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Metacognitive Skills, Academic Success and Exam Anxiety as the Predictors of Psychological Well-being

İsa Yücel İşgör

Correspondence: Assistant Prof. Dr., Erzincan University, Educational Sciences Department, Psychological Counseling and Guidance, Turkey.

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Abstract

The purpose of this research was to investigate the predicting effect of high school students' metacognitive skills, exam anxiety and academic success levels upon their psychological well-being in a provincial center with a medium-scale population in Eastern Anatolian Region. The research group included totally 251 high school students including 149 females and 102 males between 14 and 19 years old. Psychological Well-Being Scale, Metacognitive Skills Scale, and Personal Information Form were used in the research. According to the results, it was determined that there was a positive significant relationship between psychological well-being and metacognitive skills and academic success average, and a negative significant relationship between psychological well-being and exam anxiety. It was also specified that there was a negative significant relationship between exam anxiety and metacognitive skills, and a positive significant relationship between metacognitive skills and academic success average. Finally, metacognitive skills, exam anxiety and academic success average were noticed to be significant predictors of psychological well-being. In this model, it was revealed that success average explained R^2=.30 of psychological well-being, academic success average and metacognitive skill explained R^2=.46 of the variance together, and the triple model including academic success average, metacognitive skill and exam anxiety explained R^2=.57 of the variance.

Keywords*:* Academic success, exam anxiety, metacognitive skill, psychological well-being

1. Introduction

The concept of psychological well-being is one of the fundamental investigation areas of positive psychology movement. The studies carried out within this scope have been encountered more in recent years. The concept of psychological well-being that has been discussed in several variables of the social life has a particular importance in terms of learning environments. Human is a presence directing the life through learning. Life quality of individuals, in a sense, is possible to be mentioned as depending upon the quality of their learning and even their learning ratio. Within daily life, individuals fulfill their needs through their potential of learning. Considering this property, learning potential can be assessed as a potential opening a door into well-being through meeting the needs and being satisfied with life. Individuals who do not use or adequately use their learning potential due to any reasons experience some problems upon fulfilling their needs, and this negatively affects their psychological well-being.

Psychological well-being is a structure at a micro level, and provides information related to how individuals evaluate their self and life (Ryff, Magee, Kling & Wing, 1999). Well-being as a complex structure related to ideal experiences and functions has been discussed in two general viewpoints: the first one is hedonic approach focusing on pain avoidance, satisfaction and happiness, and the other is eudemonic approach focusing on meaning and self-realization and being used in a meaning for individuals to function as a whole (Ryan & Deci, 2001). Both these approaches are based upon humanistic bases analyzing how a good life should be and increasing the human potential (Keyes, Shmotkin, & Ryff, 2002). Ryff (1989) mentioned psychological well-being as including self-acceptance, positive relationships with the others, autonomy, environmental control, life purpose and personal development. Roothman, Kirsten and Wissing (2003) expressed psychological well-being as possible to be conceptualized related to emotional, physical, cognitive, mental, personal and social processes.

It is possible to discuss psychological well-being within the scope of individuals' learning potential. Learning potential becomes prominent as a fundamental component for individuals' maintaining their life healthily, harmoniously and in interaction with the others. Furthermore, it is also possible to say that this potential is also remarkable in terms of

individuals' level of psychological well-being. In this sense, the factors such as learning velocity of individuals, learning strategies and learning methods are expected to affect psychological well-being of individuals. Metacognitive skill, at this point, is a learning strategy that has frequently been discussed in terms of its effect upon both individuals' learning potential and exam anxiety, and has been recently investigated. Metacognitive skills actuate and control other cognitive strategies in learning and thinking process, and make plans and decisions of other cognitive strategies to be used in future (Yurdakul & Demirel, 2011). Metacognition is expressed as individuals' thinking on their cognition and their "thinking on thinking" (Flavell, Miller, & Miller, 1985). Metacognition is individuals' skill of deeply thinking, understanding and controlling their own learning (Schraw & Dennison, 1994). The competence of using metacognitive skill is important for individuals' overcoming the problems they encounter. Metacognitive skill strategies such as the strategy of learning's decentralization, planning strategy and evaluation strategy are remarkable for reaching to a conclusion when individuals encounter a problem. Through these strategies, individuals evaluate whether they will be successful or not, they make decision on which steps they will fulfill the task, pay attention how the processes proceed, and transfer their experiences they obtain to the following processes (Gourgey, 1998). In reference to this, psychological well-being is defined as being successful and having more positive psychological properties, as result, increasing the learning potential and decreasing anxiety having metacognitive skill.

In individuals with metacognitive skill, a self-efficacy belief related to achieving is possible to develop (Tunca & Şahin, 2014), and this result can provide opportunity for individuals to present a more succesful performance decreasing the exam anxiety (Shokrpour, Zareii, Zahedi, & Rafatbakhsh, 2011). Metacognitive skills' providing individuals reach to academic success can be depended upon its decreasing effect upon the exam anxiety in individuals through the self-confidence and self-competence it provides. Anxiety generally emerges in situations when new information will be learned and a resistance against the change is present. Accordingly, because anxiety has negative effects upon cognitive performance and learning, it is essential to decrease anxiety (Namlu & Ceyhan, 2002).

In literature review upon the subject, different studies with similar properties to the research topic were noticed. In their study upon metacognitive skill and well-being, Kiaei and Thomas G. Reio (2014) found that metacognitive skill knowledge positively predicted well-being. Similarly, in another study, Fastame and Penna (2014) observed a positive relationship between cognitive and metacognitive competence and psychological well-being.

It was possible to mention that learning performances of the individuals trying to learn using metacognitive skill would increase. This also positively reflected upon the academic success of individuals. However, different research findings were encountered in this sense in the literature review (Colomeischi, 2015; Demir, 2013; Dost, 2010; Karakoç, Bingöl, & Karaca, 2013; Loveless, 2006; Telef, Uzman, & Ergün, 2013). When evaluated as a learning strategy leading individuals towards the academic success, research findings related to metacognitive skill's increasing the academic success of students and its positively affecting well-being levels of the students were also found (Al-Baddareen, Ghaith, & Akour, 2015; Ayazgök & Yalçin, 2014; Bağçeci, Döş, & Sarıca, 2011; Garner & Alexander, 1989; Hoseinzadeh & Shoghi, 2013; Hrbáčková, Hladík, & Vávrová, 2012; Pressley & Ghatala, 1990; Tunca & Şahin, 2014).

In the literature review related to the relationship between metacognitive skill knowledge, exam anxiety and academic success, there were research findings in the studies carried out considering the abilities of students related to the fact that the students with average school ability and lower anxiety level were more successful rather than the students with higher anxiety level (Topçu, 1986; Ekenel, 2005).

Consequently, in the light of relevant literature review and evaluations, this research aimed to test a model depending upon the interaction between metacognitive skills, exam anxiety, academic success and psychological well-being. It was noticed that the studies related to testing this model leading the individuals towards psychological well-being in learning environment were limited. However, there were studies analyzing the relationship between academic success and well-being, metacognitive skill and academic success and exam anxiety. This research aimed to create a model aiming to reveal the predicting power of variables such as metacognitive skill, exam anxiety, and academic success upon psychological well-being of individuals. This research was noticed to have an original value in terms of having limited number of studies carried out upon psychological well-being in learning environments and the factors predicting this. The study was considered to reveal to what extent performance in learning environments could be increased using metacognitive skill based strategies and how this could reflect upon psychological well-being of individuals.

2. Method

2.1 Research Group

The research sample included high school students between 14 and 19 years old ($\bar{X}$=17.42 SD= 0.94) studying at a medium-scale populated province of Eastern Anatolia Region in 2014-2015 academic year. In order to create the sample group from the research population, totally 251 high school students including 149 female (59.5%) and 102 male (40.6%) were selected through cluster sampling method. In cluster sampling method, the study population includes

clusters, and the research is carried out upon the clusters to be selected among the population (Karasar, 2005). While determining the sample in the research, the list of the schools related to the research population was primarily prepared. Subsequently, these schools were clustered as the high schools displaying similarities according to the school types (Anatolian High School, Science High School, Vocational Technical High Schools, Religious Vocational High School and Fine Arts High School) (Judd, Smith, & Kidder, 1991); and the sample was determined from each cluster through simple random sampling. In the research, 38 (15.1%) of the participants studied at the 9th grade, 57 (22.7%) studied at the 10th grade, 80 (31.9%) studied at the 11 grade, and 76 (30.3%) studied at the 12th grade.

2.2 Research Model

In this study, general screening model as one of the descriptive research models was used in order to determine the predicting levels of the variables such as metacognitive skill, academic success and exam anxiety upon psychological well-being. Descriptive research is a research approach aiming to describing a present or current situation. The individual, event or object as the topic of the research is tried to be described as it is within its own conditions (Krathwohl, 1993). Screening researcher can directly investigate the object or individuals' self. Moreover, the researcher can interpret distributed data to be obtained applying to reference people and various records kept before integrating these systematically through observations (Karasar, 2005). In screening researches, it is important to find facts, establish relationships, and collect evidence in order to make judgments and make evaluations related to past events (Kıncal, 2010). General screening model is screening organizations upon all population or a group or sample selected from the population in order to make a judgment about the population including several elements (Bailey, 1982). In such models, a sample group with high representative power for the population is especially selected, and the results are generalized for the population.

2.3 Data Collection Tools

Three measurement tools were used in order to collect the research data. These measurement tools were Personal Information Form, Psychological Well-Being Scale (Ryff, 1989), and Exam Anxiety Inventory developed by Spielberger (1980). Moreover, academic success level of the sample group was determined using the information form.

2.3.1 Personal Information Form

The form was developed by the researcher in order to collect socio-demographical data. It was a form including the questions related to determining the variables such as gender, school type, domain, grade, success average, educational status of parents, and income level of parents for the participants in the research.

2.3.2 Psychological Well-Being Scale (PWBS)

Psychological Well-Being Scale aiming to evaluate the psychological well-being of the individual was developed by Ryff (1989). The scale was a 6-point Likert type scale including totally 84 items with 6 sub-dimensions and 14 items in each dimension based upon psychological well-being model. The lowest score possible to be taken from the scale was 84, and the highest score was 504. The highest score indicated the highness of psychological well-being, and the low score indicated the lowness of psychological well-being. For the scale adapted into Turkish by Akın (2008), internal consistency coefficients were noticed to vary between .87 and .96, and test re-test reliability was noticed to vary between .78 and .97. Within the scope of this research, internal consistency coefficient of the scale was determined to be .88. The correlations between Turkish and original form Psychological Well-Being Scale scores were found as α=.94 for autonomy sub-scale, α=.97 for environmental control, α=.97 for personal development, α=.96 for positive relationships with the others, α=.96 for life purposes, and α=.95 for self-acceptance. In this research, reliability coefficient was determined to be α=.84. In exploratory factor analysis, 68% of the total variance was determined to be explained, and the items were noticed to be grouped in 6 factors. Factor loads varied between .30 and α=.94. In confirmatory factor analysis, fit index values were found as RMSEA= .07, NFI= .97, CFI= .98, GFI= .93, and SRMR= .06.

2.3.3 Metacognitive Skills Scale (MSS)

Metacognitive Skills Scale was developed by Altındağ and Senemoğlu (2013), and aimed to measure the metacognitive skills of the students. According to the factor analysis results, the scale had one-dimension, and it explained 35.74% of the total variance with 30 items. The one-dimensional scale with 30 questions was scored on 5-point Likert type (1= I totally disagree, 2= I disagree, 3= Neither agree nor disagree, 4= I agree, and 5= I totally agree). The highest score possible to be taken from the scale was 150, and the lowest score was 30. High score indicated the highness of metacognitive skill, and the low score indicated the lowness of the metacognitive skill. Internal consistency reliability coefficient of the MSS was calculated to be α=.94. In this research, reliability coefficient was determined to be α=.87. Construct validity of the scale was provided through the relevant literature review and asking the opinions of the specialists. The construct validity within the scope of the scale's validity studies were tested through the exploratory

factor analysis performed using the data obtained from experimental implementation. Obtained data proved that the construct validity of the scale was provided at required level. Criteria validity of the scale was tested depending upon the internal criteria. For that purpose, the differences between the scores of the 27% sub-group and 27% super-group taken from the final scale were investigated. A significant difference was found between sub-group and super-group scores ($t(126) = 20.69$, $p<0.01$). These findings indicated the scale to be a reliable and valid one.

2.3.4 Exam Anxiety Inventory

Exam Anxiety Inventory aiming to determine the exam anxiety levels of the students was developed by Spielberger (1980), and adapted into Turkish by Öner (1990). The inventory with totally 20 items and two factors included two sub-tests listed as "worry" (8 items) and "emotionality" (12 items). From the scale developed as a 4-point Likert type (1= never, 2= sometimes, 3= sometimes, and 4= often), three types of scores were calculated as worry, emotionality, and all test. The highest all test score possible to be taken from the inventory was 80. Only the first item of the inventory was reverse-expressive; therefore, it was scored reversely. The highness of the scores obtained from the inventory indicated the highness of worry, emotionality and exam anxiety. Homogeneity coefficient calculated with alpha correlations as a generalized form of Kuder-Richardson 20 formula in terms of the original inventory varied between .92 and .96 for all scale, varied between .58 and .72 for worry sub-test, and varied between .61 and .69 for emotionality sub-test. Homogeneity coefficient calculated with alpha correlations as a generalized form of Kuder-Richardson 20 formula in terms of the Turkish adaptation of the inventory varied between .70 and .90. In this research, reliability coefficient was determined as α=.81. Within the scope of inventory's validity studies, medium level negative relationship (correlation coefficients -.31 and -.56) was determined between the concept of Self-Description Inventory and Exam Anxiety Inventory; and medium level positive relationship (correlation coefficients .60 and .22) was determined between Minnesota Counseling Inventory sub-test scores and exam anxiety scores. When the relationship between grade point average and mathematic scores and exam anxiety was analyzed, the correlations were noticed to vary between .43 and 0. This supported Exam Anxiety Inventory to have a construct validity.

2.3.5 Academic Success Average

Academic success averages of the sample group were determined using the information form depending upon year-end success averages.

2.4 Process

Into the research, the voluntary high school students studying at 9^{th}, 10^{th}, 11^{th} and 12^{th} grade in various high schools affiliated to Directorate of National Education in a province with medium-scale population in Eastern Anatolian Region in 2014-2015 academic year were included. Ethical approval was obtained from the relevant committees before the research. After the participants were informed about the research, they filled in Personal Information Form, Psychological Well-Being Scale, Metacognitive Skills Scale and Exam Anxiety Inventory in two 50-minute sessions. As result of the implementation, 261 high school students answered the relevant scales and form. At the end of controlling scales and the form one by one, 4 students were determined to answer some parts of the scales, and left the other parts blank. Moreover, 3 students were noticed to mark the same choice in all items of the scales. Considering that this would affect the reliability and validity of the research, forms of these 7 students were excluded from the implementation.

2.5 Data Analysis

Evaluation of the data was carried out by the researcher manually. Obtained data were put into tables creating data-processing coding tables. These data were transferred into SPSS 22 statistical software, and analyzed through the statistical techniques appropriate to the experiments. In analysis of the data, techniques such as percentage, frequency, correlation and stepwise linear regression analysis were used.

3. Findings

In accordance with the descriptive statistics related to the variables, it was observed that average and median values were generally close to each other, and accordingly, distributions had a normal distribution property. On the other hand, because skewness and kurtosis coefficients remained at ± 1 interval, deviation from the normality was proved to be at an insignificant level (Çokluk, Şekercioğlu, & Büyüköztürk, 2010; Kline, 2015). The correlation levels between descriptive statistics, and psychological well-being, exam anxiety, metacognitive skill and academic success average related to the variables of the research were presented in Table 1.

Table 1. Average, standard deviation and correlation values related to the study variables (N=251)

Scales		1	2	3	4
1	Psychological Well-Being Scale (PWBS)	-			
2	Exam Anxiety Inventory (EAI)	-,52**	-		
3	Metacognitive Skills Scale (MSS)	,55**	-,30**	-	
4	Academic Success Average	,54**	-,23**	,30**	-
$\bar{X}$		329,94	45,092	102,27	78,02
SD		60,31	7,93	15,05	9,10

*p<.05
**p<.01

As could be seen in Table 1, a negative medium-level relationship was specified between psychological well-being and exam anxiety (r= -.52, p<.01). A positive medium-level significant relationship was also noticed between psychological well-being and metacognitive skills (r= .55, p<.01) and academic success average (r= .54, p<.01). Whereas a negative medium-level significant relationship was noticed between exam anxiety and metacognitive skills (r= -.30, p<.01); a negative medium-level significant relationship was proved between exam anxiety and academic success average (r= -.23, p<.01). Finally, a positive medium-level significant relationship was determined between metacognitive skills and academic success averages (r= .30, p<.01). Furthermore, the highest relationship was noticed to be between psychological well-being and metacognitive skills (r= .55); and the lowest relationship was between exam anxiety and academic success average (r= -.23).

In the research, it was tried to test the predicting level of metacognitive skills upon the psychological well-being beside the predicting effect of the variables such as academic success averages and exam anxiety upon the psychological well-being levels of the students. Related to this purpose, stepwise linear regression analysis was performed, and the results were presented in Table 2.

Table 2. Stepwise regression analysis results related to the predictors of psychological well-being

Predicting Variables	1st Step			2nd Step			3rd Step		
	B	*SE(B)*	*β*	*B*	*SE(B)*	*β*	*B*	*SE(B)*	*β*
ASA	3.65	.35	.55**	2.82	.32	.42**	2,24	.30	.33**
MSS				1.66	.19	.41**	1,45	.17	.36**
EAI							-2,60	.33	.-34**
SD	1,249			1,248			1,247		
F change	109.29**			71.78**			59.17**		
R^2	.30			.46			.57		
$\Delta\ R^2$	.30			.45			.56		
R^2change	.30			.15			.10		

Not: ASA= Academic Success Average; MSS = Metacognitive Skills Scale; EAI = Exam Anxiety Inventory
*p<.05
**p<.01

When Table 2 was analyzed, the analysis could be noticed to be carried out in steps. The purpose for the analysis to be carried out in steps was to notice the change that occurred after including new variables into the model tested in terms of its significance in the literature before the research, and to try to reveal a new model in this sense. In the first step of the analysis, the predicting effect of success average upon the psychological well-being was tested as a model revealed in terms of its significance in previous studies. As result of the analysis, academic success average was noticed to be significantly predicting the psychological well-being (R^2= .30, p<.01).

In the second step of the analysis, metacognitive skill was included into the equation as the basic model of the research. As result of the analysis, academic success average and metacognitive skills were noticed to significantly predicting psychological well-being (R^2= .46, p<.01). It was determined that when the variable of metacognitive skills was included into the equation, the change in the new model was at a significant level (R^2 change= .15, p<.01).

In the last step of the analysis, the variable of exam anxiety was included into the equation. As result of the analysis, it was proved that success average, metacognitive skill and exam anxiety significantly predicted the psychological well-being (R^2= .57, p<.01). The change revealed in the last model was noticed to be at a significant level (R^2 change= .10, p<.01).

4. Discussion

This study was carried out to reveal the predicting power of the variables of academic success, metacognitive skills and exam anxiety upon the psychological well-being of the high school students, and to create a model within the scope of these variables. According to the research findings, significant relationship was determined, as expected, between psychological well-being, academic success average, metacognitive skill and exam anxiety variables. Furthermore, stepwise regression analysis results revealed that success average was a significant and important predictor of

psychological well-being. According to the analysis results, metacognitive skill made a significant contribution upon the model, and was a strong predictor of psychological well-being together with the academic success average, and exam anxiety included into the equation in the final step was found to significantly predict the psychological well-being. As result, a new model in which all three variables were revealed to provide significant contributions upon the prediction of psychological well-being was presented.

Similar studies supporting the result obtained in the research were encountered in the literature. There were various research findings related to academic success average's increasing the well-being levels of individuals. In the study carried out by Telef et al. (2013) upon analyzing the relationship between psychological well-being and values in pre-service teachers, it was concluded that academic success was a good predictor of psychological well-being. In similar studies (Cenkseven & Akbaş, 2007; Certel, Bahadır, Saracaloğlu, & Varol, 2015; Chow, 2005; Colomeischi, 2015; Dost, 2007, 2010; Karakoç et al., 2013), a positive relationship was determined between well-being level of individuals and academic success levels.

In the research, one of the variables providing significant contribution upon the model was found to be metacognitive skill. Metacognitive skill has particularly been discussed in researches within the scope of variables such as learning level of individuals, academic success level, and self-competence. The result obtained in the research could be partly depended upon the positive effect of metacognitive skill upon the academic success. When the literature was reviewed, studies supporting the research finding were possible to be found. The studies carried out in this sense revealed that the students with metacognitive skill had high academic success (Al-Baddareen et al., 2015; Ataalkın, 2012; Ayazgök & Yalçin, 2014; Bağçeci et al., 2011; Çalışkan, 2010). In similar studies, as well, positive effects of metacognitive skill upon the success were also noticed (Demir, 2013; Garner & Alexander, 1989; Hoseinzadeh & Shoghi, 2013; Hrbáčková et al., 2012; Mirzaei, Phang, Sulaiman, Kashefi, & Ismail, 2012; Pressley & Ghatala, 1990; Tunca & Şahin, 2014). Success of individuals with metacognitive skill could be depended upon their abilities such as awareness, planning, choosing strategies, monitoring the learning process, correcting the mistakes, controlling whether the preferred strategies were beneficial or not, and changing learning method and strategies, if required.

In the research, it was also determined that exam anxiety significantly contributed upon the model. The individuals' with high metacognitive skill having the aforementioned abilities related to learning strategies could create an increasing effect upon their academic success decreasing their exam anxiety. This can be evaluated as providing a positive contribution upon the well-being of individuals. In their study carried out on the effects of metacognitive strategies upon education performance and exam anxiety, Shokrpour et al. (2011) observed that the students with metacognitive strategies had significantly low exam anxieties. They also proved in the study that the academic success of the students was high. In another study, Ekenel (2005) findings were obtained related to the fact that course success of the students using metacognitive strategies was high.

When research findings were evaluated in general, it was revealed that the components such as metacognitive skill, exam anxiety and academic success had a significant and strong predicting effect upon the psychological well-being of individuals. In this model, it was concluded that, success average explained .30 of the psychological well-being, academic success average and metacognitive skill together explained .56 of the variance, and the triple model including academic success average, metacognitive skill and exam anxiety explained .57 of the variance. In reference to the research results, different predictors for the well-being in learning environments could be suggested to be discussed. Another suggestion could be discussing these strategies in learning environments in a broader context in reference to the predicting effect of metacognitive skill upon psychological well-being. In the literature, there were limited studies discussing the effect of these three components upon the psychological well-being. This was considered as one of the original and strong aspects of the research. Moreover, the presence of limited number of studies discussing the concept of well-being in learning environments was possible to be mentioned as providing original value upon the study, as well.

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