Working Paper No. 215

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The Swiss Leading House on Economics of Education, Firm Behavior and Training Policies is a Research Program of the Swiss State Secretariat for Education, Research, and Innovation (SERI).

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Abstract

We examine the association between the personality trait grit and post-compulsory educational choices and trajectories using a large survey linked to administrative student register data. Exploiting cross sectional variation in students' self-reported grit in the last year of compulsory school, we find that an increase in students' grit is associated with a higher likelihood to start a vocational education instead of a general education. This association is robust to the inclusion of cognitive skill measures and a comprehensive set of other students' background characteristics. Moreover, using novel data on skill requirements of around 240 vocational training occupations, we find that grittier vocational education students sort into math-intensive training occupations. Similarly, students in general education with more grit select themselves more often into the math-intensive track. Finally, we do not find evidence that students with a higher grit have lower dropout rates in post-compulsory education.

Keywords: Non-cognitive skills, Personality traits, Grit, Educational choices
JEL Classification: D01, I20

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*The authors thank the Federal Statistical Office and the survey institute GfS for the generous provision of the data. Maurizio Strazzeri is grateful to the Swiss State Secretariat for Education, Research and Innovation for financial support through the Leading House ECON-VPET while working at the University of Bern.

1 Introduction

For well over three decades, it has been empirically well documented that so-called non-cognitive skills or personality traits have contributed a great deal to the understanding of individual success or failure in the education system (see, e.g., Koch et al., 2015) and in the labour market (see, e.g., Heckman et al., 2006, and for a recent overview Cabus et al., 2021). Even if causal relationships are not always easy to establish, the correlations between non-cognitive skills and various outcomes show that individual decisions and results can be better explained and understood if non-cognitive skills are taken into account in addition to measurements of cognitive skills. However, as with cognitive skills, there is no single measure for personality traits and non-cognitive skills and a wide variety of concepts are proposed and empirically tested in the literature. The variants of non-cognitive skills are so numerous that they can practically only ever be used individually or in combination with a few other characteristics. This paper is no exception in this respect. In this study, we use the concept of "grit", which was introduced by Angela Duckworth (see, e.g., Duckworth et al., 2007) and is intended to map two dimensions of personality traits, namely consistency of interest, sometimes also called passion, and perseverance, which has a certain overlap with the trait of conscientiousness, which is important for self-regulation and is covered, for example, as one of the five personality traits of the big five (see, e.g., Volz and Masicampo, 2021).

The choice of the concept of grit was motivated by the fact that there are now several empirical studies showing that grit is a good predictor of academic achievement (for an overview, see Christopoulou et al., 2018), that higher grit leads to fewer school dropouts (Eskreis-Winkler et al., 2014), correlates with higher grades (Duckworth et al., 2007; Akos and Kretchmar, 2017) and less frequent changes of majors (Akos and Kretchmar, 2017). However, not all studies on the importance of grit in educational decisions and success reach the same conclusions. Some studies have criticized the concept of grit for several reasons (for an overview, see Credé et al., 2017). For example, not all studies find a correlation between grit and academic performance (see, e.g., Bazelais et al., 2016), or its additional explanatory power is low compared to other personality traits (e.g. conscientiousness from

the Big Five traits) (Rimfeld et al., 2016; Steinmayr et al., 2018). This has also led to questioning the use of grit as a higher-order construct/higher-order structure, as both subcomponents (persistence of effort and consistency of interest) are not always equally relevant or the relevance of the two components differs depending on the outcome (Bowman et al., 2015; Karlen et al., 2019; Wolters and Hussain, 2015).

In this paper, we examine the association between grit and students' post-compulsory educational choices and trajectories using data from a large survey linked to longitudinal student register data of students in Switzerland. Exploiting cross-sectional variation in students' self reported grit (8-item grit scale, see Duckworth and Quinn, 2009) in the last year of compulsory school, we find that students with higher levels of grit are found more often in vocational training programs after compulsory schooling than in general education and that in this respect it is only the subcomponent of perseverance of effort that is significantly related to this difference. Furthermore we find, that in both strands of post-compulsory education, general and vocational, students with higher grit are more likely to be found in study courses and occupations with higher demands on mathematical skills. While in the case of general education both subcomponents of grit are related to math-intensive majors, in the case of vocational education and training, it is only the consistency of interest sub-component that is related to math-intensive training occupations.

Our contribution to the existing literature is threefold: First, we examine the explanatory power of the concept of grit not only for educational success, but also for educational choices and preferences in an educational system, Switzerland, that is less homogeneous at the upper secondary level and allows for significantly more educational options and types than, for example, in the USA or other countries with a dominant system of general education. To the best of our knowledge, the importance of grit in the choice of type of education has never been demonstrated in the way we have studied, in an education system that has both a strong vocational orientation, with 2/3 of young people choosing vocational education as their first education, as well as a strong academic track. Secondly, the population we have analyzed is a cross-section of the whole population and not, as in many studies, only selected groups such as e.g. college students. Finally, the empirical analysis is based not only on a large representative survey of more than 2,000 students, but

also on linking this survey data with administrative data on education, which allows us to follow the educational trajectories of the population without data attrition.

The rest of the paper is structured as follows: In Section 2 we briefly describe the institutional setting, the Swiss education system, in which we analyze the choices and educational trajectories of adolescents. In Section 3 we describe the data, in Section 4 the empirical strategy and Section 5 shows the empirical results, followed by our conclusions in Section 6.

2 Swiss education system

In the Swiss education system, students sort after compulsory schooling (K+9) either into a vocational track or continue with a general education. Around two thirds of school-leavers opt for the vocational track, whereas the remaining third follows general education leading either to an university entrance diploma (the academic baccalaureate) or a specialized baccalaureate giving access to universities of applied sciences or universities of teacher education. The decision to pursue vocational training or general education depends to a large extent on the grade point average of the last compulsory school report, but only pupils at the bottom of the ability distribution have no real choice. Students in the middle of the ability distribution and at the upper end have a choice and as a result there is also quite a large overlap in academic performance between those students who choose general education and those who prefer vocational education (Wolter et al., 2018). The general education options lead to a baccalaureate certificate, which grants practically free access to university, while the vocational options offer the possibility of a vocational baccalaureate, which opens up direct access to universities of applied sciences and, with an additional year of training, access to academic universities. The permeability of the system is therefore a prerequisite for ensuring that decisions at the end of compulsory schooling are not made solely on the basis of school grades, but that preferences also play a role.

Students going into the vocational track can choose of more than 240 different occupations to train for. While some some programs are fully school-based, the majority of VET programs (around ninety percent) are completed in a dual training system where students

study 1-2 days in a week in a vocational school and work 3-4 days in the training company. Many of these company based programs are highly competitive as in contrast to most academic programs, admission is not only based on school academic records or an academic entry test, but on a multidimensional selection process by which training companies select and recruit their students from a pool of applicants.

Students who opt for the general education (the academic baccalaureate schools) can choose between seven different specializations. Two of these are in STEM subjects (maths & physics; chemistry & biology), two in languages, one in economics and law, one in the arts and finally one in psychology, education and philosophy. Although the baccalaureate certificate at the end of upper secondary level grants universal access to universities and study subjects (with the exception of medicine at certain universities), the choice of specialization is usually a decision with far-reaching consequences, because in practice these specializations prepare students for university subjects to varying degrees and can therefore limit their later choice of subject at university.

3 Data

Our analysis uses data from the annual "Nahtstellenbarometer" survey. This survey is administered by the Swiss State Secretariat for Education, Research and Innovation and gathers information from Swiss students in their last year of compulsory school through two interviews conducted in March (i.e., shortly before the end of the school year) and August (i.e., when students enter upper-secondary school). We focus specifically on the 2020 March wave, which includes data on students' grit. Our sample consists of 2 479 students who completed compulsory school in 2020.[1]

We merge our survey data with longitudinal student register data (up to 2022), which provides annual information on students' education status, including education type, school track, and grades. This data allows us to determine if students choose general or vocational

[1]We piloted the grit measure in the previous year of the survey, using the August wave. Since there are legitimate concerns that the individual grit is malleable and can change over time (see Hoeschler et al., 2018), it could also be that the grit measure is not stable in the transition phase from compulsory to post-compulsory education. However, we do not find any statistically significant differences between the measurement times, nor do we find any differences between groups of people with higher or lower grit levels between the two survey times.

education after compulsory school, and for those pursuing a baccalaureate school within the general education track, their chosen major is also recorded. Similarly, vocational education students' chosen training occupation is included in the data.

We use the student register data to create three outcome variables. First, we generate a categorical variable indicating whether a student (a) enters a vocational education track (combined firm and school-based training), (b) enters a general education track, or (c) does not directly transition to the upper-secondary level in the year after compulsory school. Second, we create variables that measure the math content in upper secondary school. To assess the math content of the vocational education track, we utilize information from the official expert rating of cognitive requirements of vocational education programs for Switzerland, which provides skill requirement measures for math, natural sciences, foreign languages and school language.[2] The skill requirements are measured on a scale of 0-100. To assess the math content of the general education track, we focus on students who enter baccalaureate school, and generate a binary variable that indicates whether a student chooses a math-intensive major. Third, we create a variable that indicates whether a student dropouts early of upper secondary school. Specifically, we generate a binary variable that indicates if a student proceeds to the second year of upper secondary school. Students can, of course, still experience failure later but in most education programs the performance during the first year is crucial. Therefore, a successful transition from the first to the second year of an education program is an important sign of a good match between the requirements of the chosen education and a student's competences.

Our main variable of interest is grit—a compound personality trait that measures stamina in the dimensions of interest and effort (Duckworth et al., 2007). Students' grit is measured using the short grit scale (Grit-S) developed by Duckworth and Quinn (2009). Grit-S consists of eight questions, with four questions assessing students' consistency of interest (CI) and four questions assessing students' perseverance of effort. Participants rate their responses on a Likert scale ranging from 1 (very much like me) to 5 (not at all like me). To calculate students' overall grit score, we follow previous literature and take the average of

[2]See: www.anforderungsprofile.ch. This website is administrated by the Swiss Trade Association and the Swiss Conference of Cantonal Ministers of Education and partially financed by the Swiss Secretariat for Education, Research, and Innovation.

their responses across all eight questions.

We include several control variables in our analysis. These control variables are gender, age, located in an urban area, language region, foreign born, language spoken at home, parental education, track in the last year of compulsory school, and students' grades in math and language. Summary statistics of the variables used in this paper are shown in Table 1.

4 Empirical strategy

To determine the effect of grit on students' educational choices and trajectories, we estimate the following model:

$$y_i = \alpha + \beta_0 \times Grit_i + \sum_{j=1}^{N_1} \beta_{1j} \times x_{1ji} + \sum_{k=1}^{N_2} \beta_{2k} \times x_{2ki} + \epsilon_i \tag{1}$$

where y_i is the education outcome of student i which is either educational track at upper secondary school, the math-intensity of the educational program in vocational and general education or dropout during the first year of upper secondary school. $Grit_i$ denotes student i's grit score, x_{1ji} denotes one of N_1 student-specific background characteristics (gender, age, located in urban area, language region, foreign born, language spoken at home, parental education), and x_{2ki} denotes one of N_2 student-specific cognitive skill measures (grades in mathematics and language as well as track in lower secondary school).

The key parameter of interest, β_0, is identified through variation of students' grit score across students in the sample. Hence, we assume that, conditional on the other variables included in our model, there are no other factors that are correlated with students' grit and the outcome variable in Equation 1 (omitted variable bias). While this assumption cannot be tested, it should be noted that we control for a rich set of student background characteristics such as gender, age, and parental education, that are likely correlated with students' grit as well as students' educational choices and trajectories.

Additionally, as students' character and cognitive skills have been shown to be correlated (see, e.g., Bowles et al., 2001), we also add measures of cognitive skills to our estimation equation. However, control variables that are outcomes of students' grit can induce

additional bias to our estimate of β_0 (see, e.g., Cinelli et al., 2022). Again, this assumption cannot be tested but as previous literature suggests that non-cognitive skills might indeed have the potential to foster the promotion of cognitive skills (Cunha and Heckman, 2008), bias due to the inclusion of cognitive skill measures might be a concern in our setting. To assess such a potential bias, we report our baseline result both with and without the inclusion of the cognitive skill measures.

5 Results

Table 2 reports estimates of Equation 1 using students' post-compulsory educational track as outcome variable. We model the probability to select into a particular post-compulsory school track based on a multinomial probit model. Each column reports separate estimates using as outcome variable a variable that can take on three different values for vocational education, general education, or no transition to post-compulsory education. Columns 1-2 of Table 2 report estimated average marginal effects of students' overall grit score, column 3 reports estimated average marginal effects of students' grit subcomponent consistency of interest (CI), and column 4 reports estimated average marginal effects of students' grit subcomponent perseverance of effort (PE).

Table 2 provides clear evidence that students' overall grit in the last year of compulsory school is associated with the type of post-compulsory education they start subsequently. Our estimates in column 1 of Table 2, which are based on a model that does not include cognitive skill measures, show that an increase in students' grit score by one increases the probability to select vocational education by 8.7 percentage points. This increase in the likelihood to start vocational education is driven by an equally-sized drop in the likelihood to start general education or to not start post-compulsory education at all.

In column 2 of Table 2, we add the set of cognitive skill measures to the estimation equation. Conditional on these additional control variables, the association between grit and entering vocational education after compulsory school becomes even stronger. However, in contrast to the results reported in column 1, this increase is mainly driven by a reduction of the likelihood to enter general education. As explained above, the assumption whether

our cognitive skill measures are affected by grit and therefor biasing our estimates of β_0 cannot be easily tested in our setting. However, as our estimation results do not change in direction, we conclude that concerns because of "bad controls" (Angrist and Pischke, 2009) are of minor importance and report all remaining results with both sets of control variables.[3]

Estimation results reported in columns 3-4 of Table 2 show that the effect of grit depends highly on the grit subcomponent used in the analysis. While there is no association between consistency of interest, i.e. passion, and post-compulsory track choice, we find that perseverance of effort, i.e. hard work, explains the observed correlation between grit and the likelihood of entering vocational education. This result can be rationalized by the highly competitive selection process in the dual vocational education training system, where effort arguably outweighs passion.

Table 3 reports estimation results of a variable indicating the math-intensity of the selected post-compulsory education track on students' grit. Columns 1-3 show least squares estimates for the restricted sample of vocational education students using the official expert rating of cognitive requirements of vocational education programs for the subject math as an outcome variable. Columns 4-6 show average marginal effects of probit estimates for the restricted sample of baccalaureate school students using a binary variable indicating whether a student chooses a math-intensive major as outcome variable.

Table 3 makes clear that there is a significant association between students' grit and the math intensity of the educational track. Column 1 of 3 shows that an one-unit increase of students' grit score increases the expert rating of the math content of the vocational training occupation by 2.131. Interestingly, as shown in columns 2-3, consistency of interest instead of perseverance of effort is driving the positive correlation between the math-intensity and grit. We find a qualitatively similar result for students selecting into a baccalaureate school, where a one-unit increase of student grit score increases the likelihood to choose a math intensive major by 9.1 percentage points. However, here both grit subcomponents appear to be equally important.

The relationship between higher grit and math-intensive educational programs is a

[3]We replicated all estimation results of our paper without the cognitive skill measures and the interpretation of our results remains qualitatively the same.

finding that is similar to the finding that individuals with a higher propensity to compete are more likely to find themselves in math-intensive programs (see Buser et al., 2022). However, there are three findings that indicate that grit and competitiveness should nevertheless be treated as different personality traits. Firstly, Buser and Oosterbeek (2023) show that there is only a weak correlation between grit and competitiveness. In their study, they differentiate between four different dimensions in the competitiveness measure and empirically only find a significant positive correlation with grit for just one sub-dimension of competitiveness, namely the dimension of "challenge seeking."

Secondly, the analyses of the influence of competitiveness on the choice of maths-intensive programs (see also Buser et al., 2017) show that the gender gap can be explained to a non-negligible extent by differences in competitiveness between women and men. However, this is not the case for grit. In Table 4, we report estimates of the gender gap in math-intensive study choices with and without adjusting for students' grit. Table 4 shows that the gender gap in the choice of maths-intensive programs remains high after taking grit into account, which was to be expected, as women and men in our sample do not differ significantly in their grit. Similar to competitiveness, a higher grit indicates a higher probability of choosing a maths-intensive program, but grit does not explain why this program is chosen more often by men.

Thirdly, competitiveness only shows a higher probability of choosing a general education pathway for certain subgroups (women with average academic performance), but for the entire population there is practically no correlation between higher competitiveness and the choice of a vocational or general education pathway (see Buser et al., 2022). For grit, on the other hand, we find a very strong correlation for both genders between a higher grit measure and the likelihood of choosing the vocational training route.[4] It is precisely these differences that indicate that, despite overlaps, competitiveness and grit should be regarded as different personality measures.

Table 5 reports estimates of a binary variable indicating if a student does not continue in the post-compulsory education program he or she had initially chosen after the first year of the program. We report these estimates for the entire sample of students who continue

[4]Estimation results are available upon request.

their education in upper-secondary school (column 1) and restricted samples by type of education (vocational education and general education, columns 2-3). Table 5 indicates that grit is not associated with a higher risk of dropping out of post-compulsory education in the short term as our estimated coefficients are close to zero and not statistically significant.

6 Conclusions

In this paper, we investigate whether individual differences in the personality trait "grit" are associated with different educational trajectories. We can draw on a large national sample of adolescents whose grit was assessed before the end of compulsory schooling. By being able to link this measure and other information on these young people with the administrative data from the national education statistics, we can observe the decisions of the young people and their progression in the first post-compulsory school year without any attrition of data. The results show that grit correlates very strongly with the choice of a vocational program as opposed to a choice of a general education program and that in both types of education system, individuals with higher grit are more likely to be found in math-intensive occupations or education programs. While this second finding reflects a pattern that can also be found for individuals with a higher propensity to compete, we conclude that these are two different personality traits, as the gender gap in the choice of maths-intensive programs can be partially explained by the measure of competitiveness, but not by individual differences in grit.

However, the analyses in which the two dimensions of grit, consistency of interest and perseverance, are considered individually show that the overall measure of grit is not always the best specification of the personality trait. The selection of vocational training vs. general education only correlates with the grit component of perseverance, and while the correlation of mathematics-intensive programs in general education correlates with both dimensions of grit, this is only the case for the dimension of consistency of interest in mathematics-intensive occupations.

Grit may therefore be a measure of personality traits that provides additional insight into the preferences and educational choices of individuals, but it is not always clear from

the outset whether the composite measure of grit is the best description of these personality traits.

Finally, in contrast to other studies, we find no correlation between educational success and grit, at least in the short term, but in an education system in which young people are selected or select themselves into very different types of education at an early age. This may therefore also have to do with the fact that this selection is already very strongly influenced by differences in grit. In very homogeneous education systems, on the other hand, where the same or at least very similar demands are placed on young people, it is quite conceivable that success and failure correlate more with individual differences in grit.

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Table 1:
Summary statistics

	Mean	SD	Min	Max
Outcome variables				
Educational choice				
VE track	0.41	0.49	0	1
GE track	0.42	0.49	0	1
No track	0.17	0.38	0	1
Math-intensity of chosen track				
VE track	48.06	16.42	11.78	81.8
GE track	0.48	0.50	0	1
Passed first year of upper-secondary school	0.85	0.35	0	1
Student characteristics				
Grit	3.51	0.47	1.13	5
Female	0.50	0.50	0	1
Age	14.67	0.63	14	16
Municipality type				
Urban	0.60	0.49	0	1
Intermediary	0.22	0.41	0	1
Rural	0.18	0.39	0	1
Parental education				
No college education	0.50	0.50	0	1
Father has college education	0.14	0.34	0	1
Mother has college education	0.11	0.31	0	1
Both have college education	0.19	0.39	0	1
Do not know	0.07	0.26	0	1
Migration background				
Foreign nationality and speaks foreign language at home	0.13	0.34	0	1
Foreign born	0.14	0.35	0	1
Track in lower-secondary school				
Low-track	0.24	0.43	0	1
High-track	0.69	0.46	0	1
Mixed	0.07	0.25	0	1
Grades				
Math (from 1=very poor to 4=pass to 6=excellent)	4.82	0.68	3	6
Language (from 1=very poor to 4=pass to 6=excellent)	4.91	0.55	3	6

Note: Summary statistics of student background characteristics and outcome varibles. Number of observations: 2 479. Number of observations for *Math-intensity of chosen track*: 949 (VE track) and 880 (GE track). Number of observations for *Passed first year of upper-secondary school*: 2,057.

Table 2:
Effect of grit on students' educational choices

	Grit score		CI	PE
	(1)	(2)	(3)	(4)
Educational choice				
Vocational education	0.087***	0.097***	0.020	0.121***
	(0.020)	(0.020)	(0.014)	(0.017)
General education	-0.042**	-0.074***	-0.010	-0.100***
	(0.018)	(0.017)	(0.012)	(0.014)
No transition	-0.045***	-0.023	-0.009	-0.021
	(0.16)	(0.015)	(0.010)	(0.013)
Controls 1	Yes	Yes	Yes	Yes
Controls 2	No	Yes	Yes	Yes
Observations	2,479	2,479	2,479	2,479

Note: Results of multinomial probit regressions (marginal effects) using as dependent variable an indicator variable indicating if a student entered a vocational education, general education, or no track immediately after compulsory school on students' grit score (values 1-5, columns 1-2), consistency of interest (values 1-5, column 3), and perseverance of effort (values 1-5, column 4). Sample consists of students in the last year of compulsory school. Control variables: gender, age, located in urban area, language region, foreign born, language spoken at home, parental education (controls 1), track in compulsory school, math and language grade (controls 2). Heteroskedasticity-consistent standard errors reported in parentheses. Significance levels: * p <0.1, ** p <0.05, *** p <0.01.

Table 3:
Effect of grit on math-intensity of study choice

	Math requirement in VE			Math-intensive major in GE		
	(1)	(2)	(3)	(4)	(5)	(6)
Grit score	2.131**			0.091**		
	(1.033)			(0.037)		
Consistency of interest		2.172***			0.051**	
		(0.716)			(0.026)	
Perseverance of effort			-0.391			0.066**
			(0.959)			(0.032)
Controls 1	Yes	Yes	Yes	Yes	Yes	Yes
Controls 2	Yes	Yes	Yes	Yes	Yes	Yes
Observations	949	949	949	880	880	880

Note: Results of ordinary least squares regressions using as dependent variable the math requirement of a vocational education (VE) student's training occupation (values 0-100, columns 1-3) or results of probit regressions (marginal effects) using as dependent variable a binary variable indicating if a general education (GE) student selected a math-intensive major (columns 4-6) on students' overall grit score (values 1-5, columns 1 and 4), consistency of interest (values 1-5, columns 2 and 5), or perseverance of effort (values 1-5, columns 3 and 6). Sample consists of students who entered the vocational education track (columns 1-3) or baccalaureate school of the general education track (columns 4-6). Control variables: gender, age, located in urban area, language region, foreign born, language spoken at home, parental education (controls 1), track in compulsory school, math and language grade (controls 2). Heteroskedasticity-consistent standard errors reported in parentheses. Significance levels: * p <0.1, ** p <0.05, *** p <0.01.

Table 4:
Effect of grit on math-intensity of study choice, gender gap

	Math requirement in VE		Math-intensive major in GE	
	(1)	(2)	(3)	(4)
Female	-14.998***	-15.226***	-0.234***	-0.238***
	(1.067)	(1.071)	(0.037)	(0.037)
Grit		2.131**		0.091**
		(1.033)		(0.037)
Controls 1	Yes	Yes	Yes	Yes
Controls 2	Yes	Yes	Yes	Yes
Observation	949	949	880	880

Note: Results of ordinary least squares regressions using as dependent variable the math requirement of a vocational education (VE) student's training occupation (values 0-100, columns 1-2) or results of probit regressions (marginal effects) using as dependent variable a binary variable indicating if a general education (GE) student selected a math-intensive major (columns 3-4) on students' gender (binary) and students' overall grit score (values 1-5). Sample consists of students who entered the vocational education track (columns 1-2) or baccalaureate school of the general education track (columns 3-4). Control variables: gender, age, located in urban area, language region, foreign born, language spoken at home, parental education (controls 1), track in compulsory school, math and language grade (controls 2). Heteroskedasticity-consistent standard errors reported in parentheses. Significance levels: * p <0.1, ** p <0.05, *** p <0.01.

Table 5:
Effect of grit on probability to continue the initial post-compulsory education

	Any program (1)	VE program (2)	GE program (3)
Grit score	0.005	0.008	-0.012
	(0.017)	(0.023)	(0.023)
Controls 1	Yes	Yes	Yes
Controls 2	Yes	Yes	Yes
Observations	2,057	1,014	1,043

Note: Results of probit regressions (marginal effects) using as dependent variable a binary variable indicating if a student continues his or her initial educational program after one year after compulsory school on students' overall grit score (values 1-5). Sample consists of students who either entered the general education (GE) or vocational education (VE) track (column 1), vocational education track (column 2), or general education track (column 3). Control variables: gender, age, located in urban area, language region, foreign born, language spoken at home, parental education (controls 1), track in compulsory school, math and language grade (controls 2). Heteroskedasticity-consistent standard errors reported in parentheses. Significance levels: * p <0.1, ** p <0.05, *** p <0.01.