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RELATIONSHIP BETWEEN ACADEMIC SELF-REGULATION, ACADEMIC ACHIEVEMENT AND HEALTH

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Abstract. *The aim of this study was three-fold: first, to determine the existence of a self-determination continuum in our socio-cultural conditions on an academic level, second, to determine the relationship between the academic self-regulation and the academic achievement, and third, to determine the relationship between the academic self-regulation and health. The study was performed on a sample of 217 first and second year students (159 female and 58 male) of biology and medicine. The following measurement instruments were used: Self Regulation Questionnaire-Academic (SRQ-A, Ryan and Connell, 1989), subjective evaluation of psychical and physical health and grade in test. The obtained results point to the following: In our socio-cultural conditions, on an academic level, there can be registered an existence of a self-determination continuum that the Deci-Ryan's theory anticipates. There is a positive correlation between autonomous motivation and the grades in test. Intrinsic motivation and the college that the students attend are significant predictors for academic achievement. There is a positive correlation between autonomous motivation and health. The students with autonomous motivation had a better subjective evaluation of psychical and physical health than the students with controlled motivation. These results are discussed with reference to Deci and Ryan's (1985, 1991) self-determination theory.*

Keywords: *Self-regulation, academic achievement, self-determination continuum, health*

INTRODUCTION

Self-determination theory (SDT) is a general theory of human motivation and is concerned with the choices people make with their own free will and full sense of choice, without any external influence and interference. SDT focuses on the degree to which an individual's behavior is self-endorsed and self-determined (Deci & Ryan, 2000). Deci & Ryan (1987) define extrinsic motivation as the performance of an activity in order to attain some separable outcome and, thus, contrasts with intrinsic motivation, which refers to doing an activity for the inherent satisfaction of the activity itself. Unlike some perspectives that view extrinsically motivated behavior as invariably nonautonomous, SDT proposes that extrinsic motivation can vary greatly in its relative autonomy (Ryan & Connell, 1989; Vallerand, 1997). At the far left of the self-determination continuum (Figure 1) is amotivation, the state of lacking the intention to act. To the right of amotivation are five classifications of motivated behavior. At the far right of the continuum is the classic state of intrinsic motivation. It is highly autonomous and represents the prototypic instance of self-determination. Extrinsically motivated behaviors, by contrast, cover the continuum between amotivation and intrinsic motivation, varying in the extent to which their regulation is autonomous. First to the right of amotivation is external regulation, the extrinsically motivated behaviors that are least autonomous. A second type of extrinsic motivation is labeled introjected regulation. Introjection involves taking in a regulation but not fully accepting it as one's own.

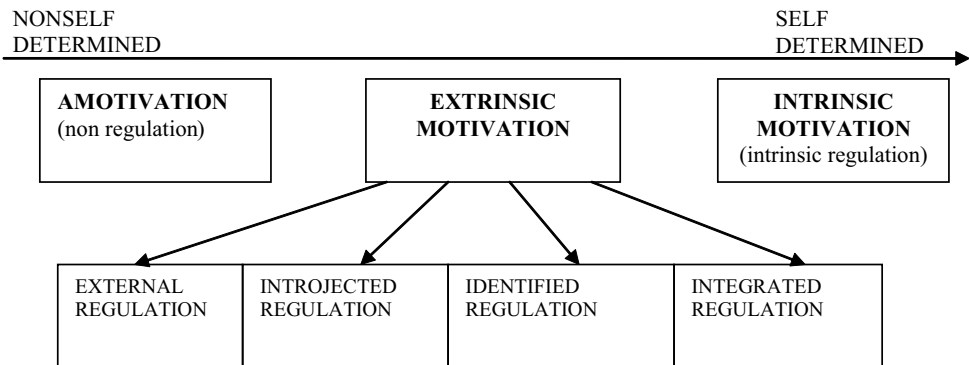


FIGURE 1. THE SELF-DETERMINATION CONTINUUM (Deci & Ryan, 1985)

In some studies, external regulation (being interpersonally controlled) and introjected regulation (being intrapersonally controlled) have been combined to form a controlled motivation composite. A more autonomous, or self-determined, form of extrinsic motivation is regulation through identification. Identification reflects a conscious valuing of a behavioral goal or regulation, such that the action is accepted or owned as personally important. Finally, the most autonomous form of

extrinsic motivation is integrated regulation. Integration occurs when identified regulations are fully assimilated to the self. In some studies, identified, integrated, and intrinsic forms of regulation have been combined to form an autonomous motivation composite. As people internalize regulations and assimilate them to the self, they experience greater autonomy in action.

Ryan & Connell (1989) have tested assumptions of the motivation continuum and they have determined four types of extrinsic motivation. Students with external regulation had been less interested in homework and more prone to blame others for negative outcomes. Students with introjected regulation put in more effort, but they were anxious and had problems coping with failure, while students with identified regulation enjoyed school more and had more positive coping style with different outcomes. Intrinsic motivation was connected with interest, pleasure, competence and positive coping. Other research has shown that autonomous academic motivation is positively associated with academic achievement (Connell & Wellborn, 1990; Fortier, et al., 1995; Grolnick, Ryan, & Deci, 1991; Guay & Vallerand, 1997; Miserandino, 1996; Ratelle, et al., 2007), task persistence, effort, and enjoyment (Ryan & Deci, 2000; Vansteenkiste et al. 2004; Waterman 2005) lower dropout rates (Ryan & Deci, 2000), high quality of learning (Grolnick & Ryan, 1987; Ryan & Deci, 2000) and better psychological well-being (Sheldon & Kasser, 1995; Levesque et al., 2004). Studies have shown that external rewards, such as grades, tend to undermine intrinsic motivation in the academic setting (Deci, 1971; Deci et al., 1999).

The researches have consistently shown that autonomous motivation is a strong predictor of success in college studies and of psychological health (Black & Deci, 2000; Deci et al., 2006). It was also shown that relevant educational outcomes are related to intrinsic motivation and a well internalized extrinsic motivation (Yi-Guang Lin & McKeachie, 1999). Sviben (2006) found that autonomous motivation is a significant contribution to academic achievement and Goldin's research (2007) shows that intrinsic regulation is a significant predictor of school success among girls, while among boys the significant predictors of success in school are the external, identified and intrinsic regulation.

Autonomous motivation is also reliably related to psychological health. Maltby & Day (2001) have shown positive association intrinsic motivation for exercise with psychological health. Ratelle et al. (2004) have shown that people with higher level of self-determination have reported better mental health.

Standage & Treasure (2000) tested the motivation continuum. They confirmed previous studies and got a simple correlation matrix between subscales on SIMS (Situational Motivation Scale), i.e. the SIMS subscales were distributed along the self-determination continuum.

As it was mentioned in the previous text, many researches have dealt with motivation, psychological health and academic achievement and the majority of

them have been done in the USA. With the exception of a few graduation theses (Čuk, 1990; Košanski, 2004; Goldin, 2006; Sviben, 2006) that have dealt with a similar problem area, there has been no research done in our country that would examine the self-determination theory, i.e. the correlation between the degree of autonomy, academic achievement and psychological health. In order to verify the results of previous researches on our population, we decided to do our research on correlation between academic self-regulation, academic achievement and psychological health. The aim of this study was three-fold: to determine the existence of a self-determination continuum in our socio-cultural conditions on an academic level, to determine the relationship between the academic self-regulation and academic achievement, to determine the relationship between the academic self-regulation and health.

METHODOLOGY

PARTICIPANTS AND PROCEDURE

The participants were first and second year students of biology and medicine. Two hundred and seventeen students (58 male and 159 female) volunteered to participate in the study. Their ages ranged between 18 and 23 years. Questionnaires were administered to the students during a class period. At least one researcher was present during data collection. The students had approximately 45 min to complete the surveys. Anonymity was guaranteed. The survey was conducted a few days before the end of the lectures in a course. After they have taken the exam their grades were collected and used as a measure of academic achievement.

INSTRUMENTS

For the present study we made a special form which was used to collect data such as: gender, faculty and year of study. Students also needed to fulfill the SRQ-A (Self Regulation Questionnaire-Academic; Ryan & Connell, 1989) and give their subjective evaluation of psychological and physical health. At the end we collected the grades in test.

The SRQ-A consists of 32 multiple-choice questions (7 alternatives, Lickert type). The variables of sum are formed accordingly: the external, the introjected, the identified and the intrinsic motivation regulation. A Relative Autonomy Index (RAI) has been formed using weighted variables of sum in the formula. RAI describes the level of autonomous behavior: the higher positive RAI, the more autonomous, the higher negative RAI, the more non-autonomous. The validity of the variables of sum was studied by comparing the correlations. The result was logical: the more external variables correlated higher with each other and the more intrinsic variables correspondingly with each other. The introjected and the iden-

tified settled in between the external and the intrinsic variables, as was expected. The reliabilities of the variables of sum were good showing sufficient internal consistency (Cronbach's alphas .78– .84).

RESULTS

DESCRIPTIVE STATISTICS

TABLE 1. MEANS AND STANDARD DEVIATIONS FOR DIFFERENT TYPES OF MOTIVATION, ACADEMIC ACHIEVEMENT AND HEALTH REGARDING GENDER

Gender	Female (N=159)		Male (N=58)		t-test
	M	SD	M	SD	
external regulation	3,90	1,22	3,78	1,33	-,61
introjected regulation	4,05	1,09	3,73	1,10	-1,86
identified regulation	5,65	0,98	5,45	1,65	-1,07
Intrinsic motivation	4,39	1,21	4,01	1,28	-2,00*
controlled motivation	3,98	1,09	3,78	1,13	-1,18
autonomous motivation	5,02	0,99	4,73	1,29	-1,76
academic achievement	3,18	1,47	2,51	1,46	-2,71**
psychological health	86,08	14,63	85,42	21,30	-.22
physical health	83,96	16,87	83,57	21,93	-.11

* Significant at the 0.05 level (two-tailed)

**Significant at the 0.01 level (two-tailed)

EXPLORATORY FACTOR ANALYSIS

Exploratory factor analysis (method principal components, varimax rotation) have show extraction of 8 factors which have eigen values more than 1 and explained 68,80 % of overall variance. Given factor structure show 2 dominant factors (explained 40% of variance) and other factors have small eigen values and very small proportion of explained variance. First factor explained 28,009 % of overall variance and second factor explained 12,605 % of overall variance.

CONFIRMATORY FACTOR ANALYSIS

The structure we tested was supposed to rely on four factors, namely the following: external regulation, introjected regulation, identified regulation and intrinsic motivation. We interpreted the saturation more than 0,3 and we managed to interpret the four mentioned factors. The first two of these factors have most saturation for external and introjected regulation and combining them we inter-

puted controlled motivation. The last two of these factors have most saturation for identified regulation and intrinsic motivation and combining them we interpreted autonomous motivation. Although all items were not distributed as SRQ-A presumed, most items were confirmatory with SRQ-A assumptions.

SIMPLEX PATTERN

Correlations among the different types of motivation are shown in Table 2. The correlations between the variables appear to be in conformity with a simplex ordered matrix, although we found some small deviations from this presumed pattern. For example, external regulation displayed a more important relationship with intrinsic motivation (.28) than with identified regulation (.24), although it was a very small difference and not significant.

TABLE 2. SIMPLE CORRELATION MATRIX FOR DIFFERENT TYPES OF MOTIVATION

	External regulation	In- trojected regulation	Identi- fied regu- lation	Intrinsic motiva- tion	Con- trolled motiva- tion	Autono- mous motiva- tion
External regulation	1	.76**	.24**	.28**	.95**	.26**
Introjected regulation		1	.33**	.45**	.94**	.43**
Identified regulation			1	.60**	.35**	.89**
Intrinsic motivation				1	.31**	.93**
Controlled motivation					1	.35**
Autonomous motivation						1

** Correlation is significant at the 0.01 level (two-tailed)

CORRELATION ANALYSIS

As we expected we confirmed correlation between academic achievement and different types of motivation (table 3). A statistically significant correlation was between autonomous motivation and academic achievement, and there was no significant correlation between academic achievement and controlled motivation. Highest correlation was between academic achievement and intrinsic motivation and then between identified regulation and academic achievement, although both correlations were rather small.

TABLE 3. CORRELATION MATRIX FOR DIFFERENT TYPES OF MOTIVATION AND ACADEMIC ACHIEVEMENT

	Academic achievement
External regulation	.12
Introjected regulation	.14
Identified regulation	.33**
Intrinsic motivation	.34**
Controlled motivation	.14
Autonomous motivation	.37**

** Correlation is significant at the 0.01 level (two-tailed)

As we expected we confirmed the correlation between health and different types of motivation (table 4). Correlation analysis showed positive significant correlation between psychological health and autonomous motivation, intrinsic motivation and identified regulation, although correlation coefficients were relatively small. There was no significant correlation between psychological health and controlled motivation, introjected and external regulation. Also, there was statistically significant positive correlation between physical health and autonomous motivation, intrinsic motivation and identified regulation, although correlation coefficients were also small. There was no significant correlation between physical health and controlled motivation, introjected and external regulation.

TABLE 4. CORRELATION MATRIX FOR DIFFERENT TYPES OF MOTIVATION AND HEALTH

	Physical health	Psychological health
External regulation	-.08	.09
Introjected regulation	-.01	.08
Identified regulation	.18*	.18*
Intrinsic motivation	.24**	.20**
Controlled motivation	-.05	.09
Autonomous motivation	.23**	.21**

* Correlation is significant at the 0.05 level (two-tailed)

** Correlation is significant at the 0.01 level (two-tailed)

As we expected to have students with autonomous motivation and controlled motivation we calculated RAI. There were 131 students with autonomous motivation and 46 students with controlled motivation. Also the span of results for students with autonomous motivation was bigger (from 0 to 16,37) than the span of results for students with controlled motivation (from - 6,05 to 0).

DISCUSSION

The present study had three goals: a) to determine the existence of a self-determination continuum in our socio-cultural conditions on an academic level, b) to determine the relationship between the academic self-regulation and the academic achievement, c) to determine the relationship between the academic self-regulation and health.

Ryan & Connell (1989) tested the self-determination continuum assumptions. The results showed existence of four types of motivation regulation. The correlations between the different types of motivation have shown that the four types of motivation regulation lie along the continuum, i.e. the interrelationships among the four subscales of the SRQ-A, as expected, formed a simplex pattern in which those subscales adjacent along the continuum correlated more positively than those more distal along the continuum. Aligned with previous research (Ryan & Connell, 1989; Guay et al., 2000; Standage et al., 2000; Treasure et al., 1999; Vansteenkiste et al., 2005), the results of the present study provide further empirical support for the simplex-like pattern of relationships among the SRQ-A subscales. This pattern of significant correlations suggests that the SRQ-A does capture multidimensional motivation in line with the theoretical tenets proposed by Deci & Ryan (1985, 1991). Moreover in our research we have affirmed with the use of confirmatory FA the existence of four factors that we can interpret as: external regulation, introjected regulation, identified regulation and intrinsic motivation. With that we managed to give an answer to the first problem that SDT deals with, i.e. we established the fact that also in our socio-cultural conditions and on an academic level we can register the existence of the self-determination continuum predicted by the Deci-Ryan (2000) theory.

Previous research within the SDT tradition has shown convincingly that an autonomous, relative to a controlled, regulation of study activities is associated with various positive learning outcomes and has thereby provided evidence for the claim that the quality of students' motivation matters (Reeve et al., 2004). When internally regulated students are more task oriented, more excited about the course, use more deep level learning strategies, persist more, and perform better (Connell & Wellborn, 1990; Fortier et al., 1995; Grolnick et al., 1991; Guay & Valleraud, 1997). When externally regulated on the other hand, students adopt more approach and avoidance ego goals, study less regularly, show less excitement, persist less, use more surface level strategies and perform worse (Miserandino, 1996; Ratelle et al., 2007). In line with the SDT (Deci & Ryan, 1985, 2000), we found that students whose behavior is autonomously motivated had better academic achievement than students with controlled motivation. We found significant positive correlation only between academic achievement and autonomous types of motivation, and there is no statistically significant correlation between academic achievement and controlled types of motivation. These results are consistent with

the starting assumption and former studies (Sviben, 2006). This may imply that grades are not an important recognition standard or that they are not viewed as a true indicator of ability, perhaps because grades are not consistently applied. That is, students may receive differing messages from parents and peers with regard to the meaning or importance of grades, and professors are notoriously variable in their grading standards. Additionally, students may choose to withdraw from the university in order to avoid creating a poor academic record for themselves. In the present research we used RAI, because it is a more precise measure of motivation than the subscale of different types of motivation. The results have shown that the majority of students have the autonomous motivation, while the students with a controlled motivation, besides being less in number, have also a smaller span of results which could have affected the failure to get a correlation between controlled motivation and academic achievement. Our results indicate that the motivation in college is rather self-determined and that the autonomous style of motivation regulation is the prevalent one, which is in accord with previous research (Sviben, 2006). The findings also support the SDT claim that intrinsic motivations and integrated extrinsic motivations are related to achievement (Ryan & Deci, 2000). Black and Deci (2000) reported that the autonomous motivation for taking a particular course was not predictive of students' grades in that course. The current study may have produced significant findings because participants were asked to respond based on "subject that they are listening these weeks" and we took grade form that subject as measure of academic achievement. Our results were opposite to Black & Deci (2000) ones. Maybe this is because reasons for taking a course and reasons for participating in the class are not necessarily the same. Taking the course is a decision made prior to or early in the semester, when registering for the course. The decision to participate is an ongoing one throughout the course of the semester. This is consistent with the reported results of others who have examined the relationship between self-determination and academic achievement (Wehmeyer & Palmer, 2003; Wehmeyer & Schwartz, 1997). In present research correlation was highest between the intrinsic motivation and academic achievement which confirms the theoretical assumptions. This is in concordance with the previous results (Reeve, 2002; Wiest et al., 1998).

Aligned with previous research (Maltby & Day, 2001; Ratelle et al., 2004; Sheldon & Kasser, 1995; Levesque et al., 2004) the results of the present study provide further empirical support for positive correlation between autonomous types of motivation and physical and psychological health. As we expected, the highest correlation was between intrinsic motivation and health (both physical and psychological), although rather small. There could be a few reasons for that. First, the participants were college students, whose responses may not be generalizable to other age or cultural subgroups. A second concern is that our variables were based on self-report. It will be important in future studies to tie indices of

both motivation and health to observable variables such as behavioral manifestations or objective tests of health. The advantage of the autonomous motivation over the controlled was found by Black & Deci (2000) and Levesque et al. (2004) who have discovered that the autonomous motivation influences the enhancement of psychological health. In concordance with earlier findings (Vallerand et al., 1995; Vallerand & O'Connor, 1989), the present study has shown that individuals motivated in a self-determined way were those reporting a more positive psychological and physical health. The results make theoretical contributions to SDT (Deci & Ryan 2000). Recent studies on SDT have begun to highlight the critical role that internalization and integration play in psychological and physical well-being (Burton et al., 2006; Deci & Ryan 2000; Williams et al. 1996). Higher levels of relatedness and value are associated with integration of extrinsic behaviors, making the behaviors more intrinsic to the individual. Further study should include these findings in planning their research.

Among the limitations of this study few are especially noteworthy. The first limitation concerns the sample used in the study. Participants included in the study were 18 to 23 years of age. Further research should determine if the present results generalize to individuals from other study groups and from different age groups. Second, most of the participants were female. This is related to the educational programme we focused on: biology and medicine. However, as other findings collected with both genders show similar patterns (Simons et al., 2003), we are confident that the role of the future will not be fundamentally different for men. Although it is important to mention that some studies showed more intrinsic motivation for girls than boys, and for other types of motivation there were no differences (Baker, 2004; Sviben, 2006). Third, we only included one course in the present analysis. Specifically, some courses (e.g. anatomy or biochemistry) were perceived as highly relevant to one's future job and as internally regulated by almost everyone, whereas the opposite was true for e.g. 'Philosophy'. Had we done the analyses with these courses, the relations would be much different. On the other hand, analyses with all courses involved would have led to inconclusive results because participants were not equally distributed across the four types of instrumentality. Therefore, analyses including all courses would be confounding possible individual differences. Hence, we believe that we conducted the most informative and honest test of the theoretical statements by selecting only one course. The fourth limit concerns our use of self-report measures, which entails a possible self presentation bias in participants' answering. Future research should replicate our findings using other types of measures (e.g. implicit measures). Lastly, it is important to remember that the present study only assessed a limited number of health indicators (i.e. subjective evaluation of psychological and physical health). Future research should test the generality of the present results using other mental and physical health indicators.

CONCLUSION

Although the present study confirmed results of previous study, in our socio-cultural conditions, on an academic level, the biggest problem, as mentioned above, was generalization of these results to students population. Future research is needed, in order to further test the generality of the motivational model and their connection to academic achievement and health.

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