THE PREDICTIVE ROLES OF COGNITIVE FLEXIBILITY AND ERROR ORIENTED MOTIVATION SKILLS ON LIFE SATISFACTION

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ABSTRACT

The aim of present study was to examine the associations among cognitive flexibility, error oriented motivation skills and life satisfaction. The study group consisted of 336 university students, 247 female (73.5%) and 89 male (26.5%). The age of the university students in the study group ranged from 17 to 30 with a mean age of 20.22 (SD = 1.81). Cognitive Flexibility Inventory, Error Oriented Motivation Scale, Satisfaction with Life Scale and personal information form, which collect demographic information of the participants, were used in the data collection process. According to correlation analysis results, significant relationships between life satisfaction and alternatives and control, which are sub-factors of cognitive flexibility, were determined. Additionally, there were significant relationships between life satisfaction and error-oriented learning, error-oriented covering, error-oriented worry. As a result of multiple linear regression analysis, it was determined that alternatives from cognitive flexibility skills and error oriented covering from error-oriented motivation skills accounted for 13% of total variance of life satisfaction. While alternatives had a positive contribution to the regression model, the error oriented covering had negative. The results were discussed in light with the relevant literature.

Keywords: Life satisfaction, cognitive flexibility, error oriented motivation, positive psychology.

INTRODUCTION

Cognitive flexibility theory is a conceptual model that focuses on redesigning learning environments based on cognitive learning theory. Cognitive flexibility is the ability to appropriately use the individual's specific needs to regulate cognition in situations such as understanding and problem solving (Spiro & Jehng, 1990). Cognitive flexibility is the ability to be aware of alternative options in knowledge (Spiro, Feltovich, Jacobson, & Coulson, 1992) that an individual cannot fully construct, and to be flexible enough to pass these options. In other words, cognitive flexibility is changing the individual's cognition in response to different experiences (Dennis & Vander Wal, 2010).

Flexible learning environments are needed in the development of cognitive flexibility associated with learning experiences. These learning environments are thought to play an important role when individuals develop sufficiently from the cognitive and social aspects. Therefore, in the development of cognitive flexibility, learning environments should be created that allow information to be presented and learned from various sources for different purposes (Spiro et al., 1992). An individual who has grown up in such a learning environment and has gained sufficient cognitive flexibility skill develops effective coping strategies against different experiences (Stahl & Pry, 2005). These individuals who are able to make changes in cognition can create a more positive cognition by discovering non-constructive thoughts (Gülüm & Dağ, 2012). Cognitive flexibility is associated with many psychological structures, although it is more associated with learning processes. Individuals who can cope effectively with challenging experiences have higher psychological robustness (Philips, 2011). At the same time, these individuals have problem-solving abilities (Bilgin, 2009) and ability to cope (Dennis & Vander Wal, 2010). It is thought that the ability to rearrange their cognition as a result of flexibility in the face of compulsive experiences by using individual cognitive skills effectively enables them to draw lessons from mistakes they make. Given the theoretical basis, it can be stated that the concept of error-oriented motivation includes cognitive, emotional and behavioral elements (Schell, 2012).

The error-oriented motivation concept is a motivational approach that has been put forward in the direction of achievement goal orientations. In goal orientation models, learning orientations lead students to focus on learning and to learn the concept or task. (Ames, 1992; Dweck & Legget, 1988). Researchers have come to the consensus that individuals are exposed to different learning experiences from their own experience with the help of errors or failures (Catino & Patriotta, 2013; Lipshitz, Popper, & Friedman, 2002). Individuals' attitudes towards the mistakes are considered as important determinants of their future behavior. In some special cases, faults include things that allow for new learning. However, taking precautions against mistakes by individuals can cause the increase of negative consequences of mistakes. The expectation that individuals will not face mistakes is shown as the reason for the increase of these negative consequences (Nonaka & Takeuchi, 1995; Reason, 1990). Individuals are beginning to learn by mistakes (Arnold & Roe, 1987), as they identify the causes of errors and strategies to cope with errors. The view that errors play an important role in the shaping and performance of individuals' behaviors constitutes the theoretical sub-structure of the concept of error-oriented motivation. In other words, individuals are taking ownership of the errors and exhibiting their future behavior

taking into account their mistakes (Keith & Frese, 2008). It is believed that individuals may use cognitive flexibility skills in the face of challenging experiences and that their behavior, by assessing the mistakes they make, may lead to changes in their perceptions of satisfaction with their lives.

The mental health and emotions of individuals who experience different experiences in the direction of developmental tasks are at the forefront of many aspects of life. Every individual who has the ability to assess the truth makes inquiries about his / her life. In this way, the individual making inferences based on the subjective experience makes the evaluations of the cognitive and emotional aspects of subjective well-being more apparent. In other words, when an individual evaluates his / her life as a whole, independent of subjective events, he / she has an awareness of the life satisfaction expressed as the sum of the perceptions of satisfaction towards the whole of life, which constitutes the cognitive dimension of subjective well-being (Diener, 2000).

The concept of life satisfaction, which individuals can examine through the help of self-assessment processes, is a comprehensive evaluation of their own lives. The individual obtains a subjective conclusion by comparing the living conditions he/she gains with the standards he/she desires (Pavot, Diener, Colvin, & Sandvik, 1991). Therefore, life satisfaction can be defined as a conscious cognitive process in which an individual evaluates his life in accordance with his or her own standards (Pavot & Diener, 1993). In terms of conceptual implications, life satisfaction can be defined as having the benefits of providing hedonic satisfaction in the life of the individual. In other words, the closeness of the distances between what the individual wants to achieve and the hedonic gains he has has a high level of life satisfaction (Çikrıkci, 2016). In this direction, it was decided that cognitive flexibility and error-oriented motivation skills should be considered as explanatory factors of life satisfaction. In this context, it was aimed to determine the relationships between life satisfaction and cognitive flexibility and error-oriented motivation skills.

METHOD

Research Design

This study aimed to determine the explanatory role of cognitive flexibility and error-oriented motivation skills on life satisfaction in university students was developed according to correlational model. Correlational research enables the understanding of the complexity of human behaviors to be understood or explained by working on existing phenomena. In this way, the relationships between behavior patterns and variables can be determined (Cohen, Manion, & Morrison, 2007; McMillan & Schumacher, 2006). Fraenkel, Wallen and Hyun (2012) state that correlational research serves two important purposes: (*i*) to explain important human behaviors and (*ii*) to predict possible consequences of human behavior. In accordance with the nature of relational research, the explanatory role of the independent variables (cognitive flexibility and error-oriented motivation) dependent variable (life satisfaction) was assessed in present study.

Research Group

The research group consisted of a total of 336 university students (247 female (73.5%) and 89 male (26.5%). The age of the university students in the research group ranged from 17 to 30 and the average age was 20.22 (*SD* = 1.81).

Measures

In data collection process, Cognitive Flexibility Inventory, Error Oriented Motivation Scale and Life Satisfaction Scale were used.

Cognitive Flexibility Inventory (CFI)

The Cognitive Flexibility Inventory (CFI) aims to measure the degree to which individuals can produce appropriate and harmonious thinking in the face of difficulties they experience. Developed by Dennis and Vander Wal (2010), CFI consists of 20 items and is a likert type measuring instrument with five-point evaluation. The Turkish adaptation of CFI (alternative, control) consisting of two sub-dimensions was carried out by Gülüm and Dağ (2012). The exploratory factor analysis findings revealed two sub-dimensions. The internal consistency coefficient of the Turkish form is .90. In current study, confirmatory factor analysis (CFA) was applied to determine the structural validity of the CFI. According to the results of the CFA, the two-factor structure shows good fit (*RMSEA* = .05; *SRMR* = .06; *GFI* = .90; *TLI* = .88; *CFI* = .90). For present study, the internal consistency coefficient for CFI was calculated as .71 ($\alpha_{alternatives}$ = .85, $\alpha_{control}$ = .70).

Error Oriented Motivation Scale (EOMS)

The Error Oriented Motivation Scale (EOMS) was developed by Schell (2012) in order to determine motivation levels for future experiences by drawing lessons from the errors of individuals. The measure consisting of 21 items has three sub-dimensions. The Turkish adaptation of the EOMS was carried out by Çikrıkci et al. (2014). In the adaptation study, the EOMS was found to be valid (*RMSEA* = .04; *SRMR* = .06; *GFI* = .91; *NNFI* = .91) and reliable (α = .72). In present study, confirmatory factor analysis (CFA) was applied in order to determine the validity of the EOMS. According to the results of the CFA, the three-factor structure shows good fit (*RMSEA* = .05; *SRMR* = .06; *GFI* = .91; *TLI* = .91; *CFI* = .92). In current study, the internal consistency coefficient for EOMS was calculated as .77 ($\alpha_{\text{error oriented learning}}$ = .82, $\alpha_{\text{error oriented covering}}$ = .81, $\alpha_{\text{error oriented worry}}$ = .75).

Life Satisfaction Scale (LSS)

The Life Satisfaction Scale (LSS) is a measure developed by Diener, Emmons, Larsen, and Griffin (1985) with seven-point scale to determine perceived satisfaction with individuals' lives. The internal consistency coefficient of the LSS, which consists of five items, was found to be .87. The adaptation of the scale to Turkish culture was carried out by Yetim (1991). Within the scope of this study, the reliability of the LSS was examined

with the internal consistency coefficient and the result of the reliability of the measure was reached (α = .86). Yetim (2003) determined the test-retest reliability for the Turkish version of the LSS as .73. The high scores on the Life Satisfaction Scale, which has no negative items, indicate that the individual is highly satisfied with his life. In current study, confirmatory factor analysis (CFA) was applied in order to determine the validity of the structure of the LSS. According to the results of the CFA, the one-factor structure shows a good fit (*RMSEA* = .01; *SRMR* = .01; *GFI* = 1.00; *TLI* = 1.00; *CFI* = 1.00). For this study, the internal consistency coefficient for LSS was calculated as .82.

Procedure and Analytical Approach

Prior permission has been obtained for the purpose of applying this research in the planned form. Following the procedure on legal allows, the decision of the Ethics Committee of the Social and Human Sciences was applied. The relevant committee stated that there is no ethical problem in carrying out the research. After completing the process related to legal and ethical allows, the time period for the meeting with the academicians was determined. The data collection process was terminated in a single session (approximately 20 minutes) with academicians experienced in both data collection and quantitative research. Before the statistical analyzes necessary for achieving the research objectives are passed, the organization of the data and some assumptions have to be met. Missing value analysis, extreme value analysis, normal distribution and linearity analysis are among the assumptions to be met (Field, 2013). In this study, first the missing value analysis was performed and it was determined that there is no missing data related to the measurements in the data set. When an extreme value analysis was performed, the scores of the variables in the dataset were converted to standard z scores, and it was determined how much the data deviated from the average (Tabachnick & Fidell, 2007). Out of the obtained z scores, those not in the range of -3 and +3 were extracted from the data set (n = 26). Therefore, the result was that there are no extreme values in the data set. The skewness and kurtosis values of the variables were examined when the normality assumption was evaluated (Table 1). The result of the analysis showed that the skewness and kurtosis values of the variables were in line with the acceptable criterion in the literature (Tabachnick & Fidell, 2007). The Pearson Product-Moment Correlation Coefficient and multiple linear regression analysis techniques were used in the analysis of data. The data was analyzed using IBM SPSS 22.0 and IBM AMOS 22.0 package programs.

Table 1. Skewness and Kurtosis Coefficients of Measures

	N	Min.	Max.	M	SD	Skewness		Kurtosis	
						Coef.	Error	Coef.	Error
LS	336	5.00	35.00	20.58	6.71	-.10	.13	-.48	.26
A	336	35.00	65.00	51.12	6.08	-.13	.13	-.13	.26
C	336	10.00	33.00	21.20	4.26	.21	.13	-.05	.26
EOL	336	18.00	35.00	28.09	3.63	-.01	.13	-.06	.26
EOC	336	9.00	30.00	20.16	4.88	-.13	.13	-.66	.26
EOW	336	6.00	26.00	15.11	4.42	.17	.13	-.50	26

LS: Life Satisfaction, *A:* Alternative, *C:* Control, *EOL:* Error Oriented Learning, *EOC:* Error Oriented Covering, *EOW:* Error Oriented Worry

RESULTS

Findings Related to Correlational Analysis

In order to investigate the relationship between life satisfaction and cognitive flexibility (alternative and control) and error-oriented motivation (error-oriented learning, error-oriented covering and error-oriented worry), Pearson's product moment correlation coefficients were determined (Table 2). According to correlation analysis results, significant relationships between life satisfaction and alternatives (r = .31, p < .01; %95 CI [-.27, .40]) and control (r = -.17, p < .01; %95 CI [-.27, -.06]), which are sub-factors of cognitive flexibility, were determined. Additionally, there were significant relationships between life satisfaction and error-oriented learning (r = .21, p < .01; %95 CI [.10, .32]), error-oriented covering (r = -.23, p < .01; %95 CI [-.34, -.13]), error-oriented worry (r = -.17, p < .01; %95 CI [-.26, -.07]).

Table 2. Relationships Among Variables

	M	SD	1	2	3	4	5	6
1.LS	20.58	6.71	1					
2.A	51.12	6.08	.31**	1				
3.C	21.20	4.26	-.17**	-.28**	1			
4.EOL	28.09	3.63	.21**	-.46**	-.16**	1		
5.EOC	20.16	4.88	-.23**	-.12**	.43**	-.13**	1	
6.EOW	15.11	4.42	-.17**	-.17**	.24**	-.21**	.37**	1

N = 336, ** *p* < .01; *LS: Life Satisfaction, A: Alternative, C: Control, EOL: Error Oriented Learning, EOC: Error Oriented Covering, EOW: Error Oriented Worry*

Findings Related to Regression Analysis

It was decided to apply multiple linear regression analysis to determine the extent to which cognitive flexibility and error-oriented motivation skills predicted life satisfaction. A number of prerequisites must be met before starting the regression analysis. First, the bivariate correlations between variables were examined and attention was paid to not having multicollinearity. For this purpose, the autocorrelation state was first investigated with the Durbin-Watson value and it was concluded that the obtained values (1.93) were within normal limits (Field, 2013). In the second step, the tolerance value ($1\text{-}R^2$), which is the variance value that independent variables can not explain, and the variance inflation factor (VIF) were examined. The tolerance value ($1\text{-}R^2$ = .98) was found to be greater than .20 and the variance inflation factor (*VIF* = 1.01) was lower than 10 (Field, 2013).

As a result of multiple linear regression analysis, it was determined that alternatives from cognitive flexibility skills and error oriented covering from error-oriented motivation skills accounted for 13% of total variance of life satisfaction ($F_{(2, 333)}$ = 26.14, p <.001). While alternatives had a positive contribution to the regression model ($ß$ = .29, p <.001, %95 CI [.20, .43]), the error oriented covering had negative ($ß$ = -.20, p <.001, %95 CI [-.43, -.13]; Table 3).

Table 3. The Predictors of Life Satisfaction

	B	SE	ß	t	p
Constant	86.21	6.14		14.03	.000
A	-.28	.13	-.10	-2.06	.040
EOC	-.44	.07	-.33	-6.25	.000

R^2 = .13, ΔR^2 = .13, p < .001; *A: Alternative, EOC: Error Oriented Covering*

DISCUSSION AND CONCLUSION

In present study, the predictive roles of cognitive flexibility and error-oriented motivation skills of life satisfaction were investigated. According to the findings, alternatives from cognitive flexibility skills and error-oriented covering from error-oriented motivation skills were significant predictors of life satisfaction. Alternatives predicted life satisfaction in the positive direction, while error-oriented covering has the negative contribution to the model.

When the research findings are evaluated, it can be stated that the increase that can be observed in the alternatives from the cognitive flexibility skills may have a positive contribution to the development of life satisfaction. The alternatives sub-dimension makes it possible for the individual to respond to life and the people around him by offering possible solutions in challenging situations (Dennis & Vander Wal, 2010). Responding to the daily life activities or developmental tasks of individuals by evaluating alternative processes in their lives can enable them to make the gains they desire from life. As previously stated, the life satisfaction increases as the distance between the individual and the hedonic gains is shortened. Activating the cognitive flexibility skills while reaching the desired gain presents a number of possibilities for the individual. When the literature is examined, it can be reached that the variables such as social competence expectancy (Bilgin, 2009), self-awareness (Martin, Staggers, & Anderson, 2011), academic performance (Lin, 2013) and consciousness (Moore & Malinowski, 2009) are among these possibilities. It is thought that cognitive flexibility skills can be very effective on the life satisfaction (Diener, 2000) where the individual's cognitive evaluations are observed intensively. It is stated that in the hedonic direction, processes and gains that give pleasure to the individual can contribute positively to the life satisfaction of the individual (Pavot & Diener, 1993). Individuals may navigate through cognitive and behavioral processes that may have these hedonic gains with the help of alternatives from cognitive flexibility skills. Spiro et al. (1992) suggested that individuals with cognitive flexibility skills can control the process by evaluating alternatives. In other words, the individual is able to make changes by making an assessment on cognition (Dennis & Vander Wal, 2010). Thus, in life experiences that are not fully clarified or forced by the individual, the individual may overhaul the hedonic gains he desires, using cognitive flexibility skills, or may ultimately force alternatives he or she may reach to the desired hedonic gains. In this respect, it is seen that the theoretical structure of life satisfaction is quite consistent with the processes in which cognitive flexibility skills are included. Due to the fact that researches examining the relationships between cognitive flexibility and life satisfaction are limited in literature, it is very difficult to make generalizations (Odacı, Çikrıkci, Bolat, & Aydın, 2015; Windle, 1986).

In the literature, it appears that cognitive flexibility is related to many psychological structures (Bilgin, 2009; Dickstein et al., 2007; Geurts, Corbett, & Solomon, 2009; Lysaker & Hammersley, 2006). When these structures were examined, it can be said that cognitive flexibility in developing mental health has a role to be underestimated. Because the individual adapts to his surroundings with his cognitive flexibility and is able to respond more appropriately to surrounding stimuli (Martin, Anderson, & Thweatt, 1998). Miyake et al. (2000) stated that cognitive flexibility is an important component of executive functions and that mental processes are actuated in the face of challenging experiences. It was predicted that the individual who can actively use cognitive flexibility skills can perform developmental tasks without losing control of life. It was thought that cognitive flexibility (Spiro et al., 1992), which is regarded as an output of a flexible learning environment, offers effective coping strategies to the individual (Dennis & Vander Wal, 2010) and prepares a positive cognition for life in the individual. It was reported that assessing cognition is influential on life satisfaction (Çikrıkci & Odaci, 2016).

The other variable evaluated as a predictor role on life satisfaction within the scope of the research was error-oriented motivation skills. Error oriented covering negatively accounted for life satisfaction. This finding suggested that instead of lecturing on their errors, ignoring them may have negative implications for the development of life satisfaction. According to the error-oriented motivation theory, individuals who could face and make errors may plan and exhibit their future experiences on a more robust structure (Keith & Frese, 2008). Therefore, individuals who use the causes of errors and coping strategies were assessed their own errors as learning environment (Arnold & Roe, 1987). In the context of life satisfaction, it is thought that the individuals who are at peace with the errors and evaluate them as a chance for new learning can plan the hedonic experiences more rationally. In other words, if the individual is conscious of the mistake that leads to an irrational hedonic gain, taking precautions can positively affect life satisfaction.

Because error-oriented learning can provide a flexible cognition for the individual to have more realistic experiential gains Nevertheless, the individuals with error-oriented learning, the anticipations and the preparations for the faults to always exist, prepare them for the negativities they will face in life (Bainbridge, 1983). In this context, it is thought that the individuals who can face the negativities in the experiential process can improve their life satisfaction by using more active coping strategies. Another dimension of error-oriented motivation theory, which is a significant predictor of life satisfaction in this study, is error-directed covering. The individual who uses error-oriented covering does not want other people to observe the errors he has made. (Schell, 2012). Those individuals who do not want to face errors with this justification can avoid the experiences they will experience again. Decreases in the quality and quantity of experiences may increase the distance between the gains of the individual and the hedonic gains of the individual, and may negatively affect life satisfaction. In this study, error-oriented covering was interpreted as a variable that can adversely affect the development of life satisfaction.

LIMITATIONS and RECOMMENDATIONS

There are some limitations in this study due to the nature of scientific studies. The most important limitation of the work is that methodological generalization is not at the desired level. It is recommended to conduct future studies on similar study groups in order to generalize the findings obtained from this study to the population. This study has been carried out in accordance with quantitative research approaches. Further studies can be made to adopt qualitative research approaches so that the effects of cognitive flexibility and error-oriented motivation skills on the life satisfaction can be investigated in more detail. In this direction, interaction of variables with each other can be investigated by using qualitative data collection techniques such as observation and interview on different working groups. In addition to university students, psycho-education programs may be applied to high school students to enable cognitive flexibility and error-oriented motivation skills to develop. The creation of a lecture environment that allows for the development of these skills is thought to be an important achievement at the primary and secondary level. Given the fact that cognitive flexibility skills can develop in appropriate and flexible learning environments, it is especially important to educate educators and to make appropriate changes in learning environments in terms of cognitive development of individuals.

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