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THE RELATIONSHIP BETWEEN SCHOOL RELATED VARIABLES AND MOTIVATIONAL PATTERNS OF UNDERGRADUATES: A LOGISTIC REGRESSION ANALYSIS

LA RELACIÓN ENTRE LAS VARIABLES RELACIONADAS CON LA ESCUELA Y LOS PATRONES MOTIVACIONALES DE LOS ESTUDIANTES UNIVERSITARIOS: UN ANÁLISIS DE REGRESIÓN LOGÍSTICA

Gürhan Can

gurhancan49@gmail.com

Hasan Kalyoncu University, Faculty of Education, Psychological Counseling and Guidance, Gaziantep, Turkey

Seydi Ahmet Satıcı

sasatici@artvin.edu.tr

Artvin Coruh University, Faculty of Education, Psychological Counseling and Guidance, Artvin, Turkey

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Abstract:

The purpose of this study is to investigate the relationships between gender, academic achievement, and satisfaction with degree program, and motivational patterns of undergraduates. The sample of the study consisted of 259 participants (141 females, 118 males) who were defined according to their motivational patterns as having either autonomous motivation (n=127) or controlled motivation (n= 132) among 732 participants who were selected randomly from the undergraduates attending Anadolu and Osmangazi Universities in Turkey. The data were collected via the Turkish Version of the Academic Motivation Scale. The findings obtained from 732 participants by using the linear regression analysis technique indicated that autonomous motivation predicted the academic achievement positively. The logistic regression analysis conducted on 259 participants also revealed that satisfaction with the degree program and being male increased the autonomous motivation significantly. The findings were discussed in the light of related literature.

Keywords: Motivational patterns; educational outcomes; logistic regression.

Resumen:

El propósito de este estudio es investigar las relaciones entre el género, el rendimiento académico y la satisfacción con el programa de grado, y los patrones motivacionales de los estudiantes universitarios. La muestra del estudio consistió en 259 participantes (141 mujeres, 118 hombres) que se definieron según sus patrones motivacionales como que tenían motivación autónoma (n = 127) o motivación controlada (n = 132) entre 732 participantes que fueron

seleccionados al azar de los estudiantes de pregrado que asisten a las Universidades de Anadolu y Osmangazi en Turquía. Los datos fueron recolectados a través de la versión turca de la Escala de Motivación Académica. Los resultados obtenidos de 732 participantes mediante el uso de la técnica de análisis de regresión lineal indicaron que la motivación autónoma predijo positivamente el rendimiento académico. El análisis de regresión logística realizado en 259 participantes también reveló que la satisfacción con el programa de grado y el hecho de ser hombre aumentaba significativamente la motivación autónoma. Los hallazgos se discutieron a la luz de la literatura relacionada.

Palabras clave: patrones motivacionales; resultados educativos; regresión logística

1. Introduction

Motivation, which is an important determinant that affects the individual to achieve something, is defined by Self-Determination Theory (SDT; Deci & Ryan, 1985) as the reasons of underlying human behavior (Ratelle, Guay, Vallerand, Larose, & Senecal, 2007). Unlike the previous motivation theories, SDT views motivation in terms of varying degrees of autonomy and hypothesizes that there are three types of motivation; intrinsic, extrinsic, and amotivation. Intrinsic motivation includes three equal types of autonomous sub-motivation, namely; intrinsic motivation to know (IMTK), intrinsic motivation to accomplish (IMTA) and intrinsic motivation to stimulation (IMTS). Unlike intrinsic motivation, extrinsic motivation is considered as controlled or partly autonomous form of motivation which is separated into four types of ordered sub-motivation according to their levels of autonomy. These are external regulation (EMER), introjected regulation (EMIN), identified regulation (EMID) and internalized regulation (EMINT). Lastly, the amotivation is the least autonomous type of motivation, which is neither intrinsic nor autonomous for the self.

According to the theory, all of these motivational states are arranged in a descending order on the self-determination continuum from the least autonomous to the highest as shown below:

AMOT<EMER<EMIN<EMID <EMINT<IMTS-IMTA-IMTK

Intrinsic motivation is defined as “doing an activity for its inherent satisfaction rather than for some separable consequences” (Ryan & Deci, 2000, p. 56). As seen in the self-determination continuum IMTK, IMTA and IMTS are the most autonomous forms of motivation. IMTK refers to performing or creating something to experience for the pleasure of doing it (Cokley, Bernard, Cunningham & Motoike, 2001; Pelletier, et al., 1995; Onder & Karatas, 2016). IMTA is related to the satisfaction resulting from the process of performing something (Cookley, et al., 2001; Ozcan & Bicen, 2016). Lastly, IMTS refers to the behaviors that were carried out to experience stimulating sensations as the consequences of some activities being engaged (Cokley, 2000). In contrast to intrinsic motivation, extrinsic motivation refers to the actions that are led by external or internal pressures such as expectation of rewards or avoidances of punishment or feelings of guilt (Sen, 2016). EMER, which is the least autonomous form of extrinsic motivation, refers to the actions that are carried out in order to gain an external reward or avoid punishment (Standage & Treasure, 2002; Demirok & Ozcan, 2016; Hursen, 2017). EMID is related to behaviors that are found valuable and important by the individual.

However, it is more autonomous than EMER. EMIN is related to the behaviors that are strengthened through internal pressures such as guilt or anxiety (Pelletier, et al., 1995). It is more autonomous than EMER. Finally, the most autonomous form of extrinsic motivation, EMINT, refers to the behaviors that are realized under certain circumstances in which identified

regulations are fully assimilated by the self (Ryan & Deci, 2000; Farren, 2016; Birkollu et al., 2017). External regulation and introjected regulation are considered as controlled sub-types of motivation because they have not been well internalized by the self. Nonetheless, the identified regulation and internalized regulation that are partially internalized by the self are known as autonomous types of sub-motivation (Chu, 2012; Deci & Ryan, 1985, 2000; Verloigne et al., 2000; Baglama, Yikmis & Demirok, 2017). Finally, amotivation, which is neither an autonomous nor controlled motivation, refers to the state of unintentional to act (Ryan & Deci, 2000).

SDT proposes that autonomous types of motivation lead to positive outcomes, but controlled types of motivation bring about negative consequences (Fortier, Vallerand & Guay, 1995; Sorakin & Uzunboylu, 2017). This proposition was generally supported by many researchers who focused on the relationship between autonomous motivation and some educational outcomes. For instance, Vallerand, Blais, Briere, & Pelletier (1989) found that there was a strong positive relationship between autonomous motivation (IM) and educational outcomes such as perceptions of competence, positive emotions, and time for academic tasks. Additionally, Vallerand et al. (1989) reported that the relative autonomous motivation of identified regulation showed stronger correlations with the outcomes, even if it was weaker than the correlations between global intrinsic motivation and some of the outcomes mentioned above. However external regulation and introjected regulation demonstrated slightly negative correlation with these educational outcomes. Finally, amotivation showed strong negative correlation with educational outcomes as expected.

Student motivation, which is a vital determinant of academic performance and achievement, has been extensively studied in the context of higher education (Maurer et al., 2013; Yilmaz & Yavuz, 2017; Tezer & Ozreberoglu, 2017). Studies that focused especially on the relationship between motivation and school performance indicated that autonomous motivation positively influenced students' academic achievement performance (Eymür & Geban, 2011; Grolnick, Ryan & Deci, 1991; Harter & Connell 1984; Kruskar et al, 2013; Pintrich & Garcia, 1991; Unrau & Schlackman, 2006; Vansteenkiste et al. 2005; Palma, Russo & Egizio, 2017; Uzunboylu et al., 2017) as well as students' conceptual learning (Benware & Deci, 1984; Grolnick & Ryan, 1987; Vansteenkiste, Zhou, Lens, & Soenens, 2005). According to Griffin and colleagues (2013), students' level of intrinsic motivation is the most important determinant influencing positive academic performance. It is also a good predictor for better learning (Vansteenkiste et al., 2005), student's course grades (Wilson & Wilson, 2007), and their persistence on continuing the program (Dodge, Mitchell, & Mensch, 2009).

Nearly all of the previous studies exploring the relationship between motivation and gender indicated that females showed higher degree of autonomous motivation than males (Clark, 2010; Corey et al., 2010; Gillet & Rosnet, 2008; Vallerand & Bissonnette, 1992). However, it was stated in a study (Standage, Sebire, & Loney, 2008) that males obtained higher scores than females on autonomous motivation, although the difference between mean scores is not statistically significant. One of the key factors that influence student's attending licence program without disruption and their level of motivation is student satisfaction from the undergraduate program. Studies that treated motivation as a dependent variable indicated that higher satisfaction from licence program provides higher levels of motivation (Chute, Thompson, & Hancock, 1999; Donohue & Wong, 1997; Tugun, Uzunboylu & Ozdamli, 2017). According to other studies investigated the relationship between motivation and student satisfaction with degree program also indicated that there have been positive relationship between these two variables (Harris et al., 2014; Harun et al., 2012; Soenens & Vansteenkiste, 2005; Vos et al., 2011; Hu, 2017). However, "student satisfaction is not correlated with actual student

achievement, the fact that satisfaction is a contributing factor in motivation and motivation is a predicting factor of student success” (Moore & Kearsley, 1996).

Although the relationships between motivation or motivational patterns of the undergraduates and school related variables (e.g., motivation and academic achievement, motivation and satisfaction from degree program, gender and motivation) have been investigated broadly in the western culture, except two studies (e.g., Eymür & Geban, 2011; Işıksal, 2010; Agabekova, 2017), nearly all the previous studies related to motivation in Turkey have been far away from to investigate these relationships. However, the studies related to motivation in Turkish culture investigated issues such as scale adaptation (Bacanlı & Şahinkaya, 2011; Can, 2012; Ersoy-Kart & Güldü, 2007; Kara, 2008; Karagüven, 2012; Karataş & Erdem, 2012; Kazak, 2004; Kocayürek, 2012), motivational profiles of adolescent athletes (Çağlar & Aşçı, 2010), basic psychological needs (Kağıtçıbaşı, 2005; Özyeşil, 2012; Tekin et al., 2012) and perceived self-determination and self- efficacy of instructors (Ünver, 2004).

Understanding the relationship between undergraduate students’ motivational patterns and educational outcomes may be helpful for instructors to enhance autonomous motivation level of their students. Additionally, being aware of the students’ school-related outcomes that are compatible with different motivational patterns such as autonomous or controlled motivation may be useful to guide them to appropriate degree programs and educational activities. Thus, the aim of this study is to investigate the predictive role of the students’ motivational patterns on their academic achievements and to determine the role of gender and school related outcomes such as satisfaction with the degree program on their motivational patterns as autonomous or controlled. Taking the purpose of the research into account, the following research questions were developed:

Question 1: Do the motivational patterns of the university students predict their academic achievements?

Question 2: Do gender and satisfaction with the degree program predict the motivational patterns of the university students?

2. Method

2.1. Participants

The participants of this study were 732 students (400 55% females, 332 45% males) with a mean age of 21.03 (sd = 1.05) attending Anadolu (n = 555) and Osmangazi (n = 177) Universities in Eskisehir, Turkey. Of the participants, 224 were from Faculty of Engineering, 169 were from Faculty of Science, 246 were from Faculty of Education, and 93 were from Faculty of Humanities. As for their grades, 187 were freshmen, 175 were sophomores, 176 were juniors, and 194 were seniors. The first research question of the study was conducted with 732 participants, whereas the second research question was conducted with total 259 participants, including 127 autonomous motivated and 132 controlled motivated students chosen from 732 participants.

2.2. Data Collection Tool

In the current study, the Turkish Version of Academic Motivation Scale (AMS) was used (Can, 2015). AMS (Vallerand, et al., 1992) is the English version of the original scale which is called “Echelle de Motivation en Education in French (Vallerand, et al., 1989). AMS is a 28 item Likert type scale with seven sub-scales assessing amotivation (AMOT), three ordered types of extrinsic motivation (EMER, EMIN, EMID) and three types of intrinsic motivation (IMTK, IMTA, IMTS). The

confirmatory factor analyses (CFA) conducted by Can (2015) with 797 Turkish university students revealed acceptable fit values (CFI=.92, SRMR=.062, NNFI=.90, GFI=.89, AGFI=.86, RMSEA=.064) that confirmed the scale's construct validity. Cronbach's alpha values of the scale ranged from .65 for EMID to .87 for IMTA, and test-retest reliability coefficients for the seven- sub-scales ranged from .74 to .84.

2.3. Analysis of the Data

Before conducting the analyses, the data obtained within the scope of the study were checked. Among the 797 forms of the scale obtained from the two universities, 52 forms were excluded from the study because they had some missing information. Then the extreme data were checked and 13 forms were excluded. As a result, the study was conducted on the data obtained from 732 university students. In order to be able to conduct the analyses related to the research questions, first of all, it was determined at which level the participants presented autonomous or controlled motivation. For this purpose, seven scores each participant obtained from subscales of the Academic Motivation Scale were converted to a single SDI score by using the Self-determination Index (SDI); thus, an indicator was obtained related to at which level each participant presents autonomous or controlled motivation. It was observed that SDI scores that were calculated with the formula $SDI = [2X(IMTK+IMTA+IMTS)/3] + (EMID) - ((EMIN+EMER)/2) - 2 \times AMOT$; (Guay, Mageau, & Vallerand, 2003) ranged from -3.71 to 13.38. Because there were minus scores among the SDI scores of the participants, all of these scores were converted to standardized scores ($M = 50, SD = 10$), and it was observed that the standard SDI T scores ranged from 26.02 to 69.29.

In order to determine whether academic achievement was predicted by the motivational patterns of the students, first the descriptive information related to SDI scores and academic mean scores (minimum, maximum, mean, standard deviation, skewness, and kurtosis) of 732 students were determined. Then the linear regression analyses were conducted related to the fact that SDI scores predicted the academic achievement. The linear regression analysis was used due to the nature of this technique which allows to explain the relationship between one continuous quantitative dependent variable (academic achievement average) and one continuous quantitative independent variable (SDI).

The second research question of the study, whether gender and satisfaction with the degree program predicted the motivational patterns of the university students (autonomous or controlled), was analyzed with the binary logistic regression analysis. At first stage of the binary logistic regression analysis, the means and the standard deviations of 732 participants' SDI score were calculated. It is important that the predicted variable be categorical in the binary logistic regression. At this stage, the distinction of category on 732 data was performed by calculating the means and standard deviations of the SDI scores. Thus, the standard SDI T scores falling 1 standard deviation below of the mean score was regarded as "controlled motivation" scores, whereas the standard SDI T scores falling 1 standard deviation of above the mean score was regarded as "autonomous motivation" scores. It was observed that while the autonomous motivation scores varied from 59.71 to 69.26, the controlled motivation scores varied from 26.02 to 41.55. Accordingly, the second research question of the study was analyzed with total 259 participants including 127 autonomous motivated and 132 controlled motivated participants. 473 participants whose standard SDI T scores varied between -1 standard deviation and +1 standard deviation were not included in the analyses related to the second research question of this study. Since the dependent variable has to be grouped and coded as 0-1 in the binary logistic regression (Çokluk, 2010), 0 and 1 were coded as controlled motivation and

autonomous motivation respectively. Therefore 0 = controlled motivation and 1 = autonomous motivation in this study.

3. Results

In accordance with the first research question of the study, the relationship between the standard scores of academic achievement (GPA; academic achievement average) and the self-determination index was analyzed. Table 1 indicates the descriptive information related to these two variables.

Table 1
Descriptive Statistics for Study Variables

Variable	Minimum	Maximum	<i>M</i>	<i>SD</i>	Skewness	Kurtosis
SDI	26.02	69.26	50.66	9.00	-.42	-.39
GPA	.60	3.82	2.65	.49	-.26	.12

As seen at Table 1, the standard SDI T scores of the 732 participants range from 26.02 to 69.26 ($M = 50.66$, $SD = 9.00$). On the other hand, it is understood that the academic achievement average scores of the participants range from .60 to 3.82 ($M = 2.65$, $SD = .49$). The results of the linear regression analyses conducted to analyze whether the motivational patterns of the university students predicted the academic achievement are presented in Table 2.

Table 2
Self-determination index scores as a predictor of academic achievement average (GPA)

	<i>B</i>	<i>SEB</i>	β	<i>t</i>	<i>F</i>	R^2	Adjusted R^2	Pearson <i>r</i>
Constant	2.074	.10	-	20.20**	32.55**	.043	.041	.21**
SDI	.01	.00	.21	5.70**				

Dependent variable: Academic achievement, ** $p < .01$

When Table 2 is examined, it is seen that the SDI scores and the academic achievement scores of the students have a significant and positive correlation ($r = .21$, $p < .01$), and the SDI scores predict the academic achievement levels of the students significantly in a positive way ($\beta = .21$, $t = 5.70$, $p < .01$). 4% of the total variance of the academic achievement scores can be explained by the SDI scores ($R^2 = .043$, adjusted $R^2 = .041$). These findings show that having autonomous motivation is an enhancing effect on the academic achievement levels of the students.

The second research question of the study, aiming to determine whether gender and satisfaction with the degree program significantly predicted the students' having autonomous or controlled motivation, was analyzed with the binary logistic regression analyses. The results were represented in Table 3.

Table 3.
Summary of Logistic Regression on Motivational Patterns

Variable	B	SE	Wald	df	Odds Ratio	95% CI for OR	
						LL	UL
Gender [†]	1.95	0.33	34.82**	1	7.05	3.69	13.50
Satisfaction with the program	1.38	0.21	45.06**	1	3.96	2.65	5.91
Constant	-5.89	0.81	53.03**	1	0.00		

Note. Nagelkerke $R^2 = .46$; Hosmer and Lemeshow test $\chi^2 (6) = 6.79, p = .34$; ** $p < .001$; [†] Female = 0 and Male = 1; OR = Odds Ratio; LL = Lower level; UL = Upper level; CI = Confidence interval

When Table 3 is examined, it is seen that gender (Wald = 34.82, $p < .001$) and satisfaction with the program (Wald = 45.06, $p < .001$) were significantly predicted on motivational patterns. Males have been at the autonomous motivation unlike females (OR = 7.05, 95%CI = 3.69 – 13.50). Students who were satisfied with their program were significantly more likely to have autonomous motivation than those who were less satisfied (OR = 3.96, 95%CI = 2.65 – 5.91).

Nagelkerke R^2 and Hosmer-Lemeshow test were also computed. Nagelkerke R^2 values of the independent variables related to predicting the variance indicated for the dependent variable. According to Nagelkerke R^2 , giving an opportunity to predict the variance, gender and satisfaction with the program explain 46% of the dependent variable. The result of the Hosmer and Lemeshow test, which evaluates the goodness of fit of the model as a whole, does not give a significant value [$\chi^2 (6) = 6.79, p > .05$]. The fact that this value is not significant indicates that the model has an acceptable fit and that the data fit of the model is at a sufficient level.

Consequently, the findings obtained from this study indicate that the autonomous motivation increases academic achievement level and that being male and having satisfaction with the program have positive contributions to autonomous motivation.

4. Discussion

The current study revealed that the autonomous motivation positively predicted the academic achievement of the undergraduate students, as in many previous studies (Eymür & Geban, 2011; Grolnick, Ryan & Deci, 1991; Harter & Connell 1984; Pintrich & Garcia, 1991; Unrau & Schlackman, 2006). On the other hand, the study indicated that being a male student or feeling satisfied with the degree program positively predicted the autonomous motivation. These findings were also a consistent with the previous studies that investigated the relationship between autonomous motivation and gender (Black & Deci, 2000; Clark, 2010; Corey et al., 2010; Gillet & Rosnet, 2008; Vallerand & Bissonnette, 1992), and with the studies that investigated the relationship between autonomous motivation and satisfaction from degree program (Chute, et al., 1999; Donohue & Wong, 1997; Walls, 2009). Consequently, it can be said that, this study provides an acceptable support for the fact that quality of motivation is important in determining good performance, and satisfaction with the degree program increases quality of motivational orientations of the undergraduates at university. The findings obtained in this study indicate that we need to help university students improve their autonomous motivational levels in order to increase their academic success and help them choose appropriate areas for their talents and interests that may provide them satisfaction from the degree programs that they have been attending.

In terms of the strength and limitation of the study, several things were thought to be important. One of the major contribution of this study is that it is the first study in the Turkish literature, which investigates the role of being satisfied with the ongoing program on the undergraduates' motivational patterns. Another important aspect of this study is that our attention has led to an unexpectedly low level of autonomous motivation (17%) among participants. The fact that autonomous motivation is a very important factor in the academic life of the students suggests that this disappointing result should be tested with more extensive research. Similar results that will be obtained from future research, may be a warning to the educators to seek new strategies to improve the level of autonomous motivations of the students (Uzunboylu, Uluc & Ozcan, 2017).

One of the limitations of the study is related to the concept of generalizability of the research findings because the data of the study were collected only from two universities in the same district. Secondly, motivational profiles of the students examined in the current study are limited with only two motivational orientations; controlled and autonomous motivation. However, obtaining more motivational profiles using the cluster analysis technique on a greater sample may provide us with more motivational patterns other than the types of autonomous and controlled motivation. By doing so, not only academic motivation but also its antecedents and outcomes can be explained more thoroughly. Despite these limitations, the study does provide some considerable support for the previous studies examining various antecedents and outcomes associated with academic motivation.

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