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### Effect of Secondary Schools on Academic Choices and on Success in Higher Education

Heidi Pustjens<sup>a</sup>, Eva Van de gaer<sup>a</sup>, Jan Van Damme<sup>a</sup> & Patrick Onghena<sup>b</sup>

<sup>a</sup> Centre for Educational Effectiveness and Evaluation, Katholieke Universiteit Leuven Belgium

<sup>b</sup> Centre for Methodology in Educational Sciences, Katholieke Universiteit Leuven Belgium

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## Effect of Secondary Schools on Academic Choices and on Success in Higher Education

Heidi Pustjens<sup>1</sup>, Eva Van de gaer<sup>1</sup>, Jan Van Damme<sup>1</sup>,  
and Patrick Onghena<sup>2</sup>

<sup>1</sup>Centre for Educational Effectiveness and Evaluation, Katholieke Universiteit Leuven,  
Belgium, and <sup>2</sup>Centre for Methodology in Educational Sciences,  
Katholieke Universiteit Leuven, Belgium

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### ABSTRACT

Follow-up data from a group of final-grade students of the 65 schools that participated in the Flemish Longitudinal Research in Secondary Education project (Van Damme, De Fraine, Van Landeghem, Opdenakker, & Onghena, 2002) were collected to study the long-term effects of the secondary school on the educational choice when leaving secondary education and on subsequent outcomes in higher education. Multilevel logistic regression models showed significant long-term effects of secondary schools on both outcome variables. Indications are found that the effects are mediated by the achievement level of the students at the end of secondary education.

An important additional finding was that grade repetition has negative long-term consequences after leaving secondary education, which raises questions about a justified policy regarding students that are at risk of academic failure.

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### INTRODUCTION

A student's educational career is usually described as partitioned – coarsely or finely, depending on the purpose at hand – in distinct phases. From this point of view, the criterion variables in school effectiveness research are almost always short-term outcomes, in the sense that they are measured in the phase in which the school membership is defined. In contrast, in this article long-term

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Address correspondence to: Heidi Pustjens, Dekenstraat 2, 3000 Leuven, Belgium. Tel.: +32-16-325724. Fax: +32-16-326274. E-mail: Heidi.Pustjens@ped.kuleuven.ac.be

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effects, that is: the effects of the school in a particular phase on outcomes in a later phase, are addressed. More specifically, we investigated the effects of the secondary school on the educational choice after secondary schooling and on subsequent success in higher education. We regard these postschool effects as important educational effectiveness criteria since they direct the students' further educational career possibilities, especially in a differentiated educational system in terms of curriculum such as in Flanders, as well as their professional career perspectives. Fitz-Gibbon (1999) even stated that the influence of schools on curriculum choices may be more important than their influence on relative performance on school subjects. Focusing on students who appeared sufficiently able to have taken mathematics at A-level at the age of 16, it was found that those who did and who were in high pulling power institutions (a high number of students were attracted to mathematics) reported 5 years later a higher quality of life and a higher expectation for salaries than similar students who had been in institutions with low pulling power for mathematics and who had taken English at A-level.

There is a well-established research tradition, especially in educational economics and the sociology of education, with regard to the effect of schooling on the further career and adult life (see several chapters in Hallinan, 2000). This research tradition is, however, not concerned with the effect of attending a particular school, which is the perspective of school effectiveness research. Indeed, leaving aside the – predominantly American – research about the effects of individual universities and colleges (see e.g., Alwin, 1976), little is known about potential continuing effects of enrolment in a particular secondary school. Important reference books in the domain of school effectiveness research (such as Scheerens & Bosker, 1997; Teddlie & Reynolds, 2000) mention this topic scarcely or not at all. Nonetheless, there are some school effectiveness studies concerning the effects of secondary schools on the further educational career choice available. Béguin, de Jong, Rekers-Mombarg, and Bosker (2000), Iannelli (2001), and Marsh (1991) are examples of such evidence. Béguin et al. (2000) reported several effects of the secondary school on the outflow of students from secondary education to further education or to the labor market when controlling for some background characteristics, the achievement level at the beginning of secondary education, the study advice given by the primary school at the end of primary education, and the number of years of delay during secondary education. There appeared to be some effect on the chosen level of further education rather than on the chosen branch of study.

Although the multilevel structure of the data was not properly taken into account, the study of Marsh (1991) showed that the composition of the student body during high school correlates with college attendance. Marsh, on the one hand, found a significant negative effect of a high school-average academic ability – controlling for the positive effect of ability at the individual level and for relevant background characteristics – on college attendance and on later educational and occupational aspirations. The effect of the school-average socioeconomic status (SES), on the other hand, was significant and positive.

Iannelli (2001) examined students' positions about 1 year after having left secondary education in The Netherlands, Ireland, and Scotland. In all three countries, schools significantly varied in the educational choice of their students. Although individual characteristics accounted for the largest part of the between-school variation (varying from 14 to 94%), a significant amount of between-school variation remained unexplained.

So these studies of Béguin et al. (2000), Iannelli (2001), and Marsh (1991) appear to provide some evidence for secondary school effects on the educational career of their students after secondary education. But the previous research has only focused on the educational career choice of the students. Very little attention has been paid to how successful students are in their educational career choice. To our knowledge, only Tymms (1995) has investigated this. He found small but positive long-term consequences of attending effective departments (in terms of cognitive outcomes) versus ineffective departments. Students were more likely to move on to a degree course immediately after secondary education and to obtain a degree in the long run if they had attended effective departments. In addition, Tymms found that for students who had obtained a degree, the effectiveness of their former educational department correlated positively with their salary at the time of the survey.

## RESEARCH QUESTIONS

The first objective of the study was to examine the impact of Flemish secondary schools and the effects of several student-level characteristics (general cognitive ability and background factors) on the subsequent educational choices of their students after secondary schooling and on the students' success in higher education. Secondly, we investigated whether the secondary school effect operates by affecting the students' academic achievement

through their secondary schooling. It was hypothesized that, if the school for secondary education only has an effect on the long-term outcomes of their students by affecting students' academic achievement, the measured variation between secondary schools would disappear if account was taken of the achievement level for Dutch and mathematics at the end of secondary schooling. If not, the secondary schools would have a continuing extra association with subsequent outcomes.

## RESEARCH DESIGN

### Sample

Flanders (the Dutch-speaking part of Belgium) has no tradition in nationally keeping records of career paths of students or of organizing central exams. Therefore, we organized a follow-up study of the 5,571 students who were enrolled in the sixth grade of secondary education in the school year 1995–1996 in the 65 schools that participated in the Longitudinal Research Project in Secondary Education (Van Damme, De Fraine, Van Landeghem, Opendakker, & Onghena, 2002; Van Damme, De Troy, Meyer, & Mertens, 2001; Van Damme et al., 1997). The Longitudinal Research Project in Secondary Education started in 1990 in Flanders. A cohort of 6,411 students was followed through secondary education (Van Damme et al., 1997, 2002). The research group used in the follow-up study, which was conducted at the end of 1999 (i.e., 3.5 years later), consists of a subsample of the original group of 6,411 students, namely those who reached the sixth grade of secondary education without delay in one of the schools that participated in the project, plus their classmates in 1995–1996. Through a written questionnaire and through cooperation with the universities and the colleges of higher education outside universities, the career path of 5,373 students (or 96.5% of the sample) could be determined.

The schools were selected from several regions in Flanders and almost all schools within those regions participated in the study. This was done to prevent an unworkable fragmentation of students over schools during secondary education. The regions chosen are representative of Flanders regarding some school characteristics (for example the proportion Catholic/public schools) and show some diversity as for the geographical, economical, and social characteristics of the region.

The study focused on the students of the academic, the artistic, and the technical track of secondary education (4,088 students). To clarify why the

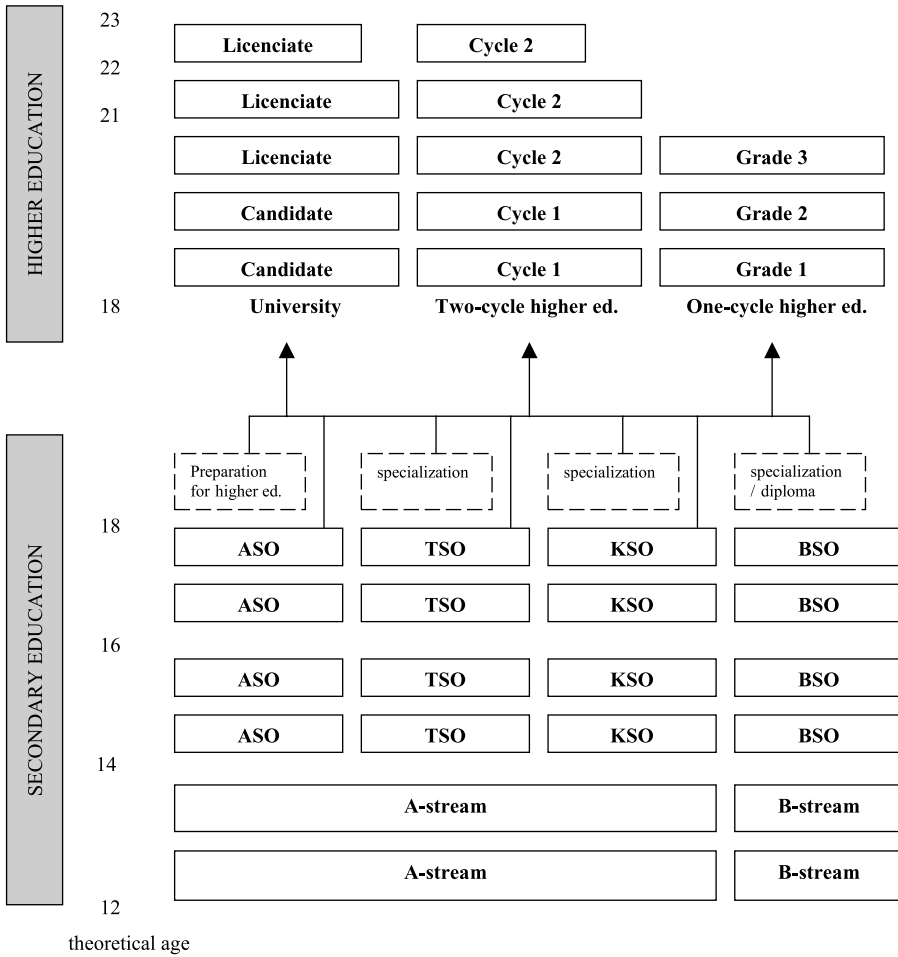


Fig. 1. Secondary and higher education in Flanders.

students of the vocational track were excluded from the study, an overview of the structure of Flemish secondary and higher education is given in Figure 1. Flemish secondary education is meant for pupils aged 12 to 18 and consists of six grades that are grouped into three cycles of two grades (Fig. 1). The first two grades are comprehensive. From the third grade on, four forms of secondary education are distinguished: academic or general (ASO), technical (TSO), artistic (KSO), and vocational (BSO) secondary education. All forms

of secondary education give access to all forms of higher education. But, students who complete vocational secondary education need to follow a 7th year of secondary education before they can graduate in secondary education – which is a prerequisite for higher education. Besides, the vocational track prepares the students for the labor market rather than for higher education, which was the particular interest of the study.

### Variables

Three different outcome variables were analyzed. The first one was the educational choice of the students in the year after finishing secondary education. On the basis of the educational system in the Flemish Community (see Fig. 1), five educational choices were distinguished: university education, two-cycle higher education, one-cycle higher education, a form of further secondary education, and leaving the educational system (and entering the labor market). Universities offer academic study programmes of at least 4 years, which lead to a degree that can be considered an academic master's degree. Two-cycle higher education consists of two periods of at least 2 years each. This study is of academic level and leads to a degree that can be considered a vocational master's degree. One-cycle higher education provides theoretical and practical training for specific professions during a study period of 3 years. The program leads to a degree that can be considered a vocational bachelor's degree. The other outcome variables pertained to the effect of the secondary school on being successful or not in one-cycle higher education and in academic education (university). Therefore, the position the students occupied 3,5 years after starting higher education was investigated. Information about whether students were still enrolled in higher education and additional information about the type of education and what program the students were taking was available.

The independent variables were all situated at the individual level: gender, age, SES, general ability, and the achievement level for Dutch and mathematics at the end of the sixth grade of secondary education. The students' *gender* was coded "0" for girls and "1" for boys. Most students finished secondary education at the age of 18 or less (0), others finished secondary education at the age of 19 or more (1). *Socioeconomic status (SES)* is a composite measure that reflects parental education and the occupational status of the parents. As a measure of *general cognitive ability* we used the intelligence score on the Berenschot g-Test (Roggeveen & van de Linde, 1973), measured at the end of the sixth grade of secondary education.



We hereby assumed that intelligence is a stable characteristic, which in normal circumstances does not change over time. This assumption was tested for a subgroup of the research group, namely for the students who belonged to the original research group of the Longitudinal Research Project in Secondary Education. Both at the start of secondary education and at the end of secondary education, insofar as they still attended a school that participated in the project, their intelligence was examined. The correlation between the two equaled 0.75, based on 3,028 observations. The intelligence score was used as a proxy for academic achievement scores at the start of secondary education, which were not available for all students. The *achievement level for Dutch and for mathematics at the end of the sixth grade of secondary education*<sup>1</sup> was measured with a curriculum-relevant multiple-choice test. The scores on the two tests were converted into IRT-scores situating students' scores on two latent scales, one for Dutch and one for mathematics. For more information about the construction of the tests we refer to Van Damme et al. (2001).

## Method

Multilevel logistic regression models were used to analyze the data. Through the use of multilevel modeling we took into account the students' grouping into schools, which made it possible to describe the school effect, besides the effect at the individual (student) level. Logistic modeling was used because of the nominal level of measurement of the outcome variables. For details about the technique we refer to Long (1997) and Snijders and Bosker (1999). The MIXNO-software package of Hedeker (1999) was used.

For each of the outcome variables three different models were estimated. The first model without predictor variables was designed to say something about the observed raw variance among secondary schools. In the second model we examined whether there were still school effects after we had controlled for the general cognitive ability and the background characteristics (gender, age, SES) of the students. In this way we got value-added scores (Sammons, Mortimore, & Thomas, 1996) for the secondary schools (net

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<sup>1</sup>The achievement level for Dutch and mathematics of the students of the original research group of the Longitudinal Research Project in Secondary Education was tested both at the start and at the end of secondary education. The correlation for Dutch equaled 0.731 (N = 3985). For mathematics the correlation was equal to 0.477 (N = 2820). Because the students of the vocational track in secondary education did not get a test for mathematics at the end of the secondary education, the correlation for mathematics was based on a much smaller number and a more homogeneous group of students than for Dutch.

effects). It is assumed that these net effects represent a better proxy for educational differences between schools than the raw effects (first research question). We thus tried to account for other potential confounding factors of the school outcome and to make a more fair comparison between schools. This technique has already often been used in educational effectiveness research studies (Fitz-Gibbon, 1992; Goldstein, 1987; Goldstein & Sammons, 1997; Sammons, 1989; Sammons, Nuttall, & Cuttance, 1993; Sanders & Horn, 1995). However, given the correlational research design, it will be impossible to be sure that we have accounted for all confounding factors and we should be cautious about making causal inferences. The final model tried to formulate an answer to the second research question. Therefore, the achievement levels for Dutch and mathematics at the end of the sixth grade were also taken into consideration, in addition to the variables from the previous model.

All the coefficients of the predictor variables were fixed at the school level so that the within-school effect of these variables was constrained to be the same for all schools. In addition, all the continuous predictor variables were centered around their respective grand means. This facilitated the interpretation of the parameter estimates.

## RESULTS

The results are presented in three parts, according to the three outcome variables. First, we examined the position the students occupied immediately after graduation. Secondly, we selected the group of students who started one-cycle higher education and examined their position 3,5 years later. Thirdly, the same was done for the students who started academic education.

### **Educational Choice After Graduating From Secondary Education**

Do secondary schools differ regarding the educational choice their students make after graduating from secondary education? In order to answer this question, the first position students occupied after leaving secondary education was investigated and five categories were distinguished:

1. Those who had left the educational system and had entered the labor market (9.4%).
2. Those who were enrolled in a further form of secondary education (4.3%).

3. Those who were enrolled in one-cycle higher education (45.0%).
4. Those who were enrolled in two-cycle higher education (12.3%).
5. Those who were enrolled in academic education (29.0%).

Most of our graduates moved on to one of the three types of higher education. Only a minority chose to attend a further form of secondary education or to move on to the labor market.

As mentioned before, three models were fitted to examine the random variation at the school level. Table 1 summarizes the results of the three models by representing the proportion of variance that is attributed to the school level (also called the intraschool correlation coefficient) for the various models. The entire set of estimated coefficients is presented in the Appendices A, B, and C. Records of students for whom information about one or more variables was missing, were deleted. As a result, the analyses were based on a total of 2,311 students (= 56.5% of the total group of graduates) and 55 schools. For the analyses we used the category of students who moved on to academic education as the reference group with which the other groups were compared.

The first model provided evidence for the existence of significant variation between secondary schools in students' educational choice after graduating. About 50% of the variance of the log odds of moving on to the labor market versus moving on to academic education was situated at the school level.

Table 1. Post-Secondary Educational Choice: Percentage of the Variance Attributable to the School Level.

| Model          | Academic ed. | Labor market | Secondary ed. | 1CHE <sup>a</sup> | 2CHE <sup>b</sup> |
|----------------|--------------|--------------|---------------|-------------------|-------------------|
| 1 <sup>c</sup> |              | 54.1         | 52.2          | 27.3              | 10.6              |
| 2 <sup>d</sup> |              | 37.5         | 41.3          | 13.9              | 4.9               |
| 3 <sup>e</sup> |              | 32.9         | 36.7          | 8.0               | 3.5               |

*Note.* The table represents the significant (conditional) intraschool correlation coefficients for the various models. Source: Appendices A, B, and C.

<sup>a</sup>One-cycle higher education.

<sup>b</sup>Two-cycle higher education.

<sup>c</sup>Model 1 measures raw school effects (no predictor variables).

<sup>d</sup>Model 2 measures value-added school effects or net effects (intelligence and background characteristics as covariates).

<sup>e</sup>The predictor variables measuring Dutch and mathematics achievement at the end of secondary education are added to the model.

For the category of students who were enrolled in further secondary education, the fraction of the variance at the school level was similar. For the categories of students who were enrolled in higher education outside university the intraschool correlations were smaller; about 27% for one-cycle higher education and 10.6% for two-cycle higher education. The relatively large differences between the secondary schools were not surprising because schools in Flanders differ with regard to their educational program, some offering a more academic program, others offering a more vocational program. More surprising was that even when the cognitive ability, the gender, the age, and the socioeconomic status of pupils were taken into account, secondary schools still significantly differed in the educational choice their students made after graduation (model 2). The intraschool correlations ranged from 4.9% (for two-cycle higher education) to 41.3% (for further secondary education). Still remarkably large intraschool correlations (around 40%) were found for the categories “labor market” and “further secondary education”. Apparently, secondary schools differ a lot with respect to the probability that their students enter the labor market or enroll in further secondary education in comparison to the probability that they enrol, in academic education. This pattern held, even when we took into account the academic achievement of the students for Dutch and mathematics at the end of secondary education (model 3). The intraschool correlation coefficients for labor market and further secondary education were only slightly lower than in model 2. So, besides improving their academic performance on Dutch and mathematics, the secondary school seems to have an additional effect on the subsequent career path of its students.

The effect of each significant predictor variable is presented in Table 2. Table 2 shows, for each educational pathway, the percentage change in the odds ratio that is due to a one-unit increase (for dichotomous measures) or a one standard deviation increase (for continuous measures) in the significant student variables, controlling for effects of the other variables in the model (Long, 1997, p. 81: “factor change and standardized factor change”).

The results showed that the odds of entering the labor market, choosing further secondary education or choosing one-cycle higher education relative to choosing academic education were about 40 to 60% lower for students with a high score on the intelligence test (average plus one standard deviation [=6.07]) than for students with an average score on the intelligence test. For students with a high Dutch achievement level (average plus one standard deviation [= 1.08]) the odds of choosing two-cycle higher

Table 2. Percentage Change in Odds Ratio of Students Moving Through to the Labor Market or to Higher Education Due to an Increase in the Value of Significant Predictor Variables.

|                     | Academic ed. | Labor market | Secondary ed. | 1CHE <sup>a</sup> | 2CHE <sup>b</sup> |
|---------------------|--------------|--------------|---------------|-------------------|-------------------|
| Intelligence        |              | -60.0        | -50.6         | -42.5             |                   |
| Gender <sup>c</sup> |              |              |               | -43.2             |                   |
| Age <sup>d</sup>    |              | 456.8        |               | 179.8             |                   |
| SES                 |              | -58.6        |               | -19.3             |                   |
| Dutch Mathematics   |              | -66.7        | -71.4         | -59.3             | -45.8             |
|                     |              |              |               | -31.1             |                   |

*Note.* The table represents the change in the odds ratios, expressed as a percentage change, due to a one standard deviation increase (for continuous measures) or a one-unit increase (for dichotomous measures) in the predictor variable, controlling for the other variables in the model. Source: Appendix C.

<sup>a</sup>One-cycle higher education.

<sup>b</sup>Two-cycle higher education.

<sup>c</sup>0: girl/1: boy.

<sup>d</sup>0: finishing secondary education at the age of 18 or less/1: finishing secondary education at the age of 19 or more.

education relative to choosing academic education were 46% lower than for students with an average Dutch achievement level at the end of secondary education. A similar result was found for entering the labor market, for enrolment in further secondary education and for enrolment in one-cycle higher education. The impact of the mathematics achievement level (standard deviation = 1.06) on the educational choice of the graduates was limited: only for one-cycle higher education did we find a significant coefficient. Background factors also had a significant impact upon students' educational career choice even after controlling for intelligence and achievement level at the end of secondary education. The odds of entering the labor market or choosing one-cycle higher education relative to choosing academic education were lower for students from high SES-families (average plus one standard deviation [= 2.25]) than for students from average SES-families. For students who repeated one or more grades in primary or secondary education, the odds of entering the labor market or choosing one-cycle higher education relative to choosing academic education were 450% (for labor market) and 180% (for one-cycle higher education) higher than for students who did not. Finally, Table 2 shows that for boys the odds of choosing one-cycle higher education relative to choosing academic education were about 40% lower than for girls.

### Success in One-Cycle Higher Education?

To investigate the differential influence secondary schools have on the success of their former students in one-cycle higher education, we selected those students who immediately after graduation started in one-cycle higher education ( $N = 1758$  or 43.0% of the total group of graduates) and examined their position 3,5 years later. As said, one-cycle higher education is a 3-year program leading to a vocational bachelors' degree. Three groups were distinguished and compared with each other:

1. Students who successfully finished one-cycle higher education without delay (40.9% of the students were in this position).
2. Students who were held back one grade in one-cycle higher education (21.9%).
3. Students who, without a degree of higher education, left the educational system and entered the labor market (28.2%), students who quitted one-cycle higher education and went back to secondary education (1.7%), and students who were held back two grades in one-cycle higher education (7.5%).

Three models were fitted to examine the random variation at the school level. Because the estimated coefficients from logistic multilevel regression models as such are not easy to interpret, we present them in the Appendices D, E, and F. In the text that follows, the results are summarized in a couple of tables. Records of students for whom information about one or more variables was missing, were deleted. As a result, the analyses were based on a total of 943 students and 54 schools. The least successful category of students was used as the reference group with which the other groups were compared. In the analyses we did not account for the different colleges for higher education students attended. Because there was a divergent outflow to several colleges for higher education, it seemed unlikely that effects of the colleges for higher education confounded any secondary school effect.

Table 3 gives the proportion of the variance that may be attributed to the school level for the various models. In the first model, the raw school differences in the success of their former students in one-cycle higher education were examined. The results showed significant school differences in the proportion of students moving on to the most successful group and to the group of students who were held back one grade in one-cycle higher education.

The second model demonstrates that even when cognitive ability, gender, age, and SES were taken into account, secondary schools still differed significantly in the proportion of students who moved on to the most

Table 3. Success in One-Cycle Higher Education: Percentage of the Variance Attributable to the School Level.

| Model          | Unsuccessful or held back two grades in 1CHE <sup>a</sup> | Successful in 1CHE <sup>b</sup> | Held back one grade in 1CHE <sup>c</sup> |
|----------------|---|---------------------------------|--|
| 1 <sup>d</sup> |   | 16.6                            | 4.7                                      |
| 2 <sup>e</sup> |   | 10.9                            |  |
| 3 <sup>f</sup> |   | 8.7                             |  |

*Note.* The table represents the significant (conditional) intraschool correlation coefficients for the various models. Source: Appendices D, E, and F.

<sup>a</sup>Students who left the educational system and entered the labor market without a degree of higher education, students who quitted one-cycle higher education and went back to secondary education and students who were held back two grades in one-cycle higher education.

<sup>b</sup>Students who successfully finished one-cycle higher education without delay.

<sup>c</sup>Students who were held back one grade in one-cycle higher education.

<sup>d</sup>Model 1 measures raw school effects (no predictor variables).

<sup>e</sup>Model 2 measures value-added school effects or net effects (intelligence and background characteristics as covariates).

<sup>f</sup>The predictor variables measuring Dutch and mathematics achievement at the end of secondary education are added to the model.

successful group in higher education. Almost 11% of the unexplained variance of the log odds of moving on to the most successful category of students versus moving on to the least successful category of students could be attributed to the school level. There were no more school differences in the proportion of students who moved on to the group of students who were held back one grade in one-cycle higher education. In the last model we found the same pattern. Still, 8.7% of the unexplained variance of the log odds of moving on to the most successful category of students versus moving on to the least successful category of students can be attributed to the school level. So, besides improving the academic performance on Dutch and mathematics of its students, the secondary school seems to have an additional long-lasting effect on the proportion of their students who move on to the most successful category of students in one-cycle higher education.

The effect of each significant predictor variable is presented in Table 4. The analysis showed that only the variables age and achievement level for Dutch could make a distinction between the least successful and the most successful category of students. The odds of being most successful in one-cycle higher education relative to being least successful in one-cycle higher education were

Table 4. Percentage Change in Odds Ratio of Students' Success in One-Cycle Higher Education Due to an Increase in the Value of Significant Predictor Variables.

|                     | Unsuccessful or held<br>back two grades<br>in 1CHE <sup>a</sup> | Successful<br>in 1CHE <sup>b</sup> | Held back one grade<br>in 1CHE <sup>c</sup> |
|---------------------|---|------------------------------------|---|
| Intelligence        |   |                                    |   |
| Gender <sup>d</sup> |   |                                    | -39.8                                       |
| Age <sup>e</sup>    |   | -72.1                              | -52.6                                       |
| SES                 |   |                                    |   |
| Dutch               |   | 35.8                               |   |
| Mathematics         |   |                                    |   |

*Note.* The table represents the change in the odds ratios, expressed as a percentage change, due to a one standard deviation increase (for continuous measures) or a one-unit increase (for dichotomous measures) in the predictor variable, controlling for the other variables in the model. Source: Appendix F.

<sup>a</sup>Students who left the educational system and entered the labor market without a degree of higher education, students who quitted one-cycle higher education and went back to secondary education and students who were held back two grades in one-cycle higher education.

<sup>b</sup>Students who successfully finished one-cycle higher education without delay.

<sup>c</sup>Students who were held back one grade in one-cycle higher education.

<sup>d</sup>0: girl/1: boy.

<sup>e</sup>0: finishing secondary education at the age of 18 or less/1: finishing secondary education at the age of 19 or more.

72% lower for students who repeated one or more grades in primary or secondary education than for students who did not. For students with a high Dutch achievement level at the end of secondary education (average plus one standard deviation [= 0.92]), the odds of being most successful in one-cycle higher education relative to being least successful in one-cycle higher education were 35% higher than for students with an average Dutch achievement level. For the distinction between the category of students who were held back 1 year in one-cycle higher education and the least successful category of students, age and gender were important variables. The odds of having been held back one grade in one-cycle higher education relative to belonging to the least successful category of students in one-cycle higher education were 40% lower for boys than for girls. For students who repeated one or more grades in primary or secondary education, the odds of having been held back only one grade in one-cycle higher education relative to belonging to the least successful category of students were 53% lower than for students who did not.



### Success in Academic Education?

To investigate the effect of schools on the success of their former students at university, we selected those students who immediately after graduation started at a university ( $N = 1134$  or 27.7% of the total group of graduates) and examined their position 3,5 years later. Two groups were distinguished and compared with each other:

1. Being successful: Students who completed the first 3 years of academic education without delay (40% of the students were in this position).
2. Being unsuccessful: Students who were held back 1 or 2 years in academic education (25.3%), students who had changed over to higher education of one or two cycle(s) (28.5%), and students who had left the educational system and had entered the labor market (without a degree of higher education) (5.8%).

Again, the results of the analysis are summarized in a couple of tables. The entire set of estimated coefficients from the logistic multilevel regression models are presented in the Appendices G, H, and I. Data about all the variables were available for 769 students and 43 schools.

Table 5 gives for the various models the proportion of variance that was attributed to the school level (intraschool correlation coefficient). The first

Table 5. Success in Academic Education: Percentage of the Variance Attributable to the School Level.

| Model          | Unsuccessful <sup>a</sup> | Successful <sup>b</sup> |
|----------------|---------------------------|-------------------------|
| 1 <sup>c</sup> |                           | 5.3                     |
| 2 <sup>d</sup> |                           | 3.3                     |
| 3 <sup>e</sup> |                           |                         |

*Note.* The table represents the significant (conditional) intraschool correlation coefficients for the various models. Source: Appendices G, H, and I.

<sup>a</sup>Students who are still following academic education with 1 or more year(s) of delay, students who have changed over to higher education of one or two cycle(s) and students who have left the educational system and have entered the labor market (without a degree of higher education).

<sup>b</sup>Students who completed the first 3 years of academic education without delay.

<sup>c</sup>Model 1 measures raw school effects (no predictor variables).

<sup>d</sup>Model 2 measures value-added school effects or net effects (intelligence and background characteristics as covariates).

<sup>e</sup>The predictor variables measuring Dutch and mathematics achievement at the end of secondary education are added to the model.

model showed significant school differences in the proportion of successful students; about 5% of the unexplained variance of the log odds of being successful in academic education relative to being unsuccessful in academic education was attributable to school differences. The average predicted proportion of successful students is 0.41, but schools differ in this proportion.

The second model demonstrated that, even when cognitive ability, gender, age and SES were taken into account, secondary schools still significantly differed in the proportion of successful students; 3% of the unexplained variance of the log odds of being successful in academic education relative to being unsuccessful in academic education is attributable to school differences. In the last model, no more evidence was found for secondary school differences. The secondary school differences on the success of their students at the university vanished when the achievement of their students for Dutch and mathematics was taken into account.

The effect of each significant predictor variable is presented in Table 6. The analyses showed that the odds of being successful in academic education relative to being not successful were 74% lower for students who repeated 1 or more years in primary or secondary education than for students who did not,

Table 6. Percentage Change in Odds Ratio of Students' Success in Academic Education Due to an Increase in the Value of Significant Predictor Variables.

|                     | Unsuccessful <sup>a</sup> | Successful <sup>b</sup> |
|---------------------|---------------------------|-------------------------|
| Intelligence        |                           |                         |
| Gender <sup>c</sup> |                           |                         |
| Age <sup>d</sup>    |                           | -74.1                   |
| SES                 |                           | 21.9                    |
| Dutch               |                           | 43.5                    |
| Mathematics         |                           | 51.1                    |

*Note.* The table represents the change in the odds ratios, expressed as a percentage change, due to a one standard deviation increase (for continuous measures) or a one-unit increase (for dichotomous measures) in the predictor variable, controlling for the other variables in the model. Source: Appendix I.

<sup>a</sup>Students who are still following academic education with 1 or more year(s) of delay, students who have changed over to higher education of one or two cycle(s) and students who have left the educational system and have entered the labor market (without a degree of higher education).

<sup>b</sup>Students who completed the first 3 years of academic education without delay.

<sup>c</sup>0: girl/1: boy.

<sup>d</sup>0: finishing secondary education at the age of 18 or less/1: finishing secondary education at the age of 19 or more.

when the other variables were controlled for. For students with a high Dutch achievement level at the end of secondary education (average plus one standard deviation [= 0.92]), the odds of being successful in academic education relative to being unsuccessful were about 40% higher than for students with an average Dutch achievement level. The same was true for mathematics achievement (standard deviation = 1.03). Also family background still played a role; the odds of being successful in academic education relative to being unsuccessful were 22% higher for students from high SES-families (average plus one standard deviation [= 2.15]) than for students from average SES-families, even after controlling for achievement level.

### DISCUSSION AND CONCLUSION

The results of the present study provide evidence for statistically significant and large long-term effects of secondary schools on both students' educational postsecondary choice and success in one-cycle higher education (a profession-oriented form of higher education during 3 years) and academic education. The results concerning the educational career choice are in line with the conclusions of Béguin et al. (2000), Ianelli (2001), and Marsh (1991) and the results with regard to success in higher education are consistent with the conclusions of Tymms (1995). Opdenakker, Van Damme, De Fraine, Van Landeghem, and Onghena (2002) found that the raw school effects (without taking into account student characteristics), as well as the value added or net school effects on achievement scores of students, are much larger in Flanders than in other industrialized countries like The Netherlands, the United Kingdom, and the United States of America. This might imply that the long-term school effects in those countries also will be smaller than in Flanders. Furthermore, the significant impact of cognitive ability and background factors shows the importance of an adequate control for both factors in future school effectiveness research, to ensure that the estimates do not reflect unfairly upon schools receiving disadvantaged intakes. Unfortunately, the achievement scores at the entry of secondary education were not available for a large part of the students. We tried to overcome this by controlling for the intelligence measured in the 6th year of secondary education. In fact, accounting for the variation in the post-school outcomes net of the intelligence score at the end of the sixth grade, may well provide a stronger test for postschool effects than the use of a measurement of ability at some earlier time.

The difference between schools with respect to their students' post-secondary educational choice and their success in one-cycle higher education is partly due to differences between schools with respect to their students' academic achievement at the end of secondary education. For the success in academic education no more differences between secondary schools are found after controlling for students' achievement level at the end of secondary education. Because the secondary school effect on the short-term academic achievement of their students was not the focus of this investigation, we can only hypothesize that secondary schools have an indirect impact on their students' long-term educational choice and success in higher education by positively affecting students' short-term academic progress. Exploring the literature, a lot of evidence can be found of the secondary school's impact on the cognitive outcomes of their students (Daly, 1991; Fitz-Gibbon, 1991; Lee & Bryk, 1989; Tymms, 1993; Willms & Raudenbush, 1989). This may indicate, as concluded by Tymms (1995), that effective schools in terms of cognitive outcomes are also effective in terms of educational career choice and success in subsequent higher education.

For students' postsecondary educational choice and their success in one-cycle higher education, schools – after controlling for students' academic achievement at the end of secondary education – still significantly differ from each other. So, the secondary school seems to have an additional long-term effect on its students' educational choice and on their success in one-cycle higher education. What remains unclear, however, is how secondary schools affect their students' further career. Perhaps schools apply different recommendation policies. Maybe the differences can be explained by the overall differential impact of secondary schools upon their students' attitude towards school, their effort expenditure for learning tasks, and their academic self-concept, which may affect later educational choices and later success. With respect to academic self-concept, the work of Marsh (1991) is relevant. He found negative effects of school average ability on subsequent outcomes and his study showed that the effects were primarily mediated by the academic self-concept and educational aspirations during secondary education. This effect is explained by the social-psychological principle that success is judged by the relative standing in the social group, not by the position in the total population (Davis, 1966): Being a member of a strong group will have an adverse impact on the self-concept and the aspirations of students because the basis of comparison is the performance of above-average students. This, in turn, has a negative effect on their further educational career choice. Also, Alwin and Otto (1977) showed that school

average ability was negatively associated with college plans and occupational aspirations. Given the correlational research design, it is not possible to establish cause and consequence. The fact that there is variation between schools may be due to many other factors than “school effect.” For example, in recent years it has become clear that the class and the teacher level are probably more important than the school level in affecting students’ outcomes (Hill & Rowe, 1996; Scheerens & Creemers, 1989). Further research which also includes the classroom and/or the teacher level will probably tell us more about the ways secondary schools affect their students’ later outcomes and what can be done to improve later outcomes.

Our analyses show that repeating one or more grades in primary or secondary education – a common practice in our country – goes together with a less successful route after graduating from secondary education, even after controlling for some background characteristics and the achievement level for Dutch and mathematics at the end of secondary education. Students who repeated one or more grades are less ambitious in their educational career choice after secondary education and are less successful in tertiary education. This result is in accordance with the finding in numerous studies that retained students run a much greater risk of future failure. Retained students demonstrate achievement gains in the short term but these gains are not maintained in the long run. They also display poorer attendance, social adjustment and attitudes toward school and more problem behaviour (Holmes, 1989). Several studies found that retained students are more likely to drop out of secondary education (Grissom & Sheppard, 1989; Jimerson, 1999; Roderick, 1994; Rumberger, 1995; Van Damme et al., 2001). In line with our findings, Jimerson (1999) found that retained students were less likely to be enrolled in a postsecondary education program. He also found poorer employment outcomes for retained students at the age of 20. Given the large amount of negative long-term effects of grade repetition, it seems worthwhile to focus on and to evaluate alternative interventions, so schools and teachers can pursue a justified policy regarding students that are at risk of academic failure.

Notwithstanding the fact that we have not yet attempted to relate the school differences to specific school characteristics, we think that the results of this investigation are relevant, given the little attention that thus far has been paid to the question of the long-term impact of secondary schools on the further career of their students. The results are especially relevant for principals and teachers since they point to the long-term impact secondary schools can have upon their students’ careers.

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## APPENDIX A

Educational Choice After Graduating From Secondary Education: Null Model.

|           | Academic ed. |      | Labor market |      | Secondary ed. |      | 1CHE <sup>a</sup> |      | 2CHE <sup>b</sup> |      |
|-----------|--------------|------|--------------|------|---------------|------|-------------------|------|-------------------|------|
|           | Estimate     | S.E. | Estimate     | S.E. | Estimate      | S.E. | Estimate          | S.E. | Estimate          | S.E. |
| FIXED     |              |      |              |      |               |      |                   |      |                   |      |
| Intercept | -1.79***     | 0.18 | -2.25***     | 0.17 | 0.70***       | 0.07 | -0.50***          | 0.07 |                   |      |
| RANDOM    |              |      |              |      |               |      |                   |      |                   |      |
| Intercept | 1.97***      | 0.14 | 1.90***      | 0.12 | 1.11***       | 0.06 | 0.62***           | 0.08 |                   |      |

Note. <sup>a</sup>One-cycle higher education.

<sup>b</sup>Two-cycle higher education.

\*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001.

## APPENDIX B

Educational Choice After Graduating From Secondary Education: Intelligence and Background Characteristics as Predictor Variables.

|                     | Academic ed. |      | Labor market |      | Secondary ed. |      | 1CHE <sup>a</sup> |      | 2CHE <sup>b</sup> |      |
|---------------------|--------------|------|--------------|------|---------------|------|-------------------|------|-------------------|------|
|                     | Estimate     | S.E. | Estimate     | S.E. | Estimate      | S.E. | Estimate          | S.E. | Estimate          | S.E. |
| FIXED               |              |      |              |      |               |      |                   |      |                   |      |
| Intercept           | -1.73***     | 0.37 | -1.81***     | 0.47 | 1.16***       | 0.19 | -0.36*            | 0.17 |                   |      |
| Intelligence        | -0.23***     | 0.02 | -0.21***     | 0.03 | -0.17***      | 0.01 | -0.06**           | 0.02 |                   |      |
| Gender <sup>c</sup> | 0.10         | 0.35 | 0.53         | 0.30 | -0.41**       | 0.13 | 0.33              | 0.18 |                   |      |
| Age <sup>d</sup>    | 1.83***      | 0.40 | 0.74         | 0.42 | 1.16***       | 0.24 | 0.32              | 0.33 |                   |      |
| SES                 | -0.40***     | 0.08 | -0.16        | 0.08 | -0.21***      | 0.04 | -0.15*            | 0.06 |                   |      |
| RANDOM              |              |      |              |      |               |      |                   |      |                   |      |
| Intercept           | 1.40***      | 0.21 | 1.52***      | 0.41 | 0.73***       | 0.15 | 0.41***           | 0.11 |                   |      |

Note. <sup>a</sup>One-cycle higher education.

<sup>b</sup>Two-cycle higher education.

<sup>c</sup>0: girl/1: boy.

<sup>d</sup>0: finishing secondary education at the age of 18 or less/1: finishing secondary education at the age of 19 or more.

\*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001.

## APPENDIX C

Educational Choice After Graduating From Secondary Education: Intelligence, Background Characteristics, and Achievement Level at the End of Secondary Education as Predictor Variables.

|                     | Academic ed. |      | Labor market |      | Secondary ed. |      | 1CHE <sup>a</sup> |      | 2CHE <sup>b</sup> |      |
|---------------------|--------------|------|--------------|------|---------------|------|-------------------|------|-------------------|------|
|                     | Estimate     | S.E. | Estimate     | S.E. | Estimate      | S.E. | Estimate          | S.E. | Estimate          | S.E. |
| <b>FIXED</b>        |              |      |              |      |               |      |                   |      |                   |      |
| Intercept           | -1.74***     | 0.41 | -1.84***     | 0.49 | 1.21***       | 0.19 | -0.21             | 0.21 |                   |      |
| Intelligence        | -0.15***     | 0.04 | -0.12*       | 0.05 | -0.09***      | 0.02 | -0.03             | 0.04 |                   |      |
| Gender <sup>c</sup> | -0.16        | 0.38 | 0.20         | 0.50 | -0.57**       | 0.18 | 0.18              | 0.24 |                   |      |
| Age <sup>d</sup>    | 1.72***      | 0.50 | 0.64         | 0.68 | 1.03**        | 0.34 | 0.20              | 0.39 |                   |      |
| SES                 | -0.39***     | 0.10 | -0.16        | 0.11 | -0.20**       | 0.05 | -0.14             | 0.06 |                   |      |
| Dutch               | -1.02***     | 0.19 | -1.16***     | 0.24 | -0.83**       | 0.10 | -0.57***          | 0.10 |                   |      |
| Mathematics         | -0.32        | 0.20 | -0.28        | 0.25 | -0.35***      | 0.11 | 0.05              | 0.14 |                   |      |
| <b>RANDOM</b>       |              |      |              |      |               |      |                   |      |                   |      |
| Intercept           | 1.27***      | 0.30 | 1.38**       | 0.50 | 0.54***       | 0.17 | 0.35*             | 0.16 |                   |      |

Note. <sup>a</sup>One-cycle higher education.

<sup>b</sup>Two-cycle higher education.

<sup>c</sup>0: girl/1: boy.

<sup>d</sup>0: finishing secondary education at the age of 18 or less/1: finishing secondary education at the age of 19 or more.

\*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001.

## APPENDIX D

Being Successful in One-Cycle Higher Education: Null Model.

|               | Unsuccessful or held<br>back two grades in 1CHE <sup>a</sup> | Successful in<br>1CHE <sup>b</sup> |      | Held back one<br>grade in 1CHE <sup>c</sup> |      |
|---------------|--|------------------------------------|------|---|------|
|               |  | Estimate                           | S.E. | Estimate                                    | S.E. |
| <b>FIXED</b>  |  |                                    |      |   |      |
| Intercept     |  | 0.52***                            | 0.16 | -0.31*                                      | 0.13 |
| <b>RANDOM</b> |  |                                    |      |   |      |
| Intercept     |  | 0.81***                            | 0.13 | 0.40*                                       | 0.18 |

*Note.* <sup>a</sup>Students who left the educational system and entered the labor market without a degree of higher education, students who quitted one-cycle higher education and went back to secondary education and students who were held back two grades in one-cycle higher education.

<sup>b</sup>Students who successfully finished one-cycle higher education without delay.

<sup>c</sup>Students who were held back one grade in one-cycle higher education.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

## APPENDIX E

Being Successful in One-Cycle Higher Education: Intelligence and Background Characteristics as Predictor Variables.

|                     | Unsuccessful or held back<br>two grades in 1CHE <sup>a</sup> | Successful in<br>1CHE <sup>b</sup> |      | Held back one<br>grade in 1CHE <sup>c</sup> |      |
|---------------------|--|------------------------------------|------|---|------|
|                     |  | Estimate                           | S.E. | Estimate                                    | S.E. |
| FIXED               |  |                                    |      |   |      |
| Intercept           |  | 1.07***                            | 0.21 | 0.12  | 0.18 |
| Intelligence        |  | 0.06**                             | 0.02 | 0.03  | 0.02 |
| Gender <sup>d</sup> |  | -0.50*                             | 0.24 | -0.49*                                      | 0.25 |
| Age <sup>e</sup>    |  | -1.27***                           | 0.23 | -0.74**                                     | 0.26 |
| SES                 |  | 0.08                               | 0.05 | 0.06  | 0.06 |
| RANDOM              |  |                                    |      |   |      |
| Intercept           |  | 0.63***                            | 0.15 | 0.25  | 0.25 |

*Note.* <sup>a</sup>Students who left the educational system and entered the labor market without a degree of higher education, students who quitted one-cycle higher education and went back to secondary education and students who were held back two grades in one-cycle higher education.

<sup>b</sup>Students who successfully finished one-cycle higher education without delay.

<sup>c</sup>Students who were held back one grade in one-cycle higher education.

<sup>d</sup>0: girl/1: boy.

<sup>e</sup>0: finishing secondary education at the age of 18 or less/1: finishing secondary education at the age of 19 or more.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

## APPENDIX F

Being Successful in One-Cycle Higher Education: Intelligence, Background Characteristics and Achievement Level at the End of Secondary Education as Predictor Variables.

|                     | Unsuccessful or held back<br>two grades in 1CHE <sup>a</sup> | Successful in<br>1CHE <sup>b</sup> |      | Held back one<br>grade in 1CHE <sup>c</sup> |      |
|---------------------|--|------------------------------------|------|---|------|
|                     |  | Estimate                           | S.E. | Estimate                                    | S.E. |
| FIXED               |  |                                    |      |   |      |
| Intercept           |  | 1.00***                            | 0.23 | 0.12  | 0.20 |
| Intelligence        |  | 0.03                               | 0.02 | 0.03  | 0.03 |
| Gender <sup>d</sup> |  | -0.43                              | 0.27 | -0.51*                                      | 0.26 |
| Age <sup>e</sup>    |  | -1.28***                           | 0.25 | -0.75**                                     | 0.26 |
| SES                 |  | 0.08                               | 0.05 | 0.06  | 0.07 |
| Dutch               |  | 0.33**                             | 0.10 | 0.02  | 0.15 |
| Mathematics         |  | 0.22                               | 0.13 | 0.08  | 0.13 |
| RANDOM              |  |                                    |      |   |      |
| Intercept           |  | 0.56***                            | 0.16 | 0.24  | 0.27 |

*Note.* <sup>a</sup>Students who left the educational system and entered the labor market without a degree of higher education, students who quitted one-cycle higher education and went back to secondary education and students who were held back two grades in one-cycle higher education.

<sup>b</sup>Students who successfully finished one-cycle higher education without delay.

<sup>c</sup>Students who were held back one grade in one-cycle higher education.

<sup>d</sup>0: girl/1: boy.

<sup>e</sup>0: finishing secondary education at the age of 18 or less/1: finishing secondary education at the age of 19 or more.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

## APPENDIX G

Being Successful in Academic Education: Null Model.

|               | Unsuccessful <sup>a</sup> | Successful <sup>b</sup> |      |
|---------------|---------------------------|-------------------------|------|
|               |                           | Estimate                | S.E. |
| <b>FIXED</b>  |                           |                         |      |
| Intercept     |                           | -0.37**                 | 0.12 |
| <b>RANDOM</b> |                           |                         |      |
| Intercept     |                           | 0.43**                  | 0.17 |

*Note.* <sup>a</sup>Students who are still following academic education with 1 or more year(s) of delay, students who have changed over to higher education of one or two cycle(s) and students who have left the educational system and have entered the labor market (without a degree of higher education).

<sup>b</sup>Students who completed the first 3 years of academic education without delay.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

## APPENDIX H

Being Successful in Academic Education: Intelligence and Background Characteristics as Predictor Variables.

|                     | Unsuccessful <sup>a</sup> | Successful <sup>b</sup> |      |
|---------------------|---------------------------|-------------------------|------|
|                     |                           | Estimate                | S.E. |
| <b>FIXED</b>        |                           |                         |      |
| Intercept           |                           | -1.53**                 | 0.47 |
| Intelligence        |                           | 0.05***                 | 0.01 |
| Gender <sup>c</sup> |                           | -0.33                   | 0.26 |
| Age <sup>d</sup>    |                           | -1.41*                  | 0.55 |
| SES                 |                           | 0.10**                  | 0.04 |
| <b>RANDOM</b>       |                           |                         |      |
| Intercept           |                           | 0.33*                   | 0.19 |

*Note.* <sup>a</sup>Students who are still following academic education with 1 or more year(s) of delay, students who have changed over to higher education of one or two cycle(s) and students who have left the educational system and have entered the labor market (without a degree of higher education).

<sup>b</sup>Students who completed the first 3 years of academic education without delay.

<sup>c</sup>0: girl/1: boy.

<sup>d</sup>0: finishing secondary education at the age of 18 or less/1: finishing secondary education at the age of 19 or more.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .



## APPENDIX I

Being Successful in Academic Education: Intelligence, Background Characteristics and Achievement Level at the End of Secondary Education as Predictor Variables.

|                     | Unsuccessful <sup>a</sup> | Successful <sup>b</sup> |      |
|---------------------|---------------------------|-------------------------|------|
|                     |                           | Estimate                | S.E. |
| <b>FIXED</b>        |                           |                         |      |
| Intercept           |                           | -1.49**                 | 0.49 |
| Intelligence        |                           | -0.00                   | 0.02 |
| Gender <sup>c</sup> |                           | -0.29                   | 0.27 |
| Age <sup>d</sup>    |                           | -1.35*                  | 0.56 |
| SES                 |                           | 0.09*                   | 0.05 |
| Dutch               |                           | 0.39**                  | 0.13 |
| Mathematics         |                           | 0.40***                 | 0.10 |
| <b>RANDOM</b>       |                           |                         |      |
| Intercept           |                           | 0.17                    | 0.29 |

*Note.* <sup>a</sup>Students who are still following academic education with 1 or more year(s) of delay, students who have changed over to higher education of one or two cycle(s) and students who have left the educational system and have entered the labor market (without a degree of higher education).

<sup>b</sup>Students who completed the first 3 years of academic education without delay.

<sup>c</sup>0: girl/1: boy.

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\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .