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The Role of Personal Resources and the Results of External Exams in Explaining the School Achievements of High School Students

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Abstract
The purpose of this study was to examine the direct and indirect relationships between students' selected personal resources, such as self-esteem, self-efficacy, learned helplessness and motivation to learn, in predicting high school students' achievement and to analyse the consequences of additionally including in the model the results of external examinations prior to secondary school. The quota sample consists of 489 third-grade students (age 18) of Polish secondary school (Bydgoszcz), including 220 high school students, 161 students of technical and 108 basic vocational schools. Regression analysis indicated that personal resources and school type were significant predictors of school achievement ($R^2 = 0.279$). The most important of these was motivation ($\beta = 0.325$). The mediating role of motivation, self-efficacy and helplessness in the relationship between self-esteem and school performance was also confirmed (PROCESS macro). Adding the results of external exams to the model significantly improved its quality. Structural equation modelling confirmed a good fit of the model ($\chi^2 = 62.20$, $df = 18$, $p < 0.001$; CFI = 0.974; TLI = 0.946; SRMR = 0.033; RMSEA = 0.071). The model explained more than half ($R^2 = 0.617$) of the variability of high school achievements. Students' personal resources remained significant predictors despite the inclusion of external exam results in the model. Motivation and a learned helplessness were also important variables mediating the relationship between the results of external examinations and school achievements.

Self-esteem, self-efficacy, motivation to learn and a learned helplessness are variables whose level can be optimised as a result of intervention, and knowledge about mediation processes allows for more accurate planning of interventions.

Keywords: grade point average, self-esteem, self-efficacy, learned helplessness, motivation to learn.

Introduction

Students' academic achievement depends on the broadly understood teaching-learning environment. Numerous contextual variables significantly affect the effectiveness of education and the psychosocial development of students. Many of these variables are non-intellectual, but they are useful in explaining the differences between the students' achievement predicted by measures of intellectual ability and students' actual learning outcomes. In addition, these factors are often more susceptible to intentional changes than intellectual factors. Systematisation of these variables makes it possible to divide them into variables of school, family environment and students' personal resources (Fleming et al., 2010; Kyunghee, 2011). Students' personal resources are important not only because of academic achievements but also because of the need to prepare young people to function in an unstable labour market. Rapid changes in the economy mean that the skills acquired at an early stage of education become insufficient over the years. Therefore, it is necessary for schools to additionally prepare young people to participate in lifelong learning (Parker, 1998; Bańka, 2016; Hanemann & Robinson, 2022; Sahoo et al., 2023).

Students' personal resources

Personal resources are relatively constant, dispositional features that affect the selectivity of cognitive and coping processes, but they can also be changed by the results of these processes (Moos & Schaefer, 1993). Personal resources, the level of which should be optimised in the education process, are those that will foster the acquisition of competences through participation in education or self-education throughout life (Yamashita et al., 2019;

2022; Bielecki, 2022). Research shows that self-efficacy, adequate self-esteem and motivation, as well as counteracting the feeling of helplessness, play an important role in regulating individual behaviour (Seligman, 2002; Goodman et al., 2011; Richardson et al., 2012). This applies to the functioning of an individual not only at school but also in other areas of life (Borys, 2010; Alessandri et al., 2015; Lin et al., 2015; Łaguna, 2015) and is related to mental health (Rosenberg et al., 1995; Moksnes & Reidunsdatter, 2019; Seligman et al., 2023).

Motivation and other students' personal resources

Motivation is a relatively constant human tendency to pursue specific goals, life tasks and values. Motivation is a result of a cognitive appraisal of a situation or event. This assessment includes the expectation of success, the importance of the goal and the rewards and satisfaction associated with its achievement. Atkinson's model assumes that the factors influencing taking action are the subjective value of the goal and the subjective assessment of the probability of its achievement (Pintrich & Schunk, 2002). If the person considers it impossible to achieve the goal (the probability of achieving the goal is zero), action will not be taken. Thus, for a learner to be motivated, he or she must value not only the value of the goal but also self-esteem and self-efficacy (Bouffard-Bouchard et al., 1991; Komarraju & Nadler, 2013; Mubeen & Reid, 2014).

Motivation is one of the most important factors influencing learning (Schunk, 2007; Brophy, 2010). It has a significant impact on academic achievement (Meece et al., 2006; Wu et al., 2020), intention to drop out of continuing education (Alivernini & Lucidi, 2011) and absenteeism (Moore et al., 2008) and is related to curiosity, persistence and productivity (Ayub, 2010) but also plays a key role in adult participation in various forms of education and self-education (Yamashita et al., 2019; 2022).

Motivation to learn is derived from the situation in which learning takes place. If it is satisfying and the learner perceives the goals as valuable and evaluates positively the effectiveness of the actions taken, motivation increases, reaching an optimal level (Bong et al., 2012). Depending on the location of the reasons for taking action, intrinsic motivation can be distin-

guished, when activities are taken by the student due to his interests and their performance is enjoyable, and extrinsic, when the activities are taken as a result of external reinforcements (Ryan & Deci, 2000). Research indicates that high achievers have both significantly higher extrinsic and intrinsic motivation than others (Meydan, 2021), which means that interests and creativity in a given field (intrinsic motivation) can be trained and strengthened using external gratification (Eisenberge & Cameron, 1998; Eisenberge et al., 1999; Vallerand, 2012).

A realistic assessment of oneself, a perception of one's worth and a strong sense of competence should influence cognitive processes and intellectual achievement and prompt one to invest more effort and perseverance in the learning process. Similarly, a belief in self-efficacy, that is, a belief in one's ability to solve a particular problem, should, by increasing the probability of success, result in increased motivation to take action to solve it (Alivernini & Lucidi, 2011; Mubeen & Reid, 2014; Fisher & Oyserman, 2017). Self-efficacy acts as a motivator (Bandura, 2012; Richardson et al., 2012).

Self-esteem (SES) is a relatively constant disposition of a conscious attitude towards the self, i.e. an assessment of one's overall self-worth and competence, and is one of the important factors on which human thoughts, feelings and behaviours depend (Rosenberg et al., 1995). Self-esteem is an attitude towards oneself that helps individuals create a realistic and positive self-image, trust in their abilities and feel worthy. High self-esteem is often accompanied by a high level of self-efficacy (Asakereh & Yousofi, 2018). These individuals believe that they are capable of overcoming life's challenges and try to actively change unfavourable situations. SES can influence achievement through motivation (Phillips et al., 2003; Wasylkiw et al., 2020), but it should also act as a buffer to protect a person from stress, from the negative effects of failure and feelings of helplessness and, as a result, foster higher achievement.

Studies on the role of self-esteem in school achievement provide different results (Ross & Broh, 2000) depending on the definition of self-esteem (general, academic; Richardson et al., 2012; Moyano et al., 2020), the research tools used (Jagtap, 2018), the population studied (Pullman & Allik, 2008; Waseem & Asim, 2020), as well as the methods of data analysis (Yazon, 2018). School achievement and self-esteem are usually positively correlated, and the impact of these variables is reciprocal (Waseem & Asim, 2020; Noorollahi,

2021). This means that high self-esteem promotes higher school achievement, but high achievement also results in higher self-esteem (Rosenberg et al., 1995; Swann et al., 2007).

A relationship between self-esteem and self-efficacy is also to be expected (Lane et al., 2004; Mete, 2021). Individuals who rate SES highly should be convinced that they are more effective, especially generalised self-efficacy. This relationship is less obvious in the case of self-efficacy in a specific domain. If self-efficacy relates to a specific domain or specific activities, a person may have high overall self-esteem and, at the same time, low self-efficacy in a specific domain (Bandura, 2015).

Self-efficacy is a relatively permanent, subjective conviction of an individual about the possessed competences that allow for undertaking and controlling specific behaviours. If this belief applies to behaviours in various domains, we are talking about generalised self-efficiency (GSES, Bandura, 2015).

Self-efficacy belief is essential for a person encountering difficulties and failures to take action to find the right and effective manner of coping. It is also related to the effort and commitment to achieving the goal, which should have a positive impact on the achieved results (Bandura, 2015; Noorollahi, 2021). People with a strong sense of self-effectiveness are persistent in the face of obstacles and resistant to failure. They tend to treat difficult tasks as challenges to be met rather than threats to be avoided (Mete, 2021). It can therefore be expected that a high GSES should protect one against a sense of helplessness, both related to school failures and experienced in adult life.

Thus, it can be expected that a high GSES should protect one against feelings of helplessness if the failures are in the school-related sphere, as well as in adult life if there are failures specific to that period of life.

GSES is an important construct for understanding why some students react with a sense of helplessness in the face of school challenges (Kalsner, 1992). Students who believe that their skills and abilities are sufficient to be effective in school tasks perform better than those who rate their effectiveness worse (Bandura, 1997). Students' assessment of their self-efficacy depends on their previous experience with similar tasks, and if they do not have any, they form their assessment based on general representations of relevant competencies (Richardson et al., 2012). Similarly, as in the case of self-esteem, the

relationship between self-efficacy and achievement reported by researchers varies (Bandura, 2012). Students' self-assessment of self-efficacy depends on their previous experience with similar tasks from which they can form expectations. These expectations are important in explaining school achievement (Richardson et al., 2012). In some studies, self-efficacy has a clear relationship with school achievement and is a significant predictor of performance in many fields (Chen et al., 2001; Gore, 2006; Wasylkiw et al., 2020; Noorollahi, 2021). In others, the relationship is insignificant (Wu et al., 2020) or even negative (Vancouver & Kendal, 2006; Carroll et al., 2009; Schmidt & DeShon, 2010). Among the reasons, differences in research methods are indicated, e.g. a specific sense of effectiveness (Carroll et al., 2009; Mornar et al., 2021) or generalised (Zimmerman et.al., 1992; Wasylkiw et al., 2020), as well as in theoretical assumptions (Schmidt & DeShon, 2010; Vancouver & Purl, 2017; Halper et al., 2018).

Learned helplessness arises as a result of previously experienced failures and the individual's perceived lack of a relationship between his behaviour and the occurrence of events (Dweck & Licht, 1980). It is particularly useful in explaining the negative reactions of some students to failures (Sędek, 2005; Ciżkowicz, 2009). In the educational process, it can occur in highly cognitively active individuals who are highly motivated to learn (Seligman, 2002). While some students focus on learning, increased effort and perseverance in response to failure, students with learned helplessness react differently. Their effort is reduced, their strategies deteriorate, and their performance declines. These students are often unable to solve the same problems they were able to solve shortly before experiencing failure (Dweck & Licht, 1980; Kalsner, 1992).

A sense of helplessness is a reaction to the constant failures and disappointments in an individual's life, which results in a belief in one's own powerlessness in the face of the problems encountered and a growing belief that this ineffectiveness will continue regardless of the actions taken. In individuals who believe that they are the main cause of failures, low self-esteem and low belief in their ability to succeed are expected. Research confirms the impact of learned helplessness on students' school achievement and, consequently, also on undertaking further education and self-education (Sędek, 1995; Ciżkowicz, 2009).

Method

The purpose of this study was to assess the role of the direct and indirect relationships between the selected students' personal resources, such as self-esteem, self-efficacy, sense of helplessness and motivation to learn, in predicting the school achievement of high school students (Model 1, Figure 1) and to analyse the consequences of additionally including in the model the results of external examinations prior to high school education (Model 3, Figure 2).

Based on the presented literature, three hypotheses were formulated:

1. SES, GSES and motivation to learn are significant positive predictors, and SBS is a significant negative predictor of high school students' achievement.
2. GSES, motivation and SBS are mediating variables in the relationship between SES and grade point average (GPA).
3. Adding the results of external examinations prior to secondary schooling to the model significantly improves the prediction of the GPA, but the students' personal resources remain important explanatory variables of the GPA.

Participants and procedure

The study involved 489 eleventh grade students (age 18; 45% female) from Polish secondary schools in a large city (Bydgoszcz). A quota sample by school type was used. Students from private schools and schools for working people were excluded from the study in Poland. There were 220 high school (LO) students, 161 technical school (Tech) students and 108 Basic Vocational School (ZSZ) students. These numbers reflect the proportions in the population. Participants, in the presence of a teacher, filled out a questionnaire (on paper) containing a series of tests and questions about gender, type of school and the results of the external exam and school grades obtained in the certificate in the second grade of secondary school. Previously, students were asked by teachers to remind themself these results at home.

Measurement

The school achievement of students was both a dependent and independent variable in this study (Figure 2). The independent variable was the average of the external exam (Avg. Exam) passed before entering education in secondary school (range: 0 to 100). The dependent variable was the **grade** point **average** (**GPA;** range: 1 to 6) in Polish, mathematics, physics and history obtained in the certificate at the end of 10^{th} grade. The choice of subjects was made based on their occurrence in all types of secondary schools.

The other data was collected using the testing method.

Global self-esteem was assessed using the Rosenberg Self-Esteem Scale (SES; Łaguna et al., 2007) containing 10 items (e.g. I feel that I have a number of good qualities). Students answered items on a 4-point scale of: completely disagree (1), disagree (2), agree (3), completely agree (4). SES was the sum of points. A higher score meant higher self-esteem. The reliability coefficient of the Polish version of the SES for people aged 14–18 was Cronbach's $\alpha = 0.81$.

Generalised self-efficacy was determined using the Generalised Self-Efficacy Scale (Juczyński, 2000). The scale consists of 10 items (e.g. It is easy for me to stick to my objectives and accomplish my goals) with a 4-point Likert-type scale ranging from 1 to 4. The score ranged from 10–40 points. A higher score meant higher self-efficacy. The internal consistencies of $\alpha = 0.85$.

Learned helplessness was measured using the School Helplessness Scale (SBS) (Ciżkowicz, 2009; 2021). The scale consists of 20 items concerning the feelings accompanying students during lessons (e.g. I am ashamed when I do not understand something). The subjects answered using a 5-point Likert scale (1–5). The measure of the level of helplessness was the sum of points (20–100). Higher scores meant a higher level of helplessness (Cronbach's $\alpha = 0.89$).

Motivation to learn (Mot) was tested with a shortened version of the learning motivation scale. This version of the scale consists of 15 items (e.g. I study only to get a positive grade; Ciżkowicz, 1999). The subjects determined how much this statement applies to them using a 5-point Likert scale (1–5). The indicator of the level of motivation was the sum of points (15–75). The reliability of the measurement was high ($\alpha = 0.85$).

Data analysis

Data analysis was conducted using IBM SPSS Statistics v. 27 and the AMOS package. Data was checked for completeness, outliers and normality of distributions (skewness < 3 and kurtosis < 8; Kline, 2015). In the multiple regression, the autocorrelation of the residuals and collinearity of the variables were checked. The variance inflation coefficient (VIF) should not be greater than 2.5 (O'Brien, 2007; Kock & Lynn, 2012).

The mediating role of personal resources (GSES, Mot, SBS) in the effect of SES on GPA was tested using PROCESS macro v. 3.5, model 81. For direct and indirect effects, a 95% CI was determined with a bootstrap of 10,000 samples (Hayes, 2018). The fit of the structural models was assessed using $\chi 2$, the standardised root-mean-square residual (SRMR), the root-mean-square error of approximation (RMSEA), the comparative fit index (CFI) and the Tucker–Lewis index (TLI). When SRMR and RMSEA < 0.05 and CFI and TLI > 0.95, the model is well fitted, and for SRMR and RMSEA < 0.08 and CFI and TLI > 0.90, the fit is acceptable (Hu & Bentler, 1999). For nested models, the change of > 0.010 for CFI supplemented by the change of > 0.015 for RMSEA indicates significant differences between the compared models (Chen, 2007). Local fit was estimated using modification indices (Schermelleh-Engel & Moosbrugger, 2003).

The replicability of the study (Stanley et al., 2018) was assessed by conducting an a priori power analysis in Statistica for: N = 489 subjects, type I error = 0.05 and medium effect sizes. Test power for ANOVA = 0.98, for regression analysis = 1.00; for SEM: Model 1 = 0.73; Model 2 = 0.86; Model 3 = 0.81. For SEM and only one of the three models (Model 1) was the test power slightly below the cut-off value accepted in literature (power > 0.80) (MacCallum et al., 1996; Arend & Schäfer, 2019).

Results

Descriptive statistics and Pearson's linear correlation coefficients for quantitative variables included in the research model are shown in Table 1.

Table 1. Descriptive statistics, Cronbach's α and Pearson's correlations among quantitative variables (N=489)

Variables	GPA	Avg Exam	SES	GSES	SBS	Mot
Avg. Exam	0.66***					
SES	-0.01ni	-0.07ni				
GSES	-0.02 ni	-0.08 ni	0.51***			
SBS	-0.28***	-0.07 ni	-0.48***	-0.39***		
Mot	0.43***	0.27***	0.23***	0.25***	-0.58***	1
Cronbach's *α*	-	-	0.84	0.84	0.85	0.91
M	3.2	63.3	29.5	30.2	53.1	52.6
SD	0.84	21.54	5.98	4.91	10.31	9.19
Skew	0.30	-0.07	-0.41	-0.40	0.11	-0.10
Kurtosis	-0.66	-1.19	-0.33	1.03	0.14	0.16

Note. Avg. Exam – average of external exam; SES – self-esteem; GSES – self-efficacy; SBS – learned helplessness; Mot – motivation to learn; *** $p < 0.001$.

Source: Author's research.

The Shapiro-Wilk test for GPA (W = 0.965), Avg. Exam (W = 0.954), SES (W = 0.978) and GSES (W = 0.975) did not show a normal distribution ($p < 0.001$), but skewness and kurtosis allowed us to consider that they were normally distributed. The SBS (W = 0.996; p = 0.289) and Mot (W = 0.993; p = 0.024) distributions were close to normal distribution.

SES and GSES did not correlate with GPA, while they were significantly related to motivation to learn and to sense of helplessness, with a stronger relationship with SBS. The strongest positive correlation was between GPA and external exam scores (Table 1). Exam scores explain 43.6% of the variance GPA. A one-way analysis of variance (ANOVA) was used to test whether personal resources and GPA vary significantly by type of secondary school.

Table 2. One-way ANOVA of quantitative variables by secondary school type (N=489)

Quantitative Variables	LO	Tech	ZSZ			
	M(*SD*)	*M*(*SD*)	*M*(*SD*)	*F*(2,486)	*p*	η^2
SES	29.2 (6.05)	29.9 (6.09)	29.4 (5.69)	0.70	0.497	0.003
GSES	29.9 (4.98)	30.4 (4.54)	30.7 (5.26)	1.18	0.308	0.005
SBS	53.4 (10.65)	53.4 (9.62)	52.3 (10.64)	0.50	0.607	0.002
Mot	54.0 (9.55)	52.0 (9.31)	50.6 (7.79)	5.41	0.005	0.022
Avg. Exam	73.5 (18.58)	64.0 (19.01)	41.4 (13.09)	119.59	< 0.001	0.330
GPA	3.4 (0.90)	3.1 (0.73)	2.7 (0.65)	25.80	< 0.001	0.096

Note. Avg. Exam – average of external exam; SES – self-esteem; GSES – self-efficacy; SBS – learned helplessness; Mot – motivation to learn.

Source: Author's research.

Motivation to learn and school achievements, both current (GPA) and those obtained in external examinations prior to secondary education, were significantly differentiated by the type of secondary school (Table 2). For each of these variables, the highest values were obtained by LO students, and the lowest by ZSZ students. The post-hoc analysis (Scheffe's test) showed that the motivation to learn of ZSZ students was significantly lower than that of LO students ($p = 0.008$), and this was the only significant difference between the motivation of students attending various types of secondary schools. School achievement measured by GPA and Avg. Exam differed significantly ($p < 0.001$) for each compared pair. The exception was the GPA of LO and Tech students, for which $p = 0.002$. The strongest school effect occurred for the Avg. Exam ($\eta^2 = 0.33$), and this was in line with expectations. The type of school explained 33% of the variance in this variable. For the current GPA, the effect of the school was medium (10% of variance).

Hierarchical regression analysis was used to assess the usefulness of students' personal resources in explaining GPA variation. Autocorrelation of residuals (Durbin-Watson test = 1.732) and collinearity (VIF: [1.05–1.92]) were checked. In step 1, the role of students' personal resources (SES, GSES,

SBS and Mot) was examined, and in step 2, school type and gender were added to the list of variables (Table 3).

Table 3. Hierarchical multiple regression analysis for GPA (N=489).

Predictor Variables	β	β	R^2	ΔR^2	ΔF	p
Step 1: personal resources			0.214	0.214	32.88	< 0.001
SES	-0.121*	-0.138**				
GSES	-112*	-0.092*				
SBS	-0.158**	-0.203***				
Mot	0.390***	0.325***				
Step 2:			0.279	0.066	21.98	< 0.001
gender		0.038ni				
type of secondary school		0.266***				

Note. SES – self-esteem; GSES – self-efficacy; SBS – learned helplessness; Mot – motivation to learn; * p < 0.05. ** p < 0.01. *** p < 0.001.

Source: Author's research.

Students' personal resources explained 21.4% of the variation in students' school grades (Table 3). Motivation to learn was the strongest predictor, followed by learned helplessness. SES and GSES were weak but significant predictors of GPA, and the relationship was negative. This means that students with higher self-esteem and higher self-efficacy obtained slightly lower school grades than others. In the second step, gender and school type were additionally introduced into the model. The prediction of GPA improved significantly (by 6.6%). Thus, the model allowed for the explanation of nearly 28% of the GPA variance. The highest GPA was achieved by high school students, lower by Tech students, and lowest by ZSZ students (see Table 2).

The hypothesis of the mediating role of GSES, motivation to learn and the sense of helplessness in the relationship between SES and GPA was tested using PROCES macro model 81 (Figure 1). The goodness of fit of the model to the data was found to be acceptable (M1, Table 5).

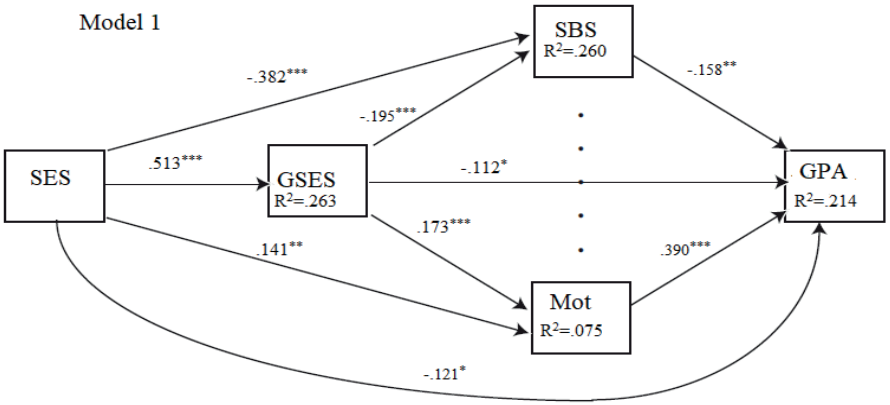

Figure 1.

Structural Equation Model (SEM): GSES, SBS and learning motivation as mediating variables in the relationship between students' self-esteem and school achievement (standardised path coefficients).

Source: Author's research.

All indirect effects of the relationship between SES and GPA were significant, with the SBS effect being the strongest (Table 4). Individuals with a high SES were characterised by a low level of helplessness, with higher school grades achieved (Figure 1). The indirect effect of GSES was slightly weaker than that of SBS. However, in this case, β was negative. This meant that students with a high SES should be expected to have a high GSES. However, individuals with a higher GSES score slightly lower than those with a lower sense of self-efficacy, and although this relationship is weak, it is significant and negative (Figure 1). Motivation to learn also constituted a significant mediating variable in the relationship between SES and average grades. Individuals with high self-esteem were more motivated to learn and, as a result, achieved better learning results. The dependencies of GPA from SES, mediated by two variables, GSES and SBS and GSES and Mot, respectively, were also significant, with the effect being stronger in the latter case (Table 4).

Table 4. Standardised indirect effects of the relationship between self-esteem and GPA (N=489).

Indirect effect	*β*	*SE(β)*	*95%* CI
SES ⟶ GSES ⟶ GPA	-0.057	0.026	[-0.109; -0.007]
SES ⟶ SBS ⟶ GPA	0.060	0.022	[0.019; 0.106]
SES ⟶ Mot ⟶ GPA	0.055	0.023	[0.013; 0.103]
SES ⟶ GSES ⟶ SBS ⟶ GPA	0.016	0.007	[0.004; 0.033]
SES ⟶ GSES ⟶ Mot ⟶ GPA	0.035	0.012	[0.013; 0.060]

Note. SES – self-esteem; GSES – self-efficacy; SBS – learned helplessness; Mot – motivation to learn; GPA – grade point average

Source: Author's research.

To test hypothesis 3, two models were examined. The M2 model was created by adding to the M1 model only the direct effect average of exam to GPA. The M2 fit was acceptable (Table 5), and the explained variance increased by 30.8%. In total, Model 2 explained more than half (52.2%) of GPA variability. However, analysis of local fitting indicated that GSES, Mot and SBS may also mediate the relationship of exam mean to GPA. Introducing indirect effects and error correlating Mot. and SBS to M2 (M3; Figure 3) significantly improved the fit of the model (Table 5).

Table 5. Model fit statistics for estimated models (N=489)

Model	χ^2	*df*	CFI	ΔCFI	TLI	SRMR	RMSEA [90% C.I]	ΔRMSEA
M1	47.64 $p < 0.001$	14	0.976		0.953	0.026	0.070 [0.049–0.093]	
M2	113.45 $p < 0.001$	21	0.946		0.908	0.069	0.095 [0.078–0.112]	
M3	62.20 $p < 0.001$	18	0.974	0.028	0.946	0.033	0.071 [0.052–0.091]	0.036

Note. M1- students' personal resources; M2 – M1 + direct effect of Avg. Exam on GPA; M3 – M2 + indirect effect of Avg. Exam on GPA.

Source: Author's research.

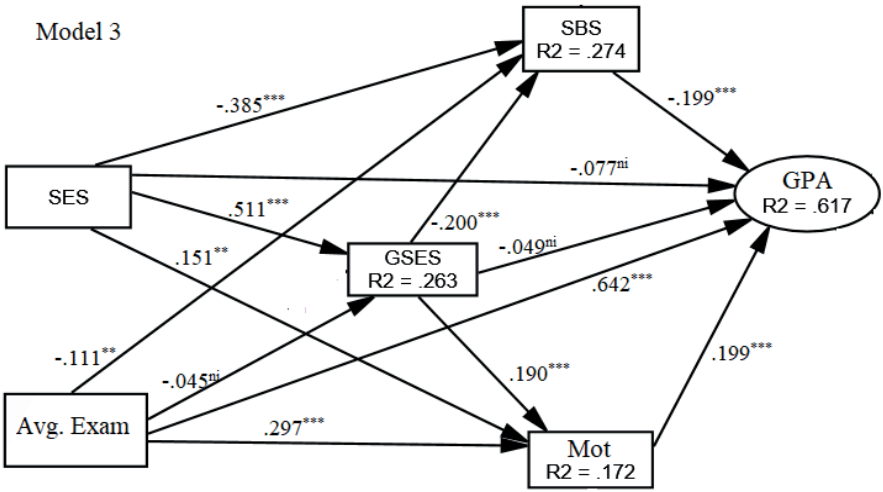

Figure 2.

Standardised direct and indirect effects of students' personal resources and Avg. Exam.

Source: Author's research.

Model 3 demonstrates that the results of the external examination, preceding high school education, are an important predictor of learning achievements of high school students, and this influence is not only direct, for which $\beta = 0.642$ (SE = 0.031; [95% CI: 0.578–0.701]), but is mediated by the students' personal resources. The total indirect effect of Avg. Exam mediated by SBS and Mot ($\beta = 0.080$; SE = 0.018; [95% CI: 0.052–0.111]) are highly significant ($p < 0.001$). Individuals who obtained a high average result in the external exam displayed a weaker sense of helplessness and, as a result, higher school grades. In addition, students with high exam scores were more motivated to learn, which also results in better grades. The only insignificant mediating variable was the sense of effectiveness. A higher result of the external exam did not affect the students' sense of efficacy, but then again, efficacy was insignificant in explaining school grades. It is also worth noting that in the model extended by exam results, both the direct impact of SES and GSES on the average assessments and the impact of the SES via the GSES was insignificant.

Model 3, into which, in addition to students' personal resources, were introduced, explains 61.7% of the variability of the GPA (Figure 2), which was 40.3% more than Model 1. However, students' personal resources remained significant predictors of school achievement even when cognitive achievement (Avg. Exam) was included in the model.

Discussion

Numerous studies indicate that predictions of school achievements can be more accurate if they take into account not only previous achievements and cognitive abilities but also non-intellectual, individual differences between students. This should be especially useful in secondary education. Well-developed self-regulation of learning is key to enabling students to achieve both their learning goals and broader personal development (Borys, 2010; Alessandri et al., 2015; Łaguna, 2015).

The purpose of the current study was to examine the role of direct and indirect relationships between such variables as self-esteem, generalised self-efficacy, sense of helplessness and motivation to learn in secondary school students in explaining their school achievements (Model 1, Figure 1) and an analysis of the consequences of additionally including in the model the results of external examinations prior to secondary school education (Model 3, Figure 2). These variables are susceptible to intentional changes and are important not only in the educational process (Zimmerman et al., 1992) but also in career development (Wang et al., 2022).

A quota sample of 489 students (age 18) from Polish secondary schools from a large city (Bydgoszcz) was examined. These were students from general secondary schools ($n_1 = 220$), technical secondary schools ($n_2 = 161$) and basic vocational schools ($n_3 = 108$). Therefore, before testing the research models, it was checked whether students' personal resources differ significantly, depending on the type of school they attend. The analysis showed that only motivation to learn was significantly different among high school students and basic vocational schools (Table 2).

The hypothesis assuming a significant role of personal resources of secondary school students in predicting their school achievements was partially confirmed. Students' personal resources were significant predictors of aca-

demic achievement (R = 0.46), and the strongest predictor was motivation to learn (Table 3). Students with higher motivation achieved higher academic results. This was consistent with both theoretical models (Ryan & Deci, 2000; Mubeen & Reid, 2014) and with the results of other studies (Meece et al., 2006; Ayub, 2010; Alivernini & Lucidi, 2011; Komarraju & Nadler, 2013). Consistent with previous research, there was also a negative, significant relationship between SBS and the GPA. Students with a higher sense of helplessness achieved lower academic results (Dweck & Licht, 1980; Ciżkowicz, 2009; Deptuła & Borucka, 2020). The assumption of a significant role of SES and GSES in predicting school achievement was confirmed, but the direction of the relationships was opposite to that expected. A negative relationship was founded between SES and GSES and school achievement. Although the correlations were weak, they were statistically significant.

The results of the study also confirmed the hypothesis of the mediating role of GSES, SBS and motivation to learn on the impact of self-esteem on school achievement (Figure 1). This was consistent with theoretical assumptions about the role of GSES, motivation (Pintrich & Schunk, 2002) and SBS (Seligman, 2002) on the impact of SES on school achievement. The model was a good fit to the data (M1, Table 5). Students with high SES had low SBS, while these students achieved higher grades. High self-esteem was also accompanied by high motivation to learn, which was associated with students achieving higher school grades. All indirect effects were significant (Figure 1; Table 4), and almost all positive. The only negative indirect effect occurred when GSES was the mediating variable. This meant that those with high SES had high GSES, but self-efficacy did not promote the acquisition of better school grades. It should be added that in this model, the direct effect of SES on GPA was also weak, as well as negative and significant. The negative relationships between SES and GSES and school grades were inconsistent with the hypothesis but were in agreement with some studies (Carrol et al., 2008; Schmidt & DeShon, 2010; Halper et al., 2018) in which these relationships were justified by ambiguous feedback on goal attainment (Schmidt & DeShon, 2010), discrepancies between self-efficacy and a student's actual abilities (Halper et al., 2018) and shorter time allocated to learning by students with relatively high SES and GSES (Vancouver & Kendall, 2006; Sitzmann & Yeo, 2013; Vancouver & Purl, 2017). According to Vancouver & Kendall

(2006), those with higher GSES believed they were making faster progress toward their goal than those with lower self-efficacy and therefore put in less effort than those with lower self-efficacy, and according to Pullman & Allik (2008), successful students had a more critical view of themselves than students with lower cognitive ability, who compensate for their poor academic performance by raising their SES. Consequently, Vancouver et al. (2008) proposed another theoretical approach (control theory) to reconcile the current and previous findings.

Theoretical discussions (Vancouver & Purl, 2017) and published research still lack clear conclusions about the role of SES (Rosenberg et al., 1995; Pullman & Allik, 2008) and GSES (Bandura, 2012) in explaining school achievements (Wasylkiw et al., 2020). However, the majority of studies indicate a positive, significant relationship between SES and achievement (Jagtap, 2018; Moyano et al., 2020; Waseem & Assim, 2020) or no relationship at all (Pullman & Allik, 2008; Boerchi et al., 2021). The same is true for GSES (Yazon, 2018; Wasylkiw et al., 2020; Mornar et al., 2021).

Another hypothesis assuming an improvement in the prediction of school achievement after including the results of external examinations in the model while maintaining the important role of students' personal resources was confirmed by the data (Figure 2). As a consequence of including only the direct effect of Avg. Exam on GPA (M2), the explained variance increased by 30.8%, while additionally including indirect effects (M3) resulted in an increase of another 10%. Model 3 has a significantly better fit to the data than M2 (Table 5). Personal resources remain significant explanatory variables for students' school achievement, and the negative relationships of SES and GSES when controlling for cognitive skills have become insignificant.

To sum up, the research did not reveal a direct, positive relationship between self-esteem and self-efficacy and school achievements, but this impact was mediated by motivation to learn and a sense of helplessness and remained significant even when cognitive skills were controlled. These findings were important for at least three reasons. Firstly, it is possible to stimulate GSES (Cai et al., 2021) and strengthen self-esteem and self-efficacy as a result of the intervention (Unrau et al., 2018; Bonaiuto et al., 2022), and knowledge about mediation processes allows for more accurate planning of the intervention. Secondly, appropriate self-regulation in learning promotes

not only school achievements but also self-education and taking up education in adult life. Thirdly, the research results contribute to theoretical considerations on GSES.

Limitations and future directions

The research was carried out on a targeted sample in only one city, which makes it impossible to accurately estimate generalisation errors. Therefore, generalisations should be treated with some caution. Moreover, the sample included students from three types of secondary schools: general secondary schools, technical secondary schools and basic vocational schools (the proportions reflected the proportions in the population). Therefore, it was tested whether students' personal resources and achievements differ significantly among students, taking into account the type of school attended (Table 2). However, it should be additionally verified whether the relationships between the variables in the research model do not differ significantly in relation to the type of school. However, the reliability of the results of these comparisons requires larger trials.

Conclusions

The changing labour market requires flexible adaptation of society to its needs. This entails the need for continuous learning. Non-intellectual variables that may be conducive to undertaking education are gaining in importance.

The study examined the importance of self-esteem, sense of efficacy, helplessness and motivation in explaining the school achievements of high school students. The results demonstrate that:

- secondary school, technical and vocational school students do not differ significantly in terms of self-esteem, sense of efficacy and sense of helplessness. Only the motivation of high school students is significantly higher than that of basic vocational school students (Table 2). This allows for further analysis to consider them as a homogeneous group in terms of the examined personal resources;

- contrary to the assumptions, the correlation matrix showed no correlation between SES and GSES and school achievements, measured by both the average of external exam results and the average grade, while SES and GSES are significantly related to a sense of helplessness and motivation (Table 1);
- as assumed, efficacy, motivation to learn and a sense of helplessness are important intermediary variables in the relationship between SES and school achievement (Figure 1; Table 4). Student personal resources explain 21.4% of high school students' average grade variability, and all variables are significant;
- the model (Figure 2), after adding the results of the external examination prior to secondary school, explains 61.7% of the variability of school grades;
- personal resources, even taking into account the results of the external exam, remain important variables explaining the school achievements of students, partly in direct relationships (Mot, SBS) and partly in indirect relationships (SES, GSES).

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