

Research article

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Conscious Self-Regulation and School Engagement as Resources for Exam Success: A Longitudinal Study

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Abstract: Introduction. The current direction of modern research in the field of psychology of education is the study of psychological resources that can be considered as long-term predictors of learning success. Self-regulation and school engagement are traditionally considered as such resources. The study objectives included exploring the relationship of these resources among schoolchildren during their studies in the secondary school and clarifying whether the development of conscious self-regulation can predict examination success. Students participated in a 3-year longitudinal study during their schooling since 7th to 9th grade, a total of 81 participants (52 % – boys). **Methods.** “Self-regulation Profile of Learning Activity Questionnaire” by V. I. Morosanova (SRPLAQ-M); “Multidimensional Scale of School Engagement” adapted to the Russian sample (T. G. Fomina, V. I. Morosanova). The study collected data on the students' performance (an average of annual grades in the main academic subjects) and results of their major state exams in the 9th grade. **Results.** Statistical data analysis included the calculation of descriptive statistics, correlation analysis, and structural modeling. On its basis, a structural model was built, its correspondence to empirical data was assessed using the following agreement indices. The model demonstrates the specifics of longitudinal relationships between school engagement, conscious self-regulation, and the final exams results in the secondary school. It shows that the level of conscious self-regulation development, as measured in 7th grade students, is actually a long-term predictor of their academic performance and results of the major state exam in the 9th grade. School engagement turned out to be a less significant factor in the success of passing exams, and its influence is mediated by the level of conscious self-regulation development. **Discussion.** For the first time, the longitudinal study has revealed the specificity of relationship between conscious self-regulation and school engagement at different stages of education in the secondary school. The stated fact of the existence of long-term prognostic effects of the conscious self-regulation development on examination results is of undoubted scientific significance.

Keywords: conscious self-regulation, resource approach, school engagement, motivation, academic performance, learning activity, longitudinal research, examination success, age dynamics, structural modeling

Highlights

- The formation of psychological resources contributing to the students' examination success is closely related to the development of conscious self-regulation of educational activities as the ability to independently and responsibly put forward educational and life goals and manage their achievement.
- Dynamics of development and features of the age-related changes in conscious self-regulation, school engagement, academic success in the education process in secondary school determine the specifics of their relationship.
- General level of the conscious self-regulation development is a long-term predictor of academic performance and a prognostic resource of the students' examination success in the secondary school.

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Introduction

Self-regulation and school engagement are traditionally regarded as significant predictors of academic performance. However, the study of their relationship and specifics of their joint determination of the various indicators of academic success has been actively developed only in recent years (Estévez et al., 2021; Fomina et al., 2020).

Since school engagement is a multidimensional construct extending its projections into various areas of educational activity, its manifestations are associated with a wide range of psychological phenomena (Fredricks et al., 2019). One of them is self-regulation. Research demonstrates the reciprocity of the relationship between engagement and self-regulation: on the one hand, engagement contributes to the development of self-organization skills, planning, self-control (Wang & Eccles, 2012b), while on the other hand, it has been shown that focusing on goals associated with achieving high results is more likely to lead for high levels of engagement (Bae & De Busk-Lane, 2019; Vasalampi et al., 2009). Numerous studies revealed the role of self-regulation as a predictor of various components of school engagement. For example, researchers identified a significant contribution of self-regulation to behavioral and cognitive engagement (Park & Kim, 2022). Self-regulation is essential for students to ensure the features of school engagement such as the ability to focus on relevant stimuli and maintain a high level of attention to the learning task (Rademacher, 2020). At the same time, researchers verified the hypotheses that school engagement contributes to actualization of the students' self-regulation (Stefansson et al., 2018; Morosanova et al., 2022).

However, many issues in this problem area require clarification, in particular what concerns the aspect of development and formation. Longitudinal studies make it possible to identify not only the dynamics of the phenomena under consideration, but also reliably establish causal relationships (Salmela-Aro et al., 2021). At present, researchers scrutinized some aspects of the

dynamics of school engagement: it has been shown that engagement of middle and high school students decreases, demonstrating meanwhile an uneven change in its individual components (Wang & Eccles, 2012a; Bakadorova et al., 2020; Engels et al., 2017). These studies also point that the trajectory of changes in school engagement can be influenced by contextual factors (peer status and popularity), the degree of aggression, self-competence (Moreira & Lee, 2020; Lemos et al., 2020; Engels et al., 2020). However, some issues still require consideration, e.g., to which extent the dynamics of engagement and self-regulation factors significant for academic results are reflected in their relationship.

Naturally, questions arise related to the psychological preparation for passing exams: what resources of the individual should be relied upon when building strategies for preparing for exams, how to help students cope with test anxiety and demonstrate their best knowledge during examination. Traditionally, among the factors influencing exam results, researchers consider cognitive characteristics: intelligence, working memory, information processing speed (Smirnov et al., 2007; Kornilova et al., 2018; Richardson et al., 2012; Rohde & Thompson, 2007; Fonteyne et al., 2017). In recent years, more and more attention has been paid to the personality factors of academic achievement, including motivational, characterological, temperamental characteristics, emotional stability and anxiety (Gordeeva et al., 2013; Eremina, 2010; Zaveryukha & Prokhorov, 2018; Prikhozhan, 2007; Strizhius, 2013; Chibisova, 2008; Chamorro-Premuzic & Furnham, 2014). There is now a growing body of research investigating various types of psychic self-regulation among the factors of academic achievement (Zimmerman & Schunk, 2011; Wolters & Hussain, 2014; Schunk & Greene, 2018; Baumeister, 2018).

In our opinion, formation of psychological competencies allowing students to successfully pass examinations is closely related to the development of conscious self-regulation of educational activities as the ability to independently and responsibly put forward educational and life goals and manage their achievement taking maximum advantage of the individual resources (Morosanova, 2014, 2022; Morosanova & Filippova, 2019).

The main objective of this study was to verify, on the basis of longitudinal data, the hypothesis of conscious self-regulation and school engagement as significant long-term predictors of the final examination results at school. This task required answering the particular research questions:

- Is there any specificity in the relationship between conscious self-regulation, school engagement, and academic performance of schoolchildren in the process of studying in the secondary school?
- Can the level of conscious self-regulation development be considered a long-term predictor of academic performance and a predictive resource of exam success?

Methods

In this work, we used the data obtained in a 3-year longitudinal study. The pupils were examined three times (with an interval of approximately one year) in the 7th, 8th, and 9th grades. The total sample included 81 people (52 % boys). The average age of the study participants in the 7th grade was 13.02 (standard deviation – 0.47), in the 8th grade – 13.91 (standard deviation – 0.45), in the 9th grade – 14.74 (standard deviation – 0.44).

Diagnostics of the conscious self-regulation development was carried out by means of V. I. Morosanova's "Self-regulation Profile of Learning Activity Questionnaire (SRPLAQ-M)" (Morosanova & Bondarenko, 2017). The technique allows assessing both the general level of

conscious self-regulation and its individual characteristics associated with the specifics of setting and achieving learning goals. To implement the study objectives, we used an indicator of the general level of conscious self-regulation.

School engagement was assessed using the “Multidimensional Scale of School Engagement Questionnaire” adapted to the Russian sample (Wang, 2019; Fomina & Morosanova, 2020). The method allows assessing the severity of four components of school engagement vs four components of school disengagement (behavioral, cognitive, emotional, social). In the context of the study objectives, an integral indicator of school engagement was used, calculated as the sum of scores for all components of engagement.

The study collected data on the effectiveness of schoolchildren's learning activities: academic achievement (the average value of annual marks in the main academic subjects) and the results of passing the major state exams at the end of the 9th grade. The overall indicator of the major exams result of a student was calculated as the sum of scores received for passing exams in the compulsory subjects (Russian language and Mathematics).

Statistical processing. Statistical analysis of the data was carried out using the statistical package SPSS 26.0 (SPSS Inc.) and AMOS 23 (calculation of descriptive statistics, correlation analysis, structural modeling).

Results

Correlation analysis

At the first stage of the data analysis, descriptive statistics were considered, as well as correlations between the variables under study, taking into account their repeated measurements (Table 1). The results obtained indicate significant relationships between the general level of conscious self-regulation measured in the 7th grade and all other variables – engagement and academic achievement, including later measurements (in the 8th and 9th grades). It should also be noted that, despite the level of significance, the correlation of academic achievement and self-regulation is higher than that of academic achievement and engagement. At the same time, engagement and self-regulation measured in the 9th grade do not show a significant relationship with exam success. This fact apparently indicates the multidirectional dynamics of the conscious self-regulation, engagement, and academic achievement at this stage of education.

Table 1

Means, standard deviations, and correlation analysis results

Variables	Mean	SD	1	2	3	4	5	6	7	8	9
1. SR_7	28.73	9.91	1	0.64**	0.61**	0.52**	0.46**	0.38**	0.41**	0.48**	0.33**
2. SR_8	28.83	8.93		1	0.72**	0.57**	0.48**	0.16	0.25*	0.27*	0.28*
3. SR_9	28.53	9.96			1	0.47**	0.65**	0.11	0.17	0.31**	0.12
4. Engage_8	68.05	11.79				1	0.62**	0.22*	0.26*	0.34**	0.12

Variables	Mean	SD	1	2	3	4	5	6	7	8	9
5. Engage_9	64.42	13.15					1	0.28*	0.32**	0.45**	0.12
6. Ach_7	4.00	0.68						1	0.86**	0.76**	0.70**
7. Ach_8	3.92	0.63							1	0.78**	0.70**
8. Ach_9	3.93	0.57								1	0.60**
9. Exm_9	43.48	8.51									1

Note: ** $p < 0.01$, * $p < 0.05$; Mean – mean value, SD – standard deviation, SR – self-regulation, Engage – school engagement, Ach – academic achievement, Exm – exam result.

On the whole, descriptive statistics suggest that conscious self-regulation is relatively stable, whereas school engagement is declining. These facts are confirmed by a number of studies (Fomina et al., 2021; Tsyganov & Bondarenko, 2022).

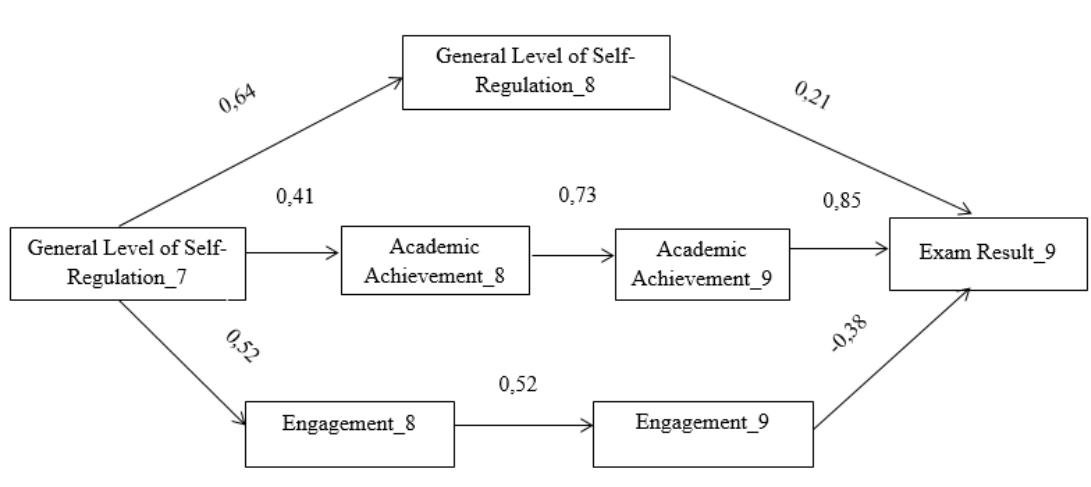
Structural modeling

Data analysis was performed by structural equation modeling (SEM) using the AMOS 23 computer program.

The following fit indices were used to assess the fit of the model to empirical data: GFI > 0.95; AGFI > 0.9; CFI > 0.95; RMSEA < 0.05, path analysis was used. Figure 1 shows the final model, characterized by acceptable fit indices: GFI = 0.970; AGFI = 0.905; CFI = 0.997; RMSEA = 0.037.

Figure 1

Structural model of the longitudinal relationship between conscious self-regulation, school engagement, and final exams result



The resulting model shows that pupils' academic achievement is a stable predictor of their success in the final examination, that is, children who consistently do well in the middle grades of the school demonstrate success in the future exams. At the same time, the general level of conscious self-regulation is a long-term predictor of academic performance: the data analysis revealed a significant effect of the conscious SR level on academic achievement in the 7th grade, and this effect is mediated by SR level in the 8th grade as well. In addition, self-regulation in the 7th grade affects academic achievement in the 9th grade through a mediator – academic achievement in the 8th grade. And although the general SR level in the 9th grade is not a significant predictor of exam results, nevertheless, it can be concluded that self-regulation is a long-term predictor of academic success in general.

The model also shows that general SR level in 7th grade influences the level of school engagement in 8th grade and, indirectly, – in 9th grade. However, school engagement itself is not related to the examination scores. Engagement in school life may be associated not so much with the will to achieve high academic success, but with the need to impress, interact more often with interesting people at school. Success in the final state examination requires engagement in a specific test preparation program with clearly defined conditions. In addition, activity within the framework of school curriculum, according to many students, in their minds is not directly related to their success in the exam. They consider additional classes, lessons with tutors, their own efforts out of school to be much more productive for obtaining high exam scores. In addition, in 7–9th grades adolescents experience a shift in the leading activity from their study to intimate-personal communication. It is possible that by the 9th grade schoolchildren do not yet have time to realize the personal significance of the major state exams. This form of examination appears as an incomprehensible goal set from the outside, so students are not engaged consciously and actively in the process of its implementation. However, it is worth noting the delayed impact of the general SR level on both exam success and school engagement. We can say that conscious work that students do by the 7th grade – activity in mastering school subjects – gives them a good base. This backlog allows them to live through a difficult adolescence period with the less loss in productivity.

We believe that when preparing schoolchildren for the major state examination, it is necessary to concentrate on the personal significance of the exam, to help the students understand why they should try to get a high score, how to choose subjects for examination, based on their long-term goals. The ability to make plans for the long term is associated with the need to realize oneself in the chosen profession, and this is formed a little later. Therefore, the teenagers still need help with planning in this period.

Discussion

For the first time the presented study has revealed, on the basis of longitudinal data, the specifics of the relationship between conscious self-regulation and school engagement of adolescents, and their resource role in relation to their academic performance and examination success.

The analysis made it possible to state the fact that school engagement has a clear downward trend in the middle grades of the school. Researchers confirm that declining school activity of students, especially adolescents, remains a serious problem that carries risks associated with serious social consequences (Lam et al., 2016; Perkmann et al., 2021). However, as evidenced by the data obtained, the conscious self-regulation of the learning activity serves as a significant resource

for the progress and engagement of students during this period. Thanks to it, students can compensate for the lack of engagement and motivation by overcoming natural limitations associated with the social situation of development and psychophysiological maturation (Bakracevic et al., 2010). Research demonstrated the effects convincingly proving the importance of goal setting, planning, and effective goal achievement for the school engagement of adolescents during this period (Caraway et al., 2003). Indeed, students with a high level of engagement develop more effective learning strategies, cope with learning difficulties more successfully, and are more likely to achieve their goals. Researchers come to the conclusion that relationships between self-regulation and school engagement are reciprocal and their directionality can be associated with both age and internal dynamics of the development of these phenomena (Fomina et al., 2021; Stefansson et al., 2018).

In this study, for the first time, it was established that the earlier development of conscious self-regulation contributes to higher productivity and efficiency of students (using the example of the situation of passing final exams). Children who were characterized by a higher development of regulatory competencies in the 7th grade, later coped with examination tests more successfully, demonstrating higher results. Empirical studies carried out within the framework of other methodological approaches to understanding self-regulation (executive functions, self-control, etc.) also show the effects of self-regulation on various types of activity and human behavior in subsequent periods of life: the level of achievement, interpersonal relationships, cognitive abilities, well-being (Robson et al., 2020).

It is also impossible to ignore the fact that, in general, there is a decrease in academic performance in the middle classes of the school. At the same time, children who consistently do well in the middle grades of school demonstrate success in the future exams. And those children who, for some reason, "let go" their studies or could not find sufficient motivators for themselves, can show a positive exam result only thanks to the resources of conscious self-regulation (Morosanova & Filippova, 2019). These results, in particular, are shown in the studies that consider differential aspects of the relationship between conscious self-regulation and academic success (Potanina & Morosanova, 2021).

Although some studies show significant correlations between academic achievement and engagement (Lei et al., 2018), our data show that engagement gains its resource role through the conscious self-regulation.

Conclusion

Thus, the study verified the hypothesis of conscious self-regulation and school engagement as significant long-term predictors of success in the final examination at school based on the longitudinal data and using structural modeling tools. It is demonstrated that dynamics of development and peculiarities of the age-related changes in conscious self-regulation, school engagement, and academic performance in the process of learning in the secondary school determine the specifics of their relationship. Conscious self-regulation, being a more stable resource for the productivity of educational activities, acts as a predictor of the examination success of students in the secondary school and influences the level of their school engagement. The results obtained indicate the directions of practical work with schoolchildren in terms of updating their psychological non-cognitive resources in the implementation of various forms of education activity.

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E. V. Filippova prepared the theoretical review, collected, and processed the research data, participated in the interpretation of the research results.

M. L. Ovanesbekova participated in preparing of the theoretical review and interpretation of the results, designed the manuscript.

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Conflict of Interest Information

The authors have no conflicts of interest to declare.