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Katharina Jaik and Stefan C. Wolter

Universität Zürich
IBW – Institut für Betriebswirtschaftslehre

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Lost in Transition

The Influence of Locus of Control on Delaying Educational Decisions*

Katharina Jaik[1] & Stefan C. Wolter[2]

[1]*University of Zurich (Chair of Empirical Research in Business, Industrial Relations and HRM)*

[2]*University of Bern (Centre for Research in Economics of Education), CESifo & IZA*

Abstract

The transition from compulsory schooling to upper-secondary education is a crucial and frequently difficult step in the educational career of young people. In this study, we analyze the impact of one non-cognitive skill, locus of control, on the intention and the decision to delay the transition into post-compulsory education in Switzerland. We find that locus of control, measured at ages 13–14, has a significant impact on the intention to delay the transition into upper-secondary education. Furthermore, we find that the intention to delay the transition is strongly correlated with the actual delay, measured one and a half years after the intention. Finally, students with the initial intention to delay but successfully continuing into upper-secondary education show a stronger internal locus of control than comparable students who do delay their transition.

Keywords: Locus of control, school-to-school transition, school-to-work transition

JEL-Codes: I21, J24

Communicating author: Stefan C. Wolter, University of Bern, Schanzeneckstrasse 1, P.O. Box, CH-3001 Berne, stefan.wolter@vwi.unibe.ch

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1. Introduction

We can observe in almost all industrialized countries that the absolute, compulsory minimum of education is not sufficient anymore to guarantee individuals sustainable success on the labor market. People who fail to complete upper-secondary education show higher levels of unemployment, higher levels of dependency on social assistance and benefits, and have more negative outcomes compared to people who have finished at least an upper-secondary education program. Despite this, on average, a fifth of the student population in the OECD countries (OECD 2015) does not succeed to complete post-compulsory education at the upper-secondary level. In many cases, those young people are drop-outs from upper-secondary level programs, but, in other cases, youths who delayed the transition into upper-secondary education for various reasons have never started or completed a post-compulsory program.

In this study, we focus on students who delay their transition into upper-secondary education. In particular, the purpose of this study is to find out what role non-cognitive skills play in this transition phase. Although most of the students in Switzerland who delay their decision to continue their education will in the end complete an upper-secondary education, the motivation for this study are previous research findings that have shown that delaying the transition either increases the risk of non-completion or, in the case of completion, does not result in gains in terms of a better type or quality of upper-secondary education (see, e.g., Mueller 2016, Sacchi & Meyer 2016, Buhr & Mueller 2008). In the latter case, the delay causes additional non-productive years, which result in high and potentially avoidable individual and societal costs.

A growing body of literature shows that educational decisions leading to more or less individual investments in human capital depend not only on cognitive abilities but also on non-cognitive skills (e.g., Cunha & Heckman, 2007). What makes these non-cognitive skills valuable for educational policymakers is the observation that many of these skills are malleable and that, therefore, educational interventions can and should target them as much as cognitive skills (Heckman, Stixrud & Urzua, 2006). However, the issue of which of these non-cognitive skills should be targeted in relation to which educational objective remains largely underexplored (Borghans et al. 2008).

One potential non-cognitive skill in the context of our research question is “locus of control”. Over the last 15 years many studies have shown the importance of locus of control for outcomes in different areas, such as educational and labor market outcomes (e.g.,

Coleman & DeLeire, 2003; Cebi, 2007; Barón & Cobb-Clark, 2010), job search strategies (McGee, 2015; Caliendo et al., 2015), and students' subject and schooling choices (Mendolia & Walker, 2014; Piatek & Pinger, 2015). Common to all of these studies is that having an internal locus of control leads to positive outcomes in many different areas of life.

The psychological concept of locus of control describes how human beings interpret life events as being dependent on either their own actions or external factors (Rotter, 1966). Rotter argues that those with an internal locus of control believe that a causal relationship exists between their actions and the resulting outcomes; those with an external locus of control believe that they have hardly any control over what happens to them (Rotter, 1966).

This study contributes to the growing body of literature on school-to-school or school-to-work-transitions and on locus of control by concentrating on decisions prior to educational attainment and labor market outcomes. We show how locus of control influences the outcome through the educational intentions that the students develop towards the end of compulsory schooling.

We find that for students, locus of control – controlling for both cognitive skills and individual socio-economic and socio-demographic background – has a statistically significant impact on both their educational intentions and decisions. First, having an internal locus of control correlates negatively with the intention to delay an upper-secondary education. These intentions, in turn, then correlate significantly and positively with the students' final decisions to delay the transition into upper-secondary education. Second, in the group of students who wanted to delay their choice in the first survey, a stronger internal locus of control has a positive and significant effect on ultimately not delaying the transition.

The remainder of the paper is structured as follows: Section 2 gives background information on the educational context and school system in which our analyses takes place. Section 3 introduces the theoretical and empirical concept of locus of control and the relevant empirical literature. Section 4 describes the study design and the data. Section 5 presents our empirical results, and Section 6 concludes.

2. Educational decisions at the end of compulsory schooling

In this paper, we study the influence of locus of control on educational decisions that students have to make towards the end of compulsory schooling (9th grade). We do so in two steps. In the first step, we analyze the influence of locus of control with respect to students' intentions towards the impending decision. In the second step, we investigate the impact of locus of control and students' intentions towards their educational decision.

In general, students in Switzerland have the choice between applying for vocational and academic upper-secondary education at the end of the 8th grade and during the 9th grade.[1] About 70% of Swiss students in each cohort choose a vocational education, and 90% of this group starts a dual apprenticeship, which requires them to find an employer willing to offer them a training position. These students and their parents [2] typically sign apprenticeship contracts with their employers (Mueller & Wolter, 2014) in the second half of the 8th grade or the first half of the 9th grade.

Another 25% of a cohort continues upper-secondary education in general full-time schooling, with most studying at an academically oriented baccalaureate school. The remaining 5% do not start any upper-secondary education and delay their educational decision.

While the number of students completing upper-secondary education in Switzerland is very high in comparison to other OECD countries, not all students transition smoothly into upper-secondary education and pass through it in the minimum time required. In the part of Switzerland where our data was sampled, every year more than a fifth of those students who left school delay their transition into upper-secondary education. Most of them choose an interim solution, such as a 10th grade (an additional year of lower-secondary school), do a preparatory internship for an apprenticeship or take language courses. A minority starts working and delays upper-secondary education to a later stage.

A delay of the transition into upper-secondary education is often defended on the ground of claims that it leads to a better preparation for an upper-secondary education, an improvement of the match of the educational choice, and therefore better chances to successfully complete the post-compulsory education and to find a more stable and better remunerated job afterwards. If that were the case, the public and private costs of delaying

[1] For detailed information about the Swiss education system, see SCCRE (2014).
[2] Parents have to sign these contracts on behalf of their children, because students are typically under age when they apply for apprenticeship places.

the educational transition would potentially be justified. However, recent evaluations of the outcomes of delaying the transition have shown that students who choose educational interim solutions (e.g., 10th grade) before entering a certifying upper-secondary education do not show better outcomes than comparable students who enter post-compulsory education without delay (see Mueller 2016 or Sacchi & Meyer 2016).

3. Related Literature on Locus of Control

The original psychological concept of locus of control, which dates back to Rotter (1966), has been used in psychology for decades. Locus of control refers to the way in which people frame causality: Those with an internal locus of control believe that a causal relationship exists between their actions and the resulting outcomes; those with an external locus of control believe that they have little or no control over what happens to them.

The concept of locus of control first interested economists in the 1970s. Andrisani (1977) tested the impact of locus of control on different labor market outcomes, finding positive effects of an internal locus of control on earnings and occupational attainment.

Since the 2000s, locus of control has returned to the attention of economists, primarily because it enables them to better explain a number of economic outcomes. Studies concentrating on locus of control as an important non-cognitive skill, such as Barón & Cobb-Clark (2010), Coleman & DeLeire (2003), Cebi (2007)[3] or Heckman et al. (2006), all find positive effects of an internal locus of control on different educational and labor market outcomes. Cobb-Clark et al. (2014, 2016) also report positive effects on other outcomes, such as savings and health behavior.

While most of these studies concentrate primarily on the impact of locus of control on different economic outcomes, two other strands of research, focusing on decision-making, are more closely related to the questions we pose in our study. The first strand of this literature analyzes, among other outcome variables, the impact of locus of control on educational decisions. Piatek and Pinger (2015), using data from the German Socio-Economic Panel (GSOEP), find that the students' decision to obtain higher education is significantly and largely positively influenced by locus of control. However, they do not find a direct effect on wages. Mendolia and Walkers' (2014) study of 15-year-old students

[3] However, in contrast to Coleman & DeLeire (2003), Cebi (2007) finds a positive and significant effect of locus of control on wages, but not on educational outcomes, when she controls for cognitive ability.

in the UK shows that a student's external locus of control negatively influences two decisions: that of taking A-level exams (the university entrance qualification in the UK) and that of choosing more demanding subjects in school (e.g., math and science). They conclude that students having an external locus of control do not believe that their choices influence future outcomes.

The second strand of this literature shows that an internal locus of control is associated with a more active strategy in looking for a new job (McGee 2015, and Caliendo et al. 2015). This finding is particularly relevant for our study for two reasons: First, because the transition to upper-secondary education is not automatic and students have to look actively for a solution, either a program of general education or a vocational education. Second, because the majority of school leavers will apply for an apprenticeship position in Switzerland, the transition into upper-secondary education is similar to applying for a job.

Combining those two strands of the literature and transferring them to our educational context, we expect the following: First, as non-cognitive skills typically influence intentions more strongly than decisions (Aijzen 1991), we expect that locus of control in particular has an impact on educational intentions. Second, having a stronger internal locus of control should increase the likelihood of students choosing not to delay their transition to upper-secondary education after compulsory schooling.

4. Data

4.1. Data collection

In 2013 and 2015, we collected our panel-dataset in the Canton of Bern, the second largest Swiss canton. We surveyed the students at two points: at the beginning of the 8th grade and at the end of the 9th grade. First, at the beginning of their school year (August/September 2013), we surveyed 1514 8th graders[4] with a computer-based questionnaire, asking them about their intentions for upper-secondary education. We also collected information on non-cognitive skills, cognitive skills (school grades and ability track), and student background information (e.g., parents' education and family background).

[4] This represents about 17% of the students enrolled in 8th grade in the German-speaking part of the Canton of Bern at the time of the survey. The schools sampled for this study cover the whole Canton; urban as well as rural areas.

For the sampling of the data, we contacted every school in the German-speaking part of the Canton of Bern. Twenty-eight of these schools (approximately 10%) stated an interest in taking part in the survey. Most of these schools had two or more classes of 8th graders. Ultimately, this allowed us to survey 87 classes. We administered the survey during a normal school lesson, which guaranteed that we could minimize the risk of sample selection. Descriptive statistics are presented in the Appendix in Table A1.

At the end of the 9th grade, we surveyed the students again, asking them about their realized choices. For this second survey, we were able to reach most of the students through their schools, but some of them had already changed classes or schools or even left the canton or country and therefore had to be contacted individually. In the end, we realized an attrition rate of less than 5% and were able to get panel data for 1446 students.[5]

4.2. Outcome variables: Educational intentions and decisions

To analyze the decision-making process of students in their transition from compulsory to upper-secondary education, we construct two outcome variables: first whether students intend at the beginning of the 8th grade (in 2013) to delay their transition to upper-secondary education one and a half years later and second whether they ultimately delay their transition to upper-secondary education in 2015. The survey shows that at the beginning of the 8th grade, 26.22% of the students already had the intention to delay their transition – long before having tried to find an educational program at the upper-secondary level. In the second survey, we find that around 20% of the students actually delay their transition. This decrease of around 6 percentage points is not only a result of those students who initially planned to delay their transition but ultimately started upper-secondary education, there are also a number of students who planned to immediately start upper-secondary education, but then delay their transition. Therefore, we additionally analyze the realized choices separately for those students with the intention to delay and those with the intention to immediately start upper-secondary education.

4.3. Locus of Control

Our main variable of interest is locus of control. Although this is not the only important non-cognitive skill in the context of educational decisions, the literature shows consistently

[5] An attrition analysis shows no statistically significant differences between those who answered our second questionnaire and those who did not.

that locus of control is an important aspect of personality. Therefore, we assume that it helps in explaining the behavior of students at the end of compulsory schooling in our sample.

To operationalize locus of control, we have chosen to follow the concept used in the Household, Income and Labour Dynamics in Australia (HILDA*)* Survey,[6] based on Pearlin & Schooler (1978), because a high number of studies have already confirmed the consistency and usability of this measure (see, e.g., Cobb-Clark & Schurer, 2013; Cobb-Clark et al., 2016[7]). The measure uses seven questions with a seven-item Likert scale from "strongly agree" to "strongly disagree." The basic version used in our paper uses equal weights and adds the points of the two questions indicating strong internal control (+40) and subtracts the points of the five questions indicating strong external control.[8] The potential outcomes therefore range from a minimum of seven points for extreme external control to a maximum of 49 points for extreme internal control. In our study, the observed values cover almost the entire possible range (12–49), with a standard deviation of 6.36 points and a mean of 37.28 points (see Table A1 in the Appendix).

A number of factors explain individual differences in the degree of external or internal locus of control as shown in the regression in Table 1. They are similar to those found in the literature (for an overview on sex differences see, e.g., Sherman et al. 1997). In our sample, boys and children of immigrants have a significantly higher (internal) locus of control than girls and Swiss native students. Conversely, students being in the lower ability track, and having lower grades (only in German), have a more external locus of control.

[6] We translated the questions from the version used in wave 7 of HILDA into German (see appendix 1).
[7] Although Pearlin & Schooler (1978) call the concept "self mastery," we follow the interpretation as locus of control as done by Cobb-Clark & Schurer, 2013 or Cobb-Clark et al., 2016. For an explanation, see Cobb-Clark (2015).
[8] We follow Cobb-Clark & Schurer (2013) and use a combined index of locus of control with summing up equal weights.

Table 1: Determinants of locus of control (OLS regression, standard errors clustered for 87 school classes, N = 1446)

VARIABLES	Determinants of LoC
Boy	1.411***
	(0.324)
Age	–0.238
	(0.282)
Grade Math	0.0206
	(0.305)
Grade German	1.024***
	(0.373)
Grade French	0.265
	(0.292)
Grade English	0.546
	(0.353)
Lower ability track	–2.610***
	(0.492)
Academic ability track	–0.0562
	(0.683)
Immigrant	0.613
	(0.946)
Child of immigrants	1.514**
	(0.600)
Mother compulsory education	–0.460
	(0.489)
Mother tertiary education	–0.696**
	(0.338)
Father compulsory education	–0.226
	(0.543)
Father tertiary education	–0.198
	(0.371)
Single parent	–0.0693
	(0.495)
Only child	0.925
	(0.615)
Own room at home	0.690
	(0.683)
No. of bathrooms	0.201
	(0.274)
No. of books	–0.0749
	(0.123)
Constant	31.43***
	(4.688)
Observations	1,446
R-squared adjusted	0.056

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

4.4. Control variables

To guarantee a good comparability with other studies in the field of education, we used the PISA [9] student background questionnaire (2009) to collect additional information on students' socio-demographic and socio-economic backgrounds, complemented with information about grades and ability track. In the absence of a standardized external assessment of student ability in Switzerland, we take both self-reported grades and ability track as reported by the schools as measures for cognitive ability. Although the grades are not based on standardized tests, in our context, they seem to be the best proxies for cognitive skills because promotion into higher schooling options (e.g., academic baccalaureate schools) or the probability of finding an apprenticeship position depend mostly on the school grades in the 8th grade and the first term of the 9th grade and the ability track followed in lower-secondary school. Thus, we can reasonably assume that students, when forming an opinion of their educational possibilities, use their school grades as their best informational source to assess their prospects.

5. Results

Tables 2 and 3 summarize our main empirical results. In Table 2 we analyze the intention to delay the transition and in Table 3 we analyze the determinants of the actual choice at the end of compulsory schooling. Both analyses show that locus of control is an important explanatory variable for educational intentions and decisions, even when we control for a rich set of background information and proxies for cognitive skills.

In addition to the level of statistical significance, the effect size of locus of control is considerable. A decrease in locus of control by one standard deviation increases the probability of intending to delay upper-secondary education by 4.2 percentage points. A comparison of the magnitudes of the effects for both cognitive and non-cognitive skills shows that a one standard deviation change in the German and math grades changes the percentage of students planning to delay upper-secondary education by 2.9 and 4.7 percentage points, respectively. The effect sizes for those grades are comparable to the effect size of locus of control and underline the importance of non-cognitive skills in the transition to upper-secondary education.

[9] PISA = Programme for International Student Assessment (OECD).

Table 2: Probit regression on intention to delay an upper-secondary education after compulsory schooling, average marginal effects, standard errors clustered for 87 school classes, N = 1446

DEPENDENT VARIABLE: Intention to delay upper-secondary education	(1) Marginal effects	(2) Marginal effects	(3) Marginal effects	(4) Marginal effects
Locus of Control (std)	–0.0642***	–0.0624***	–0.0413***	–0.0422***
	(0.0110)	(0.0110)	(0.0112)	(0.0118)
Time invested in considering options		–0.0572***	–0.0699***	–0.0702***
		(0.0164)	(0.0169)	(0.0168)
Boy			–0.116***	–0.108***
			(0.0243)	(0.0240)
Grade Math (std)			–0.0471***	–0.0469***
			(0.0119)	(0.0121)
Grade German (std)			–0.0300**	–0.0282**
			(0.0137)	(0.0134)
Grade French (std)			–0.00214	–0.00250
			(0.0136)	(0.0135)
Grade English (std)			–0.00681	–0.00564
			(0.0138)	(0.0136)
Lower ability track			0.0998***	0.0863**
			(0.0386)	(0.0402)
Academic ability track			–0.102	–0.0901
			(0.0668)	(0.0660)
Immigrant				0.0785
				(0.0546)
Child of immigrants				–0.00441
				(0.0363)
Mother compulsory education				–0.0139
				(0.0385)
Mother tertiary education				0.0138
				(0.0283)
Father compulsory education				0.000291
				(0.0381)
Father tertiary education				–0.0354
				(0.0272)
Father entrepreneur				0.0158
				(0.0307)
Single parent				0.0645
				(0.0402)
Only child				0.101**
				(0.0405)
Number of bathrooms				–0.0313
				(0.0195)
Number of books				–0.00182
				(0.00889)
Observations	1,446	1,446	1,446	1,446

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3 shows the marginal effects after a probit regression on delaying the transition at the end of the 9th grade. In column 1, we show the results for the full sample. We then split the sample into two groups: the group of students who had the intention to immediately

start upper-secondary education in 2013 (column 2) and the group of indecisive students who had the intention to delay their transition to upper-secondary education (column 3).

In the first step, we look at the full sample of students (column 1). Although the positive effect of locus of control on decisions is no longer significant and is smaller in size (compared to the probit in Table 2), we find that the intention to delay upper-secondary education at the beginning of the 8th grade has a highly significant impact on the probability of actually delaying the transition at the end of 9th grade. Having intended to delay increases the probability of actually delaying after controlling for other observable differences between the surveyed individuals by more than 50 percent.

In the second step, we split the full sample into two groups: the group who had the intention to immediately start upper-secondary education and the group who had the intention to delay upper-secondary education. In the first group (column 2), locus of control does not explain why students who did not have the intention to delay their educational transition in the end do so. In this group, having low school grades, being in the lowest ability track, and being female increases the probability of delay.

However, in the second group (column 3), locus of control has a significant effect. Although the coefficient is only significant at the 10% level, the effect size is again considerable. In addition, we find that students who initially intended to delay, but ultimately transition to upper-secondary education without a delay, have a significantly higher internal locus of control than those who intended to delay and actually delay.

Another variable predicting the probability of delaying the transition to upper-secondary education is the distance from the school to the closest baccalaureate school. The greater the distance to the closest baccalaureate school (i.e., the more rural the area), the higher the probability of delaying upper-secondary education. This is particularly the case in the group of students who had the intention to delay their transition to upper-secondary education.

Table 3: Probit regressions on the decision to delay upper-secondary education after compulsory schooling, average marginal effects, standard errors clustered for school classes

DEPENDENT VARIABLE: Choice to delay upper-secondary education VARIABLES	(1) Marginal effects	(2) Marginal effects	(3) Marginal effects
Intention to delay upper-secondary education after compulsory school	0.0922*** (0.0212)		
Locus of Control (std)	–0.0133 (0.00991)	–0.00595 (0.0108)	–0.0435* (0.0256)
Distance to closest baccalaureate school (std)	0.0405** (0.0164)	0.0227 (0.0145)	0.0964*** (0.0288)
Time invested in considering options	–0.00441 (0.0163)	–0.0147 (0.0151)	0.0395 (0.0374)
Boy	–0.0604*** (0.0214)	–0.0488** (0.0213)	–0.0779 (0.0535)
Age	–0.00586 (0.0182)	–0.0189 (0.0175)	0.0536 (0.0418)
Grade Math (std)	–0.0324*** (0.0108)	–0.0244** (0.0111)	–0.0369 (0.0270)
Grade German (std)	0.000637 (0.0134)	0.00288 (0.0133)	–0.0279 (0.0306)
Grade French (std)	–0.0456*** (0.0128)	–0.0392*** (0.0130)	–0.0566* (0.0315)
Grade English (std)	0.0158 (0.0109)	0.0201* (0.0107)	0.00445 (0.0262)
Lower ability track	0.119*** (0.0243)	0.102*** (0.0250)	0.158*** (0.0581)
Academic ability track	–0.141** (0.0582)	–0.127** (0.0506)	–0.119 (0.109)
Mother compulsory education	0.0218 (0.0295)	0.0562** (0.0287)	–0.139** (0.0561)
Mother tertiary education	–0.00333 (0.0260)	–0.0277 (0.0300)	0.0908* (0.0522)
Father compulsory education	–0.0362 (0.0332)	–0.0480 (0.0342)	0.0472 (0.0759)
Father tertiary education	–0.0302 (0.0236)	–0.0154 (0.0260)	–0.0635 (0.0532)
Immigrant	0.119*** (0.0429)	0.100** (0.0478)	0.205* (0.109)
Child of immigrants	0.172*** (0.0315)	0.152*** (0.0281)	0.215*** (0.0729)
Father entrepreneur	–0.00109 (0.0222)	–0.0528** (0.0261)	0.160** (0.0650)
Single parent	0.0320 (0.0288)	0.0407 (0.0327)	0.0150 (0.0597)
Only child	0.0238 (0.0409)	0.0104 (0.0465)	0.0897 (0.0710)
Number of bathrooms	0.00573 (0.0150)	–0.00704 (0.0152)	0.0367 (0.0375)
Number of books	0.0145* (0.00779)	0.0121 (0.00862)	0.0240 (0.0189)
Observations	1,446	1,065	381

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

6. Conclusion

In this study, we analyze the determinants of delaying the transition of students from lower-secondary (compulsory) to upper-secondary education. Delaying this transition has for a long time been seen as being either the consequence of an insufficient academic preparation to immediately start an upper-secondary education program or a voluntary decision in order to improve educational outcomes. Current research has shown that despite the high costs of delaying educational progress, the outcomes cannot be improved compared to those who continue their educational career without interruption.

In our analyses, we further show that the delay is not merely the consequence of an insufficient preparation, but also the result of a personality trait that prevents people from taking action and living a more self-determined life. We find that having a more external locus of control is associated with early intentions to delay the transition into upper-secondary education and that these intentions, ceteris paribus, increase the probability of actually delaying one and a half years later at the end of compulsory schooling by more than 50 percent. The effect sizes for locus of control are considerably large and comparable to the effect sizes of cognitive skills. We also find that the students who initially planned to delay their transition, but then immediately start upper-secondary education one and a half years later, have a significantly higher internal locus of control compared to those who ultimately delay the transition.

Finally, the importance of locus of control also shows that the indecisiveness of a considerable share of school leavers is most probably not due to the simple lack of information or confusion caused by too much and conflicting information. It is rather the result of an inability to make decisions caused by the believe that others or external circumstances will decide.

In other words, programs targeting the locus of control of young students before the transition into upper-secondary education might be a more effective and efficient measure to reduce the number of students who delay their educational careers than focusing only on the cognitive skills of students.

References

Aijzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Process*, 50, 179–211.

Andrisani, P. (1977). Internal-external attitudes, personal initiative, and the labor market experience of white and black men, *Journal of Human Resources*, 12(3), 308-328, DOI: 10.2307/145493.

Barón, J.D. & Cobb-Clark, D. (2010). Are young people's educational outcomes linked to their sense of control?, IZA Discussion Paper No. 4907.

Borghans, L., Lee Duckworth, A., Heckman, J., & Ter Weel, B. (2008). The economics and psychology of personality traits. *Journal of Human Resources*, 43, 972–1059, DOI: 10.1353/jhr.2008.0017.

Buhr, P. & Mueller, R. (2008). Wege in die Berufsausbildung. In: B. Reissig, N. Gaupp & T. Lex (Eds.), Hauptschueler auf dem Weg von der Schule in die Arbeitswelt, 118-135, Muenchen: DJI Verlag Deutsches Jugendinstitut.

Caliendo, M., Cobb-Clark, D. & Uhlendorff, A. (2015). Locus of control and job search strategies, *Review of Economics and Statistics,* 97(1), 88-103, DOI: 10.1162/REST_a_00459.

Cebi, M. (2007). Locus of control and human capital investment revisited, *Journal of Human Resources*, 42(4), 919-932, DOI: 10.3368/jhr.XLII.4.919.

Cobb-Clark, D., Kassenboehmer, S.C. & Sinnig, M.G. (2016). Locus of Control and Savings, *Journal of Banking and Finance*, Forthcoming.

Cobb-Clark, D., Schurer, S. (2013). Two economists' musing on the stability of locus of control, *The Economic Journal*, 123(570), F358-400, DOI: 10.1111/ecoj.12069.

Cobb-Clark, D., Kassenboehmer, S. & Schurer, S. (2014). Healthy habits: What explains the connection between diet, exercise, and locus of control? *Journal of Economic Behavior & Organization*, 98, 1-28, DOI: 10.1016/j.jebo.2013.10.011.

Cobb-Clark, D. (2015). Locus of control and the labor market. *IZA Journal of Labor Economics*. 4(1), 1-19, DOI: 10.1186/s40172-014-0017-x.

Coleman, M. & DeLeire, T. (2003). An economic model of locus of control and the human capital investment decision, *Journal of Human Resources*, 38(3), 701-721, DOI: 10.3368/jhr.XXXVIII.3.701.

Cunha, F. & Heckman, J. (2007). The technology of skill formation, *American Economic Review*, 97(2), 31-47, DOI: 10.1257/aer.97.2.31.

Heckman, J., Stixrud, J. & Urzua, S. (2006). The effects of cognitive and non-cognitive abilities on labor market outcomes and social behavior. *Journal of Labor Economics*, 24 (3), 411-482, DOI: 10.1086/504455.

McGee, A. (2015). How the perception of control influences unemployed job search. *Industrial Relations and Labor Review*, 68 (1), 184-211, DOI:10.1177/0019793914556245.

Mendolia, S. & Walker, I. (2014). The effect of personality traits on subject choice and performance in high school: Evidence from an English cohort. *Economics of Education Review*, 43, 47-65, DOI: 10.1016/j.econedurev.2014.09.004.

Mueller, B. & Wolter, S.C. (2014). The role of hard-to-obtain information on ability, *Empirical Economics*, 46, 1447-1471, DOI: 10.1007/s00181-013-0709-2.

Mueller, B. (2016). Four essays in economics of education, unpublished PhD thesis, University of Bern.

OECD (2015). Indicator A1 "To What Level Have Adults Studied?", in: *Education at a Glance 2015: OECD Indicators*, OECD Publishing, Paris, DOI: http://dx.doi.org/10.1787/eag-2015-7-en.

Pearlin, L.I., & Schooler, C. (1978). The structure of coping', *Journal of Health and Social Behavior*, 19, 2-21, DOI: 10.2307/2136319.

Piatek, R., & Pinger, P. (2015). Maintaining (Locus of) Control? Data combination for the Identification and Inference of Factor Structure Models, *Journal of Applied Econometrics*, DOI: 10.1002/jae.2456.

Rotter, J. (1966). Generalized expectancies for internal versus external control of reinforcement. In: J. Rotter, J. Cance, and E.J. Phares (Eds.), Applications of Social Learning Theory of Personality, 260-295, New York: Holt, Rinehart and Winston.

Sacchi, St. & Meyer, T. (2016). Übergangslösungen beim Eintritt in die Schweizer Berufsbildung: Brückenschlag oder Sackgasse?, *Swiss Journal of Sociology*, 42 (1), 9-39, DOI: 10.1515/sjs-2016-0002.

SCCRE (2014). Swiss education report 2014, Aarau: Swiss Coordination Centre for Research in Education.

Sherman, A.C., Higgs, G.E. & Williams, R.L. (1997). Gender differences in the locus of control construct, *Psychology and Health*, 12(2), 239-248, DOI: 10.1080/08870449708407402.

Appendix A

Table A1: Descriptive Statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Intention to delay upper-secondary education after compulsory school	1,446	0.263	0.441	0	1
Choice to delay upper-secondary education after compulsory school	1,446	0.200	0.400	0	1
Locus of Control	1,446	37.32	6.371	12	49
Time invested in considering options	1,446	3.291	0.700	1	4
Distance to closest baccalaureate school in minutes	1,446	24.34	19.40	5	87
Boy	1,446	0.497	0.500	0	1
Lower ability track	1,446	0.317	0.465	0	1
Middle ability track	1,446	0.593	0.491	0	1
Academic ability track	1,446	0.0899	0.286	0	1
Grade Math	1,446	4.689	0.639	3	6
Grade German	1,446	4.724	0.502	3	6
Grade French	1,446	4.647	0.619	3	6
Grade English	1,446	4.774	0.664	3	6
Immigrant	1,446	0.0526	0.223	0	1
Child of immigrants	1,446	0.149	0.356	0	1
Age	1,446	14.06	0.576	12.60	16.90
Father compulsory education	1,446	0.194	0.396	0	1
Father upper-secondary education	1,446	0.440	0.497	0	1
Father tertiary education	1,446	0.366	0.482	0	1
Mother compulsory education	1,446	0.196	0.397	0	1
Mother upper-secondary education	1,446	0.465	0.499	0	1
Mother tertiary education	1,446	0.338	0.473	0	1
Single parent	1,446	0.129	0.335	0	1
Only child	1,446	0.0671	0.250	0	1
Father entrepreneur	1,446	0.188	0.391	0	1
Number of bathrooms	1,446	1.553	0.677	0	3
0 to 10 books at home	1,446	0.165	0.372	0	1
11 to 25 books at home	1,446	0.165	0.371	0	1
26 to 100 books at home	1,446	0.335	0.472	0	1
101 to 200 books at home	1,446	0.164	0.370	0	1
201 to 500 books at home	1,446	0.120	0.325	0	1
More than 500 books at home	1,446	0.0512	0.220	0	1

Appendix B: Locus of Control questions

Locus of Control: Questions in HILDA waves 2003, 2004, 2007

(a) I have little control over the things that happen to me.
(b) There is really no way I can solve some of the problems I have.
(c) There is little I can do to change many of the important things in my life.
(d) I often feel helpless in dealing with the problems of life.
(e) Sometimes I feel that I'm being pushed around in life.
(f) What happens to me in the future mostly depends on me.
(g) I can do just about anything I really set my mind to do.

Locus of Control – Translated Version used for our survey (German)

(a) Ich habe wenig Kontrolle über Dinge, die mir passieren.
(b) Es gibt wirklich keinen Weg, wie ich meine derzeitigen Probleme lösen kann.
(c) Ich kann wenig tun, um wichtige Dinge in meinem Leben zu ändern.
(d) Ich fühle mich häufig hilflos, wenn ich Probleme in meinem Leben lösen muss.
(e) Manchmal fühle ich mich im Leben herumgeschubst.
(f) Was mir in der Zukunft passiert, hängt mehrheitlich von mir selbst ab.
(g) Ich bin fähig, praktisch alles zu tun, was ich mir vorgenommen habe.