Academic Self-Regulation in the Context of Education in Early Adolescence

Burešová I., Klimusová H., Kabeláčová, J.

Abstract In the last ten years, academic self-regulation research has brought important findings concerning motivation and self-regulation in the learning process, which are applicable in practice (school environment). Research conclusions of a number of authors have indicated that intelligence and the ability to retain information alone are not enough for success in school, and that it is necessary to engage adequate motivation processes and possess the ability to intentionally regulate one’s behavior toward reaching academic goals. The results of the presented study point to the importance of supporting the development of academic self-regulation in early adolescence, since a high level of self-regulation at this developmental stage is an important predictor of later success in school, work, social relations and life in general (see bellow). The results of this research with a sample of 363 adolescents have indicated a number of interesting correlates, which should be reflected in the manner of preparation at school and at home of children at this developmental stage.

Keywords self-regulation, early adolescence, protective factors, gender

I. INTRODUCTION

This study is part of a broader research project aimed at understanding the developmental trend in an individual’s self-regulation development in the context of coping with stress, self-efficacy and self-esteem, while studying select correlations of academic self-regulation in adolescence.

Self-regulation is a multidimensional construct consisting of a number of complex processes allowing the individual to adapt to the demands of the environment (Blair & Diamond, 2008). The ability to behave in accordance with social norms and regulate one’s behavior to focus on a set goal begins forming in early childhood and continues throughout the cognitive development and socialization period. Since an adequate development of the ability to self-regulate is an important predictor of later success in school, work, social relations as well as life in general, it is crucial to focus on its development from the very beginning and understand it in association with all important factors, which influence the way self-regulation evolves (Baltes, 1997; Bandura, 1991; Blair & Diamond, 2008).

Self-regulation is usually divided into intentional self-regulation, which is characterized by goal-oriented behavior and develops throughout life, and organismic self-regulation, which is innate, functions on a biological basis, and involves all physiological structures and functions of the organism (Gestsdóttir & Lerner, 2008; Lerner et al., 2011). The main theoretical background of this study is the SOC self-regulation model (Selection, Optimization, Compensation) created by Baltes and his colleagues (1997), which describes three specific self-regulation mechanisms, used by an individual to dynamically regulate his/her behavior throughout the entire life. This model creates a key theoretical framework for the study of human goal-oriented behavior in the context of its development throughout the entire lifespan. The SOC model presents development as the result of an interaction between an individual and all the levels of the environment, thus, including the individual aspects of self-regulation, such as focus of attention, cognition and behavior (Gestsdóttir & Lerner, 2008). The SOC model also describes the relationship between goal attainment and outcomes of the development (Freund, Baltes, 2002). In this model, Selection is the first step in the self-regulation process, where the individual sets his/her goals. Optimization is the following process, during which new knowledge and skills are gained, leading to the enrichment of resources. Optimization is determined significantly by the environment, which sets the limits of its development. Finally, Compensation allows for reaching the goal using an alternate solution or changing the goal altogether.

The main self-regulation ability develops over the first two decades of life and the changes that occur during these years can determine the direction of its future development. In the early adolescence stages, an individual gradually acquires the necessary mechanisms to utilize intentional self-regulation, in terms of behavior regulation and attaining long-term goals. Self-regulation in adolescence becomes more cognitional, focused, efficacious and intentional. In early adolescence, it is still mostly insufficiently structured but it does appear as one factor, the global SOC, while during the period of middle adolescence, it gradually begins to differentiate into the three above mentioned self-regulation mechanisms. At the end of this stage, a fourth mechanism appears and that is the Loss-Based Selection. All four of these mechanisms function in a dynamic symbiosis throughout the course of the entire further development (Lerner, Gestsdóttir, Bowers & Napolitano,
Since the most recent research, mapping the development of self-regulation in adolescence, proves a correlation between positive self-regulation development and parenting style (Bowers et al., 2011), we decided to focus the present study on this aspect, which is in accordance with the primary research goal – academic self-regulation. Thus, the study concentrates mainly on intentional self-regulation – academic self-regulation, which functions as a conative component of the self-system. Our research aim was inspired by the work of Lee, Lee & Bong (2014), who tested a hypothetical model of academic self-regulation as described by the SOC model. In an academic environment, Selection (S) represents setting a study goal, Optimization (O) represents behavior enabling this goal attainment, and if reaching the study goal is not possible then Compensation (C) is the next process, or choosing an entirely new goal - Loss-Based Selection (LBS). Compensation corresponds to an individual’s behavior directed toward attaining a goal using a different approach (e.g., ask the parents for help). A new selection, necessitated by unsuccessful reaching of the original goal, represents a selection of a new goal (Geldhof, Little & Hawley, 2012).

Based on the facts discussed above, we are of the opinion that the exploration of academic self-regulation can contribute significantly to the optimization of the strategies involved in school and home work with adolescents during this developmental stage, because a well developed ability to utilize and harmonize these self-regulation mechanisms at an advanced level predicts a positive development of the individual (Gestsdóttir & Lerner, 2007).

II. METHODS

For the purpose of this research study, we used a quantitative research design implemented by means of a one-time questionnaire survey using a combination of questionnaire methods. The study is partially of an explorative character because some of the tested realities have yet to be empirically verified.

A. Research Aims

The goal of the present study was to map the level of self-regulation mechanisms within the framework of academic self-regulation during early adolescence. In addition, we aimed to verify possible correlations between the SOC level in the academic domain and, thus, examine how adolescents in this developmental period perceive their parent’s autonomy support, involvement and warmth. One other partial goal was to map possible gender differences in these correlations.

B. Research Methods

The present study utilized the following questionnaire methods:

One’s own Composition Questionnaire – determines demographic data about the participants, their parents and select realities relevant to our research goal, such as, family circumstances, preferred ways of spending free-time with parents and alone, school aspirations and school success, etc.

The participants answered by free responses, multiple-choice responses or using a Likert scale.

The SOC Questionnaire – Academic Domain (Geldhof, Little & Hawley, 2012) – this is an adapted version of Baltes’ SOC questionnaire (1997), which the authors created for measuring SOC in adolescents. It consists of 28 items, which are unequally distributed into 4 subscales (Selection, Optimization, Compensation and Loss-Based Selection). Within the framework of the specifics associated with the developmental stage of adolescence, the authors changed the qualitative character of the Loss-Based Selection scale: in this age group, they consider the mechanism of a loss to be lack of success. In our sample of participants, the individual scales as well as the overall score of the questionnaire was internally consistent (Cronbach’s alpha 0.586 - 0.871), except for the Selection scale, which consists of 5 items only (Cronbach’s alpha 0.586).

Perception of Parents Scale (Grolnick, Ryan & Deci, 1991, cited in Robinson, 1994) – this scale was originally designed for children but it was revised for the age group of adolescents and it comprises two original subscales: Autonomy support and Involvement. A third subscale was added called Warmth, which reports how the adolescents perceive warmth on the part of their parents (i.e., emotional relationship). The questionnaire contains 21 items pertaining to the mother and 21 to the father. The internal consistency was very good in our sample (Cronbach’s alpha 0.786 - 0.839).

C. Procedure

The research data was collected using a one-time questionnaire survey presented at a select number of primary schools in the Czech Republic. The battery of tests with identical instructions was administered by a trained employee. The anonymity of the participants and the ethical approach of the research, were maintained. After processing of the data, all the participating schools were presented with the final report of the results.

D. Research Sample

The participants were students from 6th to 9th grades (aged 11-15 yrs., m=13.9 yrs., sd=0.93 yrs.) attending a common primary school. The resulting research sample comprised 363 participants, 207 girls (57%). 21 questionnaires were excluded on account of lack of participant cooperation or a greater number of items in a row being scored the same stereotypical way.

E. Data Processing Method

Gender differences in the self-regulation level were determined using the t-test for independent samples. Correlations between the scales of the Self-regulation questionnaire and other variables were verified using nonparametric Spearman’s correlation coefficients (on account of the significantly slanted distribution of the variables measuring School Results, School Aspirations and Parenting Style scales).
III. RESULTS

For clarity reasons, we are presenting a summary of the key results of this partial section of the main research aim:

**Academic self-regulation level**

Table 1. Comparison of scores in SOC-A scales

<table>
<thead>
<tr>
<th>scale</th>
<th>sample</th>
<th>mean</th>
<th>sd</th>
<th>( t_{361} )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Selection</strong></td>
<td>chlapci</td>
<td>20.5</td>
<td>5.1</td>
<td>-2.25</td>
<td>( \leq 0.05 )</td>
</tr>
<tr>
<td></td>
<td>divky</td>
<td>21.7</td>
<td>4.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>celý soubor</td>
<td>21.2</td>
<td>4.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Optimization</strong></td>
<td>chlapci</td>
<td>47.2</td>
<td>9.2</td>
<td>-1.88</td>
<td>ns*</td>
</tr>
<tr>
<td></td>
<td>divky</td>
<td>49.0</td>
<td>8.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>celý soubor</td>
<td>48.3</td>
<td>8.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Compensation</strong></td>
<td>chlapci</td>
<td>37.7</td>
<td>8.3</td>
<td>-2.79</td>
<td>( \leq 0.01 )</td>
</tr>
<tr>
<td></td>
<td>divky</td>
<td>40.0</td>
<td>7.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>celý soubor</td>
<td>39.0</td>
<td>7.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Loss-Based Selection</strong></td>
<td>chlapci</td>
<td>21.6</td>
<td>5.5</td>
<td>-0.48</td>
<td>ns*</td>
</tr>
<tr>
<td></td>
<td>divky</td>
<td>21.9</td>
<td>5.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>celý soubor</td>
<td>21.7</td>
<td>5.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SOC_A total</strong></td>
<td>chlapci</td>
<td>127.1</td>
<td>21.6</td>
<td>-2.28</td>
<td>( \leq 0.05 )</td>
</tr>
<tr>
<td></td>
<td>divky</td>
<td>132.3</td>
<td>18.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>celý soubor</td>
<td>130.1</td>
<td>20.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*ns = non-significant difference

**Relationship between attained school results and academic self-regulation level**

It is evident from the results presented above, that the correlations between all the scales of the Self-regulation questionnaire were not very close, except for the Compensation scale (see Table 2). The closest correlation was evident in the case of the Optimization scale. Higher level of self-regulation correlated with better school results, with the exception of the Loss-Based Selection, where higher scores meant poorer school results.

**Relationship between school aspiration level and academic self-regulation**

Similar patterns of correlations as the ones above, except that in this case they are closer, can be observed between the self-regulation level and school aspiration of the students. Once again, the closest correlation was found with the Optimization scale. On the other hand, no correlations, or only very slight ones, were found between the students’ academic self-regulation and perceived aspiration of their parents.

**Correlation between parents’ education and academic self-regulation level**

None of the correlations between Self-regulation scales and parents’ education level were statistically significant. In our study, parents’ education level did not influence school aspiration, neither in the case of the students nor the parents. The only significant correlation we found was with school results (0.140), which most likely is the effect of an inherited component of intelligence. It must be mentioned, that a large portion of our sample of parents consisted of individuals with secondary (39% of the mothers, 46.6% of the fathers) and university education (40.2% of the mothers, 37.6% of the fathers).

**Correlation between academic self-regulation and parenting style**

Table 3. Spearman’s correlations between Academic Self-regulation scales and Perceptions of Parents scales (mother/father)

<table>
<thead>
<tr>
<th>scale</th>
<th>Involvement</th>
<th>Autonomy</th>
<th>Support</th>
<th>Warmth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection</td>
<td>0.185**</td>
<td>0.123*</td>
<td>0.144**</td>
<td>0.114*</td>
</tr>
<tr>
<td></td>
<td>0.188**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optimization</td>
<td>0.300**</td>
<td>0.239**</td>
<td>0.258**</td>
<td>0.227**</td>
</tr>
<tr>
<td></td>
<td>0.318**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compensation</td>
<td>0.276**</td>
<td>0.257**</td>
<td>0.291**</td>
<td>0.247**</td>
</tr>
<tr>
<td></td>
<td>0.254**</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*\( p \leq 0.05 \); ** \( p \leq 0.01 \)
We found that the Parenting Style scales did not correlate very closely with Academic Self-regulation scales. The strongest correlations were found with the Optimization and Compensation scales. On the other hand, no correlations were found for the Loss-Based Selection.

**Additional interesting conclusions**

The study yielded a number of additional interesting results, of which we consider important to mention at least the correlations between the level of academic self-regulation and free-time activities of the children, even if these correlations were usually weak (around 0.150). There was a positive correlation between time spent on homework and time spent in extracurricular club activities, and a negative one with time spent on the Internet and playing computer games. A significant difference was found in the manner of spending free time between children living in a household with or without a father. Children with a father absent from the household spent significantly less free time involved in sports and extracurricular activities and more time than the other children on the Internet and playing computer games.

**F. Limits**

The limits of the study arise from the design itself, which utilized the self-reporting questionnaire method and from the selection of the research sample, which was not representative. Moreover, it is also possible that superintendents of schools, which have generally reached good results, were mostly the ones to agree to participate in the study.

**IV. DISCUSSION**

Examining the results of current research leads us to assume that during the stage of adolescence self-regulation mechanisms undergo a dynamic development. At first, these mechanisms are unstructured (Gestsdóttir & Lerner, 2007) but during the development throughout adolescence they gradually become relatively significantly differentiated. Initially, parents are the ones who determine the children’s goals; in many areas of their lives they are being lead by their parents. However, in the course of a complex process of growing up these self-regulation mechanisms become gradually differentiated and the adolescents become autonomous individuals. This developmental trend is supported by the results of our study, where we found that a higher level of academic self-regulation did indeed correlate with better school results but in the Loss-Based Selection scale, higher levels correlated with poorer school results. This self-regulation strategy is the result of unsuccessful attainment of the original goal and represents the choice of a new substitute goal. This conclusion corresponds to the research results of a number of other authors (Geldhof, Little & Hawley, 2012, and others) and indicates that the self-regulation mechanisms in early adolescence are not yet as matured as to allow for optimal utilization and effective attainment of the determined goals. Given that, our research found interesting gender differences, where girls attained higher levels of overall self-regulation, even in some utilized self-regulation mechanisms such as Selection and Compensation.

Similar, but statistically more significant correlations, were found between self-regulation level and the students’ school aspiration. The closest correlation was found with the Optimization scale. Lee, Lee & Bong (2014), who verified a hypothetical model of academic self-regulation, as described by the SOC model, note that the Optimization scale represents behavior, which makes goal attainment possible (doing homework, preparing for school, etc.).

On the other hand, no correlations at all, or very weak ones, were found between academic self-regulation and perceived aspirations of the students’ parents, which indicates that children’s perceptions of their parents aspirations do not influence their own school aspirations to the extent that we would expect.

A number of research studies carried out on self-regulation in adolescence have concluded that some demographic data pertaining to the parents, such as their education, do partially affect the level of self-regulation of their children. According to these studies, children of parents with a higher education (mainly mothers) are better equipped with self-regulation mechanisms in the social as well as school environment (Piotrowski, Lapierre & Linebarger, 2013). Higher education of the parents, according to professional literature, is then generally understood as a positive predictor of a high quality level of self-regulation behavior of their children. However, in our research sample, the parents’ education affected neither self-regulation nor school aspiration, of the students’ or the parents’. The only significant correlation of the parents’ education was found with school results, which is most likely due to inherited components of intelligence. Namely, the majority of parents in our sample had secondary or university education and, therefore, we were not able to find the above-mentioned correlations, perhaps because of a low variance of the variables. Our results, however, can point to possible relationship between the self-regulation mechanisms and the level of maturity of adequate cognitive predisposition. Here, learning by example can play a significant role in acquiring self-regulation mechanisms from parents because parenting style represents the means of parents influencing their children, teaching them to regulate their emotions and behavior (Kiss, Fechete, Pop & Susa, 2014).
Parenting style, such as whether and in what way both parents take part in the upbringing of the child, undoubtedly plays an important role in the development of self-regulation (Grolnick & Farkas, 2002; Grolnick & Ryan, 1989). Parenting style scales in our research sample manifested relationships with academic self-regulation scales that were not very close, however, the strongest relationships were found in case of Optimization and Compensation scales, which are very positive self-regulation mechanisms. On the other hand, again we found no correlations with Loss-Based Selection, which supports our previous statement concerning an unequal development of individual self-regulation mechanisms.

Last but not least, we must mention the time which parents spend with their children during which they transfer their own self-regulation abilities and strategies (Gillernová, 2009). The correlations that we have identified between the level of overall academic self-regulation and free time activities of the children were predictable to a certain degree. Thus, the relationship of self-regulation with time spent on homework and extracurricular activities was positive and with time spent on the Internet and PC games it was negative. The choice and particularly the preference of free time activities undoubtedly also affect the development and forming of an individual’s identity (Barber, Stone & Eccles, 2005; Eccles et al., 2003), because through them the development of self-regulation mechanism is either potentiated to a certain degree or inhibited.

Also, a significant difference in the manner free time was spent was found between children with a father present or absent in the household. Children with an absent father spent significantly less free time doing sports or participating in extracurricular activities, and yet they spent more time on the Internet and playing computer games than the other children.

In our opinion, the above presented results are a contribution to the comprehension of the concept of the development of self-regulation in early adolescence, and their significance lies mainly in their application directed to the support of the development of self-regulation mechanisms of children in this developmental stage, because self-regulation ability is certainly an important predictor of further positive development (Gestsdóttir & Lerner, 2007).

V. CONCLUSIONS

Theories of successful life direction, particularly the SOC model (Baltes, 1997), which in the context of intentional self-regulation perceives each individual as an active agent participating in his/her own further positive development form the basis for our study. Academic self-regulation can be viewed from the same angle, since self-regulation in the context of learning is not an innate ability. Self-regulation in learning can be learned. Its formation and development is influenced by, besides personality characteristics and cognitive predisposition of a given individual, parents, teachers, other adults with whom the individual comes into contact (e.g., free time activities), siblings and close friends (Zimmerman, 2002).

Self-regulation development, particularly academic self-regulation, is a key factor in adolescence because a successful development of self-regulation mechanisms, specifically during this developmental stage, affects to a significant degree the successful life path of the individual.

In our research sample, higher academic self-regulation level correlated with better school results and higher school aspirations of our participants. Unexpectedly, however, their level of school aspirations was not influenced by their parents’ education level and the parenting style was in a rather low correlation with academic self-regulation scales, which corresponds to the broader context of an individual’s development, who during this stage of adolescence is undergoing the process of gradual separation from the parents. This developmental trend in the evolution of self-regulation mechanisms is supported by our findings of a correlation between the overall level of academic self-regulation and intentional free time activities of our adolescent participants and interesting gender differences in the preferred strategies of academic self-regulation.

In our opinion, the presented findings can play a key role in the targeted protective work of teachers as well as parents, because their efforts in the development of the ability to effectively utilize all self-regulation mechanisms of adolescent individuals are reflected, in a significant way, in their further positive development (Gestsdóttir & Lerner, 2007).

Acknowledgements: This paper presents partial results of the project supported by MUNI/0838/2013 titled: The Development of Self-regulation in the Context of Coping with Stress, Self-efficacy and Self-esteem.

REFERENCES


