


Article

Predictors of the Intention of Learning in Higher Education: Motivation, Self-Handicapping, Executive Function, Parents' Education and School Achievement

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Abstract: Learning motivation, self-handicapping, executive function, and school achievement are interrelated variables affecting students' intention of learning in higher education. However, many educators are unaware of the ability of these predictive variables and fail to encourage students' further education. Therefore, with the aim of helping educators, this study was conducted to predict students' intention of learning in higher education based on their learning motivation, self-handicapping, executive function, school achievement, and mothers' education. We sampled Hungarian 12th graders (N = 1330) who participated in this study while collecting the data online during class hours. Questionnaires were used to measure learning motivation, self-handicapping, and executive function. Findings showed that higher learning motivation, lower self-handicapping, stronger working memory, and mother's education could increase students' intention of learning in higher education. Beyond our expectations, higher school achievement (GPA) was not a significant predictor. Comparing different theoretical perspectives, we deduced reliable predictors underlying Hungarian students' intention of learning in higher education. Therefore, this study is of great importance for educators to pick out the real support for their students' intention of learning in higher education by following our research findings.

Keywords: motivation; self-handicapping; executive function; school achievement; intention of learning in higher education

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1. Introduction

Nowadays, there is a much concern throughout the world regarding factors or predictors that influence high school students' intention to study at the colleges or universities level [1–3]. In order to avoid such much concern, educators and researchers started learning to know what predictors influence students' intention to learn at the college or university level. In education, the concepts 'motivation, self-handicapping, executive function, parents' education and school achievement' are the inter-related areas of students' cognitive and social processes researched in different educational fields to predict students' intention to further studies and their academic achievement [4–6].

Motivation is an important aspect that influences people's abilities to perform specified tasks [7]. In the field of education, there is evidence supporting motivation as an influencing factor in work and achievement [8–11]. Moreover, the concept of self-handicapping is also a strategy students often use when they are scared of failure in the achievement of academic performance [12]. Different studies showed that students' self-handicapping is also a predictor of several variables such as their academic results [13], their self-esteem [14], and their intention for further studies or dropping out of school [15]. In the case of executive function, there are cognitive aspects that enable individuals to overcome different obstacles

by using their different cognitive abilities [16]. It can also predict conceptual change in the future [17]. Furthermore, parents' education level can also influence their children's education improvement [18]. Apart from the above cognitive and social factors, school achievement (Grade point average, GPA) can also predict students' performance in future studies [19]. Therefore, educators and researchers should be familiar with these interrelated areas of students' motivation, self-handicapping, executive function, school achievement, and their intentions of learning in the higher education of colleges or universities.

A body of research predicts students' high school achievement by their motivation [20–24] self-handicapping [13–15,25], parents' education [18,26,27] and their executive function [4,6,16,28]. However, the prediction of students' intention of learning in higher education is still missing. Furthermore, Dannett [29] exclaimed that there were fundamental predictors underlying the individuals' intentionality. Thus, in the current study, we focus on what predictors are available and how they can help or hinder students' intention of learning at a higher education of colleges/universities.

2. Theoretical Framework

2.1. Motivation

Motivation is one of the crucial factors that students need to improve their learning process [30]. Motivation is also divided into two constructs such as intrinsic (satisfaction of doing activities) and extrinsic (receiving external rewards or recognitions) [31]. In higher education research, intrinsic motivation is considered the need to acquire skills or abilities, the desire for knowledge, and the enjoyment of learning or acquiring information [32]. On the other hand, extrinsic motivation is a means of achieving goals outside the learning process, such as the possibility of a higher salary, employment, and high social respect [33].

We based this study on self-determination theory (SDT) [34] to examine high school students' intrinsic and extrinsic motivation to further their studies at college/university. According to SDT, students' (intrinsic) motivated or self-determined behaviour arises from three (extrinsic) continuums of autonomy, competence, and social relations. SDT points out that both cognitive and non-cognitive (social or cultural) impacts have critical impacts in facilitating or thwarting students' self-directions and behaviors in future [34]. Like SDT, Bandura's self-efficacy theory [35] is also considered the fundamental theory for students' career motivation or decision-making processes [36,37]. The essence of this theory is 'self-efficacy', i.e., if the individual believes in himself and his abilities, s/he has strong career motivation and can carry out the task successfully [38]. While strong self-efficacy leads an individual to cope, low self-efficacy leads to avoidance. This avoidance of low self-efficacy is also called self-restraint, a self-protective strategy in the event of failure [39]. Therefore, these two theories of self-determination and self-efficacy are great foundations of this study to investigate predictors of students' intention to further studies.

Many studies [21,40–42] commonly proved that there was a significant positive relationship between students' motivation and their intentions of continuing further studies. For example, it was found in one mathematics study of higher education [43] that students intended to continue taking more mathematics classes in the future if they have strong motivation to learn mathematics in their grades 11 and 12 of senior high school. Moreover, students' higher extrinsic [22] and intrinsic [20] motivations are also predictors of high school achievement. There was a significant relationship between students' motivation and school achievement in one study [14]. Although these studies [21,40–42] did not clearly describe the students' intention to study at the university level, they could suggest that students were likely to continue their further studies if they have strong learning motivation in their unified fields. However, in one study [40], they exclaimed that the intrinsic motivation self-determined by students was the best predictor of their intention to drop out of school. In addition, one study [24] conducted in high schools in the Goalpara district of Assam also showed no significant relationship between students' intrinsic motivation and their school achievement in Tribal students (students whose characteristics are of the tribes).

2.2. Self-Handicapping

Closely related to the above area of motivation is self-handicapping. Self-handicapping refers to a self-protective strategy people apply when assessed as threatening to their positive self-esteem [14]. It is also a process involving self-creation of obstacles to the success of individual performance in tasks [15], for example, procrastination, withdrawal from making efforts, and avoiding by giving different reasons [12]. Self-handicapping stems from two types of self-distraction such as external and internal self-distractions [44]. External factors include lack of time and the search for other activities, while internal factors can be, for example, non-learning and lack of practice [45]. Self-handicapping is also related to low academic performance, bad study habits, and low self-esteem [46] and has a negative effect on learning motivation and school activities [39]. In addition, it can lead to self-restraint, a behavioural manifestation of avoidance motives [47]. Self-handicapping is accompanied by a lack of faith in one's abilities and self-confidence in learning, school performance, and success [13].

Concerning this self-handicapping, those who self-limit or self-handicap due to academic reasons have worse school results, worse study habits, and negative coping strategies [48]. One study [12] also averred that self-handicapping could hinder students' academic achievement, and thus all types of educational endeavours to improve students' achievement should focus on preventing students' self-handicapping. Even though self-handicapping can decrease students' achievement, one study [15] exclaimed no significant correlation between students' self-handicapping and future consequences.

2.3. Executive Function

The concept of Executive Function (EF) became the focus of scientific attention a few decades ago. Since then, many studies have come to light proving EF development's role in success at school, work, and in personal life [49]. EF refers to a higher-level complex cognitive process that helps regulate thoughts, emotions, and behaviour [50] in maintaining and focusing attention, planning actions, ignoring disturbing circumstances [51], resisting temptations, adapting flexibly to different situations, and making decisions [49,52].

Executive function has three components; working memory (ability to work without losing track of a task), inhibition (ability to retain the previously learned information), and cognitive flexibility (ability to regulate our previous learned thoughts to adapt to the newly learned ones) [50,53,54]. Previous research shows that EF components have significant predictive power in school performance, school grades, and social competence [51]. The development of EF starts at preschool age and lasts until young adulthood [28]. The development of EF can be influenced by parental influences, the student's environment, educational experiences, trauma, environmental toxins and stress [55]. On the one hand, the executive function plays a prominent role in information processing and knowledge and, on the other hand, in regulating behaviour to achieve long-term goals, which are essential components of further education decisions and giving up studies.

One study [16] specialised in the relationship between high school students' executive function and their English academic achievement (measured by students' grades on the year); it was found that the overall model of executive function could significantly predict their academic achievement in English. Furthermore, one study [16] also predicted that students could have a higher working memory if they beneficially apply their executive function in their academic affairs. Furthermore, findings suggest that higher-order executive function deficits play a critical role in the academic functioning of high school students [17]. In this study [28], they also described High school students' motivation (intrinsic and extrinsic) and goal-directed executive function as aspects of their self-regulated learning, and they predicted that aspects of students' executive function and motivation accounted for 23% of the variance in their Grade Point Average (GPA). Furthermore, students' higher GPAs were also influenced by their high development of EF [56]. In fact, these studies [16,17,56] could suggest the importance of students' executive function on their academic achievements. However, they could not clearly predict students' intention to

continue their studies at the university level. Gottfried and Ansari [5] found that students with weaker executive function were absent in their classes, likely to drop out early, and low in their academic achievement. It indirectly means that students with higher executive function might continue their studies and achieve higher future achievements.

2.4. Role of the Parents

Apart from students' motivation and executive function, their parents' role is very important for students' high school achievement. If students receive warmth, encouragement, and stimulated praise from their parents, they are successful in their executive function and academic fields [57]. Every school system has a little equalising function that can recreate social differences from generation to generation. The children of parents with lower educational qualifications also mainly obtain lower educational qualifications [18]. Even at the same level of performance, students from a low social background are less willing to enter more ambitious paths than their peers from a higher social background [26]. Róbert [58] examined 60,000 graduating Hungarian high school students, and the results showed that the parents' position, education, and the family's financial situation significantly influenced their intention to continue their education.

As educated parents could give more autonomy to their children, the students achieve more in high school [27,40]. Moreover, some other studies [4,59,60] confirmed that parents' higher education levels and support could also promote their children's academic achievement by enhancing their executive function. In contrast, the caring approaches of uneducated parents to their children can contribute to irregular and unsure academic achievement results in high schools [61]. Additionally, one study investigating the factors of students' intention to study or drop out of school [59] showed that a mother's lower education level could increase students' dropout rates in both academic and vocational high schools. Furthermore, a good parent-child relationship encourages students' further studies and positively impacts the student's achievement in school [18].

2.5. Students' School Achievement

At present, students' school achievement is defined in several ways. The most common meaning of school achievement is the student's performance in their respective academic fields, such as listening, reading, writing, and arithmetic, assessed by different measurement tests [62]. The most common tests are school exams, national exams, SAT/ACT scores, standardised tests [63], achievement tests [64], and GPAs [18]. As school achievement can decide students' further educational studies and future life, they must get higher school achievement [65].

Some studies [66–68] predicted that students' higher academic/school achievements (higher GPAs) in secondary schools are likely to be one of the crucial factors in the higher achievement at the university level. Therefore, students who were successful in college were the ones who were highly achieved in standardised tests in their high schools [63]. Furthermore, one study [18] also exclaimed that there was also a positive relationship between the first-year college students who were highly achieved (Credit-A) in high school and their higher GPAs at college. Furthermore, Rosário et al. [11] exclaimed that if students had higher academic achievement in high school, they had higher intention of learning in universities. At the high school level, the studies mentioned above [63,66–68] exclaimed that students' higher achievement in high schools also has a positive relationship with their higher GPAs in the colleges or university levels. However, these studies did not predict that higher school achievement was the predictor of students' intention of learning at their respective colleges or universities.

2.6. Hungarian Education System

The Hungarian education system belongs to the continental education system, like many European countries such as Germany and Poland. The continental education system is specifically different from the Anglo-Saxon education system created by the English and

Americans. In general, the continental education system is characterised by triple fragmentation (primary, secondary, and tertiary), strong selectivity, and early choice between different types of education [69,70].

In Hungary, the kindergarten level starts for children at 3. All children must attend kindergarten, by attending at least four hours per day. After three years in kindergarten, children start school at age 6 [71]. Primary education (totally 8 grades) typically takes place in primary schools. Grades 1 to 4 of primary school are the ISCED level-1 elementary, and the second part (Grade 5–8) is the ISCED level-2 lower secondary. After graduating from primary school, students continue their studies in one of the secondary schools (ISCED 3) [72].

Primary school's last year is a crucial branching point in the Hungarian school system. Students take an entrance exam to the secondary schools. Based on the results of the entrance exam and the primary school grades students can be admitted into different secondary schools (ISCED 3). There are three main tracks on: ISCED 3 level: academic (general) secondary schools (ISCED 344), vocational secondary schools (ISCED 354), and vocational schools (ISCED 353). Academic secondary schools (grades 9–12) provide general education and typically prepare students for higher (tertiary) education. Students in this track must take a secondary school qualifying exam (matura exam) at the end of grade-12. It is also a prerequisite for tertiary education admission. Vocational secondary schools are also four years long. At the end of these four years, students also have to take a secondary school qualifying exam (matura exam) to earn a professional qualification and qualify for higher education admission. Again, this track provides both general and vocational education and prepares students for higher education. Vocational schools last for three years (Grades 9–11) and not prepares for tertiary education. Totally, 43% of students study in academic schools, 33% in vocational secondary schools, and 24% in vocational schools [73].

The secondary education system, briefly described above, is true for those students who participated in this study, although the system recently changed a little. The description of the new system is not the purpose of this study (for the details see Euridyce, 2021). According to the statistical data, the number of students admitted to universities from academic secondary schools was 10–20% higher than those from the vocational secondary schools [69,74,75].

2.7. Research Objectives

This study aims to clear the dust from the ideas of two main objectives. First, previous research has highlighted the role of motivation [23,24,32], self-handicapping [12], parents' education [4,59,60] and executive function [16,49,51] in academic achievement and the obtained school grade (GPA). However, we are unaware of any previous research that has simultaneously examined the role of motivation, self-handicapping, EF, parents' education, and students' academic achievement (based on GPAs) on the intention of learning in higher education. Therefore, this study is to examine the role of motivation, self-handicapping, EF, parents' education and school achievement (based on GPAs) in furthering intention of learning in higher education in a unified model.

Second, there was a huge body of research comparing academic and vocational secondary schools; regarding students' self-esteem [76], students' sense of belongings in secondary schools [77], students' cognitive foundation skills such as numeracy, literacy and problem-solving [78], students' achievement and motivation in using the computer-aided designing-CAD [79], and students' learning efficacy of mechatronic technology [80]. In Hungary, there are also two types of schools; the academic and the vocational secondary schools (which were mentioned above) from which students can continue their studies at university. Therefore, this study is also to compare these two school types regarding students' intention of learning in higher education based on the above predictors such as students' motivation, self-handicapping, EF, parents' education, and school achievement (GPA).

3. Method

3.1. Participants

Hungarian 12th grade students in their last year of secondary school participated in the study. The reason for choosing these participants is that 12th grade is the end of the secondary school years which gives opportunities to students to decide whether or not to continue learning in higher education. We chose a convenience sampling technique for data collection due to the time constraint [81].

The data collection was done online during ordinary class sessions. A total of 1368 participants filled out the questionnaire, and thus, the participants are enough to make the generalization. Additionally, to reduce the risk of bias, we cleaned the database and deleted those individuals who did not answer. Thus, 1330 participants remained in the sample (vocational secondary school = 1182; academic secondary school = 146; Table 1). The difference in sample sizes between the two groups occurs due to the impossible randomization, availability of a given time, and researcher's accessibility to the participants (especially, contacts with the school administrators in this study). Although the size of the academic secondary school subsample is smaller than the vocational secondary school subsample, a sample of 120 participants is large enough to characterise the sample from a statistical point of view [81]. Fifty-eight percent of vocational secondary school students (686) said they would like to continue their studies in higher education. Compared to the secondary school sample, there are far more students intending to continue their education (79%; 117 participants). The difference between the two types of schools in the proportion of those intending of learning in higher education is 21%. These proportions are comparable to the typical national proportions for both school types [58,73,74].

Table 1. The mother's educational level in the study and nationally (%).

School Type	Samples	Less than Primary School	Primary School	Vocational Training	Secondary School	College, University	χ^2
Years spent at school		<8	8	11	12	15<	
Vocational	Hungary *	0.40	9.40	31.00	39.70	19.50	7.99
	Sample	0.60	7.30	31.20	41.80	19.00	(0.09)
Academic	Hungary *	0.20	3.10	27.40	28.40	41.00	8.07
	Sample	0.7	4.8	20.7	35.2	38.6	(0.089)

* Hungary (NABC database, Hungarian National Assessment of Basic Competencies, 2022).

To characterise the family background, we used the mother's education level. Many studies use the same variable for this purpose [82–85]. The following categories were distinguished, and the number of years spent studying is given in parentheses: no primary school (<8 years); primary school (8 years); vocational training (11 years); secondary school diploma (12 years); college (15 years); university (17 years). The educational level of the mothers was comparable to the Hungarian National Assessment of Basic Competencies NABC, [69,86,87]. The NABC is a nationwide, system-level measurement. Table 1 shows the distribution of the mother's educational level in this study and in the NABC study. We can see that there is no significant difference between sampled participants and the NABC national data regarding the mother's education level.

3.2. Instruments

Questionnaires containing five-point Likert statements were used to measure learning motivation, self-handicapping, and executive function. The learning motivation questionnaire was compiled based on the self-determination theory [34] and contained intrinsic (six items) and extrinsic (six items) dimensions. The statements relate to the motivation to further education at the higher education level, and each item is included as an example in Table 2. Based on Clarke and MacCann's study [45], we defined two dimensions of self-handicapping: internal (six items) and external (nine items). We have given an example of each of these in Table 2. To measure EF, we used the version of the 14-item ADEIXI

(Adult Executive Functioning Inventory) [88] executive function questionnaire adapted to Hungarian [89]. The questionnaire contains nine items measuring students' working memory difficulties and five items assessing their inhibition difficulties. We also used the semester marks obtained in school subjects (GPAs as the school achievement) for secondary school academic performance. In addition, the mother's education was used to characterise the family background. After the agreement of their children's participation in the study, the mothers provided their education in a short questionnaire (as the parent's education level). Moreover, the Yes/No item was also used for the investigation of students' intention to further studies at the universities or colleges.

Table 2. Sample items from the instruments.

Scale	Sub-Scales	Sample Items
Learning motivation	Extrinsic motivation	I want to continue studying because of the higher pay.
	Intrinsic motivation	I like challenges, and getting a degree is one newer challenge for me.
Self-handicapping	Internal	I cannot persevere for further education.
	External	I can do it even without a diploma to prosper.
Executive function (ADEXI)	Working Memory	I have difficulty remembering lengthy instructions.
	Inhibition	I sometimes have difficulty stopping an activity that I like.

3.3. Reliability and Validity of Instruments

Exploratory factor analysis was used to examine the factorial validity of scales. Based on the literature [81], factor weight limits above 0.4 were considered acceptable. Therefore, we performed factor analyses for both subsamples and the entire sample.

In the case of the learning motivation and self-handicapping scales, the Kaiser-Meyer-Olkin (KMO) index of the factor analysis was 0.95 for vocational secondary school students, 0.91 for academic secondary school students, and 0.95 for the entire sample depicting acceptable factor loadings. The explained variance of 61% for vocational secondary school students and 62% for secondary school students was obtained. During the factor analysis, the intrinsic and extrinsic motivation of learning motivation were not separated into two factors (we combined those two dimensions). Following the factor analysis, three other variables were used for further analyses: further education motivation, internal self-handicapping, and external self-handicapping. Table 3 shows the reliabilities of the scales. Again, high-reliability values were obtained for all three scales for both school types and the entire sample.

Table 3. Reliabilities (Cronbach's α) of the affective factors scales on the vocational and academic secondary school samples.

Scales	N of Items	Vocational	Academic	Total
Learning motivation	12	0.90	0.91	0.90
Self-handicapping internal	6	0.89	0.93	0.88
Self-handicapping external	9	0.77	0.83	0.78

Executive function scale: The KMO index of the ADEXI questionnaire (vocational secondary school = 0.93; secondary school = 0.85; total sample = 0.93) is reasonably good for both subsamples. The analysis confirmed the factorial validity of the questionnaire. In the sub-sample of vocational secondary school students, the working memory and inhibition subscales explain 55% of the questionnaire. In the case of secondary school students, the created subscales explain 58% of the entire questionnaire and 53% of the entire sample, respectively, higher than those published in the literature [88,89].

Table 4 shows the reliability indicators of the subscales of the ADEXI questionnaire verified by factor analysis per sample and subscale. Based on the literature [81], Cronbach's α values above 0.6 are considered acceptable. Therefore, the ADEXI questionnaire and its subscales are reliable. However, the lower reliability values of the inhibition subscale are probably due to the small number of items (5 items).

Table 4. Reliabilities (Cronbach's α) of the ADEXI scale on the vocational and academic secondary school samples.

Scales	N of Items	Vocational	Academic	Total
Working memory	9	0.91	0.85	0.91
Inhibition	5	0.68	0.73	0.68
ADEXI	14	0.90	0.86	0.89

The obtained values were comparable for university students [88] and grades 4 to 11 [89]. Overall, we can say that the executive function scales have good reliability indicators in all subsamples.

School achievement: The academic result was measured by the marks of the main subjects: Hungarian grammar, literature, mathematics, history, and foreign language. Semester grades (GPAs) were used as an indicator of academic results. In the Hungarian education system, students are given grades 1–5 on a five-point scale, where 5 is the best value. We created a combined variable from the scores and compared its averages. The combined variable formed from the grades is considered the academic result variable.

Intention to further studies: The students were asked whether they would apply to a higher education institution via a questionnaire. It was a yes-no type of question. This question was the independent variable of the study.

4. Results

4.1. Motivation and Self-Handicapping

Table 5 shows the difference in affective factors between school types. In all three variables (learning motivation, internal and external aspects of self-handicapping), there is a significant difference between secondary school students and vocational secondary school students, Cohen's d expressing the size of the differences is medium. The motivation to learn is more robust, and the self-handicapping factors are lower in academic secondary school students than in vocational secondary school students.

Table 5. Differences between vocational and academic secondary school students in motivation and self-handicapping.

Subscales	Vocational		Academic		t	p	Cohen's d
	M	SD	M	SD			
LM	2.93	0.92	3.31	0.93	3.93	0.001	0.40
I-SH	2.33	1.07	1.82	1.06	−5.19	0.001	0.47
E-SH	2.55	0.79	2.20	0.82	−4.63	0.001	0.43

Note: LM = Learning Motivation; I-SH = Internal aspect of self-handicapping; E-SH = External aspect of self-handicapping.

The obtained results are not surprising. The intentions of further education after primary school determine the secondary school years as well: the secondary school students went to secondary school to continue their education in higher education. Thus, in the 12th, i.e., the last year of their secondary school education, they are more motivated to study in higher education than vocational secondary school students. Although most vocational secondary school students had the goal of acquiring a vocational qualification when choosing a school in the 8th grade, their secondary goal at most was further education in higher education. This can also be seen in the affective factors: vocational secondary school students are less motivated to learn and doubt themselves and their ability to learn more. The SH of vocational secondary schools is much stronger. The question arises when a stronger self-handicapping of vocational secondary school students develops. Did it develop during the secondary school years, or was the choice of vocational training already a consequence of stronger self-handicapping?

We assumed that those who want to continue their studies in higher education have stronger learning motivation and weaker self-restraint. To investigate this, we performed

two-sample *t*-tests per school type (Table 6). According to the results, there is a significant difference in all three affective factors between those who plan further education and those who do not. Cohen's *d*, expressing the magnitude of the difference, is significant for all subscales (Table 6). According to this, students who decide to continue their studies in higher education have significantly stronger learning motivation and weaker self-handicapping than their peers who do not plan to continue their studies. Our results show that within the sub-samples, there are greater differences according to the further education decision than between school types.

Table 6. Differences between sub-samples according to the intention of learning in higher education.

School Type	Predictors	Intending to Continue Studies			Do not Intend to Continue Studies			<i>t</i>	Cohen's <i>d</i>
		N	M	SD	N	M	SD		
Vocational	LM	686	3.37	0.67	492	2.31	0.87	−23.44	1.36
	I-SH		1.97	1.07		2.83	0.83	14.95	0.90
	E-SH		2.27	0.83		2.94	0.55	15.72	0.96
Academic	LM	117	3.60	0.74	31	2.21	0.76	−9.22	1.85
	I-SH		1.56	0.95		2.79	0.91	6.47	1.33
	E-SH		1.99	0.76		2.94	0.57	6.43	1.41

Note: LM = Learning motivation I-SH = Internal aspect of self-handicapping; E-SH = External aspect of self-handicapping; all *t*-values in the table are significant at the 0.01 level.

The individual and combined effects of the intention to further study, the type of school as independent variables on learning motivation, and the two dimensions of self-handicapping were examined using a two-point analysis of variance (Table 7).

Table 7. Two-way analysis of variance statistics.

Variables	Main Effects, Interaction	F	<i>p</i>	η^2
Learning motivation	Intention to further study	233.28	0.001	0.15
	School type	0.57	0.449	0.00
	Interaction	4.23	0.040	0.01
Internal self-handicapping	Intention to further study	104.33	0.001	0.07
	School type	4.91	0.027	0.01
	Interaction	3.16	0.076	0.01
External self-handicapping	Intention to further study	112.15	0.001	0.08
	School type	3.10	0.078	0.01
	Interaction	3.09	0.079	0.01

Note: Learning motivation $R^2 = 33.4\%$; Internal aspect of self-handicapping $R^2 = 18.4\%$; External aspect of self-handicapping $R^2 = 19.3\%$; $\eta^2 = 0.1$ (not bad), 0.15 (big), 0.01 (small).

In the study of learning motivation, we can see that the type of school has no significant effect. This means that there is no significant difference in the learning motivation of academic and vocational secondary school students. However, there is a difference in learning motivation between those who intend to continue their education and those who do not. The interaction of the two independent variables is significant, so the degree of difference is not the same in the two school types.

The decision in favour of further education and the type of school also significantly affects self-restraint due to internal reasons. According to this, there is a significant difference in self-restraint due to internal reasons between academic secondary school students and vocational secondary school students, as well as between those who decide for and against the intension of learning in higher education. However, the interaction of the two variables is not significant; that is, they are independent of each other. Furthermore, there is no significant difference in self-handicapping due to external causes based on the type of school. However, there is a significant difference in the intention of learning in higher education. Therefore, the interaction of the two independent variables is not significant.

The two-way analysis of variance also confirms that there are significant differences in variables of learning motivation and self-handicapping (both internal and external) based on the intention of learning in higher education. According to this, those students committed to the intention of learning in higher education have stronger learning motivation and weaker self-handicapping in both school types (Table 7).

In summary, we can conclude that the examination of learning motivation and self-handicapping reveals that academic secondary school students have a more robust learning motivation than vocational secondary school students. However, both dimensions of self-handicapping hold students back from the intension of learning in higher education and are significantly more robust among vocational secondary school students. In addition, we can see that the decision in favour of the intention of learning in higher education has a greater influence on the differences in the variables of learning motivation and self-handicapping than the type of school.

4.2. Executive Function

In the case of EF, a lower scale value indicates better functioning on both dimensions [53]. There is no difference in working memory ($t = -0.85, p = 0.396$) or inhibition ($t = 1.79, p = 0.074$) between the two types of secondary school. Within school types, there are significant differences in the two components of the EF based on the decision to further education (Table 8). Students planning to continue their education reported better functioning of both components at vocational secondary schools. In the case of secondary school students, there is only a difference in working memory in favour of those planning higher education.

Table 8. Differences in EF between subsamples according to the intention of learning in higher education.

School Type	Sub-Scales	N	Intending to Continue Studies		N	Do not Intend to Continue Studies		t	p	Cohen's d
			M	SD		M	SD			
Vocational	WM	684	2.29	0.89	488	2.39	0.91	1.94	0.053	-
	I		2.69	0.82		2.81	0.85	2.30	0.022	0.14
Academic	WM	115	2.23	0.72	31	2.54	0.97	2.00	0.047	0.48
	I		2.80	0.89		3.03	0.92	1.30	0.203	-

Note: WM = Working memory; I = Inhibition.

Analysing the working memory, according to the two-way ANOVA, the difference in the intention to continue learning is significant ($F = 7.48, p = 0.006, \eta^2 = 0.01$). However, neither the school type nor the interaction is significant. In the examination of inhibition, however, the type of school is significant ($F = 4.14, p = 0.042, \eta^2 = 0.01$). In this case, the intention to further study and the interaction are insignificant. In the case of both components of the executive function, the two investigated variables, i.e., the intention to the study of higher education and the effect of the type of school, are independent. School types do not differ in any component of EF. However, there are differences based on the intention of learning in higher education in both school types.

4.3. School Achievement Based on the Grade Point Average

The average of school achievement from vocational secondary school students ($M = 3.58, SD = 0.82$) is significantly lower ($t = 3.15, p = 0.002$) than those of academic secondary school students ($M = 3.81, SD = 1.04$). Based on the examination according to the intention of learning in higher education, there are significant differences in the academic results within the school types. Students who plan to continue their studies in higher education have significantly better academic results in vocational and academic secondary school. The value of Cohen's d is high for both school types; however, in the case of academic secondary school students, the difference between the average school achievement (GPA) is greater than in the vocational secondary school (Table 9).

Table 9. Differences in school achievement based on the intention of learning in higher education.

School Type	Intending to Continue Studies			Do Not Intend to Continue Studies			<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	N	M	SD	N	M	SD			
Vocational	679	3.76	0.87	487	3.31	0.66	−9.70	0.001	0.59
Academic	114	4.01	1.05	30	3.08	0.61	−4.59	0.001	1.07

The results of the two-way analysis of variance, with which we examined the individual and combined effects of the intention of learning in higher education and the type of school as independent variables on the academic result, show that only the intention of learning in higher education has the main effect ($F = 63.02, p = 0.001, \eta^2 = 0.05$). According to this, there are significant differences in academic results based on the intention to study further. Those who plan to continue their studies in higher education have better grades than those who do not plan to continue their studies. The type of secondary school has no significant effect ($F = 0.01, p = 0.938, \eta^2 = 0.00$). According to this, there is no significant difference in academic results between academic secondary school students and vocational secondary school students. The interaction of the two independent variables is significant ($F = 7.27, p = 0.007, \eta^2 = 0.01$), which means that the degree of differences between the two school types is not the same. This confirms the result of the *t*-test (Table 7), according to which the school achievement results of academic secondary school students differ to a greater extent based on the decision of learning in higher education than those of vocational secondary school students.

In summary, it can be concluded that the intention of learning in higher education has a more significant impact on school achievement results than the type of school.

4.4. Correlations between Variables

We performed a correlation calculation to explore the correlation system of the academic results (Table 10). All variables in vocational secondary school students are significantly related to the school achievement (GPAs). Among academic secondary school students, only inhibition has no significant correlation with GPAs. The results show that students with stronger learning motivation and parents with higher education achieve better academic results. In contrast, a greater degree of self-restraint and the higher index of executive function difficulties (a weaker functioning of the executive functions) are associated with worse grades.

Table 10. Correlation of variables.

Variables	GPA	LM	I-SH	E-SH	WM	Inhibition	Mothers' Education
GPA	-	0.27 **	−0.58 **	−0.42 **	−0.38 **	−0.18 **	0.07 *
LM	0.51 **	-	−0.40 **	−0.29 **	0.05	0.01	0.10 **
I-SH	−0.59 **	−0.60 **	-	0.63 **	0.58 **	0.31 **	−0.14 **
E-SH	−0.56 **	−0.47 **	0.68 **	-	0.44 **	0.24 **	−0.15 **
Working memory	−0.37 **	−0.25 **	0.56 **	0.46 **	-	0.54 **	−0.06
Inhibition	−0.05	−0.11	0.17	0.25 **	0.47 **	-	−0.07
Mothers' Ed.	0.28 **	0.282 **	−0.22 *	−0.26 **	−0.06	−0.04	-

Note: * $p < 0.05$; ** $p < 0.01$; Upper triangle (Vocational secondary school); Lower triangle (Academic secondary school); LM = Learning motivation I-SH = Internal aspect of self-handicapping; E-SH = External aspect of self-handicapping.

4.5. Factors Determining the Intention to Further Study

Binary logistic regression was used to examine which factors increase or decrease the intention of learning in higher education in a sub-sample of vocational secondary school and academic secondary school students. Learning motivation, self-handicapping, Executive functions (working memory and inhibition), GPA, and mother's educational level were included in the regression as independent variables. In our model, the regression

models are significant (vocational secondary school: $\chi^2 = 447.80$, $p < 0.001$; academic secondary school $\chi^2 = 76.36$, $p < 0.001$). The unique effect of the included independent variables is the same as the correlation matrix presented in Table 10. Based on Nagelkerke's R^2 , the combination of the included independent variables explains 79.9% (vocational secondary schools) and 66.8% (academic secondary schools) of the variance of the intention of learning in higher education. (Table 11).

Table 11. Factors determining the intension of learning in higher education by the school type.

School Type	Independent Variables	β	SE	Wald	p	Exp(β)
V	Learning motivation	1.21	0.1	139.49	0.001	3.36
	Mothers' education	0.36	0.11	10.01	0.002	1.43
	Working memory	0.24	0.1	5.16	0.023	1.27
	External self-handicapping	−0.67	0.14	21.68	0.001	0.51
	Internal self-handicapping	−0.42	0.12	11.82	0.001	0.66
	Inhibition	−0.11	0.12	0.89	0.347	0.89
	GPA	0.11	0.15	0.61	0.433	1.12
A	Learning motivation	2.16	0.51	18.14	0.001	8.63
	Mothers' education	1.79	0.55	10.63	0.001	6
	Working memory	−0.01	0.46	0	0.983	0.99
	Internal self-handicapping	0.38	0.43	0.78	0.379	1.46
	External self-handicapping	−0.83	0.42	3.84	0.05	0.44
	Inhibition	−0.21	0.36	0.34	0.558	0.8
	GPA	0.36	0.39	0.87	0.351	1.43

Note: V = Vocational; A = Academic.

In the Exp (β) odds ratio presented in the table, we can see that in the case of both types of schools, the strength of learning motivation multiplies the intension of learning in higher education. In the case of vocational secondary school students, in addition to learning motivation, factors that increase the chances are the parents' higher education and the good functioning of their working memory. Both increase the decision to learn the higher education by almost one and a half times. On the other hand, both types of self-handicapping reduce the likelihood of learning in higher education.

In the case of academic secondary school students, the motivation to study increases the probability of further education by more than eight times, and the higher education of the parents by almost six times. The external cause of self-handicapping reduces the intension of learning in higher education.

5. Discussion

The study examined the factors that predict whether a student will apply for higher education or not. Among the predictive factors, we considered learning motivation, self-handicapping, executive functions, secondary school academic achievement (GPA), and mothers' education. In addition, we compared the two types of training from which you can apply for higher education in Hungary, namely academic and vocational secondary school.

Academic secondary school students have a better family background, and mothers have a higher education. Moreover, 20% more students from this type of school want to go on to higher education than those from vocational secondary schools. The results show that academic secondary school students have stronger learning motivation than vocational secondary school students. The advantage of academic secondary school students can also be demonstrated in self-handicapping's internal and external aspects. However, there is no difference between the two school types in EF. Students in academic secondary school are better in their school subject grades, GPA.

These results are consistent with the fact that the two types of schools have different functions since the primary goal of academic secondary school students may be higher education. Vocational secondary school students presumably chose vocational training leading to a secondary school qualification mainly because of a vocational qualification. Few previous Hungarian research have been conducted and compared the two types of

schools. Józsa's [90] previous research also found a significant difference in the learning motivation of academic secondary school and vocational secondary school students in favour of academic secondary school students. One study [81] reported that academic secondary school students have a more robust learning motivation and better self-efficacy. However, she found no significant difference in self-regulated learning between the two school types. The study by [83] also confirmed that academic secondary school students have better self-efficacy. However, another study [82] did not find any difference between the types of schools while examining the development of social competence.

Results show that those who wish to continue their studies in higher education have stronger learning motivation in both school types. This finding is in line with the previous studies, for example, [41] and [42] that describe students' intentions for further studies based on their strong motivation. Therefore, both aspects of self-handicapping are lower for those who intend to continue their education. This finding is consistent with one research [12] that shows self-handicapping can decrease students' intention of learning in higher education. However, it was opposed by one study [15] that averred no relationship between students' self-handicapping and their intention of learning in higher education.

The good functioning of the executive function is essential in learning since the working memory is needed for annotating the course material and solving tasks and problems. On the other hand, for inhibition, students are to be persistent during the learning process and to be able to suppress stimuli that divert them from learning. Therefore, it is an unexpected result that we did not find differences in the components of executive function. Although the types of schools do not, the intention of learning in higher education shows differences in working memory and inhibition. This partly resonates with the fact that components of executive function play a role in successful school performance [91,92].

Academic secondary school students have a significantly better the school achievement (GPA) than vocational secondary school students. This result is not surprising, on the one hand, since students are admitted to secondary school with better academic results in most cases. On the other hand, the primary function of secondary schools is mainly the preparation for higher education. Literature suggests that vocational training can reduce the chances of continuing to higher education [93].

Internal self-handicapping, for example, is associated with a weak belief in one's abilities and a lack of self-confidence in learning, school performance, and success [13,47]. In addition, they also result in poorer school outcomes and negative coping strategies [48]. So, do vocational secondary school students' negative self-image related to their abilities and learning develop during the years spent in vocational training, or is the choice of vocational training the consequence of this?

In the case of both types of schools, the intention of learning in higher education is influenced by the mother's education, learning motivation, and external self-handicapping. In the case of vocational secondary school students, two additional factors, internal self-handicapping and working memory, also have explanatory power. We find it surprising that the academic average does not have significant explanatory power in either of the two regression models. Based on the regression models, it seems that, in addition to the mothers' educational level, learning motivation, executive functions, and working memory, the student's school achievement no longer plays a role in the intention of learning in higher education.

This result clearly draws attention to the role of learning motivation and self-handicapping in the intention of learning in higher education. In order to interpret the results, it is essential to emphasise that we examined the students' intention to continue their education, not their success. The entrance exam will decide whether they get into the university or not. However, those with no intention of learning in higher education will not attend the entrance exam, so they will certainly not be able to enter higher education. Therefore, factors influencing the intention of learning in higher education play a critical role.

6. Limitations

Despite the direct application of this study's results in education, the research had some limitations. First, the study has just one data collection point, used self-reporting questionnaires. Future studies can adopt longitudinal design from secondary school to university to confirm if secondary school students' intention was actualised. Complementary reporting can also be provided from teachers' and parents' reporting. Second, the convenience sample from our study cannot be considered representative of Hungary, which limits the generalizability of the results. Lastly, to acquire the exact information about students' intention of learning in higher education, we used one item with a 'Yes-No' question as an independent variable of this study. Although this survey methodology has such kinds of limitations, this is highly acknowledged due to its appropriateness of collecting data such as the intentions of learning in higher education. For example, this survey method is the best way to collect the data/information from the item, "I want to continue studying because of the higher pay."

For the future research, some other factors such as students' performance goals to achievement, eudemonic well-being, students' cognitive learning strategies, students' self-esteem and teachers' encouragement can also be used as predictors for students' intention for further studies. Additionally, structural models (for the inter-relations between the variables) and other standard prediction models (for making the prediction of different variables) can also be used in the analysis session.

7. Conclusions

This study found that students with high learning motivation had the weak self-handicapping and a higher intention of learning in higher education. In addition, students with higher working memories had a higher intention for higher education studies. Although students from both academic and vocational secondary schools had high academic achievement (GPA), it was not the main predictor of the intention of learning in higher education. To discover the relationships between variables of learning motivation, mothers' education, and school achievement, it was also ascertained that students with stronger learning motivation and parents with higher education had greater achievement in school academic performance. This study searched for predictors of the intention of learning in higher education and proved that such predictors as higher learning motivation, less self-handicapping, and parents with higher education could increase students' intention to learn. Therefore, this study lets educators know what predictors influence Hungarian students' intentions of learning in higher education. Based on this knowledge from our research, teachers can find ways to encourage their students' intentions of learning in higher education.

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