the executive functions of the brain (Matthew, 2012).

Through cognitive flexibility, previous knowledge is linked to new information (Deak, Ray & Pick, 2004; Lowrey & Kim, 2009), and cognitive flexibility tasks vary in content and complexity, but they all have similar characteristics; a specific approach is used to answer correctly. Then, the rule changes, and it requests the adoption of an alternative entrance (Davidson, Amso, Anderson & Diamond, 2006). The cognitive flexibility index also varies according to the age of individuals to include accuracy, latency, efficiency, or working memory capacity. Hence, precision was used with pre-school, retrograde time was used among older children and working memory capacity was used between adolescents and adults (Anniken, 2011).

People act as a basic ingredient of the vitality of any living system. Vitality is the measure of the degree of the liveliness of any individual. The vitality can be at various levels, such as physical or operational, intellectual, emotional and spiritual. There are various mechanisms for the continuous vitalisation or revitalisation of enterprises; flexibility is the central one of them, which interrelates with all others such as learning and innovation ((Professor Sushil, 2011).

Accordingly, this study aimed to identify the levels of students' cognitive flexibility and subjective vitality and the differences among them according to different variables. The variables were specialisations (scientific and literary), gender (male and female) and predictive ability of cognitive flexibility in subjective vitality**.**

### *1.1. Research questions*

This study tried to answer the following questions:

1. Are there significant differences in cognitive flexibility and its sub-skills according to students' specialisation (scientific and literary)?
2. Are there significant differences in cognitive flexibility and its sub-skills according to students' gender (females and males)?
3. Could cognitive flexibility predict critical thinking significantly?

## 2. Methods

### *2.1. Participants*

The population of this study involved the university students. The sample consisted of 189 students who were selected randomly (simple random sample) from Ajloun University College – AlBalqa Applied University in Jordan in the first semester of the academic year 2019/2020. According to gender, 146 (77%) of the participants were females, and 43 (23%) were males. According to specialty, 58 (31%) of the participants were from a scientific background, and 131 (69%) were from a literary background.

### *2.2. Instruments*

#### *2.2.1. Cognitive flexibility inventory (CFI)*

The CFI (Dennis & Vander Wal, 2010), which was translated to Arabic by Rashwan & Abdulsamie' (2017), was used to evaluate cognitive flexibility among the study sample. It consists of 20 dichotomous items rated on a 5-point Likert-type scale (from '1 = not at all true' to '5 = very true') (7 of them were negatively worded) measuring two dimensions (alternative flexibility = 13 items and control flexibility = 7 items). Possible scores on the scale ranged from 20 to 100, and a higher score indicates a higher cognitive flexibility.

#### *2.2.2. Subjective vitality scale (SVS)*

The SVS (Ryan & Frederick, 1997) was used to assess individuals' subjective vitality levels. This scale consists of seven items rated on a 7-point Likert-type scale (from '1 = not at all true' to '7 = very true'). Possible scores on the scale ranged from 7 to 49, and a higher score indicates a stronger subjective vitality. The adaptation study of SVS to Arabic was carried out by Selim (2016), which used in the current study.

#### *2.2.3. Validity of cognitive flexibility scale*

The validity of the cognitive flexibility scale was evaluated using Pearson's correlation coefficients between per item and its dimension score and also the correlation between each dimension score and the total score (see Tables 1 and 2).

Table 1. Pearson's correlation coefficients between the item score and its dimension score for cognitive flexibility test

| Alternative flexibility | | Item no. | Correlation |
|---|---|---|---|
| Item no. | Correlation | 11 | 0.41** |
| 1 | 0.26** | 12 | 0.73** |
| 2 | 0.77** | 13 | 0.30** |

| | | | |
|---|---|---|---|
| 3 | 0.77** | Control flexibility | |
| 4 | 0.66** | 14 | 0.59** |
| 5 | 0.50** | 15 | 0.75** |
| 6 | 0.73** | 16 | 0.56** |
| 7 | 0.70** | 17 | 0.64** |
| 8 | 0.80** | 18 | 0.68** |
| 9 | 0.46** | 19 | 0.21** |
| 10 | 0.52** | 20 | 0.70** |

Table 1 shows that the cognitive flexibility scale has an acceptable validity.

Table 2. Pearson's correlation coefficients between cognitive flexibility dimensions scores and the total cognitive flexibility score

| Dimension name | Pearson correlation coefficients |
|---|---|
| Alternative flexibility | 0.87** |
| Control flexibility | 0.33** |

Table 2 shows that the cognitive flexibility scale has an acceptable validity.

### *2.2.4. Validity of subjective vitality scale*

The validity of the SVS was evaluated using the Pearson's correlation coefficients between per item and the total score (see Table 3).

Table 3. Pearson's correlation coefficients between the item score and the total subjective vitality score

| Item no. | Correlation |
|---|---|
| 1 | 0.77** |
| 2 | 0.27** |
| 3 | 0.75** |
| 4 | 0.84** |
| 5 | 0.69** |
| 6 | 0.78** |
| 7 | 0.85** |

Table 3 shows that the SVS has acceptable validity.

### *2.2.5. Reliability*

The reliability was evaluated using the alpha coefficient for each dimension score and the total score of CFI and subjective vitality tests. Table 4 shows that the study measures have acceptable degrees of reliability.

Table 4. Reliability coefficients (alpha) for CFI and SVS

| Measure | Alpha coefficient | No. of items |
|---|---|---|
| Alternative flexibility | 0.85 | 13 |
| Control flexibility | 0.70 | 7 |
| Total cognitive flexibility | 0.74 | 20 |
| Total subjective vitality | 0.82 | 7 |

### *2.3. Research procedure*

The CFI (Dennis & Vander Wal, 2010) and SVS (Ryan & Frederick, 1997) were administered on the study sample in the first term of the academic year 2019/2020.

## 3. Results

To determine the cognitive flexibility and subjective vitality among the study sample, means and standard deviations were calculated based on CFI and SVS used in this study (see Table 5).

Table 5. Descriptive statistics of the study sample performance on the study tools

| The measure | *N* | Mean | Std. deviation |
|---|---|---|---|
| Alternative flexibility | 189 | 53.41 | 6.25 |
| Control flexibility | 189 | 20.78 | 3.31 |
| Total cognitive flexibility | 189 | 74.28 | 6.49 |
| Total subjective vitality | 189 | 33.83 | 7.56 |

Table 5 shows that the highest mean belonged to alternative flexibility (mean = 53.41, SD = 6.25). It was also observed that control flexibility came in the second rank (mean = 20.78, SD =3.31). The total cognitive flexibility mean was 74.28 with SD = 6.49, whereas the mean of the total subjective vitality score was 33.83, with SD = 7.56.

To examine the differences in cognitive flexibility and its two dimensions and the differences in subjective vitality according to students' previous background (scientific and literary), an independent sample *t*-test was conducted (see Table 6).

Table 6. Independent sample *t*-tests between students' (scientific and literary) background on the study scales

| | Speciality | Mean | Std. deviation | *N* | df. | *T* | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|
| Alternative flexibility | Scientific | 52.02 | 5.71 | 58 | 187 | -2.053 | 0.041 |
| | Literary | 54.02 | 6.40 | 131 | | | |
| Control flexibility | Scientific | 21.56 | 3.83 | 58 | 187 | 1.935 | 0.055 |
| | Literary | 20.57 | 3.02 | 131 | | | |
| Total cognitive flexibility | Scientific | 73.59 | 6.36 | 58 | 187 | -0.978 | 0.329 |
| | Literary | 74.59 | 6.54 | 131 | | | |
| Total subjective vitality | Scientific | 32.67 | 6.73 | 58 | 187 | -1.399 | 0.163 |
| | Literary | 34.34 | 7.87 | 131 | | | |

The results shown in Table 6 indicated that there were significant differences in alternative flexibility means. This result suggested that literary background group (*m* = 54.02, SD = 6.40) has higher levels of alternative flexibility than scientific background group (*m* = 52.02, SD = 5.71), (*t* = −2.053, *p*-value = 0.041), but no significant differences were found in control flexibility (*t* = 1.935, *p*-value = 0.055), the total score of cognitive flexibility (*t* = −0.978, *p*-value = 0.329) and the total score of subjective vitality (*t* = −1.399, *p*-value = 0.163).

To examine the differences in cognitive flexibility and its two dimensions and the differences in subjective vitality according to gender (females and males), an independent sample *t*-test was performed (see Table 7).

Table 7. Independent sample *t*-tests between males and females responses to the study scales

| | Gender | Mean | Std. deviation | *N* | df | *t* | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|
| Alternative flexibility | Female | 52.86 | 6.34 | 146 | 187 | −2.231 | 0.027 |
| | Male | 55.26 | 5.61 | 43 | | | |
| Control flexibility | Female | 20.84 | 3.41 | 146 | 187 | −0.233 | 0.816 |
| | Male | 20.98 | 2.97 | 43 | | | |
| Total cognitive flexibility | Female | 73.71 | 6.66 | 146 | 187 | −2.268 | 0.024 |
| | Mail | 76.23 | 5.49 | 43 | | | |
| Total subjective vitality | Female | 33.98 | 7.60 | 146 | 187 | 0.538 | 0.591 |
| | Male | 33.27 | 7.46 | 43 | | | |

The results shown in Table 7 indicated that there were significant differences in alternative flexibility and the total score of cognitive flexibility according to gender, but no significant differences in control flexibility and the total score of subjective vitality were found. We can notice that there were significant differences in alternative flexibility (*t* = −2.231, *p*-value = 0.027). This result suggested that males (*m* = 55.26, SD = 5.61) have higher levels of alternative flexibility than females (*m* = 52.86, SD = 6.34).

Table 7 also shows that there were significant differences in the total score of cognitive flexibility (*t* = −2.268, *p*-value = 0.024), which mean that males (*m* = 76.23, SD = 5.49) have higher levels of control flexibility than females (*m* = 73.71, SD = 6.66). To examine the cognitive flexibility ability to predict subjective vitality, a simple regression analysis was performed using the enter method to determine the independent variables' ability (cognitive flexibility) to predict the dependent variable (subjective vitality) (see Table 8).

Table 8. Results of the analysis of variance for the regression model

| Model | Sum of squares | df. | Mean square | *F* | Sig. | $R^2$ |
|---|---|---|---|---|---|---|
| Regression | 473.730 | 1 | 473.730 | 8.631 | 0.004 | |
| Residual | 10,263.508 | 187 | 54.885 | | | 0.044 |
| Total | 10,737.238 | 188 | | | | |

Table 8 shows that the total regression model succeeded in predicting subjective vitality

significantly ($F$ = 8.631), and the value of the explained variance of the independent variable (cognitive flexibility) was $R^2$ = 0.044. Table 9 shows the regression coefficients of the regression model and its statistical significance.

Table 9. Multiple regression analysis for cognitive flexibility in predicting subjective vitality

| Variable | *B* | *β* | *t* | Sig. | $R^2$ |
|---|---|---|---|---|---|
| Constant | 15.661 | ---- | 2.523 | 0.012 | |
| Cognitive flexibility | 0.245 | 0.210 | 2.938 | 0.004 | 0.044 |

In Table 9, it is clear that cognitive flexibility can predict subjective vitality scores among university students significantly ($\beta$ = 0.210). Accordingly, the regression equation can be formulated as follows:

Raw regression equation:

- Subjective vitality = 15.661 + 0.245 (cognitive flexibility)

Standard regression equation:

- Subjective vitality = 0.210 (cognitive flexibility)

## 4. Discussion and conclusions

Alternative flexibility dimension had the highest mean ($m$ = 53.41, SD = 6.25), followed by control flexibility ($m$ = 20.78, SD =3.31). This result is consistent with the results of Al-Freyhat (2018). The study found that there were significant differences in alternative flexibility for the benefit of literary, whereas there were no significant differences in control flexibility as well as in the total score of cognitive flexibility according to the specialty. This result agreed with many studies (Fuad, 2016; Jaber, 2015) which concluded that there were no significant differences in cognitive flexibility due to specialisation. However, it differed with the result of Al-Najjar (2018), which concluded that the students of scientific disciplines are more cognitively flexible than the students of literary colleges.

The significant differences in alternative flexibility in favour of literary disciplines can be explained by the nature of the courses taught by the students of the literary branch compared to the courses taught by the students of the scientific branch, with full of principles and scientific facts that cannot tolerate change or substitution, and therefore, the problems they face cannot bear alternatives because it expresses specific scientific facts, and they have the skills to follow specific scientific steps to solve problems. This may lead to their minds returning to a specific scientific thinking style that does not accept doubts or modifications, and they have not alternatives to find solutions and face problems. This method may be reflected in their level of cognitive flexibility. Unlike the students of literary disciplines who are studying courses that accept change and amendment, it contains multiple alternatives; therefore, they do not deal with fixed scientific facts but deal with facts that accept change, and they have several alternatives, as they accept true and false at the same time. This makes the students' minds able to modify their cognitive structure, and they can think of multiple possible alternatives. Hence, there were statistically significant differences in alternative flexibility in favour of students of literary background (Algharaibeh, 2015).

The lack of differences in the total degree of total cognitive flexibility between students of scientific disciplines and literary disciplines may be due to the fact that cognitive flexibility is not affected by specialisation (Al-Najjar, 2018), as all the students of different disciplines are seeking success and excellence, and therefore, they develop their mental capabilities for this, especially since all courses require cognitive flexibility as a predictor of school success. The results of this study also found that there were significant differences in alternative flexibility as well as in the total degree of cognitive flexibility in favour of males.

This result is consistent with the results of many studies (Farrant et al., 2012; Kim & Omizo, 2003; Qasim & Abdullat, 2018;), of which all reached male superiority over females in cognitive flexibility, where it contradicted the results of many studies (Al-Freyhat, 2018; Jaber, 2015; Schopp et al., 2001), which indicated that cognitive flexibility levels between females were higher than males. It also differed with the results of some studies, which concluded that there were no significant differences in cognitive flexibility due to gender (Cartwright, Marshall, Dandy & Essac, 2010; Najjar, 2018).

Males' supremacy over females in alternative flexibility and the total cognitive flexibility can be explained that males in Arab society enjoy more freedom than females, which gives them more opportunities to experience various situations and experiences, provides them with training opportunities to use cognitive flexibility in various situations and supports it with males (Qasim and Abdullat, 2018) because the culture of eastern society gives multiple opportunities for males to try and make mistakes. It may overlook its mistakes, but it does not allow females' freedom granted to the male and does not allow them to go through experiences and hold them accountable for their mistakes. This makes females more cautious in their attempts for fear of making mistakes, and this makes them more rigid and less flexible than males.

The culture of eastern society requires women to adhere to the customs and traditions of society, educate them on caution and deliberation and surround them with increased protection, so this may lead to stagnation in their thinking and their inability to adapt their responses according to the situations in which they live. All these may contribute to reduce their cognitive flexibility, unlike males who enjoy with an area of greater freedom and more independence, which allows them to be free from societal and parental constraints and provides them with the ability to switch and change their responses, which is reflected more in their cognitive flexibility (Qasim & Abdullat, 2018).

It may be the nature of males in adolescence (the study sample) that is characterised by challenge, persistence and perseverance (Alreggas, 2016), which enables them to become more involved in society than females and to practice activities and actions that make them feel able to succeed and face challenges in this age that they seek to prove themselves and feel independence, which leads them to go to different sources to obtain knowledge. This would develop them with a level of cognitive flexibility more than females.

The study also found that cognitive flexibility can predict self-vitality in a statistically significant way. This result can be explained by the fact that students who have high cognitive flexibility can easily modify their cognitive structure, and this helps them to solve problems successfully and reflects on their sense of competence, which makes them feel self-vital. Hence, their confidence that they can deal with various problems makes them feel lively, ready and

feeling positive in alertness, effectiveness and fullness of energy and activity and that they can confront different situations with a vitality that enables them to solve these problems (Mustafa, 2018). This explains the possession of cognitive flexibility and the predictive ability of self-vital because cognitive flexibility considered as the important factors for a sense of self-vitality. This is consistent with the results of Selim (2016), which indicated that the individual enjoying a set of positive features and associated optimistic orientation in life is considered to be the main factor leading to a sense of self-vital and demand for life, thus enjoying mental health.

## 5. Limitations

Although the results of this study appeared promising, some limitations must be pointed out, for example, the impossibility of generalising the results beyond the specific sample of Ajloun University College/Albalqa Applied University students which was used in the current study. Another limitation is that the sample consisted only of Ajloun University College students. The future research works should use samples that are more widely representative university students, and the results of other international studies should also be studied and compared.

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