

# VULNERABILITY FACTORS OF GRADE RETENTION IN LUXEMBOURGISH SECONDARY SCHOOL

**Florian Klapproth**

*University of Luxembourg*

*Route de Diekirch*

*Walferdange, Luxembourg*

*florian.klapproth@uni.lu*

**Paule Schaltz**

*University of Luxembourg*

*Route de Diekirch*

*Walferdange, Luxembourg*

*paule.schaltz@uni.lu*

## **Abstract**

*Based on a large longitudinal sample (N = 9,031) of Luxemburgish secondary-school students, this study examined whether certain variables reflecting the socio-demographic background of the students (gender, nationality, and socioeconomic status) as well as the school track proved to be predictors of grade retention. These possible predictors of grade retention were tested against the effect of students' achievements, represented by their grade point average (GPA) at each grade level. By using Cox regression analysis we could show that even when the effects of socio-demographic variables were qualified by students' achievement, male students, immigrant students, students from schools of lower SES districts, and students attending the lower track were shown to have a higher risk of experiencing grade retention than female students, native students, students from schools of higher SES districts, or students attending the higher track. Possible reasons for the results obtained are presented.*

**Keywords:** *predictors, grade retention, secondary school, survival analysis, demographic factors*

## **Introduction**

Several meta-analyses (e. g., Hattie, 2009) and subsequent research (e. g., Chen, Liu, Zhang, Shi, & Rozelle, 2010) indicate that retention in grade does not provide benefits to students in general, compared to students who are at a similar level of academic achievement but are promoted to the next grade. However, grade retention continues to be used as an instrument to separate students with academic difficulties from their class mates performing rather sufficiently.

### **Predictors of grade retention**

Whether or not students are retained in grade is primarily based on their achievements, as is suggested by school policies and research (e. g., Liddell & Rae, 2001). However, there is a growing body of literature showing that factors not directly related to achievement may affect the likelihood of grade retention as well. Rates of retention appear to be related at least also to gender, ethnicity, and socioeconomic status. Compared to promoted students, retained students are more likely to be boys (Alexander, Entwisle, & Dauber, 2003) and members of ethnic minority groups (Byrd & Weitzman, 1994). A further predictor of grade retention is socioeconomic status (Byrd & Weitzman, 1994), showing that high-SES students are more likely to be promoted than low-SES students.

### **Aims of the Study**

With this study we wanted to examine who is retained in grade in Luxembourgish secondary school, and who is promoted to the next grade. In particular, we tested whether certain variables reflecting the socio-demographic background of the students (gender, nationality, and socioeconomic status) proved to be predictors of grade retention. These possible predictors of grade retention were tested against the effect of students' achievements, represented by their grade point average (GPA) at each grade level. We additionally investigated whether the likelihood of being retained or promoted differed between students of the different tracks to which they were assigned after finishing primary school.

### **Method**

#### **Sample and Variables**

The data set that was used for the following analyses was provided by the Luxembourgish Ministry of Education after student data had been anonymized. This data set entailed information on students' gender, nationality, the school track, and the particular school they attended in secondary school. For all students in Luxembourg, secondary school begins at grade 7 and continues to grade 12, 13, or 14, depending on the track the students follow. Additionally, information was given regarding the grade of the students in each school year, and the grade point average (GPA) they obtained each year. The data set contained information from students of two waves. Each wave was a complete age-cohort of students entering secondary school in Luxembourg. The entire data set comprised information from  $N = 9,031$  students. The first wave of students started secondary school in school year 2001/2002, the second wave in school year 2002/2003. The number of students of each wave was  $n_1 = 4,504$  and  $n_2 = 4,527$ . Information from students of each wave was recorded for nine successive years (ending in school year 2009/2010 and 2010/2011, respectively).

### Data analyses

In order to examine multiple effects of the predictors on grade retention, we applied Cox regression analysis. In Cox regression analysis, a model is built that estimates the rate of retention within a certain time interval as a function of some predictor variables. For the purpose of this study, we aimed at examining the effect of gender, SES, nationality, and school track on the students' first time of grade retention, while GPA was controlled for. To acknowledge that the rate of grade retention might vary over time as a function of achievement, we deemed it necessary to account for students' achievement as it might change between grades. Hence, if students had been retained, the GPA was used that directly preceded the retained grade. However, for students who had not been retained during their entire school career, the GPA that was obtained at the second to last year of school was used as an indicator of individual achievement. The resulting regression model was as follows:

$$h_i(t) = h_0(t) * \exp(\beta_1 \text{GPA}_i + \beta_2 \text{GENDER}_i + \beta_3 \text{NATION}_i + \beta_4 \text{SES}_i + \beta_5 \text{TRACK}_i).$$

This equation indicates that the hazard for individual  $i$  retained in grade  $t$ , given that he or she has not been retained before grade  $t$ , is the product of two factors: (a) a baseline hazard function  $h_0(t)$  that is similar to the intercept in logistic regression analysis, and (b) a linear function of a set of predictors, which is then exponentiated. The exponential of the coefficients from the Cox model gives the relative risk for an increase of one unit for the predictor in question.

### Results

Table 1 demonstrates that after adjusting for the effect of GPA, still all socio-demographic variables as well as the school track exerted an influence on grade retention.

Table 1. Cox regression model including all predictors

Variable	Hazard Ratio	95 % Confidence Interval	p
GPA	0.897	0.893 - 0.901	< .001
Gender	1.093	1.028 – 1.161	.004
Nation. Lux.	0.890	0.816 -0.970	.008
Nation. Por.	1.114	1.003 - 1.237	.043
SES	0.850	0.800 - 0.903	< .001
Track	0.923	0.863 - 0.986	.018
-2 log likelihood	71,610.135		
Chi-Square	2,497.970 (df = 6), p < .001		

*Note:* Gender was coded as 1 for girls. Nation Lux. was coded as 1 for Luxembourgish students. Nation Por. was coded as 1 for Portuguese students. SES was coded as 1 for high SES school district. Track was coded as 1 for high track.

## Discussion

As expected, socio-demographic variables as well as the school track were significant predictors of grade retention in Luxembourgish secondary school. However, there is no obvious reason for letting a certain subpopulation of students fail to promote, whereas another subpopulation will easier succeed on their grade, despite their average school marks being equal. Yet, previous research suggests that reasons for the effects of socio-demographic factors on the likelihood of being retained may be ascribed to teachers' decision-making processes (e. g., Fiske & Neuberg, 1990; Glock, Krolak-Schwerdt, Klapproth, & Böhmer, 2012), and to students' (maladaptive) behaviors (e. g., Rodney, Crafter, Rodney, & Mupier, 1999). Further research should focus on these factors.

**Florian Klapproth** was born in Tettngang, Germany. He has got his Diploma degree in Psychology in 1999 at Göttingen University, Germany, and has made his PhD at Hildesheim University, Germany, in 2003. From 2003 to 2009, he worked as a Research Assistant at the Institute of Psychology and Working Sciences, Technical University of Berlin. In April 2010 he obtained his postdoctoral lecture qualification (Habilitation) in Psychology. He is now working at Luxembourg University as a Principal Investigator of a project that is concerned with human decision making in educational contexts.

**Paule Schaltz** made her M.Sc. in Psychology at the Georg-August-Universität Göttingen, Germany, in 2011. Since February 2012 she works as a Research Assistant and PhD-candidate in the ECCS Research Unite, University of Luxembourg, in the project "PREVAL" (Predictive validity of school placement decisions of primary school

teachers in Luxembourg; Supervisor: Dr. Florian Klapproth).

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