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Self-regulation and academic self-efficacy of Czech university students

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Abstract

The paper presents findings on self-regulatory behavior in Czech adults, as measured by SRQ-CZ, an instrument originally developed by Brown et al. (1999), and on self-efficacy in learning as measured by SEQ, an instrument developed by Jakešová (2014). The two results correlated low, which indicates that SRQ-CZ measures the generic ability while the SEQ measures domain specific beliefs. As expected, the scores on positive dimensions of SRQ-CZ (Goal Orientation and Decision Making) were above the midpoint of the scale used, while in negative dimensions (Self-direction and Impulsivity Control) the scores were below the midpoint.

Keywords: self-regulation; academic self-efficacy; formal education; university students.

1. Introduction

In comparison with other living beings, humans have the unique capability to control their inner feelings, impulses and processes. In general, people are able to adapt their behavior based on set standards (external factors) and also to focus on their own goals (internal factors). The term self-regulation is often described as the ability to develop, implement, and maintain planned behavior in order to achieve one's goals (Brown, Miller & Lawendowski, 1999).

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Self-regulation broadly indicates the processes of goal setting, self-direction, decision-making and impulse control. It includes dealing with a range of challenges which individuals may face when trying to achieve something important but difficult to attain (Mischel, Cantor & Feldman, 1996). This phenomenon is considered for example in relation to organizational learning (Boekaerts, Pintrich & Zeidner, 2000) and is also examined in other contexts, such as health behavior (Ridder & Wit, 2006), drug use (Baumeister & Heatherton, 2009), alcohol abuse (Wills, Sandy & Yaeger, 2002)and truancy (Veenstra, Lindenberg, Tinga & Ormel, 2010).

Researchershave attempted to uncover the phases or stages of self-regulation. A three-phase theory consisting of self-monitoring, self-evaluation, and self-reinforcement was introduced by Carver and Scheier (1982). Subsequently, this model was extended by Kanfer (1970) and Miller and Brown (1991) to seven phases, consisting of self-evaluation, informational input, instigation to change, planning, search, implementation and evaluation. However, when this model was empirically tested, the result of factor analysis led to a single-dimension solution (Carey, Neal, & Collins, 2004). Another research (Neal & Carey, 2005) demonstrated two self-regulation phases.

As previous research yielded inconclusive results concerning the number and sequence of dimensions and phases of self-regulation, it opens new challenges for further research. In the present study we endeavor to continue in this direction. In addition, we shall provide data on the processes in self-regulation of non-Anglo-Saxon respondents, thus expanding the research field and offering a possible cross-cultural comparison.

2. Research methodology

There is a large volume of studies that aims at self-regulation in learning (e.g., Zimmerman, 1990; Winne, 2001; Pintrich, 2004). However, relatively little effort was made to investigate self-regulation in a wider range of life situations. Ample examples of this line of effort are given by studies conduced by Brown, Miller, & Lawendowski (1999), Carey, Neal and Collins (2004) and Neal and Carey (2005).

This study explores the broad, or generic, self-regulatory ability with the aim to shed more light on how this is self-perceived by respondents throughout their life. In addition, the ability for self-regulation will be compared to self-efficacy, which is an important factor related to self-regulation.

The basic research purpose was to determine the achieved level of self-regulation of students in the Zlín region and to determine the differences of this level by gender and age. Another purpose was to determine the relationship between self-regulation and perceived self-efficacy in learning.

Due to the nature of the research purpose, we grounded our research on a quantitative approach using exploratory methods. Data were analyzed using the statistical program Statistica v. 12 Base and IBM SPSS v. 21.

2.1. Measurements

Two self-report instruments were used to gather data, the Self Regulation Questionnaire and the Self-Efficacy Questionnaire. The Self Regulation Questionnaire (SRQ-CZ) is a Czech version of the original Self-Regulation Questionnaire (SRQ) by Brown, Miller & Lawendowski (1999). The original instrument was constructed to measure generic self-regulation, i.e., the ability to regulate one´s behaviour in a broad range of everyday situations. The authors define self-regulation as the ability to develop, implement, and flexibly maintain planned behaviour to achieve one´s goals. Based on Kanfer's (1970) theoretical model, they claim that self-regulation of behaviour proceeds in seven consecutive steps from receiving relevant information to making a plan of action and assessing the results of the implementation of the plan. Brown, Miller & Lawendowski's (1999) original instrument has seven subscales corresponding to the seven step-theoretical model of planning and executing behaviour. There were two attempts to prove the empirical validity of the seven-step theoretical model; however, none of them was successful. In their study Carey, Neal and Collins (2004) demonstrated a single-factor model, while data by Neal and Carey (2005) yielded a 2-factor model. In our previous study where we used a sample of 360 university students in the Czech Republic the best factorial solution was a 4-factor model (Gavora, Jakešová & Kalenda, in press).

For the purpose of this study we re-validated the instrument with a broader sample. It consisted of 1,238 respondents from the region around Zlín in the Czech Republic. The age of the respondents ranged from 19 to 83. The best solution proved to be a 4-factor model with dimensions entitled Goal Orientation, Decision-Making, Self-direction and Impulse Control. The current form of SRQ-CZ has 22 items. Dimensions, number of items per

dimension, item examples and dimension Alphas are illustrated in Table 1. Items in the first two dimensions (Goal Orientation and Decision Making) were positively worded, thus the higher the score the better the self-regulation. The latter two dimensions (Self-direction and Impulse Control) were negatively worded, therefore the lower the score, the better the self-regulation (see Table 1).

Similarly to previous studies, it was not confirmed that self-regulatory behaviour is necessarily performed in seven successive steps (represented by the seven dimensions of the questionnaire) as claimed in Kanfer's (1970) theory. The alternative interpretation offered is that even if such steps do exist, while filling in the questionnaire, respondents did not relate their behaviour to them. Rather, they considered each questionnaire item as a separate entity. The reliability of the questionnaire was .85 (Cronbach Alpha).

Table 1. Dimensions, number of items, item examples and dimension Alphas of SRQ-CZ.

Dimensions	Example of items	No. of items	Cronbach Alpha
Goal Orientation	I usually proceed to accomplish my aims.	5	.713
Decision Making	A new problem is an immediate challenge for me to find solutions.	6	.720
Self-direction	I fail to learn from my mistakes.	7	.705
Impulse Control	I give up easily when facing an obstacle.	4	.692

The Self-efficacy Questionnaire (SEQ) is a 10-item instrument developed by J. Jakešová (2014) in which respondents self-rate their belief in the ability to study efficiently. The factor analysis with this sample revealed a single factor model with Cronbach Alpha of .90. Example of an item: "If I concentrate sufficiently I can learn even a very hard subject matter". Both SRQ-CZ and SEQ used scale items ranging from 1 (strongly disagree) to 5 (strongly agree).

The two instruments were administered in group sessions of respondents. Online administration was rejected because of the threat of a low response-rate.

2.2. Sample

The base sample consisted of 1.244 respondents from the region of Zlín in the Czech Republic who were students in a medium-sized university. Out of the base sample, three subsamples were selected for this investigation as seen in Table 2. The students were registered at bachelor, master's and doctoral degree programmes at the University of the Third Age. For statistical calculations the age of the respondents was divided into three categories: (1) 19-25 (65%), (2) 26-45 (19%), and (3) 60 and over (16%). The age group 46 to 59 was not taken into consideration because it was underrepresented. The majority of the respondents was female (903 or 73%), the number of males was 333 (27%).

Table 2. Subsamples.

Age groups	N	%
19-25	800	64.3
26-45	236	19
60-83	192	15.4
Missing	16	1.3
In total	1.244	100

3. Results

First, we shall present the descriptive data on self-regulatory behavior, and then data on self-efficacy in learning. The descriptive statistics showed that respondents scored on Goal Orientation ($\bar{x}$ = 3.99, SD = .65) and Decision Making ($\bar{x}$ = 3.53, SD = .59) above the midpoint of the five-point scale used in the questionnaire (see Fig. 1)[†]. This indicates a rather good level of perceived self-regulatory behavior. On the other hand, students achieved lower scores in Self-direction ($\bar{x}$ = 2.93, SD = .48) and Impulse Control ($\bar{x}$ = 2.81, SD = .79). As these dimensions were negatively scored, this signifies that respondents can control their impulsivity and can self-direct their behavior. The results showed that the respondents achieved above-midpoint on the Self-efficacy scale ($\bar{x}$ = 3.38, SD = .43), which shows that they judge their self-efficacy as being rather high.
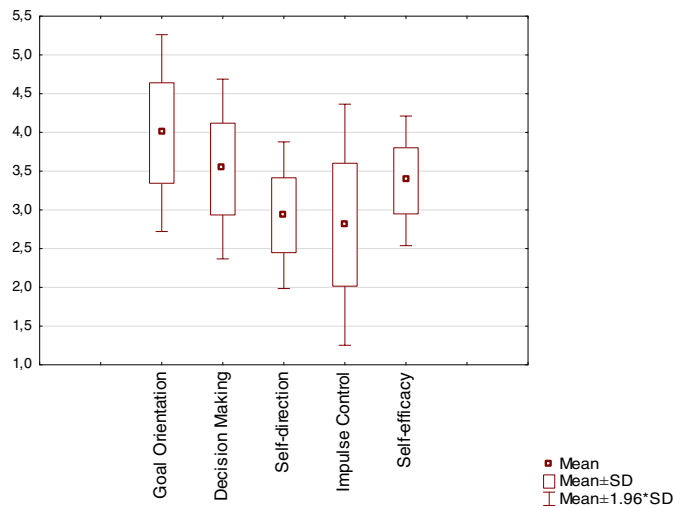

Fig. 1. The average scores on self-regulation and self-efficacy.

Regarding the relationships between dimensions, there was a positive correlation between the Goal Orientation and Decision Making dimensions (r_s = .464, statistically significant at the 5% level; Table 3). A positive correlation was also found between Self-direction and Impulse Control (r_s = .455). We can say that respondents who are goal-oriented (i.e. "I reward myself for progress toward my goals") also scored high in decision-making (i.e. "I am willing to consider other ways of doing things"), and vice versa. On the other hand, respondents who had higher scores in Self-direction also reached higher scores in controlling impulsivity, and vice versa. These findings confirm the existence of inverse relations between positively and negatively worded dimensions of self-regulation in this questionnaire[‡].

Self-efficacy scores had positive and statistically significant correlations with the positive dimensions of self-regulation, i.e. with Goal Orientation (r_s = .345) and Decision Making (r_s = .305), and low and negative correlations with negatively worded dimensions of self-regulation. This indicates that the two variables are mutually dependent entities.

[†] It would be worth comparing our data with American studies that used SRQ. However, they used scores that summed up all item points, while our sample was scored on a 1-5 point scale.

[‡] To get an idea of how many percentages of the variance are involved in two variables the coefficient of determination (r2) was calculated. In the first case (r_s = .464) variables reached 22% of the shared variance, and in the second case (r_s = .455) it was 21%.

Table 3. Correlations of self-regulation and self-efficacy.

Components	$\bar{x}$	SD	Decision Making	Self-direction	Impulse Control	Self-efficacy
Goal Orientation	3.99	.65	.464	-.146	-.294	.345
Decision Making	3.53	.59		-.139	-.353	.305
Self-direction	2.93	.48			.455	.035
Impulse Control	2.81	.79				-.044
Self-efficacy	3.38	.43				

Note: Correlation is significant at the .05 level.

The results show statistically significant differences in Goal Orientation (p = .024, p <.05) and Impulse Control (p = .000, p < .05) between men and women (Table 4). Women achieved higher scores on Goal Orientation than men but lower scores on Impulse Control. In other words, women are better goal-oriented but are likely to control their impulsivity less than men do.

Table 4. Findings on self-regulation and self-efficacy by gender and age.

Components	Gender					Age						
	man		woman			19 – 25 years		26 – 45 years		over 60 years		
	$\bar{x}$	SD	$\bar{x}$	SD	p	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	p
Goal orientation	3.91	.71	4.02	.62	**.02**	3.91	.65	4.16	.61	4.14	.62	**.00**
Decision Making	3.56	.62	3.52	.58	.08	3.41	.57	3.73	.53	3.77	.62	**.00**
Self-direction	2.94	.47	2.93	.49	.62	2.88	.45	2.89	.47	3.19	.55	**.00**
Impulse control	2.66	.81	2.86	.78	**.00**	2.87	.78	2.59	.75	2.85	.85	**.00**
Self-efficacy	3.38	.43	3.37	.43	.62	3.36	.42	3.42	.39	3.40	.48	.26

Note: $\bar{x}$ = represents the average value on a scale of 1 to 5; SD = standard deviation; p = nonparametric test (K-W ANOVA, M-W U test).

The age of the respondents affects all four dimensions of self-regulation, though differently. It was found that the youngest age subgroup scored the lowest on most of the assessed dimensions. The middle aged subgroup of respondents (26-45) were the most goal-oriented. Conversely, respondents aged 19-25 scored lowest on Goal Orientation. Similar results were also achieved in Decision Making. The ability of decision-making increases with the age of respondents. In other words, the oldest respondents, aged over 60, provide the highest level of decision-making. The youngest respondents, aged 19-25, showed the lowest level in decision- making (see Table 4).
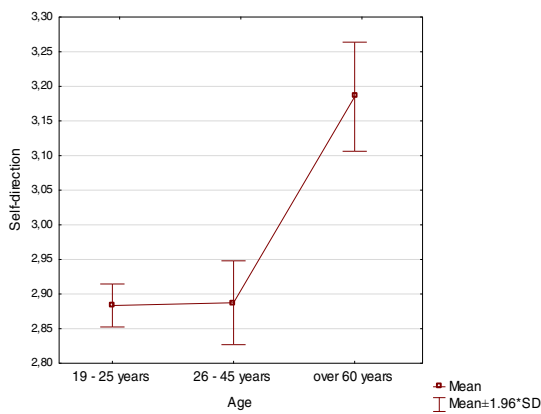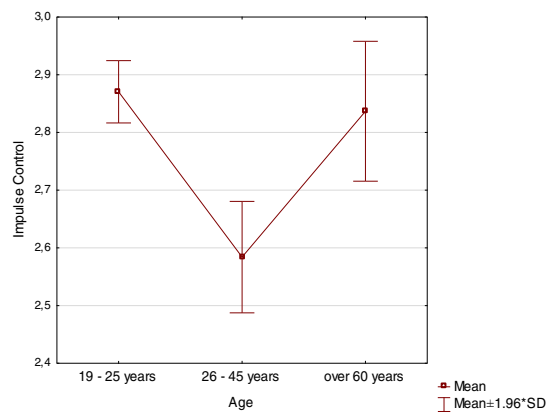
Fig. 2. Self-direction by age.

Fig. 3. Impulse Control by age.

The divergent results were shown in the two negative dimensions of self-regulation, where achieving lower

scores is perceived as indicating a greater ability in self-regulation. According to descriptive statistics and hypothesis testing, it was proven that respondents aged 60 and over reached the lowest level of self-direction (i.e. "I can´t learn from my mistakes"). Younger respondents achieved similar results (see Fig. 2).

Respondents in the middle age subgroup (26 to 45) showed better control of their impulsivity (i.e. "Even if I decide for something, I have a problem to realize it"). In contrast (see Fig. 3), for the youngest and oldest respondents the impulse control presents a greater issue.

The level of self-efficacy, which can be seen as the belief that an individual has about himself/herself, was not related to gender or age. This result together with the low correlation between the dimensions of self-regulation of behaviour and self-efficacy in learning suggests that the former is a generic concept covering a wide range of life situations while the latter is domain specific and concerns learning contexts.

4. Summary and discussion

The concept of self-regulation relates to a wide range of life situations. According to Brown, Miller & Lawendowski (1999) it is seen as the ability to develop, implement, and flexibly maintain planned behaviour in order to achieve one's goals. Self-regulation is accepted as an important skill for today's successful student, as well as for the successful individual in contemporary society.

The main aim of the study was to determine the achieved level of components of self-regulation, namely Goal Orientation, Decision Making, Self-direction and Impulse Control and to determine the differences in the scores by gender and age. Another objective was to find out the relationship between the components of self-regulation, detect the perceived level of Self-efficacy in learning and uncover the relationships between and differences in Self-regulation and Self-efficacy according to gender and age.

The 1.244 respondents from the region of Zlín in the Czech Republic who were students in a medium-size university completed the Self-Regulation Questionnaire (SRQ-CZ) and the Self-Efficacy Questionnaire (SEQ). The original instrument (SRQ) was constructed to measure generic self-regulation, i.e., the ability to regulate one´s behaviour in a broad range of everyday situations (Brown, Miller & Lawendowski, 1999). For the purpose of this study we revalidated the instrument with a broader sample of 1.238 respondents. The ages of the respondents ranged from 19 to 83. The best factor solution proved to be a 4-factor model with dimensions entitled Goal Orientation, Decision Making, Self-direction and Impulse Control. The current form of SRQ-CZ has 22 items with a reliability of $\alpha = .85$.

The presented results showed that students achieved higher than average scores on the scale's midpoint in Goal Orientation and Decision Making. On the other hand, they reached lower values in Self-direction and Impulse Control. The research also focused on Self-efficacy, which is an important factor related to self-regulation. According to the descriptive statistics, respondents achieved above-average levels on the scale's midpoint in self-efficacy, highlighting the strength of students' belief in their own ability to learn successfully.

Positive correlations were found between positive components of self-regulation (Goal Orientation and Decision Making) on the one hand, and between negative components of self-regulation (Self-direction and Control Impulsivity) on the other.

Gender had an impact on Goal Orientation and Impulse Control, while the results of testing by age identified significant differences in all four components of self-regulation. Women achieved higher levels in Goal Orientation than men but lower levels in Impulse Control. It was found that with increasing age goal orientation and decision-making also increases. Middle-aged respondents (26-45 years) were the most goal-oriented and the ability of decision-making increases with the age of respondents. A different situation was revealed within the negative components, where achieving lower values is perceived as a better ability of self-regulation. The oldest respondents aged 60 and over reached the lowest levels in self-direction and together with respondents between the ages of 19 to 25 Impulse Control represents a greater issue.

There are two main points of discussion emerging from the present results. The first concerns the interpretability of the original instrument to measure self-regulation of behavior, SRQ by Brown et al. (1999), upon which the Czech adaptation was based. The SRQ contains 7 dimensions which were theoretically developed to capture the seven phases of planning and execution of an individual's behavior. Our previous attempt (Gavora, Jakešová & Kalenda, in press) with a smaller sample of adult respondents had already failed to confirm the 7-phase model. This

attempt yielded a 4-component model, which was reconfirmed in the present study. This suggests either that the planning and execution of one´s behavior does not proceed in the sequence as anticipated by Brown et al. (1999), or that while filling in the questionnaire respondents did not relate the items to the self-regulatory *phases*. Rather, they responded to questionnaire items as to separate, disconnected phenomena. Another feasible interpretation is that the situations in SRQ items were unspecified. Thus, they might elicit virtually infinite self-regulatory associations because respondents could relate them to any event or action, either real or fictitious. Further research is needed to uncover how the questionnaire findings relate to real-life self-regulatory situations, probably using research methods such as observation and think-aloud procedures.

Another point of discussion is the relationship between self-regulation of behavior and self-efficacy in learning. They are two distinct variables, since self-efficacy in learning is the *belief* in one´s abilities to learn, while self-regulation of behavior is the *ability* to plan and perform a broad range of actions. However, we determined statistically significant correlations between positively-worded components of self-regulation (Goal Orientation and Decision Making) and Self-efficacy in learning. This suggests that the two variables share similar properties. Obviously, belief in one's learning efficiency at university requires good goal planning and decision-making abilities. On the other hand, low belief in one´s learning abilities coincides with inefficient self-direction and learner impulsivity.

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