

**ETHNIC MINORITY STUDENTS
IN SECONDARY EDUCATION IN CYPRUS – THEIR ATTAINMENT
AND RISK PROFILE**

A thesis submitted to the University of Manchester
for the degree of PhD
in the Faculty of Humanities

2013

GALATIA THEODOSIOU-ZIPITI

SCHOOL OF EDUCATION

LIST OF CONTENTS

| | |
|---|----|
| LIST OF TABLES | 7 |
| LIST OF FIGURES | 10 |
| ABSTRACT | 13 |
| DECLARATION | 14 |
| COPYRIGHT STATEMENT | 15 |
| CHAPTER 1: INTRODUCTION | 16 |
| CHAPTER 2: LITERATURE REVIEW | 20 |
| 2.1 Introduction | 20 |
| 2.2 Attainment Levels of Students from Different Ethnic Groups | 21 |
| 2.3 Factors Influencing Educational Attainment | 24 |
| 2.4 Detailed Examination of Some Specific Factors | 26 |
| 2.4.1 Gender | 26 |
| 2.4.2 Generation Status | 27 |
| 2.4.3 Socio-economic Status | 29 |
| 2.4.4 Absences | 32 |
| 2.4.5 School Size | 33 |
| 2.4.6 School Minority Concentration | 36 |
| 2.5 The Situation in Cyprus | 38 |
| 2.5.1 Demographic Changes in Cypriot Society and Schools | 38 |
| 2.5.2 Multicultural Education in Cyprus | 39 |
| 2.5.3 Attainment of Ethnic Minority Students and Responsible Factors | 42 |
| 2.6 Remarks on the Earlier Literature | 43 |
| CHAPTER 3: METHODOLOGY | 50 |
| 3.1 Design of the Study | 50 |
| 3.1.1 Background to the Study | 50 |
| 3.1.2 Research Questions | 51 |
| 3.1.3 Employing a Combination of Quantitative and Qualitative Methods | 51 |
| 3.2 Structure of the Study | 53 |
| 3.2.1 First Phase | 54 |
| 3.2.2 Second Phase | 55 |
| 3.2.3 Third Phase | 55 |
| 3.2.4 Fourth Phase | 56 |
| 3.3 Quantitative Data | 57 |
| 3.3.1 School Sample | 57 |
| 3.3.2 Student Sample | 59 |
| 3.3.3 Dependent and Independent Variables | 60 |
| 3.3.4 Variable Coding | 66 |
| 3.3.5 Sources of Information | 67 |
| 3.3.6 Quantitative Analytic Strategies | 67 |
| 3.3.7 Multilevel Regression Models | 75 |
| 3.3.8 Dealing with Outliers | 83 |
| 3.3.9 Alternative Analytical Paths | 84 |
| 3.3.10 Validity of Quantitative Data | 86 |
| 3.4 Qualitative Data | 88 |
| 3.4.1 Linking (and Triangulating) Focus Group and Individual Interviewing | 88 |

| | |
|--|-----|
| 3.4.2 Sampling – Teacher Sample | 88 |
| 3.4.3 Data Collection Methods | 89 |
| 3.4.4 Question Schedule for Focus Group and Individual Interviews..... | 93 |
| 3.4.5 Qualitative Data Analysis | 94 |
| 3.4.6 Weaknesses of the Qualitative Techniques and Validity of Qualitative Data.... | 97 |
| 3.5 Data Access and Ethics..... | 100 |
| CHAPTER 4: DATA PRESENTATION | 102 |
| 4.1 Introduction..... | 102 |
| 4.2 Multiple Regression Analysis..... | 103 |
| 4.2.1 Tables Content | 103 |
| 4.2.2 Presentation and Interpretation of the Multiple Regression Analyses..... | 103 |
| 4.3 Multilevel Regression Analysis..... | 117 |
| 4.3.1 Tables Content | 118 |
| 4.3.2 Presentation and Interpretation of the Multilevel Regression Analyses..... | 119 |
| 4.4 Model Fit of the Regression Models Presented Above | 125 |
| 4.5 Qualitative Data: Examples of Analytical Process | 128 |
| CHAPTER 5: PAPERS | 139 |
| 5.1 Introduction..... | 139 |
| 5.1.1 Small Attainment Study..... | 139 |
| 5.1.2 Focus Group Study | 140 |
| 5.1.3 Interview Study..... | 140 |
| 5.1.4 Subject Study..... | 141 |
| 5.1.5 Absences Study..... | 141 |
| 5.2 Attainment of Ethnic Minority Secondary School Students in Cyprus* | 143 |
| 5.2.1 Abstract..... | 143 |
| 5.2.2 Introduction..... | 143 |
| 5.2.3 Methodology..... | 146 |
| 5.2.4 Results..... | 150 |
| 5.2.5 Discussion..... | 157 |
| 5.2.6 Conclusion and Recommendations for Policy and Further Research | 160 |
| 5.3 Factors Affecting Ethnic Minority Students’ Attainment in Secondary Schools in Cyprus – A Focus Group Study..... | 163 |
| 5.3.1 Abstract..... | 163 |
| 5.3.2 Introduction..... | 163 |
| 5.3.3 Methodology..... | 164 |
| 5.3.4 Findings | 165 |
| 5.3.5 Concluding remarks..... | 169 |
| 5.4 Attainment Gap – The Teacher Perspective | 171 |
| 5.4.1 Abstract..... | 171 |
| 5.4.2 Introduction..... | 171 |
| 5.4.3 Methodology..... | 175 |
| 5.4.4 Findings | 177 |
| 5.4.5 Discussion..... | 183 |
| 5.5 Factors Influencing Attainment Levels among Ethnic Minority Students in Cyprus: Revisiting the Influence of Language..... | 190 |
| 5.5.1 Abstract..... | 190 |
| 5.5.2 Introduction..... | 190 |
| 5.5.3 Literature review..... | 191 |
| 5.5.4 Methodology..... | 196 |
| 5.5.5 Analysis | 200 |
| 5.5.6 Findings | 201 |

| | |
|---|-----|
| 5.5.7 Discussion | 205 |
| 5.5.8 Conclusions | 208 |
| 5.6 Excused or Unexcused, Absences Matter; Suspension Has an Even More Dramatic Relation to Attainment | 210 |
| 5.6.1 Abstract | 210 |
| 5.6.2 Introduction | 210 |
| 5.6.3 The case of Cyprus | 212 |
| 5.6.4 Methodology | 214 |
| 5.6.5 Findings from the quantitative analysis | 218 |
| 5.6.6 Findings from the qualitative analysis | 221 |
| 5.6.7 Discussion | 223 |
| 5.6.8 Conclusions | 226 |
| CHAPTER 6: CONCLUSIONS | 229 |
| 6.1 Summary of Main Findings | 229 |
| 6.2 Methodological Note | 231 |
| 6.3 Contribution to Knowledge and Implications for Practice | 232 |
| 6.4 Reflections | 234 |
| 6.5 Further Research | 236 |
| REFERENCES | 238 |
| APPENDIX 1: Reviewed Studies | 254 |
| APPENDIX 2 | 262 |
| Descriptive Statistics | 262 |
| Frequency Measures for Each Variable | 262 |
| Cross-tabulations with Ethnicity and Other Variables | 280 |
| APPENDIX 3 | 285 |
| Regression Diagnostics | 285 |
| Checking for Violations of Assumptions Using Residuals | 285 |
| Normality | 285 |
| Constant Variance | 290 |
| Linearity | 294 |
| Independence | 294 |
| APPENDIX 4: Multiple Regression Modelling Process | 295 |
| APPENDIX 5 | 318 |
| Focus Group Schedule | 318 |
| APPENDIX 6 | 320 |
| Interview Schedule | 320 |
| APPENDIX 7 | 323 |
| Letter to the Ministry of Education and Culture of Cyprus | 323 |
| APPENDIX 8 | 325 |
| Letter to Head Teachers | 325 |
| APPENDIX 9 | 328 |
| Attainment Gap and Responsible Factors – A Quantitative Study in Secondary Schools in Cyprus | 328 |
| Abstract | 328 |
| Introduction | 328 |
| Methods of analysis | 331 |
| Concluding remarks | 341 |

Word Count: 91,195

LIST OF TABLES

| | |
|--|-----|
| Table 1: Parameter Estimates of the Regression Analysis in Modern Greek (Rasch Score) (Ethnicity Variable Included)..... | 104 |
| Table 2: Parameter Estimates of the Regression Analysis in Mathematics (Rasch Score) (Ethnicity Variable Included)..... | 105 |
| Table 3: Parameter Estimates of the Regression Analysis in Modern Greek (Rasch Score) (Generation Status Variable Included)..... | 105 |
| Table 4: Parameter Estimates of the Regression Analysis in Mathematics (Rasch Score) (Generation Status Variable Included)..... | 106 |
| Table 5: Parameter Estimates of the Regression Analysis of the Trimesters Overall Attainment (Ethnicity Variable Included)..... | 108 |
| Table 6: Parameter Estimates of the Regression Analysis of the Trimesters Overall Attainment (Generation Status Variable Included)..... | 109 |
| Table 7: Parameter Estimates of the Regression Analysis of the Trimesters Overall Attainment (School Size Variable Included) | 110 |
| Table 8: Parameter Estimates of the Regression Analysis of the Trimesters Overall Attainment (School Minority Concentration Variable Included) | 111 |
| Table 9: Parameter Estimates of the Regression Analysis of the Combined Trimesters and Final Exams Overall Attainment (Ethnicity Variable Included)..... | 112 |
| Table 10: Parameter Estimates of the Regression Analysis of the Combined Trimesters and Final Exams Overall Attainment (Generation Status Variable Included)..... | 113 |
| Table 11: Parameter Estimates of the Regression Analysis of the Combined Trimesters and Final Exams Overall Attainment (School Size Variable Included) | 114 |
| Table 12: Parameter Estimates of the Regression Analysis of the Combined Trimesters and Final Exams Overall Attainment (School Minority Concentration Variable Included) | 115 |
| Table 13: Parameter Estimates of the Multilevel Regression Model for the Combined Trimesters and Final Exams Overall Attainment in the Subject Study | 120 |
| Table 14: Parameter Estimates of the Multilevel Regression Model for the Combined Trimesters and Final Exams Overall Attainment in the Absences Study | 123 |
| Table 15: Quotes From a Teacher; Initial Division Into 5 Broad Categories (in Greek)... | 129 |
| Table 16: A Focus on the 1 st of the 5 Broad Categories Above (extracts in Greek and English) | 132 |
| Table 17: Quotes from Different Teachers Relating to the Factor ‘Lack of Parental Involvement’ (Extracts in Greek and English) | 136 |

| | |
|--|-----|
| Table 18: Descriptive Statistics for the Variables Used in the Study by Ethnicity | 151 |
| Table 19: Parameter Estimates of the Regression Analysis in Modern Greek (Rasch Score) | 156 |
| Table 20: Parameter Estimates of the Regression Analysis in Mathematics (Rasch Score) | 156 |
| Table 21: Parameter Estimates of the Trimesters Overall Multiple Regression Analysis | 202 |
| Table 22: Parameter Estimates of the Multiple Regression Analysis for the Combined Trimesters and Final Exams Overall Attainment | 202 |
| Table 23: Parameter Estimates of the Multilevel Regression Model (Repeated Measures) for the Combined Trimesters and Final Exams Attainment | 203 |
| Table 24: ‘Perfect Scores’ in Attainment Indicators | 205 |
| Table 25: Description of the dependent and independent variables used in the study | 215 |
| Table 26: Mean number of absences (measured in teaching periods) by subject and ethnic group | 218 |
| Table 27: Student suspension rates across ethnic groups | 219 |
| Table 28: Parameter Estimates of the Multilevel Regression Model (Repeated Measures) for the Combined Trimesters and Final Exams Attainment | 220 |
| Table 29. Table of Reviewed Studies | 254 |
| Table 30. Year Groups (Frequency Measures)..... | 262 |
| Table 31. Descriptive Statistics for Continuous Variables (part 1/3) | 263 |
| Table 32. Ethnicity – Sample and Population (Frequency Measures)..... | 266 |
| Table 33. Ethnicity Across Year Groups (Frequency Measures)..... | 266 |
| Table 34. Gender (Frequency Measures)..... | 267 |
| Table 35. Generation Status (Frequency Measures)..... | 267 |
| Table 36. Parental Educational Level (Frequency Measures)..... | 268 |
| Table 37. Parental Occupational Level (Frequency Measures)..... | 268 |
| Table 38. Schools (Frequency Measures)..... | 269 |
| Table 39. School Size (Frequency Measures). | 270 |
| Table 40. School Minority Concentration (Frequency Measures). | 270 |
| Table 41. Ethnicity and Generation Status Cross-Tabulation. | 280 |
| Table 42. Ethnicity and Parental Education Cross-Tabulation..... | 281 |
| Table 43. Ethnicity and Parental Occupation Cross-Tabulation. | 282 |
| Table 44. Ethnicity and Schools Cross-Tabulation. | 283 |
| Table 45. Ethnicity and School Minority Concentration Cross-Tabulation. | 284 |
| Table 46. Ethnicity and Suspension Cross-Tabulation..... | 284 |

| | |
|--|-----|
| Table 47: The Manual Forward/Stepwise-Selection Procedure of the Multiple Regression Model for the Trimesters Overall Attainment in the Subject Study | 295 |
| Table 48: The Manual Forward/Stepwise-selection Procedure of the Multiple Regression Model for the Combined Trimesters and Final Exams Overall Attainment in the Subject Study | 307 |
| Table 49. Descriptive statistics for the variables used in the study by ethnicity. | 333 |
| Table 50: Parameter estimates of the regression analysis for the Overall attainment of students from first, second, and third year group..... | 338 |

LIST OF FIGURES

| | |
|---|-----|
| Figure 1: Design of the research study | 53 |
| Figure 2: Multilevel/Hierarchical Data Structure | 76 |
| Figure 3: Components of Data Analysis: Flow Model (Miles and Huberman 1994, p.10). 95 | |
| Figure 4: Graphical Representation of the Different Stages of Data Categorisation for the Interview Study..... | 138 |
| Figure 5: Rasch Scores for Students from Each Ethnicity-related Category..... | 152 |
| Figure 6: Rasch Scores for Student Attainment in Modern Greek Correlated with Gender | 153 |
| Figure 7: The Rasch Scores for Student Attainment in Modern Greek Correlated with Generation..... | 153 |
| Figure 8: Rasch Scores for Students from Different Parental Educational Categories in Modern Greek..... | 154 |
| Figure 9: Rasch Scores for Student Achievement in Modern Greek Correlated with Parental Occupational Categories..... | 155 |
| Figure 10. Histogram of the Trimesters Overall Attainment..... | 272 |
| Figure 11. Histogram of the Combined Trimesters and Final Exams Overall Attainment | 272 |
| Figure 12. Histogram of the Combined Trimesters and Final Exam Attainment in Modern Greek..... | 273 |
| Figure 13. Histogram of the Combined Trimesters and Final Exam Attainment in Mathematics..... | 273 |
| Figure 14. Histogram of the Combined Trimesters and Final Exam Attainment in History | 274 |
| Figure 15. Histogram of the Combined Trimesters and Final Exam Attainment in Physics | 274 |
| Figure 16. Histogram of Overall Absences (from All Subjects Examined)..... | 275 |
| Figure 17. Histogram of Absences in Modern Greek..... | 276 |
| Figure 18. Histogram of Absences in Mathematics..... | 276 |
| Figure 19. Histogram of Absences in History | 277 |
| Figure 20. Histogram of Absences in Physics | 277 |
| Figure 21. Age Distribution in First Year-Group | 278 |
| Figure 22. Age Distribution in Second Year-Group..... | 279 |
| Figure 23. Age Distribution in Third Year-Group..... | 279 |

| | |
|---|-----|
| Figure 24. Histogram of the Residuals for the Trimesters Overall Attainment derived from the multiple regression analysis of the Subject Study..... | 286 |
| Figure 25. Histogram of the residuals for the Combined Trimesters and Final Exam Overall Attainment derived from the multiple regression analysis of the Subject Study..... | 286 |
| Figure 26. Histogram of the Residuals for the Combined Trimesters and Final Exam Overall Attainment derived from the multilevel analysis of the Subject Study | 287 |
| Figure 27. Histogram of the Residuals for the Combined Trimesters and Final Exam Overall Attainment derived from the multilevel analysis of the Absences Study | 287 |
| Figure 28: Q-Q Normal Plot for the Trimesters Overall Attainment derived from the multiple regression analysis of the Subject Study | 288 |
| Figure 29: Q-Q Normal Plot for the Combined Trimesters and Final Exam Overall Attainment derived from the multiple regression analysis of the Subject Study..... | 289 |
| Figure 30. Q-Q Normal Plot for the Combined Trimesters and Final Exam Overall Attainment derived from the multilevel regression analysis of the Subject Study.... | 289 |
| Figure 31. Q-Q Normal Plot for the Combined Trimesters and Final Exam Overall Attainment derived from the multilevel regression analysis of the Absences Study. | 290 |
| Figure 32. Scatterplot of the residuals versus Fitted Values for the Trimesters Overall Attainment derived from the multiple regression analysis of the Subject Study..... | 291 |
| Figure 33. Scatterplot of the Residuals versus Fitted Values for the Trimesters and Final Exams Overall Attainment derived from the multiple regression analysis of the Subject Study. | 292 |
| Figure 34. Scatterplot of the Residuals versus Fitted Values for the Trimesters and Final Exams Overall Attainment derived from the multilevel regression analysis of the Subject Study. | 293 |
| Figure 35. Scatterplot of the Residuals versus Fitted Values for the Trimesters and Final Exams Overall Attainment derived from the multilevel regression analysis of the Absences Study..... | 293 |
| Figure 36: The Overall attainment (Rasch score) of students from each ethnic group..... | 334 |
| Figure 37: The Overall attainment (Rasch score) of students across gender..... | 334 |
| Figure 38: The Overall attainment (Rasch score) of students with different generation status..... | 335 |
| Figure 39: The Overall attainment (Rasch score) of students from different parental educational categories. | 335 |
| Figure 40: The Overall attainment (Rasch score) of students from different parental occupational categories. | 336 |

Figure 41: The Overall attainment (Rasch score) of students across schools with different minority concentration (0.00 = low, 1.00 = high). 337

ABSTRACT

Institution: The University of Manchester
Candidate: Galatia Theodosiou-Zipiti
Degree Title: PhD Faculty of Humanities, School of Education
Thesis Title: Ethnic Minority Students in Secondary Education in Cyprus – Their Attainment and Risk Profile
Date: May 2013

The attainment of ethnic minority students in their host countries has been occupying a significant part of the international literature for many years. However, results suggest that no generalisations can be made on whether an ethnic minority group underachieves in a particular country and the reasons behind their attainment levels, unless that specific group has been investigated in the country in question. Cyprus joined the EU in 2004 and since then the demographic composition in the island changed dramatically; a change reflected in schools. The literature on ethnic minority group attainment in secondary schools in Cyprus is virtually non-existent and, as such, in this PhD programme the aim was to examine the attainment of ethnic minorities compared to native students and the reasons behind the observed patterns.

In order to answer the research questions a series of studies were carried out. Initially, two quantitative studies were conducted. These studies used trimester grades as a proxy of attainment and Rasch analysis to turn these ordinal student grades into a linear scale. Descriptive statistics and multiple regression analyses were then run to check for trends and significant associations. Two qualitative studies then followed. Firstly, a focus group study was conducted utilising the help of six young female teachers, all teaching classics to create a homogeneous group. Then followed an interview study utilising semi-structured interviews on sixteen teachers. For both studies a thematic analysis was undertaken on the transcribed discussions. Another quantitative study then followed which employed an enhanced methodology to the first two studies and richer data. The final study was a mixed methods study and concentrated on school absences.

Results demonstrate the reality in lower secondary schools in Cyprus for the first time. The minority group Georgians, the first time that this group is met in the literature, and a combination of other smaller groups put together in a group called ‘Others’, are shown to achieve significantly lower than natives. Ethnic background, gender, generation status, absences, the socio-economic status of the family and the character of the local educational system were shown to be related to student attainment. The widely held belief that ethnic minority students do even worse in those subjects that are more language-dependent is disproven; rather it is the content of the subject that is felt to be more influential on attainment. Also, the recently emerging consensus that unexcused absences are more strongly associated with attainment than excused absences is not upheld in this study; a more detailed classification of unexcused absences might be responsible for this. Finally, it is interesting to note the differential influence of different absence variables on different school subjects.

Findings highlight the need for change and improvement in the educational practice in Cyprus and add to both the local and international literature. The specific factors identified can form the basis on which to base suggestions for improvements and further research.

DECLARATION

The first paper presented in the thesis is based on data collected during an MSc degree that the author undertook at the University of Manchester in 2005-2006. However, introduction/literature review, results, and discussion sections of the paper are significantly different from the work submitted for the initial degree or completely new. All the changes (which are explained in the Methodology chapter of the thesis) came about from work and advice received from supervisors during the PhD study period. As this initial work formed the grounding on which the PhD was based and a paper was written and accepted for publication during the PhD period, we decided to include it in the PhD thesis. Further, the letters for permission for educational research to the Ministry of Education and Culture of Cyprus and the head teachers of selected schools represent amended versions of letters submitted for the same MSc degree undertaken by the author as mentioned above. No other portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

COPYRIGHT STATEMENT

- i. The author of this thesis (including any appendices and/or schedules to this thesis) owns any copyright in it (the “Copyright”) and she has given The University of Manchester the right to use such Copyright for any administrative, promotional, educational and/or teaching purposes.
- ii. Copies of this thesis, either in full or in extracts, may be made **only** in accordance with the regulations of the John Rylands University Library of Manchester. Details of these regulations may be obtained from the Librarian. This page must form part of any such copies made.
- iii. The ownership of any patents, designs, trademarks and any and all other intellectual property rights except for the Copyright (the “Intellectual Property Rights”) and any reproductions of copyright works, for example graphs and tables (“Reproductions”), which may be described in this thesis, may not be owned by the author and may be owned by third parties. Such Intellectual Property Rights and Reproductions cannot and must not be made available for use without the prior written permission of the owner(s) of the relevant Intellectual Property Rights and/or Reproductions.
- iv. Further information on the conditions under which disclosure, publication and exploitation of this thesis, the Copyright and any Intellectual Property Rights and/or Reproductions described in it may take place is available from the Head of School of Education (or the Vice-President) and the Dean of the Faculty of Life Sciences, for Faculty of Life Sciences’ candidates.

CHAPTER 1: INTRODUCTION

I am a secondary school teacher and have worked in Cypriot schools for a number of years teaching Philological subjects (Modern Greek, History, and Classics). During these years I observed an increase in the number of students from ethnic minority backgrounds. Even though I never worked in schools or taught in classes with a large number of ethnic minority students, I, nonetheless, experienced working with them. Further, from discussions with colleagues, I got the impression that even though there were notable exceptions (students with high attainment, high attendance, good behaviour, and well prepared for school), the majority of minority students were portrayed as having the exact opposite attributes. I could not understand why some of them could do well while most could not. In addition, I noted that some of my colleagues were also puzzled about this situation. They were worried about what was happening in their schools and classrooms, but they did not know how to help their students improve their performance. More worryingly though, was the observation that most of my colleagues were very relaxed about the situation; maybe even oblivious to it. They, perhaps, expected these children to do worse than their native counterparts and in so doing, they became apathetic to their needs and difficulties. I was unclear whether this was the situation only in schools with small numbers of ethnic minority students, such as the one I was working in, or whether this was the situation in all secondary schools. This provided the impetus for me to undertake some research and look into this in more detail.

I registered for a PhD in the University of Manchester in January 2005. I started reviewing the international and local literature concerning the attainment of ethnic minority groups and realised two things. Firstly, that the literature from other countries was mainly focused on quantifying the performance differences between ethnic minority and majority groups, and not the reasons behind these differences. Most of the identified factors were examined in quantitative studies, while most of the qualitative studies investigating the factors behind the poor attainment levels of minority students looked at the effects of a single or a small number of closely related factors. Secondly, in Cyprus there had been no previous research in the performance of ethnic minority students. As such, I decided to combine quantitative and qualitative methods to investigate the attainment levels of minority students in Cyprus and to search for possible factors that could have an impact on them.

Trying to design the methodology for my study, I realised that I needed to learn more about research methods in education. So, in September 2005 I registered for an MSc in Educational Research to study research methodology. For my dissertation I carried out a

16

preliminary study looking at the attainment of ethnic minority students and some possible influencing factors, using the school population of two secondary schools (Theodosiou 2006). This was the first such study in Cyprus. Results showed that ethnic minority students had a significantly lower attainment than native students. Also, a number of factors, including gender, family socio-economic status, generation status, and absences, appeared to have a significant effect on attainment. The study was, however, small and thus concerns were raised about its validity.

The findings of the study carried out for the MSc dissertation were confirmed in a much larger quantitative study which was carried out next. This included six schools and looked at more variables. Qualitative studies were then employed to further clarify the reasons behind the lower attainment in ethnic minority students. A homogeneous focus group was initially set up, including teachers from the same gender and all teaching the same subject, albeit in different schools. A number of factors were identified as important and synthesis of the results suggested that the socio-economic status of the family and the character of the current educational system were the main reasons for the disparity in attainment. Findings in relation to family socio-economic status confirmed results from the quantitative studies. Findings, though, in relation to the character of the Cypriot educational system needed further investigation and confirmation, as the small number of participants and the fact that they all taught the same subject presented potential problems with external validity. In order to address these concerns, a further qualitative study, this time an interview study, was carried out. This included a larger number of teachers from different disciplines and different positions in the school hierarchy. The previous findings in relation to family socio-economic status and the character of the current, Cypriot educational system were once again confirmed and some further points clarified.

The alternative format thesis and the significant time taken to complete this work have to do with my personal circumstances. At the end of the second year of my PhD, I interrupted my studies for three months in order to get married. Then, I got pregnant and interrupted my studies once again. Before the end of my third year, I gave birth to my little daughter prematurely. She needed my full attention and time and, as a consequence, I needed to extend my interruption for three semesters. Following this time, I felt ready to start working on my PhD again. I had already collected the required data, but the amount of work ahead appeared enormous. I quickly realised that the time I had available for the PhD as a full-time mother was much reduced; as was my patience! With my supervisor, Professor Mel West, we decided that the best way forward was to divide the work into

smaller chunks and concentrate on one part at a time. Because of family pressures and responsibilities it was difficult for me to travel and present my work in conferences. As such, when the first piece of work was finished, I wrote it up and sent it for publication in a journal... nice to publish something! This, then, continued and each stage of the study was put together into a paper. So, even though my initial intention was to submit this thesis in the format of a standard doctoral thesis, this is submitted in an alternative format, which incorporates sections that are in a format suitable for publication in peer-reviewed journals. I believe that dividing the work into a series of stages/papers helped me complete my thesis.

I first submitted my thesis in December 2010 and had my viva in April 2011. Unfortunately, this did not go as well as I would have hoped for! The examiners suggested a number of changes/corrections and advised a resubmission of the thesis in a year's time. I should also mention that at the time of the viva I was pregnant with my son. Realising that it was difficult for me to work on my thesis under these circumstances, I took twelve months off to give me a chance to give birth to my baby boy and look after him for the first few months of life.

When I went back to the thesis, and following advice from my supervisor/advisors, it became apparent that in order to address the examiners' comments and answer my research questions I needed to familiarize myself with analytical methods that I had not used previously (multilevel analysis). There was also a need to collect more data items with regard to student absenteeism to enrich the study on absences.

The present thesis format includes a detailed literature review chapter, a detailed methodology chapter, an illustrative data chapter, five papers, and a summary/conclusion chapter. The references and appendices are included at the end.

Other than myself, a few other people whose names appear as co-authors in the relevant papers, made a contribution to this piece of work. I reviewed the literature, designed the studies, and contacted the Ministry of Education and Culture in Cyprus as well as the head teachers of the schools included in the studies to obtain permissions for access to schools and data. I also collected and analyzed both quantitative data and qualitative data, wrote the papers, and submitted them to peer-reviewed journals. One supervisor, Professor Mel West, and one advisor, Dr Iasonas Lamprianou, oversaw the whole work. Each one supervised a different part of the work; Professor West the qualitative part and Dr

Lamprianou the quantitative part. They both reviewed and commented on initial drafts of the papers. Further, Professor Daniel Muijs was involved in the review of some of the initial work undertaken for this PhD degree. However, his supervisory role ceased when he moved on to a different institution. Following the examiners' comments from the initial viva, Dr Maria Pampaka was also drafted in to offer advice regarding the necessary changes to meet the standards expected by the examiners.

Through this programme, it has been demonstrated that ethnic minority students in lower secondary schools in Cyprus underachieve. This is true, not only for language-dependent subjects. Also, an innovative way of looking at absences reveals information that is new in this area. Many possible factors have been identified as potentially relevant and these have been synthesised into two main categories – the family socio-economic status and the character of the local educational system. Some steps have already been taken by the policy makers in the island to improve outcomes. These are commented upon and further suggestions for improvement as well as areas of research are identified.

CHAPTER 2: LITERATURE REVIEW

This chapter reviews the earlier research on the attainment of ethnic minority students and considers how various factors affect this attainment. Some theoretical and methodological issues arising from earlier research studies are also discussed. International literature comprises the largest part of this review, while a smaller part is devoted to the earlier literature relating to Cyprus. The chapter ends with several general remarks drawn from the literature review.

2.1 Introduction

As this study is interested in attainment differences, the review focuses on studies that include ethnic minority as well as majority students in their sample. In fact, only a few studies focus entirely on minority populations. Further studies are included, which focus on particular factors that this research study is interested in, such as absences; these studies might not offer details about the ethnic background of their student populations, but they do not indicate that they exclude ethnic minority students from their analyses.

For the investigation of student attainment and the examination of possible influencing factors, this review includes studies and papers dealing with both primary and secondary students from 1990 until recently¹. A large number of studies from different countries, and with different methodologies have been found and examined, until a point was reached when no new patterns were observed. Several databases (Australian Education Index, British Education Index, Education Resources Information Centre) were searched to identify relevant studies. A wide range of search-terms and combinations of these were used for the searches, including ‘ethnic minorities’, ‘immigrants’, ‘attainment’, ‘achievement’, and ‘performance’, ‘gender’, ‘generation status’, ‘socio-economic status’, ‘absence’, ‘absenteeism’ or ‘attendance’, ‘racial composition’ and ‘school size’. References from identified papers were followed-up in an attempt to find further relevant papers.

All studies relevant to the attainment of ethnic minority students that were reviewed are summarised in Appendix 1. The studies are listed in order of publication date with the

¹ Earlier studies and reviews have been found and examined as well, but they are not mentioned here, as they add nothing different from the others.

oldest studies listed first. The appendix also offers information about where each study was carried out, the size and the ethnic background of the populations studied, whether the sample was from the primary or secondary sector, and the analytic methods employed. Other studies were drawn upon to further investigate the impact of a number of pre-specified factors and these are referenced in the relevant sections. The majority of the international evidence found in relation to this issue comes from the US and the UK. This is not surprising, as these countries have had diverse populations for many decades.

The literature review serves mainly as a means of identifying the general themes arising from studies in this area. The methodology employed in these studies is considered and conclusions drawn about themes that deserve further investigation. This section was felt to be necessary as restrictions in number of words imposed by most publishers when it comes to publishing manuscripts, precludes an in-depth discussion in individual papers.

2.2 Attainment Levels of Students from Different Ethnic Groups

This section presents the findings from earlier studies on the attainment of students from different ethnic backgrounds.

The question of whether ethnic minority students achieve or underachieve in their host countries occupies a significant part of the literature on minority education. From a review of a number of studies on academic performance from different countries, attainment differences appear between children from different ethnic minority groups and children from the majority groups. Differences also appear among children from different ethnic minority groups.

2.2.1 Attainment Patterns

In the US, American Asians² are found to succeed academically. They achieve at similar levels to American whites, or score higher than them (Glick and White 2003; Hoxby 2002; Rumberger and Palardy 2005). They also have higher graduation rates, compared with other minority groups (Wojtkiewicz and Donato 1995), and the highest mean years of completed education compared to the majority and to other minority groups (Rong and

² The term 'Asian' in the US refers especially to people from the Far East, while in the UK refers to people from India or Pakistan (Hornby 2000). As the studies reviewed here do not usually provide more information about the people included in this category, the terms 'American Asian' and 'British Asian' are employed here to differentiate between findings originating in the US or the UK.

Grant 1992). Chinese students, in particular, attain scores similar to American whites or achieve higher educational attainment levels than them and other ethnic minority groups (Goyette and Xie 1999; Hao and Bonstead-Bruns 1998; Pearce 2006).

Black students, though, perform less well than American whites or other minority groups (Cook and Evans 2000; Fryer and Levitt 2004; Goldsmith 2004; Hoxby 2002; Orr 2003; Rumberger and Palardy 2005). African students, in particular, perform less well compared to American whites or other minority groups (Crosnoe 2005; Griffith 2002).

Latino students also score less well than majority American whites (Crosnoe 2005; Goldsmith 2004) and other ethnic groups (Fuligni 1997). In a more detailed categorisation of Latinos, Hispanic students, in a study by Rumberger and Palardy (2005), are found to have similar progression rates to the majority group. Elsewhere, though, they perform less well than American whites (Fryer and Levitt 2004; Glick and White 2003; Griffith 2002; Hoxby 2002; Lee and Loeb 2000; Ma 2005), and have lower mean years completed education (Rong and Grant 1992) and lower graduation rates than others (Wojtkiewicz and Donato 1995). Similarly, Mexican students have lower attainment levels than the majority group and other ethnic minority groups (Crosnoe 2005; Glick and White 2003; Ream 2005) and have lower graduation rates than others too (Wojtkiewicz and Donato 1995).

From several other ethnic groups, Korean students (Goyette and Xie 1999; Hao and Bonstead-Bruns 1998) and Japanese students (Goyette and Xie 1999) achieve higher scores than American whites. On the contrary, Filipino students (Goyette and Xie 1999; Hao and Bonstead-Bruns 1998), Vietnamese students and Haitian students (Portes and MacLeod 1996) perform less well than American whites, and Cuban students have lower graduation rates than the American whites (Wojtkiewicz and Donato 1995). Also, Puerto Ricans have lower attainment levels than the majority American whites (Glick and White 2003) and much lower graduation rates (Wojtkiewicz and Donato 1995).

In China, from 55 Chinese ethnic minority groups, 13 have a higher percentage of secondary-school educated (and college-educated) people than the Han majority, eight have percentages ranging from half the Han percentage to about the same percentage, while 21 have very much lower percentages (Zhou 2001). This indicates that there are significant numbers of people from particular ethnic minority groups who do not complete secondary education. Also, Sun and Qui (2007), based on the average years of school attainment, found wide educational inequality among 56 nationalities in China.

In New Zealand, in a study by Crooks and Caygill (1999) Maori students performed less well than non-Maori students in most curriculum areas. Also, Rubie-Davies et al (2006) found Maori and Pacific Island students to perform at levels substantially below those of their New Zealand, European and Asian counterparts by the end of the examined year.

Attainment differences between minority and majority groups are reported in several European countries too. For example, in the UK, some British Asian students appear to perform at higher levels than the majority group (Sammons 1995). Specifically, Chinese students are found to do better than white British students and other minority groups (Cline et al. 2002; Connolly 2006; Demack et al. 2000; Demie 2001). Indian students appear to achieve lower attainment levels than the majority white British students in a study by Cline et al (2002), but elsewhere there is evidence that they perform as well as them and better than other minority groups (Cline et al. 2002; Connolly 2006; Demack et al. 2000; Strand 1999). Furthermore, Pakistani (Connolly 2006; Demack et al. 2000) and Bangladeshi students (Connolly 2006; Demack et al. 2000; Demie 2001) are among the main underachieving ethnic groups. Finally, Black students' attainment is lower than the majority white British students and other minority groups (Cline et al. 2002; Connolly 2006; Demack et al. 2000). African students, in particular, tend to be among the lowest attaining ethnic groups (Demie 2001; Strand 1999).

In the Netherlands, children of the first wave of 'guest' workers, that is Italian, Spanish, Portuguese, Greek, and Yugoslavian students, as well as other non-Dutch students from Western countries, do almost as well as the majority Dutch students (Driessen 1995). Also, students from Western Europe obtain higher scores compared with the Dutch students (Hofman 1994). However, Turkish and Moroccan students perform less well (Driessen 1995). They are behind the majority group and all the others (Hofman 1994). Surinamese students also perform less well than the majority Dutch students (Hofman 1994). In addition, in Greece, Albanian students (Korilaki 2004) and children from the former USSR (Mitakidou et al. 2008) perform less well than the native children.

Studies that incorporated data across different countries found similar results. Schnepf (2004) examined differences in educational achievement between immigrants and natives in ten countries with a high population of ethnic minority students (Australia, Canada, France, Germany, the Netherlands, New Zealand, Sweden, Switzerland, the UK and the USA). It was found that in almost all countries, with the exception of Canada, Australia

and New Zealand where no significant educational disadvantages were identified, minorities achieve significantly lower levels of attainment than natives. Moreover, OECD (2006) examined the student performance in seventeen countries (Australia, Austria, Belgium, Canada, Denmark, France, Germany, Luxembourg, the Netherlands, New Zealand, Norway, Sweden, Switzerland, the United States, Hong Kong-China, Macao-China and the Russian Federation). Significant differences between native students and minorities (minorities were performing at a lower level) were found in the majority of the examined countries, with more pronounced differences in Austria, Belgium, Denmark, France, Germany, the Netherlands and Switzerland. In Australia, Canada, New Zealand, and Macao-China, minorities were found to perform at similar levels to natives. Furthermore, OECD (2012) found performance differences in 23 out of 28 OECD countries, with minority students performing lower than majority students.

2.3 Factors Influencing Educational Attainment

Many studies in the international literature have attempted to explain the reasons behind the attainment gap observed in different countries. This section offers a theoretical overview of factors related to a greater or lesser degree to the attainment levels of ethnic minority students. In addition to factors relating specifically to ethnic minorities (such as, culture shock and adaptation problems), many other factors seem relevant.

A number of factors pertinent to individual children have been suggested as possible influences on educational attainment. These include factors such as student age (Driessen 1995; Orr 2003), intelligence (Verma and Ashworth 1986, see Cohen and Manion 1983, p.57 for race and intelligence), gender (Ainsworth-Darnell and Downey 1998; Orr 2003), and ethnic origin (Asanova 2005; Frost et al. 2005). In addition, the degree of student's motivation or effort (O'Connor 1999; Uhlenberg and Brown 2002), the hours spent on homework (Fejgin 1995), self-esteem (Baker 2005; Verkuyten 1994), aspirations and appropriateness of coping strategies (Fejgin 1995; Reis et al. 1995), have been discussed as relevant too. Nutrition and health status (Pollitt et al. 1993) and any potential, biological-genetic and psychological factors (Herrnstein and Murray 1994; Lips and Colwell 1987; Swann 1986) have also been put forward. Other suggested influences include absenteeism (Rumberger and Larson 1998), the length of stay and the length of education in the host country (Driessen 1995). The peer group pressure (Haynes et al. 2006) and fear of 'acting white' (Fryer 2006), that is the idea that black students purposefully do poorly in school because of racialized peer pressure (Mocombe 2006), or student' oppositional culture, such

as Black students' resistance to anything that is viewed as 'white', in order to maintain their racial identity (Ogbu 1991), have also been suggested as important.

The degree of proficiency or fluency in the dominant language has been considered important for the academic success of minority students in many studies (Callahan 2005; Demie 2001; Tengtragul 2006; Villalba et al. 2007). Schmid's (2001) review paper on language proficiency and school success concluded that poor proficiency in the dominant language limits educational attainment.

Research suggests that factors relating to the parents and home environment have an effect on attainment too. The parents' educational level (Uhlenberg and Brown 2002; Villalba et al. 2007) and interest in school performance, as well as monitoring, guidance and involvement in school (Demie 2005; Hipp 2012; Lee and Bowen 2006) are some of these factors. Parental educational expectations (Goyette and Xie 1999; Reis et al. 1995) or aspirations (Verma and Ashworth 1986), parenting techniques (e.g., discipline style, interaction) (Phillips et al. 1998; Uhlenberg and Brown 2002), and the language spoken at home (Driessen 1995) are other such examples. Family structure and parents' marital status (Bankston and Caldas 1998; Roscigno 1998), number of siblings (Blair et al. 1999), home problems (Villalba et al. 2007) and major life issues or events in the home (Hayes and Clay 2007) have all been suggested as associated variables too. Other factors that have been considered as important in relation to educational attainment are the family's wealth (Orr 2003) or socio-economic status (Haynes et al. 2006; Hipp 2012; Pearce 2006), home-learning material resources (Downey 1995; Orr 2003) and other material conditions that foster the development of skills, habits, and styles (Ainsworth-Darnell and Downey 1998). These include access to literature (books) and computers at home (Novak and Hoffman 1998; Phillips et al. 1998), summer activities and other opportunities available to students (Entwisle and Alexander 1992).

Particular teacher characteristics have also been suggested as potentially affecting students' performance. For example, their ethnic background (AMMA 1989; Warikoo 2004), expectations (Rubie-Davies et al. 2006; Uhlenberg and Brown 2002) and interactions with minority students (Farkas et al. 1990; Reis et al. 1995) have been highlighted as important. Other factors have been identified as important too, such as teachers' racist/biased behaviors (Lucas 2000) and their sensitivity when working in a multiethnic environment (Parekh 1986). Similarly, the appropriateness or sufficiency of teachers' education and

training (Warikoo 2004), as well as their ability to cater for the learning needs of a diverse classroom population (Tengtragul 2006) have been identified as relevant.

Some school characteristics have also been proposed as potentially important factors. These include school size (Rumberger and Palardy 2005; Watt 2003), racial composition (Crosnoe 2005), class size (Uhlenberg and Brown 2002), curriculum relevance (Glazier and Seo 2005; Tengtragul 2006), and the school's monocultural orientation (Farrell 1990). Other factors have their origins in the school assessment system (Li 2004) and the legitimacy of standardized tests and the test bias (Jencks 1998). Yet more factors, such as the school area (Orr 2003), its geographic (urban/suburban/rural) location (Portes and MacLeod 1996), its resources (Hanushek 1997), and its denomination, that is whether it is Catholic or not (Bryk et al. 1993), whether it is private or public (Roscigno and Ainsworth-Darnell 1999), or single-sex school (Harker 2000) have also been suggested as important. Furthermore, the degree of prejudice, racism and discrimination against minority students (Abbas 2002; Codjoe 2001), and the quality of communication with home (Bartley et al. 1999; Li 2004) have also been put forward as explanations of student attainment levels.

Finally, academic attainment has not only been connected with school influences, but also with external/societal influences. For example, the type of governmental and societal reception of immigrants (Schmid 2001), the societal ethnic stereotyping and oppression (Frost et al. 2005; Rubie et al. 2004), discrimination (Birman and Trickett 2001; Lucas 2000) and racism (Abbas 2002; Codjoe 2001) have all been linked to student attainment levels.

2.4 Detailed Examination of Some Specific Factors

This section explores in detail some specific factors, which may have the potential to affect the educational attainment of ethnic minority groups, and in which the present study is more interested. These factors are: gender, generation status, socio-economic status, absences, school size, and school minority concentration.

2.4.1 Gender

Given the, usually, unproblematic differentiation between boys and girls, gender is one factor that is often included in studies of attainment with little possibility of error. This is probably why there are more studies looking at gender compared to factors such as ethnicity or social class (Frost et al 2005). Another reason is that “categorising people by

gender is seen by many as ‘safer’ (politically less problematic) than using ethnicity or social class” (Frost et al. 2005, p.106). Gender has been considered as an important variable when considering students’ achievement.

A number of studies found males to outperform females in the subject of mathematics (Crosnoe 2005; Glick and White 2003; Lee and Loeb 2000). Males have also been found to perform higher than females in science (Lee and Smith 1995; Lee et al. 1997) and natural sciences and social studies (Duran and Weffer 1992).

Other studies found females outperforming males in the subjects of mathematics (Bempechat et al. 1999; Roscigno and Ainsworth-Darnell 1999), reading (Fryer and Levitt 2004; Hoxby 2002), history (Lee and Smith 1995) and science (Klein et al. 1997). Girls are also depicted as doing better than boys on a grade point average (Griffith 2002; Hao and Bonstead-Bruns 1998; Rumberger and Larson 1998). In addition, a higher proportion of girls is found to gain five or more higher grade passes in GCSEs compared to boys (Connolly 2006; Demack et al. 2000; McCallum and Demie 2001), and girls have significantly higher chances of graduating from secondary school than boys (Wojtkiewicz and Donato 1995).

There are also studies that find either no gender differences, or at least not very large gender differences. For instance, there are studies in which males and females are found to have a similar performance in mathematics (Fryer and Levitt 2004), reading (Sammons et al. 1993), mathematics and comprehensive test (McCoy 2005), or when considering the school years attained by children (Rong and Grant 1992). In a study by Hoxby (2002), the average female score in mathematics is only slightly higher than the average male score.

2.4.2 Generation Status

Many researchers stress the importance of considering the combined effects of generation of residence and ethnicity in studying immigrant attainment (e.g., Rong and Grant 1992, p.633). It is argued that generation of residence is part of the personal characteristics of individual children and, as such, should be considered when examining the performance of individual students.

The length of time spent in the host country often correlates with the degree of familiarity with the local values and behaviours, as well as with the dominant language. It is assumed that the longer minority children (whose home language is not the dominant one) spend in

a national education system, or the later the generational status of children, the more they acquire fluency of the dominant language and familiarity with the host country. As such, it would be expected that children who have been in the country for a short time and those of first generation are less familiar with the host country and less fluent speakers of the local language; consequently, they may be less successful at school than others.

Researchers who use generation as a factor in their studies tend to define generation status of minority children in a similar way. The categorisation into different generations is based on the birthplace of children and of their parents. Specifically, first generation status is used to indicate those students that were born outside the host country and had at least one of their parents born outside the host country as well. Second generation status is used to describe students that were born in the host country and who had at least one of their parents born outside the host country. Third generation status is used to specify those students that both themselves and their parents were born in the host country (Goldsmith 2004; Goyette and Xie 1999; Hao and Bonstead-Bruns 1998; Ream 2005). Other researchers apply an analogous differentiation. Rong and Grant (1992), for example, categorise minority children into 'immigrants' (foreign-born persons of foreign-born parent), 'children of immigrants' (US-born persons with one or more foreign-born parent), and 'natives' (US-born persons whose parents are also US-born).

The reviewed studies have shown contradictory findings on how generation status affects academic attainment. Some studies found earlier generation status of children to have a favourable effect on their attainment, whilst other studies found the opposite.

The earlier the generation status the higher the achievement: There are findings that show a tendency among early generation children to demonstrate better, on average, school performance than children of later generation status. That is, first-generation children appear to have better performance than second- or third-generation children. Rumbaut (1995) found that the foreign-born students (that is, first generation children) of East Asian, Indo-Chinese, Filipino, and Hispanic backgrounds have significantly higher grade point averages than students who are born in the USA (that is second generation children). In addition, in the study of Kao and Tienda (1995), black, Hispanic, and Asian children of both first- and second-generation earn higher average grades and mathematics scores than children of native-born parents (that is, third-generation children). Also, in a study by Padilla and Gonzalez (2001), first-generation Mexicans appear to have significantly higher grade point averages than the second and third-generation children. Furthermore, in a study

by Glick and White (2003), first- and second-generation children score higher than the third or subsequent generations.

The later the generation status the higher the achievement: There are also studies that show a tendency of late generation children to have better, on average, school performance than children of earlier generation status. In the study of Rong and Grant (1992), immigrants (that is, first generation children) of Hispanic background performed significantly less well than native Hispanics (that is, third- or higher-generation students). Also, in the study of Wojtkiewicz and Donato (1995), the foreign-born Mexicans (that is, first-generation children) exhibit significantly lower chances of graduating from secondary school than US-born Mexicans (that is, second-generation children). Another study by Ream (2005) found that the second-generation Mexican children (US-born students from foreign-born parents) achieve higher than immigrants (students born outside US), and that the third-generation Mexicans (US-born students from US-born parents) achieve even higher. In a more recent study, second generation students perform better than first-generation students (Azzolini et al 2012).

No significant differences: There is also a study where no significant achievement differences appeared between first-, second-, and third-generation students. In this study, by Fuligni (1997), the differences in attainment among Latino, East Asian, Filipino, and European students of first, second, and third generations was non-significant after controlling for a number of factors.

2.4.3 Socio-economic Status

The importance of the socio-economic status of ethnic minority groups as a possible explanation for the differences in educational outcomes has been stressed by many researchers over the years. As Plewis (1988) argued, “it is not sensible to seek explanations of differences in attainment solely in terms of socio-economic variables” (p.322), but on the other hand, analyses of ethnic group differences in attainment that ignore social class “are incomplete and could be misleading” (p.320). Many researchers admit that family socio-economic status has turned out to be the most significant factor affecting students’ performance (such as, Entwisle and Alexander 1990; Strand 1999). Others find family socio-economic status to be one of the factors with the greatest impact on the achievement of children (Connolly 2006; Demack et al. 2000; Griffith 2002).

It is also a common observation that when controlling for socioeconomic differences among ethnic groups the disparities in achievement are substantially reduced (Fryer and Levitt 2004; Hedges and Nowell 1999). The relative academic advantage or disadvantage, though, associated with specific ethnic groups remains statistically significant in most cases; thus indicating that although socioeconomic status is important, it does not on its own wholly explain the observed differences in attainment (Hedges and Nowell 1999).

There is big variation in the way the socio-economic status of participants is determined in different studies. In the studies reviewed here the following indicators appear: *parental education*, which indicates the years of education of parents, or the highest educational level attained by the parents; *parental occupation*, which offers an indication of parental occupational prestige and level of skill; *family income*, which consists of a midpoint value of family income earned by household members in a particular time period.

Other indicators employed are the following: *free or reduced-price school meals*, which indicate whether or not a student is a participant in the federal free or reduced lunch program of the school; *household educational resources*, that show whether things, such as a computer, dictionary, atlas, or encyclopaedia set, exist in a house; *subsidised housing or parental home ownership*, which indicates whether parents can afford to have their own house; *school location* and *home postcode* of students, which offer information about the area the school or home is located in, assuming that all people living in a particular area or live in neighbourhoods close to a particular school share common characteristics.

The positive impact of socioeconomic status on student achievement has been pointed out by many studies. One can observe some common patterns in those studies that include both majority and minority populations. To begin with, children from minority or majority groups, whose parents have a high-status occupation attain at significantly higher levels, on average, relative to their counterparts from families with a low-status occupation (Connolly 2006; Demack et al. 2000). Similarly, students with better educated parents have better scores than others (Cook and Evans 2000; Roscigno 1998). In studies that combine both parental education and parental occupation as a measure of socio-economic status, a similar advantage is observed for those students whose parents have high average educational and occupational levels (Fryer and Levitt 2004; Orr 2003; Rumberger and Palardy 2005).

Furthermore, children with high family income (Hedges and Nowell 1999; Pearce 2006; Roscigno and Ainsworth-Darnell 1999; Strand 1999), those who live in affluent neighbourhoods (McCallum and Demie 2001), and children with access to educational resources at home (Blair et al. 1999), also tend to perform at higher levels. In the same way, students who come from families who live in subsidised housing (Patterson et al. 1990), whose parents do not own their house (McCallum and Demie 2001; Portes and MacLeod 1996), or themselves receive free or reduced price lunches at school tend to have lower attainment levels (Bankston and Caldas 1998; Zvoch and Stevens 2006).

Inconsistencies among different indicators of socio-economic status appear in different studies. In a study by Entwisle and Alexander (1990), findings from two different indicators of socio-economic status were inconsistent. Parental education for blacks, considered as a group, has appeared to be small and insignificant, but it appeared as a potent influence on white children's maths reasoning capability. With respect to the other indicator of socio-economic status, meal subsidy, this appeared influential for blacks, but not for whites (Entwisle and Alexander 1990).

There are also cases in which the effect of socio-economic status on student achievement varies between different subjects. For example, Hofman (1994) has found that socio-economic status affects reading, but not mathematics. Also, in a study by Lee and Smith (1995), socioeconomic status is positively related to gains in mathematics and science, but its effect on gains in reading and history was only marginal.

A study by Sammons et al (1993) has reported more complicated findings. Different results are revealed for each examined subject area using different indicators. Specifically, in both reading and mathematics, those eligible for free school meals appeared to perform significantly less well than those who were not eligible. At the same time, those children whose father was in unskilled, skilled or semiskilled manual work, appeared to perform less well than children with fathers in a non-manual work in the subject of reading; a result which was not replicated for the subject of mathematics.

A number of studies recognise that non-minority families have higher average socioeconomic status than minority families. It appears that, on average, native parents tend to be employed in more prestigious occupations than minority parents, have themselves attained higher educational levels, and have more educational resources at home. This occurs in many of the studies reported: when white Americans are compared

with minority groups, such as Africans (in Caldas and Bankston 1997), blacks and/or Hispanics (in Fryer and Levitt 2004; Orr 2003); or when English, Scottish, Welsh, and Irish students are compared with blacks, black Caribbeans, black Others, Bangladeshis and Pakistanis (in McCallum and Demie 2001 and Strand 1999); or when Dutch students are compared with Turkish and Moroccan students (in Driessen 1995).

However, the socio-economically advantageous position of native students does not necessarily stand up to comparisons with all ethnic minority groups. In the US, for example, Asians have higher parental education and family income than whites (Fejgin 1995; Goyette and Xie 1999). In the UK, the proportion of Indian and Chinese students who receive free school meals is much lower than the proportion of English, Scottish, Welsh, and Irish students (McCallum and Demie 2001). Also, in the Netherlands, a group of non-Dutch children (refugees and migrants from Western countries) has parents with higher average levels of education than the Dutch parents (Driessen 1995).

Research shows a strong association between the socio-economic position of children from particular ethnic groups and their academic outcomes. Asian Americans in the US, Indian and Chinese students in the UK, and other non-Dutch children in the Netherlands (who have been mentioned above) are some examples of groups who in general fare better economically than other ethnic minority groups. In many of the examined studies, not only do they succeed academically; they outperform majority students. The opposite occurs with blacks (e.g., Africans) and Hispanics (e.g., Mexicans) in the US (e.g. Crosnoe 2005; Fryer and Levitt 2004; Kao and Tienda 1995; Lubienski 2002), blacks, Bangladeshis and Pakistanis in the UK (Demack et al. 2000; Modood 1993), and Turkish and Moroccan students in the Netherlands (Hofman 1994; Hustinx 2002).

2.4.4 Absences

Absences are measured as the percentage of total absences or the percentage of days absent (Gottfried 2009), or the average days absent (Romero and Lee 2007). Some categories are created to indicate absenteeism rate, including good (over 90%), average (80-89%), poor (below 80%) attendance records (Smyth 1999); moderate absenteeism, when a student is absent 15-25 percent of the time or severe absenteeism, when a student is absent more than 25 percent of the time during a specific period (Rumberger and Larson 1998). In other cases, more categorizations have been employed for this purpose. For example, 0, 1-2, 3-5, 6-9, 10+ days absent (Johnson et al. 2001), 0-5, 6-11, 12-17, 18+ absences (Sanchez 2012).

From all the studies examined for this review, only one has found attendance rates of children to be non-significant for their academic performance. In the study by Duran and Weffer (1992), days absent are not found to have any significant influence on Mexican American students in any of the examined subjects (mathematics, natural sciences, social studies, and English) during secondary schooling.

However, absences appear to have a significant effect on academic outcomes in a number of studies. For example, in Caldas (1993), attendance is found to be the most significant predictor of attainment. In the study of Rumberger and Larson (1998), absences are found to predict lower grades among Mexican American students. More specifically, the students with the highest rates of absences have worse grades than students with even moderate rates of absenteeism. In addition, Smyth (1999) has found that students who do well are more likely to have good attendance records. More recent studies found high absenteeism to be related to low attainment too (Byrnes and Reyna 2012, Chang and Romero 2008, Gottfried 2013, Philbeck Musser 2011, Sanchez 2012) .

2.4.5 School Size

School size is usually measured by summing the number of students enrolled in a school (Borland and Howsen 2003; Crosnoe 2005; Lamdin 1995; Lee and Loeb 2000; Phillips 1997; Sheldon and Epstein 2005, Stamm 2007), or, in other words, based on ‘school membership’, which again indicates the number of students enrolled in a school (Caldas 1993).

A number of categorisations of school size have been employed in different studies. Some studies have used *only two broad categories*, namely small schools and large schools (Gardner et al. 1999, Lee et al. 1997). Other researchers have created *three categories* for the school size, namely small, medium, and large school size (Lee and Loeb 2000, Stiefel et al. 2000). *Four categories* have been employed in some other studies, namely small, medium, large, and very or extra large school size (Lee and Burkam 2003, Rumberger and Palardy 2005). Finally, there are also cases with a *more detailed categorisation* (e.g., five categories by Crosnoe 2005, seven categories by Barnett et al 2002, eight categories by Lee and Smith 1997).

In some studies, school size is found to have no effect on student attainment. For example, Lamdin (1995) found that school size had no effect on reading and mathematics scores of white, black, American Indian, Asian, and Hispanic students enrolled in 97 primary

schools. Also, in a study by Phillips (1997) of 23 secondary schools, school size is found to be unrelated to the attainment outcomes of European American and African American students in mathematics. In addition, Kahne et al (2005) have examined the performance of eleventh-grade students from three small schools involved in an experiment of dividing larger schools into smaller ones. It was found that students in the small secondary schools did not perform differently on standardised tests to similar students in traditional secondary schools.

Nevertheless, some of the reviewed studies have found a significant positive effect of small school size on student attainment. For example, from an examination of 820 secondary schools by Lee and Smith (1995), it appears that students who attend smaller schools are favoured. Specifically, Hispanics, Asians, Native Americans, blacks, and whites in smaller schools learn more in mathematics, reading, science, and history than their counterparts in larger schools. In addition, Lee et al (1997), examining about 790 schools, found large school size to have significant negative effects, while learning in science and mathematics is greater for Hispanics, blacks, and whites in smaller schools, throughout secondary schooling (Lee et al. 1997, table 4, p.140). In a study by Lee and Loeb (2000), where 264 primary and secondary schools have been examined, blacks, whites, Asians, and Hispanics in small schools (fewer than 400 students) scored above those in middle-sized and large schools in mathematics. Moreover, Sheldon and Epstein (2005), in a study with 18 primary and secondary schools, found that larger schools report lower percentages of students at or above satisfactory proficiency levels on standardized mathematics achievement tests, and poorer grades than small schools. In fact, schools with more than 1,000 students appear to have considerably lower performance than others.

Different researchers have found both small and large school size to be an advantage compared to other school sizes. Stiefel et al (2000) found that schools of small and large size are the most effective for children with limited English proficiency. The researchers had not differentiated students into ethnic groups, but they took into account the percentage of children registered with limited English proficiency, something that might be considered (with caution, of course) as an indication of the proportion of minority children in the schools. They found that a higher proportion of students in small (0-600 students) and large (greater than 2,000 students) schools had passed a competency mathematics test than in medium-sized (600-2,000 students) schools. In addition, Lee and Burkam (2003) found that students in small schools had the highest average mathematics achievement (at grade eight) and highest grade point average in mathematics (at grade nine). The next highest

average score was for students in very large schools, and the difference was statistically significant, as it was for small schools.

Other researchers have found schools of medium size to be the most favourable for student attainment. For instance, Lee and Smith (1997), trying to identify the ideal size of a secondary school and based on student learning outcomes, have found that medium-sized schools are the most effective. In their study, achievement gains in mathematics and reading over the course of secondary school are largest in middle-sized secondary schools (600–900 students). In relation to other school sizes, the researchers have found that gains are smaller in smaller schools, particularly those with less than 300 students, and considerably smaller in large schools with more than 2,100 students. Lee and Smith have also extended their investigation to schools differentiated by their social class and minority concentrations. Schools in the moderate-sized range (600-900 students) are found to produce greater attainment gains both for low- and high-socio-economic status students, and also low- and high-minority concentrations. Consequently, Lee and Smith have suggested that this is the ideal size of a secondary school, regardless of the social class and ethnic background of students. Borland and Howsen (2003) showed similar findings when examining the achievements of children from 654 primary schools. Specifically, they found that the optimal school size in relation to student achievement on a combined score for reading, language and mathematics is a school that has approximately 760 students, that is, schools of middle size (the researchers themselves have not given the characterisation ‘medium’ to this size of school, but schools with this number of enrolments have been called as ‘medium schools’ by many other researchers, such as Lee and Burkam 2003; Lee and Loeb 2000; Stiefel et al. 2000).

Other researchers have found schools of large and extra large size to be more successful. For example, findings from an examination of the academic outcomes of 127 secondary schools by Gardner et al (1999) appear to favour large schools. In terms of verbal SAT scores, students from large schools were found to significantly outscore those from small schools; however, after controlling for socio-economic status, the difference between the large and small schools became insignificant. As regards total SAT scores and mathematics SAT scores, students from large schools performed significantly better than their counterparts from small schools, and the significant difference persisted after controlling for other factors. Also, in the study of McCoy (2005), among the four examined secondary schools, the larger school (with about 1000 students enrolled)

appeared to have significantly higher average scores in both mathematics (algebra) and a comprehensive test encompassing all subjects taught.

In addition, in a study by Barnett et al (2002) of 152 secondary schools, larger schools were found to outperform smaller ones. Specifically, a higher proportion of children gained five or more GCSEs at grades A-C in schools with 600-799, 800-999, and 1000 and over students than smaller schools. Schools of 1000 and over, though, had by far the highest achievement levels. Also, Rumberger and Palardy (2005) found that students attending large (1,201 to 1,800 students) and extra large (more than 1,800 students) secondary schools had higher attainment growth in almost all subjects examined. On the contrary, schools characterized as 'small' had little or no significant impact on student learning in some subjects after controlling for the individual and aggregate effects of student background characteristics.

2.4.6 School Minority Concentration

The majority of the studies examined in this review investigated the racial and ethnic mix at school level (Borman et al. 2004; Callahan 2005; Kahne et al. 2005). Other studies investigated the racial composition of classes and/or cohorts (Hoxby 2002). Measurements of ethnic heterogeneity were based either on the percentage of students from minority ethnic groups (Bankston and Caldas 1998; Borman et al. 2004; Crosnoe 2005; Hoxby 2002; Johnson et al. 2001) or on the percentage of majority students enrolled (Rumberger and Willms 1992). The proportion of teachers from different ethnic groups was used in some cases as well, as another way of measuring the racial composition of schools (e.g., Goldsmith 2004; Johnson et al. 2001).

The categorisation of the racial mix of the examined schools was made in a number of ways. Some studies used a *binary categorisation* of schools. For example, schools with more than 40 percent and less than 40 percent of ethnic minority students, with the former schools to be considered high-concentration minority schools and the latter low-concentration minority schools (Lee and Smith 1995; 1997, Lee et al 1997). Other studies employed *three categories*. For example, schools were divided according to the ethnic origin of the majority of the students and teachers. That is, separate-white schools, mixed schools, and separate-minority schools (Goldsmith 2004); black segregated, integrated, and white (or non-black) segregated schools (Borman et al 2004); 0-33, 34-66, and 67-100% blacks (Hoxby 2002). *Four categories* of the school composition were employed elsewhere and again a variety of percentages were used to differentiate the student population into

categories. That is, <15% black, 16-50% black, 51-90% black, and >90% black (Borman et al 2004), or none, low, medium, and high proportions of minority students (Goldsmith 2004).

A number of researchers argued that minority concentration had no effect or at least no significant effect on the academic performance of children. Lamdin's (1995) study found that the percentage of minority students (blacks, American Indians, Asians, and Hispanics) in the study schools was not a significant variable for the scores of children in mathematics and reading. Also, in other studies, high minority enrolment did not appear to have any effect on the attainment of white or Asian, Hispanic, and black students in mathematics, reading, science, and history (Lee and Smith 1995) or in early (grades eight-ten) or late gains (grades ten-twelve) in science and mathematics (Lee et al. 1997). In addition, Rivkin (2000) found no systematic or significant relationship between school racial composition and the attainment outcomes of black children in mathematics and reading. More recently, Ohinata and van Ours (2011) found no significant negative impact of minority concentration in a classroom on students' test scores in maths and science.

Many other studies have claimed that a high percentage of minority students was linked to lower overall achievement rates. That is, children in schools with larger proportions of ethnic minority students performed less well than those with smaller proportions. In a study by Schnepf (2004), it was found that, in seven of the ten countries examined (Canada, France, Germany, New Zealand, Switzerland, the UK and the USA), high proportion of minority students in schools was related to lower achievement both for minorities as well as natives attending these schools. Roscigno (1998) argued that attending a non-white school was considered to be "a penalty", a disadvantage for children, whereas a white school was considered to be "advantageous" (p.1046).

Some studies found a more negative effect of minority concentration on children of ethnic minority backgrounds than on children of majority groups. For example, in the study of Portes and MacLeod (1996), schools with a high concentration of minority students appeared to be less privileged and at a significant disadvantage in academic performance, but no appreciable effect was found on children from privileged ethnic backgrounds (native children and especially whites are usually regarded to be of advantaged ethnic background). Bankston and Caldas (1996) found minority concentration to have a significantly negative effect on white students, but the effect was relatively small compared to other groups. The researchers concluded that among school-level variables,

the percentage of African students in schools had a much greater negative impact on the scores of African students than on the scores of white American students.

In a study by Cline et al (2002), considering the impact of minority concentration on white children, it was found that children from a white background in mainly white schools outperformed those in urban multiethnic schools in mathematics, reading, and GCSE exams. In addition, Hoxby (2002) found that having more black peers was more damaging to other black students. In the third, fourth, fifth, and sixth grades, Hispanic students performed worse in reading and mathematics when they were in classes with a larger share of Hispanic students. Also, whites tended to perform less well in reading and mathematics when they were in classes with a larger share of black students. Furthermore, in a study by Goldsmith (2004), disadvantages appeared to be greater for blacks and Latinos than for white Americans in minority concentrated schools, and they increased with increasing minority representation. It was found that attainment at predominantly black and Latino schools was less than that at predominantly white schools.

2.5 The Situation in Cyprus

This section offers some demographic information as well as information about the history of multicultural education in Cyprus. It ends with a review of earlier research on ethnic minority students in the island.

2.5.1 Demographic Changes in Cypriot Society and Schools

The population of the island consists of the native Greek Cypriots, who represent the overwhelming majority of citizens, Greek people from the mainland, Turkish-Cypriots, Roma (who are considered to belong to the Turkish Cypriot community), and people from three 'religious groups', Maronites, Armenians and Latins (ECRI 2006a). It also includes groups who arrived in the island more recently. The island has experienced rapid demographic changes due to settlement of waves of immigrants in the island, especially since Cyprus' entry into the European Union (2004).

In 2005, the total number of non-Cypriot residents was estimated to be about 80,000, a number which corresponds to approximately 10% of the total population of the south part of the island (Trimikliniotis and Demetriou 2005). Most immigrants are employed in low-paid and low-status jobs such as domestic work, the service and manufacturing industries, and agriculture and construction (Trimikliniotis and Demetriou 2006).

The increasingly heterogeneous character of society has affected school composition as well. Data from secondary schools shows that the number of minority students increases year by year. For example, 1,155 minority students and about 50,000 Cypriots were enrolled in secondary schools in the academic year 2001-02 (Oikonomidou 2003). These students were spread in the Cyprus Republic-controlled area (Nicosia, Limassol, Larnaca, Pafos, and a part of Famagusta). Information from the Ministry of Education and Culture in Cyprus about the academic year 2004-05, when student data for the present study was collected, shows that the number of minority students in secondary education had more than doubled (2,431), with the number of Cypriots remaining fairly constant. For that academic year, out of 67 secondary schools (gymnasia), only 11 had no minority students; 47 of them had up to 10% minorities, six of them had up to 20% minorities, and three of them had between 25 and 55% minorities.

According to the same source of information, for the academic year 2004-05, children from Georgia formed the largest ethnic minority group in secondary education. There are also children from other minority groups, including Russians, British, Arabs, Rumanians, Bulgarians, Germans, Iranians, Canadians, Indians, Syrians, and Turks. In addition, as the numbers of minority students were not evenly divided among schools, there were schools with no minority children and schools with high concentration of minorities (more than 50%).

More recent information from the Ministry (Ministry of Education and Culture 2009) showed a continuous increase of the number of foreign-language students in primary schools. For example, for the academic year 2005-2006, 6.7% of the total student population attending the local primary schools did not have Greek as their mother language. This percentage rose to 9% of the total student population for the academic year 2008-2009. Even though no data was reported for the secondary sector, one would expect a similar increase.

2.5.2 Multicultural Education in Cyprus

Cyprus is a country with a short history in multicultural education. The heterogeneous character of society and schools in particular has been a fact for about a decade now. The local educational system has since been called to educate students from different ethnic, cultural, linguistic, and religious backgrounds. From 2005, when student data for the present study was collected, the Ministry of Education and Culture acknowledged the

multicultural character of society and the “need to approach the subject of multicultural education with great sensitivity” (Ministry of Education and Culture 2005, p.279). Its aim was to “facilitate the smooth integration of groups from different cultural identities in a creative environment, regardless of background” (Ministry of Education and Culture 2005, p.280). According to the Ministry’s report (Ministry of Education and Culture 2005), a mainstreaming programme was employed in which foreign-language students participate in the classrooms along with the native Greek-speaking students. The support measures that the Ministry has taken towards this direction “can be categorised as measures for language support, which refer to the learning of Greek as a second language and measures for facilitating the smooth integration of groups with different cultural identities” (Ministry of Education and culture 2005, p.280).

In practice, though, the educational system has not appeared ready to offer multicultural education and deal with the needs of students from different ethnic groups. This is apparent from the findings of earlier research in the island. For example, Martidou-Forsier (2003) carried out a study in Cyprus to see if the climate was ripe for implementation of multicultural education. Results were disappointing, as she found that even the basic presuppositions for the effective implementation of multicultural education (including measures for students’ sensitisation for other cultures) were nonexistent.

Angelides et al (2003), in an attempt to understand multicultural education practices in Cyprus, noted that the Ministry of Education and Culture pay little attention to the education of ethnic minority students. They also argued that public schools in the island seem to “continue to function within a monocultural and mono-linguistic framework, although the student population is no longer culturally homogeneous” (Angelides et al. 2003, p.61). Also, Angelides et al (2004), investigating the situation of multicultural education in Cyprus, concluded that “the Cypriot educational system very often, if not always, functions to assimilate others into the Cypriot culture” (Angelides et al. 2004, p.312).

Furthermore, Panayiotopoulos and Nicolaidou (2007), who also explored the issue of multicultural education in the island, pointed out that there are serious deficiencies in the current educational system, including the lack of academic and psychological support for ethnic minority students. Other researchers have pointed out the nationalistic, ethnocentric elements of the Cypriot educational system (Fragoudaki and Dragona 1997; Philippou 2007).

More specifically, as regards the school environment, it has been described as unfriendly for students from different ethnic backgrounds. Angelides et al (2004) presented the experiences of a minority female student who was marginalised, alienated, and forced to be assimilated (for example, by changing her name to a Greek one and eating pork despite this being forbidden by her religious background), in order to feel accepted and thus steer clear of racist behaviour. The researchers concluded that in a monocultural climate the local educational practice “treats the diversity of ‘other’ pupils as a type of deficiency that has to be ‘treated’ quickly” (Angelides et al. 2004, p.312). Also, in the study of Martidou-Forsier (2003), most of the participants talked about discrimination against students coming from different cultural background.

More recently, Panayiotopoulos and Nicolaidou (2007) reported racist behaviour against children from different cultural backgrounds from the part of native students. In addition, most of the native students in this study said that they had no kind of relationship with ethnic minority students in or out of school. Racism has also been reported against students of particular ethnic groups or religion. For example, racism against Turks or Muslims might be related to the historical ethnic conflicts between Greeks and Turks and the 1974 Turkish invasion (Loizos 1998; Spyrou 2002; Spyrou 2004; Spyrou 2006; Zembylas 2007), after which, as Zembylas (2007) pointed out “each group constructs its ethnic identity through learning to hate the other” (p.183). Finally, biased and xenophobic attitudes from the part of teachers and students were found in other studies too (Afantiti-Lamprianou et al. 2008; Papamichael 2008). These findings indicate that schools have no policies for tackling racism within the school.

The lack of policies against racism in school might encourage the transfer of racism from society into schools. Social racism and racial discrimination have been documented in Cyprus in many previous publications (ECRI 2006a; ECRI 2006b; Trimikliniotis 2007; Trimikliniotis and Pantelides 2003). There is also evidence of racist and xenophobic attitudes and behaviours within the families (Afantiti-Lamprianou et al. 2008; Panayiotopoulos and Nicolaidou 2007).

As regards the teachers, they have been portrayed as unprepared to function in a multiethnic environment and deal with the educational needs of ethnic minority students. Martidou-Forsier (2003), who looked at the teachers’ abilities and readiness for implementation of multicultural education, reported that the majority of teachers expressed doubts about their knowledge for their students’ cultures, the appropriateness of their

teaching methods in multicultural classrooms, and their strategies for parental involvement. Many researchers (Angelides et al. 2007; Martidou-Forsier 2003; Panayiotopoulos and Nicolaidou 2007) have highlighted the lack of appropriate teacher training as a problem, because without appropriate support and training teachers do not have the skills to effectively manage multiethnic classrooms.

Others (e.g., Afantiti-Lamprianou et al. 2008) have also indicated that teachers have ethnocentric, biased, and xenophobic attitudes. Angelides et al (2007) pointed the finger to the Ministry of Education and Culture for failing to deal effectively with the educational needs of teachers as regards multicultural issues and methods of teaching. “Despite the fact that the Ministry of Education has formally declared that teachers should be able to teach in multicultural classes and be educationally and experientially prepared to do so, this has not been followed up with the required development of teachers’ skills which would offer to all children a safe learning environment to prepare these fledgling citizens to become adult citizens of a multicultural society” (Angelides et al. 2007, p.137).

2.5.3 Attainment of Ethnic Minority Students and Responsible Factors

Considering the attainment of ethnic minority students in Cyprus, there is no other research except the one carried out by Theodosiou (2006). This is a quantitative study looking at the attainment of ethnic minority students from two secondary schools and based on student grades from two different subjects, Modern Greek and Mathematics. The findings indicated that the attainment of minority students is significantly lower compared with that of the native students, even after controlling for a number of factors. From the factors examined, it was found that low attendance rate, low parental education, low parental occupation, low generation status, and being a male student had a significant negative effect on school attainment.

Some of the studies dealing with multicultural issues in Cypriot schools hint about the academic performance of ethnic minority students being low and suggest possible reasons behind this. For instance, in the study by Martidou-Forsier (2003), teachers perceived that fluency in the Greek language, acceptance on the part of native students and teachers, parental interest in their children’s learning and their ability to help, and students’ educational aspirations and efforts were important for the school success of ethnic minority students. In addition, Angelides et al (2003), gives the account of a minority boy, through his teacher, who had difficulties in the Greek language and consequently, could not write meaningful sentences, understand mathematical problems, or history questions. This could

have serious consequences on his school success. Furthermore, in the study by Panayiotopoulos and Nicolaidou (2007), teachers as well as students considered the language difficulties of ethnic minority students as a major cause of their low school performance.

2.6 Remarks on the Earlier Literature

This section presents several remarks drawn from the literature review in relation to some theoretical and methodological issues.

Looking at the international literature, findings in relation to the attainment of ethnic minority groups in different host countries appear to vary. That is, there are some ethnic minority groups that tend to perform at levels similar to the majority students or even higher. However, many ethnic minority groups perform at a seriously lower level compared to the majority students.

The amount of research work varies from country to country. In countries with long history of multicultural education, such as the UK and the US, the attainment of ethnic minority groups has been examined to a much greater degree. Some patterns emerge among particular ethnic minority groups. That is, in the UK, for example, many studies agree about the underachievement of black and Pakistani and Bangladeshi students and the overachievement of Chinese students (Connolly 2006; Demie 2001). Similarly, in the US, a number of studies agree about the underperformance of black and Latino students and the overperformance of Asian students (Crosnoe 2005; Goldsmith 2004; Rumberger and Palardy 2005). However, in countries such as Cyprus where multiculturalism is more recent, this issue has not been investigated to any significant extent.

In search of the reasons behind the differential attainment of different ethnic groups, researchers worldwide examined the effects of factors relating to the child, family, school, teachers and society. Studies on this specific issue are to a large extent quantitative. For those quantitative studies mentioned in the literature review section (and presented in Appendix 1), several remarks on a number of issues are worth noting.

To begin with, a number of studies, as indicated by the researchers themselves, had low response rates or large numbers of missing cases (Cline et al. 2002, Connolly 2006, Drew and Gray 1990, Goldsmith 2004, Goyette and Xie 1999, Hofman 1994, Lubienski 2002)

and these could have led to bias (e.g. non-response bias) thus casting doubt on the validity of results.

Many of the examined studies have used self-reported information obtained from students themselves with regards to their personal characteristics (Goldsmith 2004, McCoy 2005, Padilla and Gonzalez 2001), family socioeconomic status (Entwisle and Astone 1994, Lubienski 2002), and school grades (Griffith 2002, Hao and Bonstead-Bruns 1998, Padilla and Gonzalez 2001). Collecting information on achievement from students retrospectively is considered unreliable due to factors such as failing memory and social desirability (Griffith 2002). Similarly, data on socio-economic status collected from sources other than parents is considered inaccurate (Sirin 2005).

A number of studies, in an attempt to categorise their student sample, employed broad and imprecise groups, such as 'Asians' (Lee and Burkam 2003; Rumberger and Palardy 2005), 'blacks' (Lubienski 2002; Orr 2003; Rivkin 2000), 'non-white' (Borland and Howsen 2003; Condrón and Roscigno 2003; McCoy 2005), 'non-Anglo' (Zvoch and Stevens 2006), and 'non-Maori' (Crooks and Caygill 1999). Broad classification can potentially hide ethnic, religious and cultural differences (Verma and Mallick 1988) as well as significant political and economic differences, and also differences in achievement between the merged heterogeneous groups (Kysel 1988). Even though it is common practice to combine small groups to form a category which is large enough for the statistical purposes of the study (Plewis 1988), it is of note that the majority of the examined studies have samples that are large enough to avoid such practices.

Some of the examined studies have looked at variables that the researcher is interested in but do not differentiate between minority and majority students' attainment (e.g., Barnett et al. 2002; Kahne et al. 2005; Sheldon and Epstein 2005; Stiefel et al. 2000). Other studies do not define their minority groups (McCoy 2005, OECD 2006, Schnepf 2004, Zvoch and Stevens 2006), and some exclude children with a limited proficiency in language (Bempechat et al. 1999, Fuligni 1997, Goyette and Xie 1999) thus showing an artificially flattering picture for minority students.

Some studies are noted to use relatively weak measures of attainment such as the pass/fail cutoff (Condrón and Roscigno 2003) or school year completed (Rong and Grant 1992; Sun and Qui 2007). It is also of note that the majority of studies in the literature tend to look at attainment in a couple of subjects and focus mainly on mathematics and/or reading (e.g.,

Borman et al. 2004, Crosnoe 2005, Fryer and Levitt 2004, Ma 2005, Rubie-Davies et al. 2006). Studies looking at attainment in more than two subjects, and in subjects other than mathematics and reading, are not only few in number, but the majority use a composite score of attainment created from all subjects in their analyses (e.g., Condrón and Roscigno 2003; Pearce 2006). As such, conclusions about performance of students in individual subjects are difficult to draw. Also, none of the examined studies specifically set out to check for a differential attainment, for ethnic minority students, between more- and less-language dependent subjects. Examination of this aspect of ethnic-minority-student attainment could be enlightening and reveal or lead to a search for explanations of the observed patterns.

The findings of many of the examined studies are based solely on descriptive statistics (e.g., McCallum and Demie 2001; Rubie-Davies et al. 2006; Sheldon and Epstein 2005). This means that during the analyses of these studies, researchers do not take individual or school factors into account; something that might have invalidated the observed patterns of attainment. Indeed, some researchers (Farkas et al. 1990; Sammons et al. 1993) have indicated that taking background characteristics into account might completely alter the results concerning the attainment differences between ethnic groups. At the same time, one notes that in some of the studies that did employ analyses capable of taking into account such background characteristics, some of the most basic ones such as gender (e.g., Orr 2003; Rumberger and Palardy 2005) or generation status (e.g., Connolly 2006; Ma 2005) were not included. Further, other studies do not control for school characteristics such as school minority population or school size (e.g., Connolly 2006; Ma 2005) despite the fact that they cover a large number of schools.

A number of those studies that employed the factor socio-economic status in their analyses based this variable on a single measurement. Some, for example, used parental education (Lubienski 2002; McCoy 2005). Other studies used parental occupation (Connolly 2006; Demack et al. 2000), or family income (Pearce 2006), or poverty (Borland and Howsen 2003). Elsewhere a composite indicator is used (Fryer and Levitt 2004, Goldsmith 2004). Usage of a single/composite indicator of socioeconomic status implies a “unitary view” (Bollen et al 2001), in which the underlying construct of socioeconomic status is considered to be reflected in a similar way by a number of different measures such as education or wealth. There is, however, evidence that for some variables (e.g. concerning health outcomes) for which socioeconomic status is examined, individual indicators of socioeconomic status may have a differential or even antagonistic impact on the variable in

question (Popkin et al 1995). This leads some researchers to conclude that the use of multiple indicators of socioeconomic status is preferable as it could lead to more reliable results. Further, different indicators are argued to offer a different angle of examination of the socioeconomic status of an entity (Laaksonen et al 2005). The employment of more than one indicators of socioeconomic status is also suggested by Sirin's (2005) meta-analytic review on socioeconomic status and academic achievement.

The next issue that the researcher has to face is the decision of which indicators of socioeconomic status to use; there are some which are best avoided. For example, even though free school meal is commonly used as a proxy for level of deprivation, it is considered to be a 'conceptually problematic' indicator (Sirin 2005, p.444). Sirin suggests the avoidance of school lunch eligibility as an indicator of the socioeconomic status of students and considers parental education and parental occupation to be the traditional indicators of socioeconomic status. Parental educational attainment is relatively constant, relatively easy to measure, and respondents are considered more likely to answer questions about their educational attainment truthfully (e.g. compared to questions about their income). It might serve as a reflection of parental educational skills and knowledge base and could indicate an ability to help their children academically. Parental occupational status might be more suggestive of the income of a family and offer an indication of availability of educational resources (e.g., books or computers) in the household for children. These two indicators of socioeconomic status are also routinely collected by schools in Cyprus.

As regards student absences, several limitations are observed in the examined studies. These include the very short time-period used to measure absenteeism (that is a few days or a single semester, in Bos et al. 1992, Farkas et al. 1990, Kahne et al. 2005, Rumberger and Larson 1998), and use of number of absences from the academic year before the year used for measurement of performance (Smyth 1999). In addition, the method of collecting the data on absences in some studies (e.g., Johnson et al 2001), that is, by asking students how many times they have 'skipped' school in the past school year might also be problematic.

Another interesting point on absenteeism is that none of the examined studies have looked at the number of absences per individual subject; rather, they used the total number of absences, which consists of the absences of all school periods in all teaching subjects. An

investigation of the interrelation between the attainment of a child in a particular subject and the number of absences in this subject might prove valuable.

In terms of school size, the most problematic issue among the examined studies is the heterogeneous categorisation of schools. It appears that there are no agreed reference values for school size. Consequently, school-size categorisation varies greatly in studies. For example, a small school for Lee and Loeb (2000) has up to 400 students, for Lee et al (1997) fewer than 500 students, while for Gardner et al (1999), Lee and Burkam (2003), Rumberger and Palardy (2005), and Stiefel et al (2000) up to 600 students. A medium school for Lee and Loeb (2000) has up to 750 students, for Rumberger and Palardy (2005) up to 1,200 students, for Lee and Burkam (2003) up to 1,500 students, while for Stiefel et al (2000) up to 2,000 students. A large school for Lee and Loeb (2000) has more than 750 students, for Rumberger and Palardy (2005) more than 1,200, for Lee et al (1997) and Lee and Burkam (2003) more than 1,500 students, for Gardner et al (1999) and Stiefel et al (2000) more than 2,000 students. An extra large or very large school for Rumberger and Palardy (2005) has more than 1,800 students, while for Lee and Burkam (2003) has more than 2,500 students. As such, the terms small, medium, or large might mean different things in different studies. This situation makes generalization of results problematic.

Qualitative studies focusing on providing explanations for the poor attainment levels of minority students are much fewer than quantitative studies and, as is to be expected from qualitative studies, most of these look at the effects of a single or a small number of closely related factors. There is only a limited number of studies that examine a broad range of variables (e.g., Haynes et al. 2006; Hipp 2012, Li 2004; Reis et al. 1995; Tengtragul 2006; Uhlenberg and Brown 2002; Villalba et al. 2007). Each one of these is focused on specific issues. For instance, Reis et al. (1995) are focused on high-ability students only, Tengtragul (2006) on teaching and learning in the classroom; Hipp (2012) on the barriers to graduating high school on time; Li (2004) on struggling English-language learners; Haynes et al. (2006) on White/Black Caribbean students only; Villalba et al. (2007) on the impressions of non-Latino teachers who work with Latino students. Further qualitative studies might be useful to provide more in-depth information in a new environment.

Coming to Cyprus itself, from the review of earlier research there, a variety of issues have come to light, mainly in relation to multicultural education in the island, which might have an impact on minority students' learning. That is, the monocultural, nationalistic, and ethnocentric character of the Cypriot educational system, accompanied by the

inappropriate multicultural teacher training and the racially hostile school and social environment can create inequalities among ethnic minority students and encourage an achievement gap. It is also clear that the attainment of ethnic minority students in Cyprus has only scantily been examined (only one study examining attainment in secondary schools, by Theodosiou (2006)). The relatively small sample size in this study (769 students from two schools only) led the researchers to pool all students together for the regression analyses without allowing for the year groups. Also, attainment was based on grades from only two subjects (Modern Greek and Mathematics). These limitations could have implications for validity and thus limit one's ability to extrapolate results. Consequently, more research is needed in Cyprus to confirm findings in relation to the attainment of minority students and to investigate the potential factors leading to any observed differences.

Throughout the discussion on individual factors above there is a plethora of studies reporting conflicting results. It should be acknowledged that conflicting findings might indicate flawed methodologies in some of the reviewed studies, even though sometimes they just indicate that generalisations are not possible. When reviewing published work, it is often difficult to know exactly how the analysis that leads to published work has been carried out. Even when it is known, there are often local factors that influence sampling in specific ways in some studies; these factors will not necessarily recur in other studies on the same topic (Lucas et al 2013). There are also occasions where the definition of the population is itself the crucial factor in determining the outcome. Arguably, especially in relation to quantitative studies, numbers are not necessarily the 'truth' but rather methods of describing findings. For example, it may be that several different analytical methods have been tried and the one that returns results that the researcher agrees with or is more likely to get a paper published, subsequently preferred. Therefore, to get to the most robust results from the literature one would need to see a full account of the methods used, and even the original source data, so that workings can be checked and judgements made about the appropriateness of the models used for the statistical analysis. Something like this would be enormously time consuming. In addition, the aim in this review was not to present the most robust findings from the literature but rather to explore the findings that have emerged from studies in this area. To not look for the most robust evidence is justified because while I do make links to some of these studies in my own work, I do not adopt any assumptions from these studies in my own study. Mine is a series of open-ended inquiries rather than the testing of hypotheses from the literature.

In conclusion, further research on this issue should pay attention to the following: collection of personal or performance data from a valid source avoiding, for example, self-reported information; use of strong measures of attainment; use of least-problematic and probably multiple indicators of socio-economic status; examination of more than two different school subjects; differentiation of students from different ethnic backgrounds and examination of each group separately; inclusion of basic personal or school factors and employment of a statistical analysis technique that can adequately control for these; a more in-depth investigation of observed patterns of attainment in ethnic minority students.

CHAPTER 3: METHODOLOGY

In this chapter, methodological issues are explored in more detail because word-count limitations within the papers did not allow for extensive methodological discussions. The chapter begins by providing some information on the background of the study. Then the research questions and the rationale behind the use of both quantitative and qualitative methods are presented. The structure of the enquiry process follows after this. The sections that follow explain the aims/objectives of the four phases of the study, describe and discuss the sampling procedures, the different methods used for data collection, the strategies for analysis employed, and validity issues. The chapter continues with a discussion of issues considering access to data and ethical considerations.

3.1 Design of the Study

3.1.1 Background to the Study

The question of whether ethnic minority students underachieve has been asked in many countries around the world and, as demonstrated in the previous chapter, has produced inconsistent and often conflicting findings. The methodology employed in many of these studies has also been criticised; one of the criticisms being the combination of factors examined in many studies. In Cyprus itself, the literature on this subject is limited to a single study undertaken during my Master's degree in the University of Manchester in the academic year 2005-2006 (Theodosiou 2006). Findings showed that the attainment of minority students was significantly lower compared to that of native students. It was also shown that low attendance rates, low parental education, low parental occupation, low generation status, and being a male student had a significantly negative effect on school attainment levels. Further, some of the major ethnic minority groups that were identified, e.g. Georgians or 'Rossopontioi', have not been met in previous studies.

The study, like most examples of individual academic research, had to be conducted within a set of constraints that could have implications for validity and restrict the ability to extrapolate from results. Thus, the study only recruited participants from two schools. The relatively small sample size (769 students) then meant that students had to be pooled together for the regression analyses without differentiation of year groups. Also, student attainment data was based on grades from two key subjects only, that is Modern Greek and Mathematics. I was aware that any further research of this topic should aspire to

investigate the issue of school attainment of ethnic minority students in the island in greater detail and depth, by employing a wider range of data collection strategies and by extending both sample size and the range of subjects covered in the research. To shape the design of further studies, a set of research questions were first defined.

3.1.2 Research Questions

1. In lower secondary schools in Cyprus, is attainment different between major ethnic minority groups and native students?
2. Are absences, gender, generation status, parental education, parental occupation, school size, and school minority concentration important for student attainment?
3. Does attainment of students from different ethnic groups differ between more and less language-dependent subjects?
4. Are there factors, other than the ones listed in research question 2, that the teachers in the examined schools consider important for the attainment of ethnic minority students?
5. Are excused/unexcused absences or school suspension important for school attainment?
 - (a) Is this effect consistent across school subjects?
 - (b) Is this effect consistent across ethnic groups?
6. Which factors are considered important for the attendance of ethnic minority students?

3.1.3 Employing a Combination of Quantitative and Qualitative Methods

In addition to the quantitative and qualitative paradigms, there is another paradigm in educational research, the mixed methods research. Mixed methods research recognises the importance and usefulness of both quantitative and qualitative research (Johnson and Onwuegbuzie 2004, p.15). Johnson and Onwuegbuzie (2004) defined this as “the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study” (p.16).

Today many researchers acknowledge the benefit and usefulness of combining research methods instead of relying exclusively on those from one paradigm. Specifically, Verma and Mallick (1999) pointed out the “increasing recognition that combining the two research traditions within an educational framework has considerable benefits, rather than making exclusive use of one or other” (p.36). Also, Strauss and Corbin (1998) argued that “unless unduly constrained, routinized, or ideologically blinded, useful research can be

accomplished with various combinations of both qualitative and quantitative procedures” (p.31).

The purpose of the study is an important consideration prior to integrating or combining methods, as Mason (1998) argued. The researcher should ask the question “which of the research questions might be addressed by different methods, and how that might be done” (p.168). So, the researcher can decide that “the different methods may address specific parts of the puzzle, they may do it in distinctive ways (...) or approach the puzzle from diverse angles” (p.169). It is also accepted that “different methods address the same parts of the puzzle but in varying levels of detail (classically, that ‘quantitative’ methods provide breadth, and ‘qualitative’ methods provide depth)” (Mason 1998, p.169).

It was considered that a combination of research methods would benefit this study. It was thought that Research Question 1, on the variations in attainment between ethnic minority and native students, Research Question 2, on the importance of particular factors for attainment, Research Question 3, on whether student attainment differs between school subjects, and Research Question 5, on the importance of different types of absences for student attainment, could best be addressed using quantitative methods. In terms of attainment, statistical analyses based on semester grades and/or end-of-year exam scores can indicate if there is a gap, and to what extent, between the examined student groups and across school subjects, and which of the factors examined are important for attainment. As regards absences, again, statistical analyses based on the number of absences recorded (in teaching periods) in particular subjects can indicate the importance of each type of absence for student attainment. Research Question 4, investigating factors teachers consider important for the attainment of ethnic minority students, and Research Question 6, looking at factors that are important for the attendance of ethnic minority students, were however areas it was thought could be best addressed using qualitative inquiry methods. Qualitative research can investigate student attainment and attendance from a different angle and in more depth. Qualitative procedures can identify factors that appear important for attainment or attendance to those who are directly involved in the education of ethnic minority students and are responsible for the assignment of the measures of attainment used in the quantitative studies.

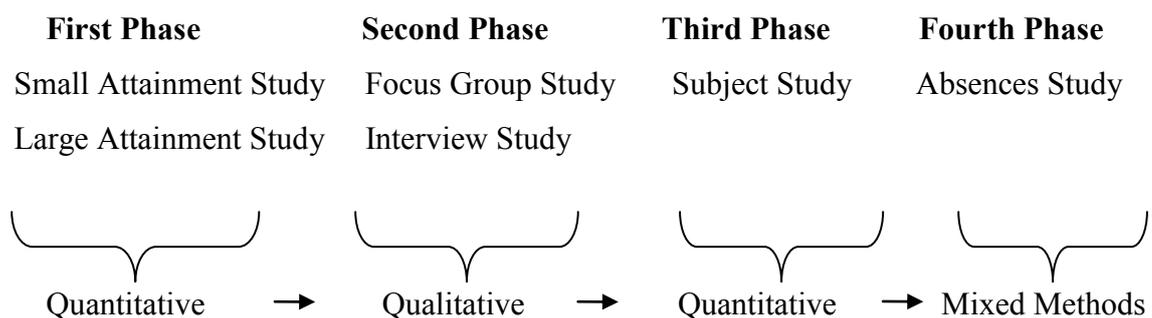
Quantitative methods can offer numbers, which can add precision to words, and identify attainment patterns, trends, and relationships; while qualitative methods can add meaning to numbers and offer detailed explanations and information on the underlying processes. A

combination of both quantitative and qualitative methodologies can enhance one's ability to provide more accurate and meaningful results. Quantitative and qualitative investigations can complement each other; as their combined use offers a fuller picture. Based on these considerations, the design of the present study employed both quantitative and qualitative methods.

3.2 Structure of the Study

The study included four phases (Figure 1). In the first phase, two quantitative studies examined the attainment levels of students from different ethnic groups and the importance of particular factors for student attainment (covering Research Questions 1 and 2). Then, in the second phase, two qualitative studies looked for the factors that were important for the attainment of ethnic minority students (covering Research Question 4). In the third phase, another quantitative study investigated whether the attainment of ethnic minority students differs between different school subjects (covering Research Question 3). Finally, in phase four, a mixed methods study examined, firstly, the attendance levels of ethnic minority students and the importance of excused/unexcused absences and suspensions for student attainment, and, secondly, the factors that are considered important for the attendance of ethnic minority students (covering Research Questions 5 and 6). One paper was written from each study (six papers in total).

Figure 1: Design of the research study



The third and fourth phases were planned and executed after the implementation of phases one and two. Having the experience of the first two phases, and having established to some extent my presence in the local (Cypriot) research literature, I was able to reposition my investigations in the context of the international literature. I identified certain gaps in the international literature, so I re-oriented my studies, collected additional data for phase three and then again for phase four and conducted the last two studies, each time using the

previous studies as a stepping stone. In effect, the order in which I present the papers in the thesis illustrates the actual conceptual and historical evolution of my studies.

3.2.1 First Phase

3.2.1.1 Small Attainment Study: The data from my MSc study, which was based on quantitative data from two secondary schools in Cyprus, was reanalysed. The purpose was to identify patterns of attainment for native and ethnic minority students. For the analysis, multiple regression models (OLS) were ran, based on attainment scores derived from a Rasch analysis. The reanalysis was run with the statistical package *SPSS* rather than *R* that was used in the MSc dissertation, employing backward elimination of the examined variables rather than the manual forward selection procedure. The tables of the final regression models were also presented in a different way and included more data items. From this new work, a new paper was derived with completely new sections that were never included in the MSc dissertation. The introduction and literature review sections were rewritten to reflect a more thorough investigation of the literature. The discussion section was also rewritten to reflect the above changes. The study showed that ethnic minority students had significantly lower attainment compared to that of native students.

3.2.1.2 Large Attainment Study: Next, a second quantitative study was carried out, aiming once again to examine the attainment patterns of secondary schools in Cyprus. This study employed similar methodology to the Small Attainment Study with some improvements; that is, (a) the inclusion of a higher number of schools and students, (b) the examination of attainment in more school subjects, (c) the introduction of two new school variables, (d) the examination of interactions between variables, and (e) the running of separate regression models for students in different year groups. Findings from this study, as far as student attainment is concerned, confirmed the results of the Small Attainment Study; ethnic minority students in Cyprus appeared to underachieve. In terms of aetiology, statistical analyses showed that *ethnicity*, *gender*, *parental education*, *parental occupation*, *generation status*, *absences*, and *school minority concentration* were significant explanatory variables of student attainment. I considered the inclusion of this study to the thesis as unnecessary, because its results are replicated and confirmed in the Subject Study which is described later in this section. The Subject Study is much more important, because it extends the research questions and the findings of the Large Attainment Study using a more parsimonious methodology. Further, the addition of scores from the end-of-year examinations for each of the included subjects not only enriches the dependent variable, but also deals with the ceiling effect noted in the Large Attainment Study. As

things practically evolved in the last two years, the Large Attainment Study ended up being a bridge between the Small Attainment Study and the Subject Study, rendering its presence as an integral component of the thesis superfluous. In effect, the inclusion of the Subject Study has rendered the Large Attainment Study obsolete. However, I included the Large Attainment Study as an appendix (Appendix 9), for the reader who is interested in the historical progression of my studies.

As the low academic attainment of ethnic minority students in lower secondary schools in Cyprus had been confirmed in the quantitative studies of the first phase, qualitative research was needed to inform my understanding of the factors perceived to be important for this.

3.2.2 Second Phase

3.2.2.1 Focus Group Study: Initially, a single focus group study was conducted with teachers. Its aim was to identify factors perceived to be important for the lower academic achievement observed in ethnic minority secondary-school students in Cyprus. As this was the first such attempt in the island, the study mainly had an exploratory purpose. A number of factors were identified as potentially important for the attainment of ethnic minority students. These were subsequently identified as relating to the child, the parents and home environment, the teachers, the school, and the wider society.

3.2.2.2 Interview Study: Next a further qualitative study was carried out, employing a somewhat different methodology to the one previously described. An interview study was conducted in some of the secondary schools that participated in the large quantitative study of the first phase. The purpose was to interview teachers in schools in which the attainment of minority students had already been studied. In so doing, the aim was to investigate the teachers' perceptions on factors considered important for the lower attainment among minority students. Once again, a number of factors relating to the child, family, teachers, schools, and society were identified. Closer consideration of those factors suggested that they could be linked back to the low socioeconomic status of immigrant families and to deficiencies in the local educational system, and that these were the main drivers behind the observed attainment levels of ethnic minority students.

3.2.3 Third Phase

3.2.3.1 Subject Study: This phase comprised another quantitative study. It aimed to, firstly, investigate whether the attainment of ethnic minority students was lower for more

language-dependent subjects compared to less language-dependent subjects; secondly, the use of final examination results in addition to teacher assessments as indicators of students' academic performance, aimed to strengthen the validity of results obtained from this study. Other than the enrichment of data mentioned above, this study differed from the Small and Large Attainment studies in that it combined multiple regression with multilevel regression analyses. The latter method was selected to examine differences in attainment across ethnic groups and school subjects. Another important modification was the use of a more direct way (rather than the Rasch analysis) to process trimester grades and transform them from an ordinal into a linear scale. Findings from the multiple regression analysis confirmed the results of the Small and Large Attainment Studies. Findings from the multilevel regression analysis showed that ethnic minority students do not perform less well than expected in subjects that are more language-dependent.

3.2.4 Fourth Phase

3.2.4.1 Absences Study: this phase represents an attempt to investigate absences in more detail using a mixed methods design. Specifically, the study aimed first of all to look at the attendance levels of ethnic minority students and the relation of different types of absences to student attainment. For this purpose, the dataset used in the Large Attainment Study and the Subject Study was enriched by gathering new information which allowed differentiation of student absences into *excused absences*, *unexcused absences*, and *suspensions*. The study also aimed to offer an insight into the observed attendance levels of ethnic minority students. For this part, the raw data from the focus group and the individual teacher interviews carried out during the second phase was used. Results showed that students from ethnic minority groups had higher levels of absenteeism than native students. Also, all types of absences were significantly associated with lower attainment, with exclusion having the highest explanatory power. A number of factors were thought by teachers to be important for the higher rates of absenteeism observed in ethnic minority students. Again, closer analysis of these factors led to the conclusion that the family socioeconomic status and the character of the local educational system are the main factors responsible for the absenteeism of ethnic minority students.

3.3 Quantitative Data

3.3.1 School Sample

The quantitative studies recruited gymnasia (lower secondary schools); two schools in the Small Attainment Study, five schools in the Absences Study, and six schools in the Large Attainment Study and Subject Study. The schools were located in different cities in the Greek-Cypriot part of the island³ (Nicosia, Limassol, Paphos, and Larnaca) as access across the divide was not possible. Stratified sampling (Cohen et al. 2004) was employed for school selection to ensure inclusion of schools with a different proportion of minority students as well as different school-size. At the time of school selection, the proportion of minority students in Cypriot schools varied greatly and some schools had no minority students at all. Essentially, the aim of the stratified sampling technique was to obtain a sample that was randomly selected from a series of strata designed to allow for the variability in school size and school minority concentration.

A specific two-stage procedure was followed for the stratified sampling (Cohen et al. 2004). Initially, all gymnasia in the south of the island were divided into groups depending on the size of their student population and the percentage of students from ethnic minority backgrounds. Specifically, the existing sixty-seven gymnasia which were located in Nicosia (23 schools), Limassol (19 schools), Larnaca (12 schools), Ammochostos (3 schools), and Paphos (10 schools), were allocated into different categories of school size and school minority concentration. The information required to see this through was obtained from the Ministry of Education and Culture. The division of schools into these categories took into account the existing literature on these issues. However, measures for school size and minority concentration, employed by other international studies, could not be used in exactly the same way in the case of Cypriot gymnasia. First, as regards school size, the number of students in the gymnasia of the island did not exceed 700, while the number of students in large schools in some of the earlier studies went much higher than that. As regards ethnic minority concentration, no gymnasium in the examined academic year (2004-2005) had more than 55% of minority students, whereas in some of the earlier studies predominantly minority schools were used. Based on these, three categories were created for the school size and two categories for the school minority concentration. Specifically, considering their size, schools were divided into small (up to 250 students), medium (up to 450 students), and large schools (up to 700 students). Considering their minority concentration, and based on the percentage of the student population that was not

³ These schools are under the control of the Republic of Cyprus.

Natives, schools were divided into schools of low minority concentration (up to 25%) and high minority concentration (more than 25%)⁴. An attempt was also made for the schools of each city to be grouped together.

The second stage of the stratified sampling procedure involved a random selection of a number of schools with different sizes, different minority concentrations, and from different cities. In terms of minority concentration, schools with low (between 10% and 20%) and high percentage (about 50%) of minority students were selected, with the assumption that selection from the extremes might give more distinct findings. In categories with more than one school available, a random selection from a hat was made. The final sample included two small schools with low and high minority concentration respectively, two medium schools with low and high minority concentration respectively, and, as there was no large school with high percentage in the island, the two large schools had low minority concentration.

The initial plan was to include more schools in the study. However, practical difficulties meant that this target was unachievable. Some head teachers did not consent to the participation of their schools for various reasons. These included an unwillingness on their part to put 'further pressure' on the already demanding schedules of teachers, participation in other studies during the same academic year, and an unwillingness to deal with potentially unhappy parents who might complain about a 'stranger' looking at potentially sensitive information in school-held student records. In addition, when I contacted the relevant department of the Ministry to check on the availability of datasets for those schools that were selected during the school selection procedure (the Ministry holds separate datasets for each school, as well as different databases for grades and absences), I realised that some schools had not completed and/or submitted their datasets for the particular academic year. At one stage, I considered collecting grades and absences for those students in the selected schools that had not submitted data to the Ministry myself (after obtaining appropriate approvals). However, when the data collection process began, I realised that this venture was impossible to complete within a reasonable time frame and with the limited resources available. I already had to collect some information (personal information) by going through individual, personal cards of all students during visits to the participating schools; that was on its own a difficult and time-consuming task, and it would take much more time to do it for more data items and for a greater number of schools.

⁴ As it was very rare for public schools in Cyprus to have teachers of any other ethnic background apart from Cypriots and Greeks, the study categorised school composition according to the ethnic background of students only.

The unwillingness of some head teachers to allow inclusion of their school in the study, the limitations imposed by the incomplete database held by the Ministry, and the lack of time and resources led to the inclusion of only six schools. Fortunately, the two schools with the highest ethnic minority concentration during the academic year examined were included in the school sample. That was very important for such a study, which deals with ethnic minority students and their school life. Furthermore, despite the difficulties met, I was able to recruit two schools from each of the three school-size categories, thus allowing some useful comparisons to be made.

3.3.2 Student Sample

The student sample consists of students aged 12-15 enrolled in the six schools during the academic year 2004-2005 (N=2054). The number of participants was different in each study as discussed in the individual studies: 769 students in the Small Attainment Study (72 Georgians, 98 'Others', and 599 Natives), 2023 students in the Large Attainment Study (259 Georgians, 266 'Others', and 1498 Natives), 2020 students in the Subject Study⁵ (258 Georgians, 266 'Others', and 1496 Natives), and 1906 students in the Absences Study⁶ (209 Georgians, 255 'Others', and 1442 Natives). This particular academic year was chosen because at the time of data collection (early 2006) it was the most recent academic year that the Ministry had some data for. The student sample from the six schools accounted for 38% of all Georgians, 71% of all 'Others', and 5.6% of all native students enrolled in lower secondary schools in Cyprus.

Students from Georgia, known locally as 'Rossopontioi' or 'Ellinopontioi', comprised the largest ethnic minority group in the schools examined but also nationally. A number of smaller ethnic groups (such as, Russians, Rumanians, Bulgarians, British, Africans, Arabs, and Americans) were pooled together for statistical purposes, to form a larger category named 'Others'. It was decided not to pool all minority students together, as the large number of Georgians in the study allows for a separate examination of this group.

The official database from the Ministry of Education and Culture only contained information on these 2054 students. During my school visits I came across school records for an extra one hundred and eight students who appear to have registered in one or other

⁵ Three students were removed from the regression analysis of this study, because they were extremely influential with high leverage values and high residuals (see 'Dealing with Outliers' section below).

⁶ One school had to be excluded from the analysis of this study because there was no information that would allow differentiation of absences into excused/unexcused absences and suspensions.

of the six schools examined. However, there was no information entered for these students by school suggesting that these students never attended the schools in question. This might be because the students moved to a different school without informing the first school of the change in their plans or they might have dropped out of school early. In any case, the school records did not have any grades for these children for any of the examined subjects. As the official database from the Ministry did not include these students and in order to avoid creating a situation with large amount of missing data, these students were excluded from the sample. Another group of thirty one students was removed from the analysis because of missing information regarding their demographics. This group of students did not appear to have a substantially different profile from the rest of the sample, therefore omitting these students should not introduce bias.

3.3.3 Dependent and Independent Variables

3.3.3.1 Student Attainment

Student attainment, which was the dependent variable in this study, was the product of the grades obtained by students in a number of school subjects. By relying on scores from a variety of subjects, more robust conclusions can be drawn regarding student attainment and school effectiveness. Scores in Modern Greek and History, which are theoretical subjects and were expected to rely more on language, and Mathematics and Physics, which are practical or numerical subjects and considered less language-dependent, were used. The rationale behind this selection of subjects was that, if the main problem of minority students is their deficiency in the Greek language, one would expect them to do better in those subjects that are less language-dependent. Inclusion of Mathematics and Physics should ensure that the achievements of ethnic minority students are not underestimated. Furthermore, use of multiple subjects could help illustrate whether differences in attainment are consistent across subject areas and also allow the investigation of differential influences in outcomes across the different subjects.

Two different indicators of student attainment were used; firstly, student grades from three consecutive trimesters (covering one academic year) in a number of school subjects, and secondly, scores from end-of-year exams in these subjects. Use of grades assigned by teachers rather than scores from a common, standardized test to measure student attainment could be considered a limitation of the present research study. This is because of the possibility of introduction of subjectivity which could, in turn, introduce bias. However, as there are no external/common examinations in gymnasia, these grades were the only available indicator of attainment for lower secondary school students in Cyprus.

Further, grades from three consecutive trimesters and end-of-year exam scores from four different subjects were used to minimize the bias associated with single measurements.

The trimester grades mainly reflect the average of a number of paper-and-pencil tests as well as informal continuous -mainly oral- assessments in the class over the period in question, based on material of the national curriculum taught during that term. Teachers might also consider the overall performance of students in the class; for example, whether they consistently participate or do their homework. The final exam score reflects the written performance of students on a single paper-and-pencil test given for each one of the examined subjects and based on material of the national curriculum taught during the whole year.

It is interesting to note that teacher assessments and examination results as indicators of attainment in secondary schools in Cyprus have been the focus of a recent study (Lamprianou and Christie 2009). This has shown that use of teacher assessments or examination results do not always return similar results. The authors suggest that across many or the full range of subjects, some students 'please' teachers, and other students 'please' tests. It might then be prudent to combine teacher assessment with test results. This could increase the validity of a study by reducing the probability of assessment bias (Koretz 2003).

Prior to combining these two indicators of attainment we examined their correlation. Pearson correlations showed high correlation between the two scores for the four subjects. Here, I correlated the overall trimesters score with the final exam score for each subjects (Modern Greek: $r(2018) = 0.88$, $P < 0.001$, Mathematics: $r(2018) = 0.86$, $P < 0.001$, History: $r(2018) = 0.82$, $P < 0.001$, Physics: $r(2018) = 0.86$, $P < 0.001$). The implication being that students who scored highly during the trimesters also tended to score high in the final exams but the two scores also seem to have some unique bits of information. Inclusion of the end-of-year exams as an indicator of attainment had another beneficial effect on this research study as it helped deal, at least partly, with the ceiling effect that is described in a later section ('Alternative Analytical Paths'). In view of the potential for increasing the validity of results, the high correlation between the two indicators of attainment and the beneficial effect on the ceiling effect, the two indicators of attainment were combined.

For the analyses of the Small Attainment Study, which was part of the MSc dissertation, the Rasch model⁷ was employed to transform the ordinal trimester grades to a linear scale. Rasch analysis processed the grades of all students from each trimester and gave an overall performance index for each student for each subject (*Modern Greek Rasch Score* and *Mathematics Rasch Score*). This overall score was then used as a continuous variable in ordinary least-squares regression models. Rasch analysis was employed in the Large Attainment Study too. No further information on Rasch analysis is offered here, as this does not constitute part of the main analytical methods of this thesis.

For the requirements of the Subject Study, the trimester grades were transformed from an ordinal form (A, B, C, D, E) to a numeric form, following the methodology used by the Ministry of Education in Cyprus. In secondary schools in Cyprus exams are marked out of 20. The semester grades are, however, given in ordinal form. Grade A is awarded for 19 and 20, grade B for 16, 17, and 18, grade C for 13, 14, and 15, grade D for 10, 11, and 12, and grade E for any number below 10. In order to obtain a single number as an indicator of student attainment for each grade, the mean of the above ranges was chosen. That is, 19.5 for grade A, 17 for grade B, 14 for grade C, and 11 for grade D. For grade E, which covers every number from 1 to 9, it was decided to use the number 8 for two reasons. Firstly, this allows the distance between grades to be kept the same (that is three units). Secondly, 8 is the lowest mark that the Pancyprian Exams (University entrance exams) report (Pancyprian Exams Guide 2008). Using this system, the three scores from the three trimesters were added together and divided by three, giving an average attainment score for each student in each subject. Final exam scores were already in a numeric form (from 1 to 20).

For the purposes of the regression analyses of the Subject Study two different dependent variables were created. The first one, the *Trimesters Overall Attainment*, is based on the trimester grades of the four subjects examined. The three grades, one for each trimester, which were transformed into a numeric form as explained above, were added together to give a total score for each student in that subject. Then, the total scores of each student for

⁷ Rasch models have been used in the context of educational assessment for many years. There is a large body of literature demonstrating how Rasch models can be used to analyse assessment data and why their use is, sometimes, desirable (e.g. Lamprianou 2006, 2008b, and Lamprianou and Boyle 2004). For the needs of this study, the Partial Credit Model, one particular variant of the Rasch ‘family of models’ was employed (see Wright and Masters 1982), because of the non-dichotomous nature of the response categories used.

each subject were added together, giving an overall score for each student. So, this overall score is based on twelve measurements (3 grades x 4 subjects = 12 scores). This was then divided by twelve, to give the average attainment. The total average score was out of 20; a scale chosen to be the same as that used in the final exams.

The second dependent variable, the *Combined Trimesters and Final Exams Overall Attainment*, was created by the combination of the *Trimesters Overall Attainment* (described in the previous paragraph) and the *Final Exams Overall Attainment*, which represents the student scores from the end-of-year exams in the four subjects examined. So, this overall score of each student was based on sixteen measurements (12 scores from trimesters + 4 scores from end-of-year exams = 16 scores). This was then divided by 16 to calculate the average attainment of each student. The total average was again out of 20 so that all results are comparable. The *Combined Trimesters and Final Exams Overall Attainment* was employed in the Subject Study and the Absences Study. For the purposes of the multiple regression analyses in the Subject Study the overall score was divided by 16 to calculate the average attainment of each student. The total average was again out of 20 so that all results are comparable. For the purposes of the multilevel analyses I used the three semester grades and the end-of-year examination score to get a combined grade for each subject. This combined grade was also out of 20 to facilitate comparisons. Attainment was used in the statistical analysis as a continuous variable.

The independent variables employed in this study are presented below.

3.3.3.2 Ethnicity

The ethnicity of children was based, as in other studies (such as, Hustinx 2002), on parental birthplace. Georgians (known locally as ‘Rossopontioi’ or ‘Ellinopontioi’) were defined as those children who had at least one parent born in Georgia. Students who had at least one parent born in any other country except Cyprus and Georgia (for example, Britain, Russia and Bulgaria) were defined as ‘Others’. Throughout the present thesis I refer to the groups of people described above as ‘ethnic minority groups’, as they are groups within the Cypriot community which have different national or cultural traditions from the main population (Oxford Dictionary)⁸.

⁸ The term ‘immigrants’ refers to people who come to live in a foreign country permanently (Oxford Dictionary). As there was no way for me to establish whether participating students were going to stay in Cyprus permanently or not, use of this term was avoided. Further, in the qualitative part of the research study,

Natives were defined as those who had both parents born in Cyprus. In this group, a handful of students from Greece were included as they speak the same language and share the same religious and cultural background as the local students (the same approach was followed by Panayiotopoulos and Nicolaidou 2007, p.66). No students from groups recognized in the Cyprus constitution (namely, Turkish-Cypriots, Maronites, Armenians, or Latins) were enrolled in the participating schools during the study period. The categories used to group participants in terms of ethnicity were: Natives, Georgians, and ‘Others’.

3.3.3.3 Socio-economic Status

Student socio-economic background was measured utilising two indicators, namely *parental education* and *parental occupation*. Parental educational and occupational levels were examined separately to ensure that any differential effect on student attainment was recognised. Parental education was taken to mean the highest level of education completed by either parent. Similarly, parental occupation was determined via the highest level of occupation of either parent. In cases of *parental education* or *parental occupation* where information was available for only one parent, this information was utilised. For single-parent families the educational level is equal to the education or occupation of the sole parent (as in a study by Bankston and Caldas 1998).

The categories used for the identification of the educational level of parents were: primary education, secondary education, and further studies. This was based on the system followed by the Ministry of Education and Culture of Cyprus and was reflected in the school-held records. The categories used for the identification of the occupational level of parents were: manual unskilled workers, manual skilled workers, civil servant and private workers, teachers and senior civil servants and senior private workers, and professionals and chief managers. Again, this was based on the system followed by the Ministry of Education and Culture of Cyprus.

I chose not to use family income as an indicator of socio-economic status for two reasons. To begin with, income on its own is not as strong an indicator as the aforementioned two, because of its high correlation with education. As Sirin (2005) argued, “parental education is an indicator of parents’ income, because income and education are highly correlated” (p.419). It is not uncommon for studies to conclude that income is not significant for the

it was argued by a number of participating teachers that there were children whose families visited the island temporarily.

prediction of students' attainment when other indicators of socio-economic status (e.g., parental education or parental occupation) are taken into account. Further, as parents would have been asked to offer this information it raises questions about its accuracy and reliability. Because of these concerns, this piece of information is not routinely collected by schools and would therefore not have been readily available for collection.

3.3.3.4 Generation Status

The birthplace of students, which could be different from that of their parents, is taken into account as a way of distinguishing students of first and second immigrant generation. That is, as explained in the Small Attainment Study, "first-generation students were defined as those born abroad with at least one parent born abroad and second-generation students those born in Cyprus with at least one parent born abroad. *Natives* were defined as those born in Cyprus by parents born in Cyprus or Greece. In the participating schools there was no minority student beyond second generation". This classification into students of first and second-generation immigrants has been used in other studies too (e.g., Goyette and Xie 1999). The categories used for the identification of the generational status of students were: native, first generation, and second generation. The length of time minority children spent in the education system in Cyprus could also be useful, but this information was unavailable.

3.3.3.5 Absences Variables

The absences variable was based on the number of absences that each student recorded in all teaching periods of the four subjects examined (Modern Greek, Mathematics, History, and Physics) for the whole academic year (2004-2005). An overall number of absences was created, *overall absences*, combining the number of absences from the four subjects. Absence levels in particular subjects were investigated in relation to student attainment in these subjects. Absences were used in the statistical analysis as a continuous variable.

For the requirements of the Absences Study, the data was enriched to allow differentiation of student absences into three absence variables: *excused absences*, *unexcused absences*, and *suspension*. As the number of teaching periods varies by subject, the absences were standardised in order to facilitate comparisons. This was achieved by dividing the total number of absences for each subject by the total number of teaching periods for that subject in the year and then multiplying by 100. As such, *excused absences* and *unexcused absences* represent the percentage of excused and unexcused absences respectively from all teaching periods in the four examined subjects. The *suspension* variable indicates

whether a student has ever been suspended from school or not. *Overall absences*, *excused absences*, and *unexcused absences* are continuous variables. The way the information on *suspension* was recorded only allowed for the creation of a categorical variable.

3.3.3.6 Other Variables

A few other variables were included in the statistical analyses too: student *age* (measured in months), *year group*, *gender*, *school*, *school size*, and *school minority concentration*. Student *age* was used in the statistical analysis as a continuous variable. The categories employed for the other variables follow. For *gender*: male and female. For *school size*: small, medium, and large. For *school minority concentration*: low percentage and high percentage. For *year group*: first year, second year, third year. For *school*: School A, School B, School C, School D, School E, and School F.

The utilisation of a variable indicating the class that each student was in could be useful. It could, for example, reveal possible attainment differences between classes. This could, in turn, be secondary to class-specific factors such as student composition or the teaching methods employed in particular classes. However, the head teachers did not want this data item to be used because of fears it could lead to identification of both individual students and teachers.

3.3.4 Variable Coding

Dummy (treatment) coding was used for dichotomous/binary variables, that is *gender*, *school minority concentration*, and *suspension*; with female students, schools of low minority concentration, and never being excluded used as the reference category in each of the respective variables. Dummy coding was used for multi-category variables too, that is *ethnicity*, *generation status*, *parental occupation*, *school*, *school size*, and *year group*. The group of native students is chosen as the reference category for the variables *ethnicity* and *generation status*, so that the two available ethnic minority groups, Georgians and 'Others', and the minority students of first or second generation status are compared to the native students. For the rest of the above-mentioned variables, parents who are unskilled manual workers, School A, schools of a small size, and students of the first year group are used as reference categories for each of the respective variables. This type of coding compares each category against the reference category (Hutcheson 2006f). For ordered categorical variables, for which order might matter (i.e., *parental education*), Helmert contrast coding is used. In this case, each category is compared to the sum of all of the previous categories (Fox and Weisberg 2011). This way, it can be checked whether

students whose parents received further education are in a more favourable academic position than those whose parents have not received further education (that is, those whose parents received primary alone or primary and secondary education).

3.3.5 Sources of Information

Student trimester grades, final exam scores, and absences for all examined subjects were obtained from a database held by the Ministry of Education and Culture of Cyprus. The information in this database is derived from the official report cards of students. Information on school population, that is the number of students in each school and the proportion of students coming from different ethnic groups, was also obtained from the Ministry. Finally, school-held records (in the form of individual cards) provided personal and parental information, that is, student birthplace, date of birth, gender, parental origin, education and occupation. The new data regarding absences was obtained years after the initial data collection but from the same database held by the Ministry of Education and Culture of Cyprus. The student's unique identification number was used to match information from the Ministry's database and the database that I created; this latter database was created during my personal visits to schools which I carried out in order to collect information from students' school-held records.

3.3.6 Quantitative Analytic Strategies

3.3.6.1 Descriptive Statistics

Descriptive statistics were created, in order for the data to be illustrated. Some of these are presented in the quantitative papers. However, more detailed descriptive statistics, that is frequency tables and graphs for the variables examined in the quantitative analysis, as well as a cross-tabulation analysis examining the relationship of the variable *ethnicity* (the variable in which the present study was more interested) together with some other variables, can be found in Appendix 2. The *R*-statistical package Version 2.15.1 (R Core Team, 2012) was used for the descriptive statistics of the present study.

Prior to presenting the main analyses of the thesis (multiple regression analysis and multilevel regression analysis), some particular tasks that were carried out should be mentioned. Firstly, the data was checked for outliers. Graphs, especially histograms, created for absences and age have pointed out that there were both absences (Figures 16-20 in Appendix 2) and age outliers (Figures 21-23) in Appendix 2. Outliers are data points, which lie far from the majority of observations showing extreme values (Hutcheson and Sofroniou 1999, 19). It is known that outliers may be a potential problem for the statistical

analyses, as they “can exert an undue influence on the slope of the obtained regression model” (Hutcheson and Sofroniou 1999, p.19). As such, these cases (data points) are certainly worth looking at to see if they represent erroneous data or, if not erroneous, whether they arise from an unusual situation (Hutcheson 2006c). A careful examination of these cases has been made, looking at the dataset of the Ministry of Education as well as the information collected from the participant schools. Age and absences outliers were double-checked utilizing both sources of information and this provided confirmation that the data was not erroneous. An action plan was decided to deal with the outliers. This is presented in the section ‘Dealing with Outliers’.

Next, regression diagnostics were created, to check whether the data of the present study meet the necessary assumptions for a linear model. Using the residuals of the data employed in the quantitative studies, the assumptions normality, constant variance, linearity, and independence were found to have been met or their effect was evaluated as non-detrimental to the validity of our statistical results (see Appendix 3).

After that, an investigation for any associations between the explanatory variables was made by checking the multicollinearity statistics. Multicollinearity is a situation where an explanatory variable in a regression model is related to one or more of the other explanatory variables. A high degree of multicollinearity might jeopardize the correct interpretation of results (Hutcheson and Sofroniou 1999, p.78-9). The use of ‘variance inflation factor’ (VIF) statistics was employed in the regression analyses in order to examine the degree of multicollinearity for the variables examined. A variable with VIF value of 5 or more shows a degree of multicollinearity that can be problematic (Hutcheson and Sofroniou 1999, p.82-3)⁹.

Multicollinearity appeared in the regression models in two separate occasions in all studies that the affected variables have been used: (a) between the variable *ethnicity* and the variable *generation status*, and (b) between the three school variables: *school*, *school size*, and *school minority concentration*. As these same variables were used in the Small Attainment Study, the Large Attainment Study, and the Subject Study, multicollinearity was observed in all these studies. It is not difficult to see why this happens in these cases. In the first case, *ethnicity* and *generation status* are related variables, as information about *ethnicity* is implied in the *generation status* variable. For example, all Greek Cypriots are in the native category, or all Georgians are of first generation status (see crosstabulation

⁹ For more information on different kinds of multicollinearity, see Hutcheson (2006a, p.1).

Table 41 in Appendix 2. In the second case, school variables are inter-related too. For example, the majority of natives and ‘Others’ are in schools with low percentages of minority students, while more than half of Georgians come from schools with high minority concentration. Also, the schools with the lowest minority concentration are the largest in size and vice versa (see crosstabulation Table 45 in Appendix 2). Under these circumstances, a decision was made for only one of the variables in each case to remain in the regression models, the variable *ethnicity* in the first case and the variable *school* in the second case. However, in order to obtain information about children of different generation statuses and children from schools with different size and different ethnic minority concentration, extra regression models were run, replacing in the first case the variable *ethnicity* with *generation status* and in the second case the variable *school* with *school size* or *school minority concentration*.

3.3.6.2 Multiple Regression Analysis

Regression analysis is a statistical method of predicting the value of one variable using the values of one or more, other variables (Allen 1997). The variable that the model tries to predict is called the dependent (response) variable and the variables that it uses as predictors of the dependent variable are called independent (explanatory) variables (Allen 1997; Rawlings et al. 1998). For the examination of student attainment by ethnic backgrounds, the data to be modelled (the dependent variable) was the student attainment. In the Small Attainment Study, *Modern Greek (Rasch Score)* and *Mathematics (Rasch Score)* were the two dependent variables used. The Large Attainment Study used the *Trimesters Overall Attainment* as a dependent variable. This variable was used in the Subject Study too (the way this was obtained was different, though, as explained earlier), together with the *Combined Trimesters and Final Exam Overall Attainment*. The latter was the dependent variable employed by the Absences Study too.

Regression analysis was chosen because it can assess how accurately an independent variable predicts a dependent variable. It can help determine the proportion of the variation in the dependent variable that can be accounted for by the variation in the independent variable(s). In addition, statistical significance can also be determined by regression analysis (Allen 1997, p.3). In order to examine whether particular factors were related to the dependent variable, a number of independent variables were entered into the regression models.

Regression analyses involving more than one independent variable are known as multiple regression analyses (Hutcheson 2006d). Multiple regression analyses can be used to simultaneously estimate the form and accuracy of the relationship between a dependent variable and several independent variables. This allows the examination of the effect of one independent variable on the dependent variable by controlling for the effects of other independent variables (Allen 1997).

One of the important aims of model building was the creation of ‘a good model’. As Hutcheson (2006b) indicated, “a good model enables accurate predictions to be made but should contain only those variables which play an important role. In other words, the model should be parsimonious” (Hutcheson 2006b, p.1). Details about which factors were examined and which of those were significant in predicting student attainment in the two studies are given below.

Single-level regression models were employed in the Small Attainment Study, the Large Attainment Study, and the Subject Study, in order to explain or predict the variation in student attainment, the dependent variable of interest, in terms of a number of independent variables.

Due to several differences in the analyses of the different studies, the regression modelling of each one is presented separately.

3.3.6.3 Regression modelling for the Small Attainment Study

Modern Greek (Rasch Score) and *Mathematics (Rasch Score)* were the dependent variables used in the Ordinary least-squares regression models of the Small Attainment Study. In order to examine whether particular factors were related to the student attainment, a number of independent variables were entered into the multiple regression models. These were: *ethnicity, gender, age, generation status, parental education, parental occupation, overall absences, year group, and school*. Different models were run for each one of the two subjects, with student population coming from three different year groups pooled together due to its small sample size.

The regression models were built using backward elimination. That is, all the independent variables were entered into the regression model in the first instance. Then, variables were removed from the model sequentially. “At each step in the process, the term which, if removed, results in the smallest significant change in the value of F (as denoted by the

partial-*F* or *t* statistics), is removed from the model – provided that it has reached a ‘removal criterion’ (in backward elimination the removal criterion is usually set at $P = 0.1$). After each term is removed, the regression equation is recalculated and those terms left in the model are re-examined to see if any contribute less than the criterion level (as determined by partial-*F*)” (Hutcheson and Sofroniou 1999, 97). This process was repeated until no more variables reached the criterion for removal and all the variables that remained in the model were important for predicting the dependent variable.

The majority of the factors examined, that is *ethnicity*, *gender*, *generation status*, *parental education*, *parental occupation*, and *overall absences*, appeared to be significant for student attainment. The variables *age* and *school* were statistically significant only in Mathematics, while *year group* was statistically insignificant in both subjects, when all the other factors were taken into account, and was excluded. The regression equations that were formed for the subjects of Modern Greek and Mathematics are presented below:

$$\begin{aligned} \text{Modern Greek (Rasch Score)} &\sim \text{Ethnicity} + \text{Gender} + \text{Parental Education} \\ &+ \text{Parental Occupation} + \text{Absences} \end{aligned}$$

$$\begin{aligned} \text{Mathematics (Rasch Score)} &\sim \text{Ethnicity} + \text{Gender} + \text{Parental Education} \\ &+ \text{Parental Occupation} + \text{Absences} + \text{Age} + \text{School} \end{aligned}$$

The model equations above indicate the dependent variables, *Modern Greek (Rasch Score)* in the first case and *Mathematics (Rasch Score)* in the second case, followed by tilde (~), which can be read as: “can be explained by”. Next, the predictors are defined.

The effect of the *generation status* variable in Modern Greek and Mathematics was examined in different regression models that were run by replacing the variable *ethnicity* with the variable *generation status*. The equations for these regression models as well as the parameter estimates of all the regression models described above are presented (Table 1-4) and interpreted in the next chapter.

3.3.6.4 Regression modelling for the Subject Study

In this study, two different analyses were run. The dependent variable of the first analysis was the *Trimesters Overall Attainment* and the dependent variable of the second one was the *Combined Trimesters and Final Exams Overall Attainment* (the creation of these overall scores is described in the ‘Student attainment’ section above).

It should be noted that, initially, for both analyses a different model was run for each of the examined subjects - as each one was considered to cover a different area - and for each year group - as the student sample consisted of students from three different year groups. However, as findings from the regression analyses across subject areas and year groups were similar, for reasons of practicality and simplicity, the scores from the four different subjects were combined creating an overall attainment score, and students from all year groups were pooled together. The *year group* and *age* variables were taken into account in the models. As such, only the overall models are presented here. A closer look at student attainment across individual subjects is offered at the next stage of the analysis, the multilevel regression models, which examines for interactions between different subjects and students coming from different ethnic groups.

Ordinary least-squares regression models were built, as both of the above attainment variables are continuous. A number of factors used in the Small Attainment Study and the Large Attainment Study were entered into the regression models as independent variables. That is, *ethnicity, gender, age, generation status, parental education, parental occupation, overall absences, year group, school, school size, and school minority concentration.*

A manual forward/stepwise selection procedure was employed to build the regression models^{10,11}. The forward method selects variables to enter into the model singularly, on the basis of relative importance. “The first term to be entered into the model is the one which, if added, results in the most significant change in the value of F (as determined by the partial- F , or equivalent t statistics), provided that this meets an ‘entry criterion’ (for variable entry, this is usually set at $P < 0.05$)” (Hutcheson and Sofroniou 1999, p.96)¹². The first step, in order to identify the first variable to enter the model, is to create simple models with each one of the explanatory variables. The explanatory variable that reaches the criterion level and has the most significant change to the F statistic is selected to enter the model. The next step is to add each of the remaining explanatory variables into separate models, which already include the variable that was added at the first step. Again, the

¹⁰ The manual forward procedure was used in addition to the backward one. Although backward elimination is a widely used method of analysis (Faraway 2005), there are recognised limitations with this procedure. For example, due to the automated nature of the method, it is possible for the model selection algorithm to miss a more appropriate model that could have been achieved by other methods. The model was run with the backward procedure too (as described in the model building of the Small Attainment Study above) and similar results were obtained (not presented here).

¹¹ The manual model is necessary because of the examination of dummy coded categorical variables, which “have to be dealt with using manual modeling procedures” (Hutcheson and Sofroniou 1999, p.97-8)

¹² Also, “the explanatory variable that has the most effect (according to the change in R^2 , the change in deviance (F , partial- F , $-2LL$) or statistics such as AIC and BIC) is selected to enter the model” (Hutcheson 2008, Session 7, p.9).

variable that reaches the criterion level and results in the most significant change to the F statistic is selected to enter the model next (Hutcheson 2008). Every time a variable is added to the model, the regression is recalculated, and those variables which are already included are tested to see if any can be removed (the 'removal criterion' is usually set at $P > 0.05$). So, the variable whose importance diminishes as an additional term is added can be removed, and if any variable not in the model reaches the criterion for entry, it can be included in the model. This procedure of entering and removing variables continues until all the significant variables are in the model or until no more variables reach the required level of significance (Hutcheson 2008, Hutcheson and Sofroniou 1999).

Implementing the above procedure for the model building, in order to identify the variable that would enter into the model first, simple regression models were created. These models had attainment as the dependent variable and one of the examined factors (except those which cause multicollinearity problems identified above), that is *gender*, *ethnicity*, *parental education*, *parental occupation*, *overall absences*, *age*, *year group*, and *school* as independent variable (see Step 1 in Table 47 and Step 1 in Table 48 in Appendix 4). For both analyses, the one with the *Trimesters Overall Attainment* and the one with the *Combined Trimesters and Final Exams Overall Attainment* as dependent variable, the variable that reached the criterion level and had the most significant change in the value of F was *overall absences*.

Next, each of the remaining explanatory variables was added into separate models, which already included *overall absences*, the variable that had been added in step 1. Again, the variable that reached the criterion level and resulted in the most significant change to the F statistic was selected to enter the model next. In this case, *gender* was added next, (Step 2), followed by *parental education* (Step 3), *ethnicity* (Step 4), *parental occupation* (Step 6), and *school* (Step 7). Every time a variable was added, the regression model was recalculated and those variables already included were tested to see if any reached the removal criterion and could be removed. All of the above factors appeared to be important for predicting student attainment and entered the models of both analyses in the same order. *Age* and *year group*, when other factors were taken into account, appeared to contribute less than the criterion level and were excluded from the model (Steps 5 and 8 in Table 47 in the case of the *Trimesters Overall Attainment*, and Step 7 in Table 48 in the case of the *Combined Trimesters and Final Exams Overall Attainment*). Their significance was checked in every step until the end of the model-building procedure, but they did not reach the entry criterion.

Every time a variable was entered into or removed from the regression model, an attempt was made to examine the significance of that variable employing *anova* tables (see Steps 2 to 8 in Tables 47 and 48). This was derived using the *deviance* statistic or *RSS* statistics (the residual sum of squares). By comparing the *deviances* of nested models, an individual variable is compared with a group of variables within a model, and the significance of this individual variable is obtained (Hutcheson 2006e). That is, for all the examined variables two nested models were compared, one with and one without a particular variable. It appeared that *absences*, *gender*, *ethnicity*, *parental education*, *parental occupation*, and *school* had a significant effect on the model ($P < 0.05$). Every time one of these variables was added to the model, the *RSS* of the model was reduced. Actually, it was reduced from 20032 (null model at Step 1) to 12379 (with the entry of the last variable at Step 7) in the case of the *Trimesters Overall Attainment* (Table 47), and from 26483 (null model at Step 1) to 15865 (with the entry of the last variable at Step 7) in the case of the *Combined Trimesters and Final Exams Overall Attainment* (Table 48). This is an indication that the addition of these variables to the model helped to build an improved model. In other words, all (six) variables together enabled a better prediction to be made of attainment levels. *Age* and *year group*, though, in the presence of other variables, had no explanatory power ($P > 0.05$) and were not included in the models.

At the end of this procedure, similar equations were formed for the final regression models of both analyses. The one for the *Trimesters Overall Attainment* was:

$$\begin{aligned} \textit{Trimesters Overall Attainment} \sim & \textit{Absences} + \textit{Gender} + \textit{Parental Education} \\ & + \textit{Ethnicity} + \textit{Parental Occupation} + \textit{School} \end{aligned}$$

And the one for the *Combined Trimesters and Final Exams Overall Attainment* was:

$$\begin{aligned} \textit{Combined Trimesters and Final Exams Overall Attainment} \sim & \textit{Absences} \\ & + \textit{Gender} + \textit{Parental Education} + \textit{Ethnicity} + \textit{Parental Occupation} \\ & + \textit{School} \end{aligned}$$

The model equations above indicate the dependent variables (*Trimesters Overall Attainment* in the first case and *Combined Trimesters and Final Exams Overall Attainment* in the second case) followed by tilde (~), which can be read as: “can be predicted by”. Next, the predictors are defined.

At this point, the variables that were excluded from the regressions at the start of the analysis because of multicollinearity (*generation status*, *school size*, and *school minority concentration*) were examined further. In order to obtain information about the attainment levels of children of different generation statuses and children from schools with different size and different ethnic minority concentration, extra regression models were run. One model was created in which the *ethnicity* variable was replaced by the *generation status*. In another model, the *school* variable was replaced by *school size*. One more model was run with *school minority concentration* replacing the *school* variable. These extra regression models were run for both the *Trimesters Overall Attainment* and the *Combined Trimesters and Final Exams Overall Attainment*. *Age* and *year group* variables appeared to be insignificant in these analyses too and were removed from the models. The equations of the multiple regression models run with the variables *generation status*, *school size*, and *school minority concentration*, as well as the parameter estimates of all the multiple regression models described above are presented (Tables 5-8 for the models of the *Trimesters Overall Attainment* and Tables 9-12 for the *Combined Trimesters and Final Exams Overall Attainment*) and interpreted in the next chapter, ‘Data Presentation’.

The *R*-statistical package Version 2.15.1 (R Core Team, 2012) was used for the building of the multiple regression models and specifically the *R Commander* package.

3.3.7 Multilevel Regression Models

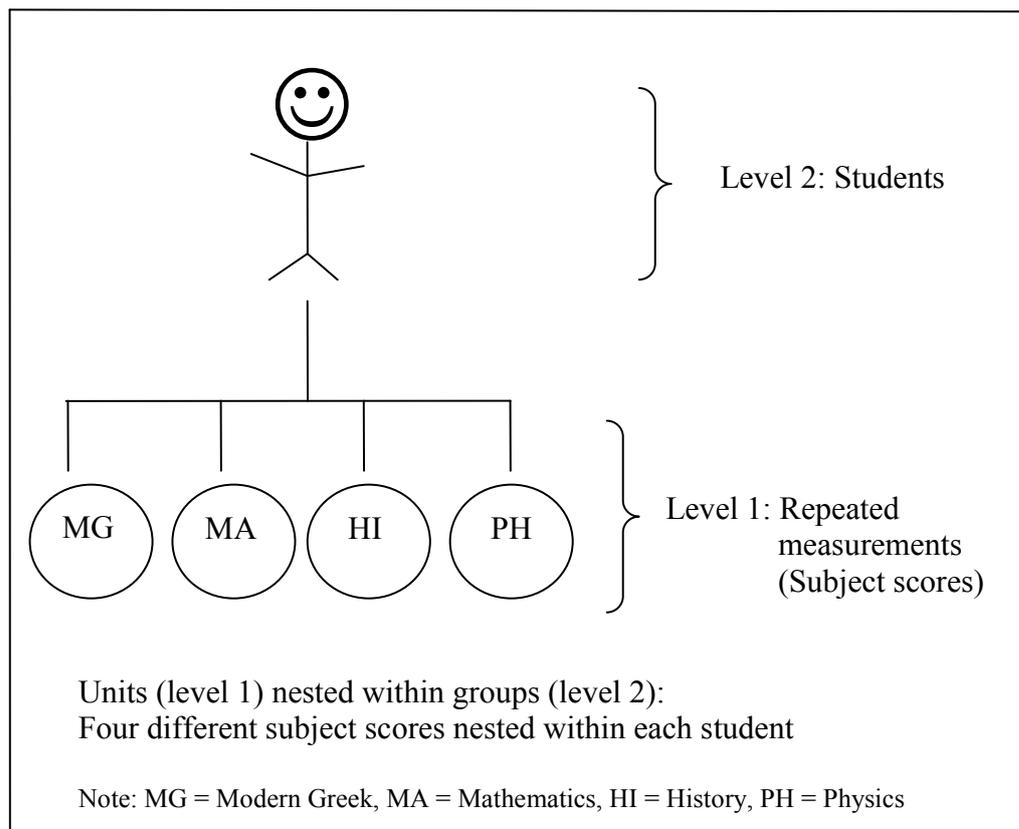
Multilevel regression models are also referred to in educational research as ‘multilevel linear models’ (Goldstein 1987; Mason, Wong, and Entwistle 1983), ‘hierarchical linear models’ (Raudenbush and Bryk 1986), or ‘linear mixed models’ (Burton et al 1998).

The dataset of the present study includes student scores from different school subjects (Modern Greek, Mathematics, History, and Physics). These attainment scores are considered to be repeated measurements, data measured more than once (Cornish 2007; also see the examples of Faraway 2006, section 9.3). In this case, there are four scores: one for the subject of Modern Greek, one for the subject of Mathematics, one for the subject of History, and one for the subject of Physics. Each score is regarded as a different measurement. So, four individual measurements, from the four different school subjects, exist for every single student. The individual measurements consist of level-one data and they are nested/clustered within students, which are level-two data. Faraway (2006) describes this as a “multiple response multilevel models” design. In methodological terms this is a multilevel problem. The multilevel/hierarchical structure of the data is illustrated

in Figure 2. Multilevel models are models that specifically deal with data that have a “hierarchical or clustered structure” (Hox 1998, p.147).

The multilevel structure of repeated measurement data is indicated by many researchers. For example, according to Gelman and Hill (2007), one “kind of multilevel data structure involves repeated measurements on persons (...) – thus, measurements are clustered within persons” (p.241).

Figure 2: Multilevel/Hierarchical Data Structure



Multilevel models work in a similar way as single-level models, but their use is more appropriate and preferable in the case of a multilevel dataset for a number of reasons. Firstly, multilevel models take into account the hierarchical structure of the data. So, with multilevel models, one dependent variable at the lowest level (level 1) and a number of explanatory variables at different levels (any level of the hierarchy) are analysed simultaneously. Also, “just as regression models postulate direct effects of independent variables at level 1 on the dependent variable at level 1, so too, multilevel models specify cross-level interaction effects between variables located at different levels. In doing multilevel modelling, the researcher postulates the existence of mediating mechanisms that cause variables at one level to influence variables at another level” (Garson 2012, p.5).

Furthermore, the particular structure of the dataset makes it clear that data of level 1 units within the same level 2 units are not independent. That is, scores in the examined subjects are more likely to be similar if they come from the same student rather than from different ones. Standard statistical analysis techniques (e.g., simple regression models) do not take into account these dependencies and results obtained by these methods can be biased (Hartig 2005). In contrast, multilevel models are able to assume different relations for different clusters and assess the influence of level 2 variables whilst controlling for differences in level 1 variables. Burton (1998), explaining the difference between a standard regression model and a multilevel model indicates that one can “extend a standard regression model by adding random effects. In a standard regression model a regression coefficient is assumed to take the same fixed value for all individuals in a data set - hence the term ‘fixed effect’. In contrast, random effects are regression coefficients that are permitted to vary from individual to individual” (p.1268). Fixed and random effects are discussed further below.

Two-level models are employed in the Subject Study and the Absences Study. In the Subject Study their use aimed to investigate whether there were differences in attainment between the different theoretical (Modern Greek and History) and practical subjects (Mathematics and Physics), as the former are considered to be more language-dependent than the latter. In the Absences Study, multilevel models were used to check for differential relationships between the three absences variables and student attainment across different subjects or across different ethnic backgrounds. The linear technique was used in both studies because the response variable student attainment is a continuous variable.

A modified version of the dataset employed in the multiple regression analysis was used for this analysis. The dependent variable was once again student attainment, and specifically the *Combined Trimesters and Final Exam Overall Attainment*. As discussed earlier, I used the three semester grades and the end-of-year examination score to get a combined grade for each subject. This combined grade was also out of 20 to facilitate comparisons. However, as the examination of student attainment scores was necessary for the four subjects separately, a new categorical variable was created, *subject*, to include the four examined subjects. This way, instead of having one overall score, each student had four records, one record per student’s subject score. Each subject’s score was the average of the grade of the three trimesters and the end-of-year exam score, in accordance to the example of Faraway (2006, p.195). Also, the majority of factors employed in the multiple

regression analysis were used in the multilevel analysis too. A couple of factors were excluded, because they were not deemed to be relevant to the research questions examined in these studies.

For the model building, first of all, the two levels of the model were defined as indicated above; that is, attainment scores from different subjects - the dependent variable - as well as all the independent variables at level 1 of the hierarchy, and the individual students at level 2. Then, a decision was made about how the examined factors were going to be treated, as in a multilevel data analysis only fixed effects and random effects distributions are actually estimated (Hartig 2005). Fixed effects are “regression coefficients (intercepts or covariate effects) that are not allowed to vary randomly across higher level units” (Diez-Roux 2002, p.590). A researcher treats a variable as fixed effect, when he is interested in making inferences about only those levels included in the study (Albright and Marinova 2010). Random effects are “regression coefficients (intercepts or covariate effects) that are allowed to vary randomly across higher level units” (Diez-Roux 2002, p.593). A researcher treats a variable as random effect, when he is not interested in making inferences about the particular sample per se, but instead he aims to generalize about the population at large (Albright and Marinova 2010).

For both of the studies, a model that incorporates both fixed and random effects was created, a ‘mixed-effect model’, as it is called by a number of researchers, such as Albright and Marinova (2010) and Starkweather (2010). So, individual students were treated as random effects whose coefficients vary randomly around an overall mean, as they “can be thought of as random samples from a larger population of units (or groups) about which inferences wish to be made” (Diez-Roux 2002, p.593). The null hypothesis for the random effect was that its variance is equal to zero (Albright and Marinova 2010). The examined factors, the independent variables, were treated as fixed effects.

After the examination of the individual factors (main effects), several interaction terms were calculated and added to the models of the Subject Study and Absences Study. The interactions were placed at level 1 and were treated as fixed effects variables. As Jaccard and Turrisi (2003) indicated, “an interaction effect is said to exist when the effect of the independent variable on the dependent variable differs depending on the value of a third variable” (p.3).

3.3.7.1 Model building of the Subject Study

At the beginning of the model building, the null model (intercept only model) was built in which only the levels are defined. The regression equation estimated for the null model is:

$$\text{Combined Trimesters and Final Exams Overall Attainment} \sim 1 + (1|\text{studentsID})$$

At this stage, it is confirmed that the variance due to the random effects was statistically significantly larger than zero. The model equation indicates the dependent variable (the *Combined Trimesters and Final Exams Overall attainment*) followed by a tilde (~), which can be read as: “is defined by”. Next, the predictors are defined. In this case, only the intercept is defined by entering a ‘1’. Then, the random elements are specified between brackets. In this case, students are used as the random element. The random element is separated by a vertical stripe (|) from the number ‘1’, which indicates the intercept at the second level of the regression), and *studentsID* is the name of the grouping factor for that term (Bates 2010).

Next, the full model was built. At the first step, the examined factors entered the null model one-by-one (manual forward procedure). The model was run employing the opposite process as well (manual backward procedure), entering all the variables at once and excluding the least significant one at each step, until no insignificant variable remained in the model. The results were the same in both analyses. The significance levels of the examined variables were checked at each step of the model building process (*T*-value greater than 2 and anova tables) as was explained in the previous sections. Being aware of the results of the Large Attainment Study, I envisaged that the majority of the individual variables (*absences, gender, parental education, ethnicity, parental occupation, school, and subject*) would have a statistically significant effect on student attainment. This was indeed the case and therefore these variables remained in the model. However, the effect of *age* and *year group* was insignificant and because of this, these variables were excluded from the model.

At the second step of the building of the full model, an interaction term was calculated and added to the model. In this case, the aim was to check for interactions between the variable *subject* and the variable *ethnicity*; that is to check for any differences in student attainment across the three different ethnic groups (that is, Natives, Georgians, and ‘Others’) in theoretical and practical subjects. The hypothesis was that ethnic minority students would

have lower average attainment in subjects that are more language-dependent. The regression equation estimated for the full model is:

$$\begin{aligned} \text{Combined Trimesters and Final Exams Overall Attainment} &\sim 1 + \text{absences} + \text{gender} \\ &+ \text{parental education} + \text{parental occupation} + \text{ethnicity} + \text{school} + \text{subject} \\ &+ \text{subject*ethnicity} + (1|\text{studentsID}) \end{aligned}$$

The model equation indicates the dependent variable (the *Combined Trimesters and Final Exams Overall Attainment*) followed by a tilde (~). After the intercept, indicated by '1', the predictors are defined, that is the factors: *absences*, *gender*, *parental education*, *parental occupation*, *ethnicity*, *school*, and *subject*. The interaction terms that entered the model appear next containing an asterisk (*) between the interacted variables: *subject*ethnicity*. At the end, inside the brackets, '1' indicates the intercept at the second level of the regression, and *studentsID* is the name of the grouping factor for that term. The parameter estimates of the full model are presented (Table 13) and interpreted in the following chapter.

An attempt was also made to include a three-level interaction in the model of the Subject Study; an interaction between the variables *subject*, *ethnicity*, and *year group*. In theory, this idea sounded reasonable and appropriate. By creating a three-level interaction, the above variables would be examined simultaneously and an idea would be formed as to whether attainment differences in the examined subjects vary by ethnicity across year groups. However, in practice, it did not make sense to compare, the average attainment of second-year or third-year students, in a particular subject and from a particular ethnic group, with that of the first-year Natives (reference category for *ethnicity*) in Mathematics (reference category for *subject*). This comparison would be meaningless for the purposes of this research study and nothing important would be gained in terms of interpretation.

Remembering the multicollinearity effect between *ethnicity* and *generation status* as discussed earlier, and having excluded *generation status* from the analyses this far, I also checked a model including *generation status* rather than *ethnicity*. I felt that, in this case, *generation status* could be more relevant as it might indicate how long students have been exposed to the local education system and language. The results of this model were similar to the one including *ethnicity*; therefore only one model, that which included *ethnicity* is presented.

Finally, an attempt was made to account for the variance of the data within classes, as the individual students participating in this study were nested within school classes. This could mean that student scores were more similar within the same class than student scores between classes. In order to check for the intra-class correlation, the variable *class* (denoting the specific class that each student comes from) was employed here. This variable was collected during data collection, but because of head teachers' concerns that it could lead to individuals' and teachers' identification (as explained in the 'Dependent and Independent Variables' section of this chapter) it had not been used this far. Trust and confidentiality issues meant that this variable could not be presented. It was therefore important to confirm a significant impact of this variable on the results and declare its non-use as a limitation of this study or prove non-significance and exclude it. So, the variable *class*, treated as a random effects term, was entered in the model alongside the random effects term *students*. Running an analysis which examines the intra-class correlation, it appeared that the intra-class variance was very small. This indicated that the inclusion of the variable *class* in the analysis was not practically significant and had negligible impact on the coefficients and standard errors of the other variables. The random effects term *class* was therefore excluded.

3.3.7.2 Model building of the Absences Study

Similar to the Subject Study, at Step 1 of the model building, the null model (intercept only model) was built. This stage defines the levels of the model. The regression equation estimated for the null model is:

$$\text{Combined Trimesters and Final Exams Overall Attainment} \sim 1 + (1|\text{studentsID})$$

At this stage, it is confirmed that the variance due to the random effects was statistically significantly larger than zero. Next, the full model was built. At Step 2, the same model which was created for the Subject Study was built. As previously this model included the variables *overall absences*, *gender*, *parental education*, *ethnicity*, *parental occupation*, *school*, and *subject*. The interaction between *subject* and *ethnicity* was examined as well, but models run with this interaction did not change the presented results. As this interaction was not directly relevant to the research questions of the present study, it was not included for the sake of simplicity. The effects of *age* and *year group* were examined too, but as they were insignificant, these variables were excluded from the final model.

Following this, the new absences variables were entered into the model one-by-one (manual forward procedure). As the purpose of this analysis was to examine the effect of different types of absences, at Step 3, the *overall absences* variable was removed from the

model and the *excused absences* variable was added. This displayed a highly significant effect (*T*-value greater than 2) on student attainment and remained in the model. At Step 4 and Step 5 the *unexcused absences* variable and the *suspension* variable respectively were added. As the effect of both of them was statistically significant, they remained in the model. Next, a number of interactions were examined; *subject*excused absences* at Step 6, *subject*unexcused absences* at Step 7, and *subject*exclusions* at Step 8, *ethnicity*excused absences* at Step 9, *ethnicity*unexcused absences* at Step 10, and *ethnicity*suspension* at Step 11. The interactions of the Steps 6, 7, and 11 were significant, while the interactions of the Steps 8, 9, and 10 were insignificant and thus excluded from the model. The regression equation estimated for the final full model is:

$$\begin{aligned} & \textit{Combined Trimesters and Final Exams Overall Attainment} \sim 1 + \textit{gender} \\ & + \textit{parental education} + \textit{parental occupation} + \textit{ethnicity} + \textit{school} + \textit{subject} \\ & + \textit{excused absences} + \textit{unexcused absences} + \textit{suspensions} + \textit{subject*excused absences} \\ & + \textit{subject*unexcused absences} + \textit{ethnicity*suspensions} + (1|\textit{studentsID}) \end{aligned}$$

The model equation indicates the dependent variable (*Combined Trimesters and Final Exams Overall Attainment*) followed by a tilde (~). After the intercept, indicated by ‘1’, the predictors are listed: *gender*, *parental education*, *ethnicity*, *parental occupation*, *school*, *subject*, *excused absences*, *unexcused absences*, and *suspension*. The interaction terms that entered the model appear next and these are denoted with an asterisk (*) between the interacted variables: *subject*excused absences*, *subject*unexcused absences*, *ethnicity*suspensions*. At the end, inside the brackets, ‘1’ indicates the intercept at the second level of the regression, and *studentsID* is the name of the grouping factor for that term. The parameter estimates of the full model are presented (Table 14) and interpreted in the following chapter.

The *R*-statistical package Version 2.15.1 (R Core Team, 2012) was used for the building of the multilevel models, and particularly the Linear Mixed Effects (*lme4*) package, which offers the *lmer* function.

3.3.8 Dealing with Outliers

This section describes how the outliers in terms of absences and age were dealt with, in order to check whether findings from the quantitative analyses were significantly affected by them.

Dealing with absences outliers first, a number of steps were taken. Initially, histograms on absences for the *overall absences* (Figure 16, Appendix 2) and the individual subjects (Figures 17-20, Appendix 2) showed a skewed distribution of absences. This problem appeared to be solved by carrying out either of two data transformations: the square root and the logarithm (Hutcheson and Sofroniou 1999). All the multiple regression analyses (Subject Study) and multilevel regression analyses (Subject Study and Absences Study) were run in three ways; firstly, with no transformation of the absences data; secondly, using the square root of the number of absences; and thirdly, using the logarithmic transformation. Comparing the three types of analyses, findings appeared to be very similar. The two transformation methods made no difference to the findings. As such, a decision was made to present findings from a non-transformed model as this makes the interpretation easier.

Then, three cases were removed from the regression analysis, because they were extremely influential with high leverage values and high residuals. After identifying these cases as extremely influential by diagnostic tests¹³ their demographic characteristics and absences were investigated. It was found that they had an unreasonably high number of absences (191, 204, 264) whereas the next student with the highest number of absences was absent only 113 times. Their absences and their extremely low performance were atypical of their background characteristics (e.g., native students with educated parents).

After this, an attempt was made to check whether an additional number of outliers could have influenced the results of the multiple regression and multilevel regression analyses in a significant way. Two different analyses were run: in the first one, students who had more than sixty absences and in the second one, students with more than fifty absences were removed from the dataset. Analyses were re-run with the remaining data. Comparing the models run with all children and the models from which outliers were excluded, no significant changes appeared. That is, the same variables remained in the final models; all

¹³ The Bonferroni Outlier Test was used in this case. This reports the Bonferroni p-values for Studentized residuals in linear and generalized linear models, based on a t-test for linear models and normal-distribution test for generalized linear models (Fox and Weisberg 2011, p.296, 317).

the remaining variables in the models were highly significant; the change to the magnitude of the coefficients is negligible; no coefficient changed from positive to negative or vice versa. As such, the analyses were run with all students (other than the 3 discussed above) included.

Furthermore, models which take heteroscedasticity into account were fitted. For the multiple regression models of the Subject Study, heteroscedastic multiple regression models were fitted using the *gls* function of the *nlme* package (Pinheiro et al 2012). The results of the homoscedastic and heteroscedastic models were practically identical: the same variables remained in the analysis and the signs and magnitude of the coefficients were practically the same. Hence, I decided that presenting the much more complex heteroscedastic models would not benefit the reader.

Then, dealing with age outliers (Figures 21-23, Appendix 2), a number of extreme cases were identified from each year group (forty-one cases from first year group whose age was above 13, fifty-three cases from second year groups whose age was above 14, and from the third year group, five cases whose age was below 13 and fifty-eight cases whose age was above 15). Age outliers (one hundred and fifty-seven cases) were excluded from the dataset. Multiple regression analyses for the Subject Study were run with and without the age outliers. Comparing the two models as above, the results were similar. Again, no significant change was shown between the two regression models. Besides, the strength of the models was reduced when part of the sample was excluded. As such, the analyses were run with the total number of students included.

It is noteworthy that when one considers students with more than 50 absences to be outliers, about two thirds would be minority students and only one third natives. In the case of age outliers, the distinction between majority and minority students is even more apparent, as from 152 cases, only 21 were natives.

3.3.9 Alternative Analytical Paths

This section describes a number of alternative paths that have been considered for the analysis of the trimester grades, the first type of attainment indicator collected for the present study. However, these options were not followed for reasons discussed below.

One alternative was the use of ordered regression as trimester grades were of ordinal nature. For the purposes of this analysis the proportional odds model would have been

chosen, as this is more intuitive to interpret and, according to O'Connell (2006), the most popular model in the framework of ordinal regressions. However, following an examination of our data, it was evident that there was a problem in meeting the assumptions of this analytical method. The fundamental assumption of the proportional odds model, that of the proportional or parallel odds, which implies that the predictors in the model have the same effects on the odds, does not hold. This indicates that at least one of the variables may have a differential effect across different outcome levels.

Another alternative considered was dropping part of the student population out of the dataset in order to deal with the "ceiling effect". This is a situation that is caused by a significant number of students achieving perfect scores; that is those who were awarded a series of straight A's (see graphs of attainment in Appendix 2). The argument is that we know that these students satisfied the criteria for being awarded grade A in all terms and for all subjects; we know that they are academically very strong. However, if it was possible to add another grade on the marking scheme, say A*, that might have enabled us to estimate the ability of some of those students with greater accuracy. At the moment, the response patterns of those students indicate that they are academically very able but we have no information to further categorise these students into those that, for example, are very able and others that are exceptionally able.

Removing these cases from the analyses might have made the distribution of the attainment scores look normal or more normal than is the case with all students included. This path was, however, rejected because the loss of a significant chunk of our data after exclusion of the students with the highest attainment did not seem to be a good idea for a study of this nature. A study which focuses on attainment levels could be criticized for bias if it disregarded those with the highest attainment. Also, if these cases were excluded, our data and results could be seriously affected because of the disproportional representation of Native students in those with perfect scores in all three year groups.

The ceiling effect is a problem that cannot easily be tackled. To begin with, the problem is not statistical. It arises in this study because of the marking process followed by teachers in schools in Cyprus and as such it represents a structural problem of the local educational system. Therefore, for any researcher, it is not only impossible to prevent this phenomenon from arising in the first place, but trying to conceal the effect (e.g. by removing the persons with perfect scores from analyses) would have detrimental effects on the validity of our data.

The problem of ceiling effect becomes even more complex in the case of the present study because of repeated measures (three terms), multiple related dimensions (the grades of the students on the four subjects are closely correlated) and ordinal data (the grades are clearly ordinal in nature). A common data-reduction technique in the discipline of Educational Measurement is to Rasch analyse such a dataset, so that the series of repeated measures would produce one single measure of ability on a linear scale. So, the use of the Rasch models could offer an alternative method for the analysis of these data. This has indeed been done (Appendix 9), but is not within the scope of the present thesis. Here, a more direct analytical path was preferred. Some of the previous work involving use of Rasch models is included in this body of work for comparison purposes. Effectively, the findings are the same.

As discussed earlier, the addition of end-of-year examination scores in the attainment variable was thought to be advantageous for validity purposes. The combination of the two measures of academic performance also helped deal, partially at least, with the ceiling effect (see Subject Study).

3.3.10 Validity of Quantitative Data

According to Cohen et al (2004), validity in quantitative research might be improved by dealing carefully with available data (p.105). For this reason, special attention was paid during the planning and data collection parts of the study. This aimed to ensure that the research questions were adequately answered, that the appropriate methodology was employed in relation to data, sample, sources, and ethics, and that any mistakes were avoided during data collection and the creation of the database. Furthermore, in an attempt to ensure the accuracy of the data used, student grades and absences were obtained from a database held by the Ministry of Education and Culture; the most accurate and valid source available. Personal information for students was obtained from school-held records, which was, in turn, volunteered by parents during initial registration of their children. Parents are thought to be the ultimate authority on student/family information (Entwisle and Astone 1994); as such, this can assure us, to a great extent, of the reliability of the data used. To add further weight to the validity of this data, it is useful to mention that this is also used by the Ministry of Education and Culture in Cyprus for internal use. For data items that were available in both the database held by the Ministry and also in the database that I created from information from school-held records (e.g. age, gender) a comparison was made to ensure the accuracy of data. Moreover, care was taken during data analysis, to

ensure that the appropriate statistical treatments for the level of data were used and any “inferences and generalizations beyond the capability of the data” (Cohen et al. 2004, p.116) were avoided. An effort to ensure validity was made during the presentation of the data too, by not “misrepresenting their message (...) making claims which were sustainable by the data (...) and ensuring that the research questions were answered” (Cohen et al. 2004, p.117).

3.4 Qualitative Data

3.4.1 Linking (and Triangulating) Focus Group and Individual Interviewing

In an effort to triangulate different forms of data collection on the same topic, I followed Morgan's (1988) suggestion for "cooperative research", employing a focus group and individual interviews within the same research project. One way to link/combine these two techniques, according to Morgan (1988, p.30-31), is to conduct a focus group with exploratory purposes at the very early stages of the research study, in order to offer guidance on how the researcher might construct the later part of his/her research. It is argued that this is particularly useful when the researcher is new to an area, as was the case here. Following Morgan's (1988) suggestion then, a focus group was carried out first, and the individual interviews followed.

3.4.2 Sampling – Teacher Sample

Teachers were the focus of the qualitative enquiry, because they are directly responsible for the education of students. Further, as the focus of this research study is attainment and in this research study this is defined by the trimester grades and end-of-year exam scores given solely by teachers, it seems intuitive that teachers are a well-informed group of respondents whose insight would be beneficial to my research study.

The fact that the qualitative part of my research study focused on the perceptions of teachers only and did not include the views of others, for example students and parents, could be considered a limitation. Time constraints did not allow for further studies in this piece of work. However, the consistency of findings across different study designs, cities, and schools would suggest that the findings represent the true picture, at least as seen through the eyes of teachers. Finally, measures were taken to strengthen the validity of findings. These measures are discussed further in the validity section below.

Specific criteria were set to select the samples used for the focus group and individual interviews. A necessary criterion was the teaching experience of participating teachers in schools/classes with ethnic minority students, as there were teachers who have very limited experience of teaching in classes with ethnic minority students. Another criterion was the teachers' willingness to be interviewed, and yet another, the teachers' availability during the days and hours that I spent at their schools, in the case of the individual interviews, or when the focus group meeting was arranged, in the case of the focus group study. I should mention that there were teachers that were excluded from the studies as they did not fulfil

the criteria e.g. experience in teaching in multicultural classes. At the same time, there were some teachers that declined to participate, usually citing time-pressures.

Six young, female, classics teachers participated in the Focus Group Study. They were employed in secondary public schools in the four major cities of the Greek-Cypriot side of the island during the academic year 2005-2006. All teachers had a similar teaching experience in multiethnic classrooms (1–5 years).

Sixteen other teachers (four head-teachers, five deputy head-teachers, and seven teachers) both male and female and with varying ages and experience participated in the Interview Study. There was an expectation that some participants from different levels in the school hierarchy would be more qualified than others to provide answers to particular questions. For example, it was thought that teachers would be able to provide more information on issues relating to classroom environment, teaching practice, attainment differences, and issues in relation to individual subjects; deputy teachers would be more aware of attendance issues as they hold the student attendance records; and head teachers would be best placed to comment on policy issues and the general school ethos. The participants were employed (during the academic year 2006-2007) to four of the secondary schools included in the quantitative part of the research study (two schools with a low ethnic minority concentration, about ten percent, and two with a high concentration, about fifty percent). The participants were chosen so that they represented schools with both high and low ethnic minority concentration to check whether they displayed different attitudes towards the learning of ethnic minority students. Finally, in order to gain insight into reports that ethnic minority students display a differential attainment in subjects depending on their reliance on language, the Interview Study concentrated on those teachers that taught Modern Greek, History, Mathematics, and Physics.

3.4.3 Data Collection Methods

3.4.3.1 Focus group

A focus group is basically a group discussion (Flick 2003; Kitzinger 1994) that functions as a form of group interview (Cohen et al. 2004). Teachers were invited to participate in a single focus group. This method of qualitative data collection was chosen because it is highly practical, and offers a quick method of identifying themes. Procedurally, it explores topics and generates hypotheses (Morgan 1988, p.20-21). The researcher's intention was not only to find out what the participants thought, but also how they think and why they

think as they do (Kitzinger 1994), as well as to identify relevant issues that could be derived from the participants' answers and pursued further. These were considered aims that can be addressed with a focus group study. More importantly though, a focus group has the potential advantages of the 'group dynamics' and participants' reactions and interactions (Frey and Fontana 1993; Kitzinger 1994; Morgan 1988; Wilson 1997); parameters that can offer richer findings.

The purpose of the focus group was for me to gain an initial insight into the views of teachers in relation to the education of ethnic minority students in secondary public schools in Cyprus and in so doing to see things through their eyes. Care was taken to ensure participants had "homogeneity of background" (Cohen et al. 2004, p.288), in other words to "share common characteristics" (Knodel 1993, p.39). This was based on a number of reasons. Firstly, participants with similar characteristics are less likely to feel "uncomfortable to disagree publicly" (Albrecht et al. 1993, p.56). Secondly, "individuals are more open and willing to share when the focus group is strictly homogeneous" (Krueger 1993, p.70). Thirdly, a homogeneous group helps "avoid mixing persons who may have sharp differences in opinion or behaviour associated with the topics under study" (Knodel 1993, p.40). Fourthly, participants with significantly different ages could have "different age-based perspectives" (Morgan 1988, p.46). Finally, I felt it would be easier to relate and get into the mindset of professionals with whom I shared common characteristics. As such, all the participants were young, female, classics teachers, all with some experience in teaching minority students. At first glance the homogeneity of the group could be seen as an obstacle to the generalisability of results. However, the fact that the overwhelming majority of teachers in Cyprus are female comes to lessen these fears. Also, this issue was more purposefully addressed in the Interview Study.

For the focus group discussion, a schedule of questions was prepared in advance about the different issues of interest (school environment and the classroom conditions, student attainment and influencing factors, teachers' work, preparation, effectiveness, and experiences with minority parents). Of course, the discussion was not at any point limited to these issues; rather, any point raised by the participants during the discussion was pursued further.

The focus group meeting was conducted in a quiet room at my house and in a relaxed climate, at a mutually convenient date and time (afternoon of 2nd April 2006). The invitation for participation was made a few days before the meeting, as some of the

participants needed to travel. Before the discussion began, I expressed my thanks to all the participants who had agreed to help me, and introduced them to the topic of interest very generally. I also asked their permission to tape-record the conversation, explained their rights and what exactly would happen with the collected data. The meeting lasted nearly two hours. The focus group discussion was conducted in Greek.

The group discussion seemed to be the most appropriate and promising initial inquiry method in this case. As Morgan (1988) indicated, “the hallmark of focus groups is the explicit use of the group interaction to produce data and insights that would be less assessable without the interaction found in a group” (p.12). Kitzinger (1994) also argued: “people’s knowledge and attitudes are not entirely encapsulated in reasoned responses to direct questions. (...) Focus groups ‘reach the parts that other methods cannot reach’ – revealing dimensions of understanding that often remain untapped by the more conventional one-to-one interview or questionnaire” (Kitzinger 1994, p.109).

In the focus group, after the first few minutes of discussion, the participants appeared to feel comfortable with each other and with the topic. Each one was trying to grasp the chance to share as much as she could about her experiences, worries, ideas, and feelings. It seemed that participants were happy to speak and express their feelings and frustrations, and that they had just found the opportunity to do exactly that. They asked each other questions, agreed or disagreed with each other about specific issues, made suggestions and took the initiative to raise points they considered important. Also, it seemed that discussing this issue made some of the participants “aware of things that they had not thought about before” (Morgan and Krueger 1993, p.17). Several teachers admitted openly they had just realised that they were not doing as much as they really could or should have been doing for ethnic minority students. In general, the participants were sufficiently involved in the discussions and engaged in interactions “which were both complementary (such as sharing common experiences) and argumentative (questioning, challenging, and disagreeing with each other)”, something which indicates that the “group dynamics worked well” (Kitzinger 1994, p.107). It was also apparent that the participants knew enough about the topic and did not feel uncomfortable about revealing their opinions on the topic in front of the others.

The data obtained by the single focus group was unquestionably useful and rich, in individual views and general themes that could guide the next part of the research to emerge. Ideally, I would like to run a number of focus groups. However, limitations in time and resources meant that this was unachievable.

3.4.3.2 Individual Interviews

The second technique employed in the present study for gathering qualitative data was the interview, a “conversation with a purpose” (Maykut and Morehouse 1994, p.79). This ‘conversation’ was held with sixteen teachers, who were seen as “data sources in the sense that they are repositories of knowledge, evidence, experience” (Mason 1998, p.35).

Interviewing was chosen as the method of choice for a number of reasons. Firstly, it allows the examination of “peoples’ knowledge, views, understanding, interpretations, experiences, and interactions”, which are “meaningful properties of the social reality” (Mason 1998, p.39). Secondly, it allows one to talk and listen to people, which is “a legitimate way to generate data” (Mason 1998, p.39-40). Thirdly, it enables the researcher to acquire “an understanding of depth and complexity” in people’s experiences (Mason 1998, p.41), rather than a broad understanding of surface patterns that the quantitative part of the study showed. Also, as Robson (1995) pointed out, interview is “a flexible and adaptable way of finding things out”. It is “an obvious short cut in seeking answers (...) asking people directly about what is going on” rather than spending time observing people’s behaviour. It offers “the possibility of modifying one’s line of enquiry, following up interesting responses and investigating underlying motives” in a way that questionnaires cannot. “It has the potential of providing rich and highly illuminating material” (Robson 1995, p.229).

I used interviews because I wanted to search for explanations about the findings derived from the first phase of the study (the quantitative studies) and also further pursue, clarify, and triangulate findings from the focus group. More specifically, my aim was to investigate the participants’ experiences, perceptions, and attitudes on different issues, as well as their thoughts, feelings, behaviours, practices, interactions, and relationships (Mason 1998) in the school environment. As discussed above, I also wanted to examine interesting responses further, aiming to identify a broader range of issues related to the topic of interest than those already identified in the literature.

For the individual interviews with teachers, an “interview schedule” (Maykut and Morehouse 1994, p.88) with a number of issues and questions was prepared in advance. Although I had a fixed set of questions, these were only used as a guide. The order in which questions were asked, but also the wording and explanations given, varied from interview to interview. A deliberate attempt was made to keep the interview schedule

flexible, both in terms of time and attention devoted to different topics. The overriding aim was to allow in-depth exploration of relevant issues raised by the participants.

An attempt was made to establish rapport with the interviewees prior to the formal interviewing process as “rapport is tantamount to trust, and trust is the foundation for acquiring the fullest, most accurate disclosure a respondent is able to make” (Glesne and Peshkin 1992, p.79). For this reason, I thanked each one of my participants, introduced them to the topic of interest in a general manner, and explained that their help was necessary for me to understand and explain findings of the previous stage of the study. I also asked their permission to tape-record the conversation, explained the interviewee’s rights and what exactly would happen with the interview data.

Interviews took place in a quiet room in the participating schools, at a convenient time during the period May-June 2007. The head-teachers were approached at a pre-determined time by appointment. The interview meetings usually lasted 30-45 minutes each. The tone was purposeful but friendly.

All conversations, both from the focus group and the individual interviews, were tape-recorded. All relevant quotes were translated to English by myself and verified by a person not involved in this study, but who is fluent both in Greek and in English.

3.4.4 Question Schedule for Focus Group and Individual Interviews

Both the focus group and the individual interviews had a semi-structured format. As Robson (1995) explained, in a semi-structured interview “the interviewer has worked out a set of questions in advance, but is free to modify their order based upon her perception of what seems most appropriate in the context of the ‘conversation’, can change the way they are worded, give explanations, leave out particular questions which seem inappropriate with a particular interviewee or include additional ones” (p.231). Lincoln and Guba (1985) explained that structured/semi-structured interviews are useful when the researcher knows what he/she does not know. In this study, I knew what information I did not have and this led to the creation of a list of topics/issues that I wanted to explore. This then implies that the semi-structured format of interviews (rather than the structured or unstructured formats) was the most appropriate for the purposes of my study.

As regards the design of the questions, the open form of questions (open-ended questions) was preferred in both cases, because the researcher did not want to restrict the participants’

answers to a pre-specified and limited number of response categories. Open-ended questions “are flexible; they allow the interviewer to probe so that he may go into more depth if he chooses, or clear up any misunderstandings; they enable the interviewer to test the limits of a respondent’s knowledge; they encourage cooperation and rapport; and they allow the interviewer to make a truer assessment of what the respondent really believes” (Cohen and Manion 1989, p.313, cited in Robson 1995).

A couple of informative, ‘warm-up’ (Glesne and Peshkin 1992, p.71), easy to answer questions, preceded the main body of questions, not only to promote rapport and assure interviewees that the questions are manageable (Glesne and Peshkin 1992, p.71), but also to assure myself that the participants had reasonable teaching experience with ethnic minority students. During the preparation of the main questions, I tried to express questions in a straightforward, clear, non-threatening, and non-biased way (Robson 1995, p.232), avoiding any leading words or expressions that might lead the interviewees’ response (Glesne and Peshkin 1992, p.67-8). In the case of the interview schedule in particular, when I asked the interviewees to provide explanations about my findings from the quantitative studies, I offered them first the chance to indicate whether this is something that surprised them, according to their experience. In addition, an attempt was made to create/formulate questions of different types, including experience questions, opinion questions, feelings questions, and knowledge questions (Patton 1990).

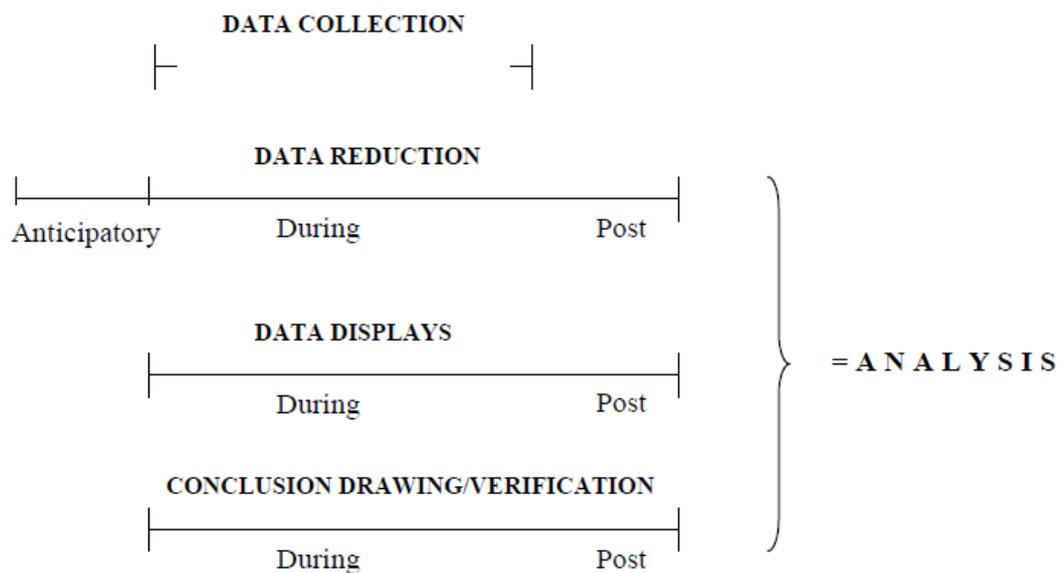
After the first couple of interviews a few questions were modified or abandoned, replaced with others, and some others were added to the schedule (Glesne and Peshkin 1992, p.64), in order to enable me to gather more information relevant to the context of the study’s research questions. Further, I realised that the way the findings from the quantitative part of the study were presented to the interviewee to comment on might have influenced some of the answers in early interviews. Consequently, the schedule was modified, so that the participants’ opinions on each point was sought prior to my revealing the results from the quantitative part. They were asked to comment on these subsequently. The detailed schedule for the Focus Group Study is available in Appendix 5 and that for the Interview Study in Appendix 6.

3.4.5 Qualitative Data Analysis

Many different strategies for analyzing qualitative data can be found in the literature. This is endorsed by Coffey and Atkinson (1996), who point out that “not only are there many ways to undertake the analysis of qualitative data but also analysis in general means

different things to different people” (p.6). However, a thematic analysis was undertaken for the analysis of both the focus group and interview data. I considered this the most appropriate method of analysis, because I had used a thematic, topic-centered approach (Mason 1998); that is, I had a range of topics/themes to cover. In order to facilitate this, I followed three main steps: data reduction, data display and conclusion drawing/verification, as suggested by Miles and Huberman (1994) (see Figure 3).

Figure 3: Components of Data Analysis: Flow Model (Miles and Huberman 1994, p.10).



Data reduction, the first data flow of the model, is “the process of selecting, focusing, simplifying, abstracting and transforming the data that appear in field-notes or transcriptions” (Miles and Huberman 1994, p.10). This process, as demonstrated in Figure 3, takes place throughout the study; even before the data collection stage. Data reduction at this stage is brought about by the choices that I make, such as the selection of participants and questions posed.

In this study, the audio tapes were transcribed immediately after the interviews to make sure that little information was lost. The interviews and the transcription manuscripts were both in Greek. Initially, the manuscript under study was read through a couple of times to identify factors affecting the attainment of ethnic minority students put forward by teachers. A manual matrix was constructed to aid with the process of analysis. A provisional list of broad codes was already available from the literature. This list was modified during the analysis as new factors emerged and some of those on the list deleted as no data seemed to fit them. In the end, five broad categories seemed to be consistently

fitting the data - specifically those referring to the child, family, teachers, school, and society. Going through each manuscript a number of times, a more detailed set of sub-themes was developed, allowing the data to be further segmented. These sub-themes indicated the identified factors in each broad category. For example, for the individual interviews, in the child category a number of factors were identified; namely, gender, ability in the dominant language, immigration, generation status, home responsibilities, paid employment, educational expectations, degree of interest and effort to learn, opportunity for extra support with private lessons, and attendance levels. It should be noted that some extracts could fit into more than one single category and in order to strengthen all categories they were listed in all relevant categories. In the end, the relevant sections of text for each category and factor were grouped together. A comparison between the answers of all the participants was made. This process of comparing and refining the codes further was ongoing.

Clearly, classifying the data is part of the process rather than the whole process (Miles and Huberman 1994). There is a need to understand patterns and recurrences; what is described as the “repeatable regularities” by Miles and Huberman (1994). The next level of analysis, display, was facilitated by use of matrices. Miles and Huberman (1994) define display as “an organized, compressed assembly of information that permits conclusion drawing and action” (p.11). Two-dimensional matrices were constructed to present the responses of participants together. Specifically, factors were set up as rows and teachers were set up as columns. The columns were brought together in various combinations to check for the emergence of specific patterns; for example for the individual interviews, teachers were listed in order of experience, grouped together according to gender, subject taught, and depending on whether they worked in schools with high- or low-minority concentration. After that, statements of participants were compared with one another to check for similarities and differences (Hammersley and Atkinson 1993; Taylor and Bogdan 1984). Extra information was evident only when the compared columns were separated between teachers enrolled in schools with low and those enrolled in school with high minority concentration. The matrices proved useful for seeing the whole picture and drawing conclusions, thus leading nicely to the third data flow of the model (Miles and Huberman 1994).

In the final stage of data flow, a synthesis was made of all pieces of data to form a cohesive picture (Dey 1995; Knodel 1993; Lindsay and Muijs 2006; Nixon 2006). Looking at the interrelationship of different factors led “from description to interpretation and theory”

(Taylor and Bogdan 1984, p.133). For example, in the interview study, factors that were allocated to the 'child-related' category, such as the finding that minority children have responsibilities at home or paid jobs from a very young age, could easily be seen to fit a greater theme; that of socio-economic status. This interrelationship revealed two major themes that most factors could be allocated into – namely family socioeconomic status and the character of the local educational system. This process offered a deeper meaning to, and a new understanding of the findings.

Relevant quotes highlighting the key themes were then translated in English by the researcher and the translation was then verified by a person not related to this study, in order that I could be confident about my translations, but who is fluent in both Greek and English. For illustrative purposes, matrices which show the coding process of extracts from the individual interviews are presented in the Data Presentation chapter.

3.4.6 Weaknesses of the Qualitative Techniques and Validity of Qualitative Data

The focus group and individual interviews proved to be useful methods for data collection. The selection of the particular participants was also appropriate in relation to the research questions of the present study. Both participants and methods proved productive, and rich data was obtained leading towards a number of different directions. Even though both studies had a relatively small number of participants, the fact that from a point onwards data was repeating itself indicates that sufficient interviews were conducted. As Ely et al (1991) argued, “when data repeat themselves, it is time to stop” (p.159), or “the analysis ends when new data no longer generate new insights” (p.177).

Both of these methods though have their weaknesses as data-gathering techniques. Some of these weaknesses might affect the accuracy or reliability of findings. As regards the focus group, firstly, it is “not based in natural settings” (in contrast to, for example, participant observation), which might cause some “uncertainty about the accuracy of what the participants say”. Secondly, “the researcher has less control over the data that is generated”. Thirdly, it is “never knowing whether or not interaction would mirror individual behavior” (Morgan 1988, p.21). As regards semi-structured interviews, “the lack of standardization that it implies inevitably raises concerns about reliability”, and “biases are difficult to rule out” (Robson 1995, p.229). Also, interviews are “prone to subjectivity and bias on the part of the interviewer” (Cohen et al 2004, p.269).

Of course, such criticisms usually come from the quantitative tradition, which has generally ignored the fact that quantitative approaches are similarly flawed. Nevertheless, conscious of the possible weaknesses of the qualitative techniques used and especially the danger of introduction of bias from the part of the researcher, a number of measures were taken by the interviewer at each stage of the focus group and the individual interviews to strengthen the validity of findings. According to Mason (1998), a researcher can demonstrate the validity of her methods and analysis by demonstrating the validity of data generation methods and the validity of interpretation. I believe that the measures presented below indicate that reasonable precautions to ensure validity have been taken.

During the design of the focus group, for example, an attempt was made to ensure that the participants shared common characteristics (in terms of age, gender, subject area, years of experience, and hierarchy), so that they would be more comfortable talking in the presence of each other. Other measures were taken during the group discussion. First of all, an effort was made to establish rapport and trust (Glesne and Peshkin 1992; Krueger 1993) with the participants. That was not difficult, as I already had a friendly professional relationship with all participants. Also, several things were made explicit from the beginning, including that the participants were expected to talk with each other rather than through me; that there should be only one person talking at any one time so that I could follow everything said; that the ‘expression of difference’ was encouraged; and that everyone was clear that there were no right or wrong answers (Nixon 2006).

When conducting the focus group, I assumed the role of the ‘moderator’ (Frey and Fontana 1993). I encouraged everybody to participate and promoted the expression of individual opinions, thus minimizing the possibility of under-reporting of atypical behavior or deviances (Nixon 2006). Moreover, I controlled the discussion topics, listened actively, asked for clarifications and explanations for articulated thoughts and experiences (Kitzinger 1994) and for different examples, while making sure that I did not control the content of discussion, but rather, gave this discussion structure (Nixon 2006) and kept checking that I understood what exactly the participants said. I also did not disclose my own perceptions, so as not to influence responses (Krueger 1993; Morgan 1988). In addition, I required opinions from those with the shortest experience first and from a different respondent each time, in order to minimize the tendency of some members “to echo the sentiments of those responding first” (Albrecht et al. 1993, p.56-7). Furthermore, I tried to maximize interaction between participants by encouraging them to express their agreement or disagreement directly to each other and “discuss the inconsistencies both

between participants and within their own thinking” and “challenging people’s taken for granted reality” (Kitzinger 1994, p.106).

In both the focus group and individual interviews, I tried to listen more than speak (Robson 1995, p.232), encouraged interviewees to talk freely, openly, and clearly; tried to made the interviewees feel relaxed and comfortable (Radnor 2001); showed how much interested I was to learn the participants’ own knowledge and experience relating the issues that I examined; tried to avoid leading or biased questions that could lead the interviewees to particular responses (Glesne and Peshkin 1992, p.67-8, and Robson 1995, p.232); kept the interviewees on the interview track, bringing them back to it when they strayed (Glesne and Peshkin 1992, p.82); asked for explanations and examples on what the interviewees said, without giving out my personal opinions or guidance during the interview (Radnor 2001); and sought explanations about what the interviewees meant without making assumptions (Glesne and Peshkin 1992, p.80).

At the stage of data interpretation, in both the focus group and the individual interviews, in order to assure the validity of data, an attempt was made initially to report, rather than interpret, what the participants said. For this reason, extracts of what the participants said are provided in the findings sections of the Focus Group Study and the Interview Study respectively, so that the readers can read what the participant actually said and thus be able to draw their own conclusions. In order to ensure that the original meaning had not been lost or changed in translation, a person who is unrelated to the study and is fluent in both Greek and English was asked to verify the translated extracts.

Other forms of validation of qualitative data, according to Silverman (2003) are the triangulation and respondent validation. Triangulation is discussed in the last chapter of the thesis. Respondent validation is achieved when findings are taken back to the participants for them to verify. Three focus group participants were contacted (via phone and email) and upon acceptance they were provided with the raw data of the discussion and a draft version of the paper (to see my interpretation of their comments). They were asked, after reading, to send me any comments or thoughts they had. This confirmed to me that I had understood the points raised by participating teachers and that I had not under/over-interpreted what was said. One of the teachers wrote: “You have addressed our thoughts successfully and took all of our anxieties and worries into consideration. The only thing that may have changed since (the focus group) is the fact that ethnic minority students in a

classroom are now more abundant. Unfortunately, we still face the same difficulties and problems in dealing with and educating ethnic minority students”.

3.5 Data Access and Ethics

Ethical issues arise from the nature of the research study itself, as it deals with ethnic differences, and from the fact that personal information of a sensitive kind were collected. All these issues were considered and appropriate steps to ensure the proper conduct of each stage of this study were taken.

First of all, official permission to conduct the study in several secondary schools in the island was sought from the Ministry of Education and Culture. A letter, which among other things explained the purpose of the study, the information needed, and the steps that the research would follow, and guaranteed that ethical issues would be taken into account, was sent to the Chief of Secondary Education in Cyprus in December 2005 (see Appendix 7).

After obtaining permission from the Ministry, permission for access to individual schools was sought, in writing, from the head teachers of the selected schools. The letter sent to them (in February 2006) described the purposes and the nature of the study, indicated the information needed, and made it clear that no teaching time would be lost during the study. In addition, the letter emphasised that great care was taken to ensure the participants’ privacy, anonymity, and confidentiality, and pointed out the importance of their participation. Furthermore, the schools were invited to participate voluntarily and I asked the head teachers to indicate whether the school was willing to participate in the study or not, by filling in, signing, and returning an enclosed form. It was also stressed that any agreement to participation was not binding; rather the school had the right to withdraw at any stage, if the head teacher or any other participant felt dissatisfied with my work. In those cases where the head teacher was positive in his/her response, I promised to visit them by appointment and answer any questions they might have about the study; something that took place within a few weeks. The letter to the head teachers is shown in Appendix 8.

Great care was taken during the conduct of the study to ensure confidentiality, anonymity, non-identifiability and non-traceability (Cohen et al. 2004). For this purpose, school names were coded with the letters A-F. Similarly, student names were not used; instead the student registration number was used. This facilitated matching between data collected

from the school-held report cards and the database held by the ministry whilst ensuring anonymity. Furthermore, I complied with the wishes of head teachers not to use 'class' as a variable, because this could potentially lead to identification of individual students and teachers. I appreciate that despite best efforts some of the schools can still be identified by those with substantial knowledge of school demographics, because of the unique combination of the proportion of ethnic minority students and school size.

Ethical issues in relation to the participation of teachers in the focus group and interviews were also considered. The procedure followed is described in the Interview Study: "Participation was entirely voluntary. Each participant was informed about the nature of the research (Maurice 1998; Robson 1995) (...) and offered the right to withdraw at any stage of the interview or to refuse to answer particular questions (Mason 1998). The participants were assured that the interviews were confidential and that their privacy and identity would be protected. Their verbal consent to participate was obtained, as well as their permission to tape-record the interviews (Cohen et al. 2004; Maurice 1998; Robson 1995). (...) To ensure anonymity and non-identification of schools or participants, schools were presented in the study with letters and teachers with numbers" (Theodosiou-Zipiti and West 2012, p.103).

CHAPTER 4: DATA PRESENTATION

4.1 Introduction

This chapter aims to familiarize the reader with the data utilized in this research study, and specifically the different analytical methods employed for these data. This is felt to be useful, because some information is not included in the papers produced from this study, due to space restrictions imposed by the journals.

The first section of this chapter deals with the presentation and interpretation of the results of the multiple regression analyses derived from the Small Attainment Study and the Subject Study. The results from the *Trimesters Overall Attainment* and the *Combined Trimesters and Final Exams Overall Attainment*, which checked for trends and significant associations between the student attainment and the examined factors, can be found here.

The results of the multilevel regression models derived from the Subject Study and the Absences Study are presented and interpreted in the second section of this chapter. The analyses were based on the *Combined Trimesters and Final Exams Overall Attainment* again. However, these analyses checked for trends and significant associations between the student attainment and the examined factors, taking into account the hierarchical structure of the data.

The third section of this chapter presents some examples of the process followed for the analysis of qualitative data. Part of interview extracts are provided in Greek, as this was the language in which all qualitative data was collected and analysed initially. When looking at some of the examined factors in more detail the extracts are translated in English as well.

4.2 Multiple Regression Analysis

In this section, the parameter estimates of the multiple regression models derived from the Subject Study are presented in tables and interpreted. For comparison purposes, similar results from the Small Attainment Study are also included. The model summary is also discussed at the end of the section.

4.2.1 Tables Content

The tables presenting the multiple regression models provide first of all the intercept (α), which represents the mean of the dependent variable when other explanatory variables are zero. Then, the regression coefficient, β is presented. In the case of a continuous independent variable, the regression coefficient indicates the average change that is expected to result from a change (of one unit) in the independent variable, when all other variables are held constant, and in the case of a categorical variable, it represents the difference between a particular level and the reference level on the dependent variable, when all other variables are held constant. Also, information is given about the standard error, which is the standard deviation of the sampling distribution (the amount of variability across cases), and t -value, which shows the contribution made by the explanatory variables entered into the model (it is the coefficient divided by its standard error). Furthermore, the P -value indicates the probability of the null hypothesis being correct. The null hypothesis of these models is that the explanatory variables used have no effect on or no relationship with student attainment levels. When the P -value is lower than 0.05, the null hypothesis is rejected and the examined variables are statistically significant in explaining student attainment. The tables also present the regression equation of each model, a model summary, as well as a reminder about the reference category of the variables examined.

4.2.2 Presentation and Interpretation of the Multiple Regression Analyses

4.2.2.1 Models Derived from the Small Attainment Study

In the Small Attainment Study, multiple regression analyses based on two subjects were run. Tables 1 and 3 present the model parameters of the regression analyses of *Modern Greek (Rasch score)* and *Mathematics (Rasch score)* respectively. These are the models which used the variable *ethnicity*. Tables 2 and 4 present the regression analyses of the same subjects in which the variable *ethnicity* was replaced by the variable *generation status* (due to multicollinearity issues, as explained in the ‘Methodology’ chapter).

All analyses for the small study were carried out in *SPSS*. As regards the variable parental educational level, dummy coding is used for this variable (rather than helmert coding as in the other studies). Also, in Tables 2 and 4 (subject of Mathematics), even though the overall contribution of the variable parental education was significant, the coefficient of the category of parents with secondary education was insignificant. However, as the number of cases in the category of parents with primary education was small, it was decided to collapse the categories of parents with primary education and parents with secondary education and compare them with the category of parents with further education.

The reader should also be reminded that the analyses of the small study are based on the Rasch score, that is Rasch ability estimates, which are expressed in a logarithmic scale, a scale of measurement that, instead of using the quantity itself, it uses the logarithm of a measurable quantity (Athanasou and Lamprianou 2002).

Table 1: Parameter Estimates of the Regression Analysis in Modern Greek (Rasch Score) (Ethnicity Variable Included)

| <i>Factors</i> | <i>Estimates</i> | <i>Std. Error</i> | <i>T-value</i> | <i>P-value</i> |
|---|------------------|-------------------|----------------|----------------|
| (Intercept) | -0.15 | 1.79 | -0.09 | 0.93 |
| ETHNICITY (ref. cat. = Natives) | | | | |
| Georgians | -5.76 | 1.04 | -5.56 | <0.01 |
| 'Others' | -3.07 | 0.89 | -3.44 | <0.01 |
| GENDER (ref. cat. = Female) | | | | |
| Male | -6.19 | 0.57 | -10.78 | <0.01 |
| PARENTAL EDUCATION (ref. cat. = Primary Education) | | | | |
| Secondary Education | 3.42 | 1.58 | 2.17 | 0.03 |
| Further Education | 6.99 | 1.68 | 4.17 | <0.01 |
| PARENTAL OCCUPATION (ref. cat. = Unskilled Manual Workers) | | | | |
| Skilled Manual Workers | 2.93 | 1.20 | 2.44 | <0.01 |
| Civil Private and Public Workers | 4.08 | 1.10 | 3.70 | <0.01 |
| Teachers and Higher Private and Higher Public Workers | 5.80 | 1.27 | 4.58 | <0.01 |
| Professionals and Chief Managers | 4.56 | 1.63 | 2.79 | <0.01 |
| OVERALL ABSENCES | -0.31 | 0.03 | -9.36 | <0.01 |
| Regression Equation: <i>Modern Greek (Rasch score) ~ ethnicity + gender + parental education + parental occupation + overall absences</i> | | | | |
| Model Summary: R: 0.601, R-squared: 0.36, Adjusted R-squared: 0.35, F: 42.48 on 9 and 761 degrees of freedom, P<0.01 | | | | |

Table 2: Parameter Estimates of the Regression Analysis in Mathematics (Rasch Score) (Ethnicity Variable Included)

| <i>Factors</i> | <i>Estimates</i> | <i>Std. Error</i> | <i>T-value</i> | <i>P-value</i> |
|--|------------------|-------------------|----------------|----------------|
| (Intercept) | 9.78 | 3.35 | 2.93 | <0.01 |
| ETHNICITY (ref. cat. = Natives) | | | | |
| Georgians | -4.08 | 0.71 | -5.77 | <0.01 |
| 'Others' | -1.93 | 0.60 | -3.20 | <0.01 |
| GENDER (ref. cat. = Female) | | | | |
| Male | -2.90 | 0.39 | -7.48 | <0.01 |
| PARENTAL EDUCATION (ref. cat. = Primary and Secondary Education) | | | | |
| Further Education | 2.82 | 0.48 | 5.87 | <0.01 |
| PARENTAL OCCUPATION (ref. cat. = Unskilled Manual Workers) | | | | |
| Skilled Manual Workers | 2.16 | 0.81 | 2.67 | <0.01 |
| Civil Private and Public Workers | 2.41 | 0.74 | 3.26 | <0.01 |
| Teachers and Higher Private and Higher Public Workers | 3.25 | 0.85 | 3.82 | <0.01 |
| Professionals and Chief Managers | 3.15 | 1.11 | 2.84 | <0.01 |
| OVERALL ABSENCES | -0.22 | 0.03 | -8.22 | <0.01 |
| AGE | -0.47 | 0.23 | -2.08 | 0.04 |
| SCHOOL (ref. cat. = School A) | | | | |
| School B | -0.90 | 0.43 | -2.08 | 0.04 |
| Model Equation: <i>Mathematics (Rasch score) ~ ethnicity + gender + parental education + parental occupation + overall absences + age + school</i> | | | | |
| Model Summary: R: 0.57, R-squared: 0.32, Adjusted R-squared: 0.31, F: 31.98 on 9 and 761 degrees of freedom, P<0.01 | | | | |

Table 3: Parameter Estimates of the Regression Analysis in Modern Greek (Rasch Score) (Generation Status Variable Included)

| <i>Factors</i> | <i>Estimates</i> | <i>Std. Error</i> | <i>T-value</i> | <i>P-value</i> |
|--|------------------|-------------------|----------------|----------------|
| (Intercept) | -0.18 | 1.79 | -0.10 | 0.92 |
| GENERATION STATUS (ref. cat. = Natives) | | | | |
| First Generation | -5.02 | 0.83 | -6.08 | <0.01 |
| Second Generation | -2.15 | 1.26 | -1.72 | 0.09 |
| GENDER (ref. cat. = Female) | | | | |
| Male | -6.23 | 0.58 | -10.85 | <0.01 |
| PARENTAL EDUCATION (ref. cat. = Primary Education) | | | | |
| Secondary Education | 3.47 | 1.58 | 2.19 | 0.03 |
| Further Education | 6.98 | 1.68 | 4.15 | <0.01 |
| PARENTAL OCCUPATION (ref. cat. = Unskilled Manual Workers) | | | | |
| Skilled Manual Workers | 2.93 | 1.20 | 2.44 | <0.01 |
| Civil Private and Public Workers | 4.07 | 1.11 | 3.69 | <0.01 |
| and Higher Private and Higher Public Workers | 5.96 | 1.27 | 4.69 | <0.01 |
| Professionals and Chief Managers | 4.62 | 1.64 | 2.82 | <0.01 |
| OVERALL ABSENCES | -0.32 | 0.03 | -9.94 | <0.01 |
| Model Equation: <i>Modern Greek (Rasch score) ~ generation status + gender + parental education + parental occupation + overall absences</i> | | | | |
| Model Summary: R: 0.60, R-squared: 0.36, Adjusted R-squared: 0.35, F: 42.18 on 10 and 761 degrees of freedom, P<0.01 | | | | |

**Table 4: Parameter Estimates of the Regression Analysis in Mathematics (Rasch Score)
(Generation Status Variable Included)**

| <i>Factors</i> | <i>Estimates</i> | <i>Std. Error</i> | <i>T-value</i> | <i>P-value</i> |
|--|------------------|-------------------|----------------|----------------|
| (Intercept) | 6.86 | 3.02 | 2.27 | 0.02 |
| GENERATION STATUS (ref. cat. = Natives) | | | | |
| First Generation | -3.16 | 0.57 | -5.59 | <0.01 |
| Second Generation | -1.83 | 0.85 | -2.16 | 0.03 |
| GENDER (ref. cat. = Female) | | | | |
| Male | -2.96 | 0.39 | -7.60 | <0.01 |
| PARENTAL EDUCATION (ref. cat. = Primary and Secondary Education) | | | | |
| Further Education | 2.83 | 0.48 | 5.86 | <0.01 |
| PARENTAL OCCUPATION (ref. cat. = Unskilled Manual Workers) | | | | |
| Skilled Manual Workers | 2.14 | 0.81 | 2.63 | <0.01 |
| Civil Private and Public Workers | 2.45 | 0.74 | 3.30 | <0.01 |
| Teachers and Higher Private and Higher Public Workers | 3.36 | 0.85 | 3.94 | <0.01 |
| Professionals and Chief Managers | 3.24 | 1.11 | 2.92 | <0.01 |
| OVERALL ABSENCES | -0.23 | 0.03 | -8.36 | <0.01 |
| AGE | -0.45 | 0.23 | -1.99 | 0.05 |
| SCHOOL (ref. cat. = School A) | | | | |
| School B | -0.86 | 0.43 | -1.98 | 0.05 |
| Model Equation: <i>Mathematics (Rasch score) ~ generation status + gender + parental education + parental occupation + overall absences + age + school</i> | | | | |
| Model Summary: R: 0.56, R-squared: 0.32, Adjusted R-squared: 0.31, F: 31.37 on 11 and 760 degrees of freedom, P<0.01 | | | | |

As it can be seen from the above tables, the majority of the examined factors (ethnicity, generation status, gender, parental education, parental occupation, overall absences, age, and school) had a statistically significant effect on student attainment in the subject of Mathematics (Table 2 and Table 4). However, age and school had no effect on student attainment in the subject of Modern Greek (Table 1 and Table 3). That is, being a native student, being a female student, high level of parental education, high level of parental occupation, and low absenteeism had a significantly positive effect on student attainment in both subjects. In the subject of Mathematics, being a younger student and coming from School A had also a favourable effect on student attainment. Specifically, even after controlling for a number of factors, these models suggest that:

- Georgians and ‘Others’ perform significantly lower in the Rasch score than Native students in both subjects, with Georgians performing the lowest. Compared to Natives, Georgians’ attainment decreases by an average of 5.76 in Modern Greek and 4.08 in Mathematics, while the attainment of ‘Others’ decreases by 3.07 in Modern Greek and 1.93 in Mathematics (Table 1 and Table 2).
- First-generation minority students have significantly lower attainment than native students by an average of 5.02 in Modern Greek and 3.16 in Mathematics. Second-

generation minorities have significantly lower attainment than natives in Mathematics only by an average of 1.83 (Table 3 and Table 4).

- Male students have significantly lower attainment than female students by 6.19 in Modern Greek and 2.20 in Mathematics (Table 1 and Table 2).
- In Modern Greek, compared to the students whose parents have primary education only, students whose parents have received secondary education have higher attainment by an average of 3.42 and students whose parents have received further education by an average of 6.99 (Table 1). In Mathematics, compared to the students whose parents have primary and secondary education, the attainment of students whose parents have received further studies increases by an average of 2.82 (Table 2).
- As parental occupational level increases, student attainment tends to increase too. That is, compared to students whose parents are unskilled manual workers, the attainment of those whose parents are skilled manual workers increases by an average of 2.93 in Modern Greek and 2.16 in Mathematics, those whose parents are civil private and public workers by 4.083 in Modern Greek and 2.41 in Mathematics, those whose parents are teachers and higher private and higher public workers by 5.80 in Modern Greek and 3.25 in Mathematics, and those whose parents are professionals and chief managers by 4.56 in Modern Greek and 3.15 in Mathematics (Table 1 and Table 2).
- Overall absences have a negative impact on attainment. Student attainment in both subjects decreases as the number of the overall absences increases. As overall absences increase by one unit, student attainment goes down by an average of 0.31 in Modern Greek (Table 1) and 0.22 in Mathematics (Table 2).
- Age appears to have a significant effect in the subject of Mathematics only. As student age increases by one unit (month), student attainment in Mathematics decreases by an average of 0.47 (Table 1 and Table 2).
- Finally, students coming from School B have significantly lower attainment than students from School A by an average of 0.90 in the subject of Mathematics only (Table 2 and Table 4).

4.2.2.2 Models Derived from the Subject Study

In the Subject Study, a number of multiple regression models were run and are presented here (Tables 5-8). Due to multicollinearity issues, as explained previously ('Methodology' chapter), between the variable ethnicity and that of generation status, and between the

variable school and those of school size and school minority concentration, different models were run and presented using one of these variables at a time, in order to examine the effect of all these variables. The reader is reminded that the numbers that appear in the tables of this section represent student attainment out of 20.

Table 5: Parameter Estimates of the Regression Analysis of the Trimesters Overall Attainment (Ethnicity Variable Included)

| <i>Factors</i> | <i>Estimates</i> | <i>Std. Error</i> | <i>T-value</i> | <i>P-value</i> |
|--|------------------|-------------------|----------------|----------------|
| (Intercept) | 16.58 | 0.33 | 50.84 | <0.01 |
| OVERALL ABSENCES | -0.07 | 0.00 | -20.07 | <0.01 |
| GENDER (ref. cat. = Female) | | | | |
| Male | -1.62 | 0.11 | -14.55 | <0.01 |
| PARENTAL EDUCATION (ref. cat. = Primary Education) | | | | |
| Level 1 - Secondary Education | 0.37 | 0.14 | 2.70 | <0.01 |
| Level 2 - Further Education | 0.48 | 0.06 | 7.79 | <0.01 |
| ETHNICITY (ref. cat. = Natives) | | | | |
| Georgians | -1.30 | 0.20 | -6.46 | <0.01 |
| 'Others' | -0.88 | 0.17 | -5.16 | <0.01 |
| PARENTAL OCCUPATION (ref. cat. = Unskilled Manual Workers) | | | | |
| Skilled Manual Workers | 0.49 | 0.23 | 2.13 | 0.03 |
| Civil Private and Public Workers | 0.87 | 0.22 | 4.01 | <0.01 |
| Teachers and Higher Private and Higher Public Workers | 1.72 | 0.25 | 6.81 | <0.01 |
| Professionals and Chief Managers | 1.90 | 0.35 | 5.41 | <0.01 |
| SCHOOL (ref. cat. = School A) | | | | |
| School B | -1.01 | 0.27 | -3.73 | <0.01 |
| School C | -1.03 | 0.30 | -3.42 | <0.01 |
| School D | -0.81 | 0.27 | -2.96 | <0.01 |
| School E | 0.79 | 0.28 | 2.82 | <0.01 |
| School F | -0.65 | 0.30 | -2.20 | 0.03 |
| Model Equation: <i>Trimesters Overall Attainment</i> ~ <i>overall absences</i> + <i>gender</i> + <i>parental education</i> + <i>ethnicity</i> + <i>parental occupation</i> + <i>school</i> | | | | |
| Model Summary: Residual standard error: 2.49 on 2004 degrees of freedom, Multiple R-squared: 0.38, Adjusted R-squared: 0.38, F-statistic: 82.59 on 15 and 2004 DF, P-value<0.01 | | | | |

Table 6: Parameter Estimates of the Regression Analysis of the Trimesters Overall Attainment (Generation Status Variable Included)

| <i>Factors</i> | <i>Estimates</i> | <i>Std. Error</i> | <i>T-value</i> | <i>P-value</i> |
|--|------------------|-------------------|----------------|----------------|
| (Intercept) | 16.56 | 0.32 | 51.21 | <0.01 |
| OVERALL ABSENCES | -0.06 | 0.00 | -19.91 | <0.01 |
| GENDER (ref. cat. = Female) | | | | |
| Male | -1.63 | 0.11 | -14.63 | <0.01 |
| PARENTAL EDUCATION (ref. cat. = Primary Education) | | | | |
| Level 1 - Secondary Education | 0.38 | 0.14 | 2.71 | <0.01 |
| Level 2 - Further Education | 0.48 | 0.06 | 7.84 | <0.01 |
| GENERATION STATUS (ref. cat. = Natives) | | | | |
| First Generation | -1.25 | 0.17 | -7.48 | <0.01 |
| Second Generation | -0.61 | 0.23 | -2.64 | <0.01 |
| PARENTAL OCCUPATION (ref. cat. = Unskilled Manual Workers) | | | | |
| Skilled Manual Workers | 0.51 | 0.23 | 2.22 | 0.03 |
| Civil Private and Public Workers | 0.87 | 0.22 | 4.03 | <0.01 |
| Teachers and Higher Private and Higher Public Workers | 1.72 | 0.25 | 6.86 | <0.01 |
| Professionals and Chief Managers | 1.88 | 0.35 | 5.35 | <0.01 |
| SCHOOL (ref. cat. = School A) | | | | |
| School B | -0.99 | 0.27 | -3.68 | <0.01 |
| School C | -1.02 | 0.30 | -3.42 | <0.01 |
| School D | -0.82 | 0.27 | -2.97 | <0.01 |
| School E | 0.80 | 0.28 | 2.84 | <0.01 |
| School F | -0.65 | 0.29 | -2.20 | 0.03 |
| Model Equation: <i>Trimesters Overall Attainment</i> ~ <i>overall absences</i> + <i>gender</i> + <i>parental education</i> + <i>generation status</i> + <i>parental occupation</i> + <i>school</i> | | | | |
| Model Summary: Residual standard error: 2.48 on 2004 degrees of freedom, Multiple R-squared: 0.38, Adjusted R-squared: 0.38, F-statistic: 82.88 on 15 and 2004 DF, P-value<0.01 | | | | |

Table 7: Parameter Estimates of the Regression Analysis of the Trimesters Overall Attainment (School Size Variable Included)

| <i>Factors</i> | <i>Estimates</i> | <i>Std. Error</i> | <i>T-value</i> | <i>P-value</i> |
|---|------------------|-------------------|----------------|----------------|
| (Intercept) | 15.91 | 0.25 | 62.96 | <0.01 |
| OVERALL ABSENCES | -0.07 | 0.00 | -20.15 | <0.01 |
| GENDER (ref. cat. = Female) | | | | |
| Male | -1.63 | 0.11 | -14.43 | <0.01 |
| PARENTAL EDUCATION (ref. cat. = Primary Education) | | | | |
| Level 1 - Secondary Education | 0.33 | 0.14 | 2.35 | 0.02 |
| Level 2 - Further Education | 0.49 | 0.06 | 7.83 | <0.01 |
| ETHNICITY (ref. cat. = Natives) | | | | |
| Georgians | -0.92 | 0.19 | -4.80 | <0.01 |
| 'Others' | -0.80 | 0.17 | -4.60 | <0.01 |
| PARENTAL OCCUPATION (ref. cat. = Unskilled Manual Workers) | | | | |
| Skilled Manual Workers | 0.51 | 0.23 | 2.23 | 0.03 |
| Civil Private and Public Workers | 0.77 | 0.22 | 3.51 | <0.01 |
| Teachers and Higher Private and Higher Public Workers | 1.51 | 0.25 | 5.96 | <0.01 |
| Professionals and Chief Managers | 1.66 | 0.35 | 4.69 | <0.01 |
| SCHOOL SIZE (ref. cat. = Small School Size) | | | | |
| Medium School Size | 0.80 | 0.18 | 4.52 | <0.01 |
| Large School Size | -0.14 | 0.16 | -0.86 | 0.39 |
| Model Equation: <i>Trimesters Overall Attainment</i> ~ <i>overall absences</i> + <i>gender</i> + <i>parental education</i> + <i>ethnicity</i> + <i>parental occupation</i> + <i>school size</i> | | | | |
| Model Summary: Residual standard error: 2.52 on 2007 degrees of freedom, Multiple R-squared: 0.37, Adjusted R-squared: 0.36, F-statistic: 96.35 on 12 and 2007 DF, P-value<0.01 | | | | |

Table 8: Parameter Estimates of the Regression Analysis of the Trimesters Overall Attainment (School Minority Concentration Variable Included)

| <i>Factors</i> | <i>Estimates</i> | <i>Std. Error</i> | <i>T-value</i> | <i>P-value</i> |
|---|------------------|-------------------|----------------|----------------|
| (Intercept) | 15.64 | 0.22 | 69.68 | <0.01 |
| OVERALL ABSENCES | -0.06 | 0.00 | -19.76 | <0.01 |
| GENDER (ref. cat. = Female) | | | | |
| Male | -1.62 | 0.11 | -14.55 | <0.01 |
| PARENTAL EDUCATION (ref. cat. = Primary Education) | | | | |
| Level 1 - Secondary Education | 0.36 | 0.14 | 2.57 | <0.01 |
| Level 2 - Further Education | 0.48 | 0.06 | 7.80 | <0.01 |
| ETHNICITY (ref. cat. = Natives) | | | | |
| Georgians | -1.35 | 0.20 | -6.79 | <0.01 |
| 'Others' | -0.89 | 0.17 | -5.17 | <0.01 |
| PARENTAL OCCUPATION (ref. cat. = Unskilled Manual Workers) | | | | |
| Skilled Manual Workers | 0.49 | 0.2 | 2.13 | 0.03 |
| Civil Private and Public Workers | 0.91 | 0.22 | 4.22 | <0.01 |
| Teachers and Higher Private and Higher Public Workers | 1.76 | 0.25 | 7.03 | <0.01 |
| Professionals and Chief Managers | 1.93 | 0.35 | 5.52 | <0.01 |
| SCHOOL MINORITY CONCENTRATION (ref. cat. = Low Minority Concentration) | | | | |
| High Minority Concentration | 1.48 | 0.15 | 9.55 | <0.01 |
| Model Equation: <i>Trimesters Overall Attainment</i> ~ <i>overall absences</i> + <i>gender</i> + <i>parental education</i> + <i>ethnicity</i> + <i>parental occupation</i> + <i>school minority concentration</i> | | | | |
| Model Summary: Residual standard error: 2.49 on 2008 degrees of freedom, Multiple R-squared: 0.38, Adjusted R-squared: 0.37, F-statistic: 111 on 11 and 2008 DF, P-value<0.01 | | | | |

Next, the four models based on the *Combined Trimesters and Final Exams Overall Attainment* are presented (Tables 9-12). Again, due to multicollinearity issues between the groups of variables mentioned above, models are run and presented using one of these variables each time.

Table 9: Parameter Estimates of the Regression Analysis of the Combined Trimesters and Final Exams Overall Attainment (Ethnicity Variable Included)

| <i>Factors</i> | <i>Estimates</i> | <i>Std. Error</i> | <i>T-value</i> | <i>P-value</i> |
|---|------------------|-------------------|----------------|----------------|
| (Intercept) | 15.98 | 0.37 | 43.31 | <0.01 |
| OVERALL ABSENCES | -0.08 | 0.00 | -21.78 | <0.01 |
| GENDER (ref. cat. = Female) | | | | |
| Male | -1.75 | 0.13 | -13.92 | <0.01 |
| PARENTAL EDUCATION (ref. cat. = Primary Education) | | | | |
| Level 1 -Secondary Education | 0.42 | 0.16 | 2.71 | <0.01 |
| Level 2 - Further Education | 0.57 | 0.07 | 8.12 | <0.01 |
| ETHNICITY (ref. cat. = Natives) | | | | |
| Georgians | -1.57 | 0.23 | -6.90 | <0.01 |
| 'Others' | -1.02 | 0.19 | -5.23 | <0.01 |
| PARENTAL OCCUPATION (ref. cat. = Unskilled Manual Workers) | | | | |
| Skilled Manual Workers | 0.59 | 0.26 | 2.28 | 0.02 |
| Civil Private and Public Workers | 1.03 | 0.24 | 4.23 | <0.01 |
| Teachers and Higher Private and Higher Public Workers | 2.01 | 0.29 | 7.05 | <0.01 |
| Professionals and Chief Managers | 2.19 | 0.40 | 5.52 | <0.01 |
| SCHOOL (ref. cat. = School A) | | | | |
| School B | -1.18 | 0.31 | -3.85 | <0.01 |
| School C | -1.07 | 0.34 | -3.15 | <0.01 |
| School D | -1.15 | 0.31 | -3.68 | <0.01 |
| School E | 0.43 | 0.32 | 1.36 | 0.17 |
| School F | -0.66 | 0.34 | -1.98 | 0.05 |
| Model Equation: <i>Combined Trimester and Final Exams Overall Attainment ~ overall absences + gender + parental education + ethnicity + parental occupation + school</i> | | | | |
| Model Summary: Residual standard error: 2.81 on 2004 degrees of freedom, Multiple R-squared: 0.40, Adjusted R-squared: 0.40, F-statistic: 89.42 on 15 and 2004 DF, P-value<0.01 | | | | |

Table 10: Parameter Estimates of the Regression Analysis of the Combined Trimesters and Final Exams Overall Attainment (Generation Status Variable Included)

| <i>Factors</i> | <i>Estimates</i> | <i>Std. Error</i> | <i>T-value</i> | <i>P-value</i> |
|---|------------------|-------------------|----------------|----------------|
| (Intercept) | 15.95 | 0.37 | 43.58 | <0.01 |
| OVERALL ABSENCES | -0.08 | 0.00 | -21.61 | <0.01 |
| GENDER (ref. cat. = Female) | | | | |
| Male | -1.76 | 0.13 | -14.00 | <0.01 |
| PARENTAL EDUCATION (ref. cat. = Primary Education) | | | | |
| Level 1 - Secondary Education | 0.42 | 0.16 | 2.72 | 0.01 |
| Level 2 - Further Education | 0.57 | 0.07 | 8.17 | <0.01 |
| GENERATION STATUS (ref. cat. = Natives) | | | | |
| First Generation | -1.48 | 0.19 | -7.82 | <0.01 |
| Second Generation | -0.70 | 0.26 | -2.68 | <0.01 |
| PARENTAL OCCUPATION (ref. cat. = Unskilled Manual Workers) | | | | |
| Skilled Manual Workers | 0.61 | 0.26 | 2.38 | 0.02 |
| Civil Private and Public Workers | 1.04 | 0.24 | 4.27 | <0.01 |
| Teachers and Higher Private and Higher Public Workers | 2.02 | 0.28 | 7.11 | <0.01 |
| Professionals and Chief Managers | 2.17 | 0.40 | 5.47 | <0.01 |
| SCHOOL (ref. cat. = School A) | | | | |
| School B | -1.15 | 0.30 | -3.78 | <0.01 |
| School C | -1.05 | 0.34 | -3.12 | <0.01 |
| School D | -1.13 | 0.31 | -3.66 | <0.01 |
| School E | 0.44 | 0.32 | 1.39 | 0.17 |
| School F | -0.65 | 0.33 | -1.95 | 0.05 |
| Model Equation: Combined <i>Trimesters and Final Exams Overall Attainment</i> ~ overall absences + gender + parental education + generation status + parental occupation + school | | | | |
| Model Summary: Residual standard error: 2.81 on 2004 degrees of freedom, Multiple R-squared: 0.40, Adjusted R-squared: 0.40, F-statistic: 89.68 on 15 and 2004 DF, P-value<0.01 | | | | |

Table 11: Parameter Estimates of the Regression Analysis of the Combined Trimesters and Final Exams Overall Attainment (School Size Variable Included)

| <i>Factors</i> | <i>Estimates</i> | <i>Std. Error</i> | <i>T-value</i> | <i>P-value</i> |
|---|------------------|-------------------|----------------|----------------|
| (Intercept) | 15.27 | 0.28 | 53.73 | <0.01 |
| OVERALL ABSENCES | -0.08 | 0.00 | -22.02 | <0.01 |
| GENDER (ref. cat. = Female) | | | | |
| Male | -1.76 | 0.13 | -13.87 | <0.01 |
| PARENTAL EDUCATION (ref. cat. = Primary Education) | | | | |
| Level 1 - Secondary Education | 0.40 | 0.16 | 2.56 | <0.01 |
| Level 2 - Further Education | 0.58 | 0.07 | 8.32 | <0.01 |
| ETHNICITY (ref. cat. = Natives) | | | | |
| Georgians | -1.22 | 0.22 | -5.67 | <0.01 |
| 'Others' | -0.94 | 0.19 | -4.82 | <0.01 |
| PARENTAL OCCUPATION (ref. cat. = Unskilled Manual Workers) | | | | |
| Skilled Manual Workers | 0.61 | 0.26 | 2.35 | 0.02 |
| Civil Private and Public Workers | 0.95 | 0.25 | 3.89 | <0.01 |
| Teachers and Higher Private and Higher Public Workers | 1.85 | 0.28 | 6.49 | <0.01 |
| Professionals and Chief Managers | 2.01 | 0.40 | 5.07 | <0.01 |
| SCHOOL SIZE (ref. cat. = Small School Size) | | | | |
| Medium School Size | 0.63 | 0.20 | 3.17 | <0.01 |
| Large School Size | -0.38 | 0.18 | -2.10 | 0.04 |
| Model Equation: Combined <i>Trimesters and Final Exam Overall Attainment</i> ~ overall absences + gender + parental education + ethnicity + parental occupation + school size | | | | |
| Model Summary: Residual standard error: 2.83 on 2007 degrees of freedom, Multiple R-squared: 0.39, Adjusted R-squared: 0.39, F-statistic: 108.2 on 12 and 2007 DF, P-value<0.01 | | | | |

Table 12: Parameter Estimates of the Regression Analysis of the Combined Trimesters and Final Exams Overall Attainment (School Minority Concentration Variable Included)

| <i>Factors</i> | <i>Estimates</i> | <i>Std. Error</i> | <i>T-value</i> | <i>P-value</i> |
|---|------------------|-------------------|----------------|----------------|
| (Intercept) | 14.85 | 0.25 | 58.50 | <0.01 |
| OVERALL ABSENCES | -0.08 | 0.00 | -21.69 | <0.01 |
| GENDER (ref. cat. = Female) | | | | |
| Male | -1.75 | 0.13 | -13.90 | <0.01 |
| PARENTAL EDUCATION (ref. cat. = Primary Education) | | | | |
| Level 1 - Secondary Education | 0.43 | 0.16 | 2.76 | <0.01 |
| Level 2 - Further Education | 0.57 | 0.07 | 8.25 | <0.01 |
| ETHNICITY (ref. cat. = Natives) | | | | |
| Georgians | -1.58 | 0.23 | -7.02 | <0.01 |
| 'Others' | -1.01 | 0.19 | -5.20 | <0.01 |
| PARENTAL OCCUPATION (ref. cat. = Unskilled Manual Workers) | | | | |
| Skilled Manual Workers | 0.58 | 0.26 | 2.25 | 0.02 |
| Civil Private and Public Workers | 1.08 | 0.24 | 4.41 | <0.01 |
| Teachers and Higher Private and Higher Public Workers | 2.08 | 0.28 | 7.34 | <0.01 |
| Professionals and Chief Managers | 2.23 | 0.40 | 5.63 | <0.01 |
| SCHOOL MINORITY CONCENTRATION (ref. cat. = Low Minority Concentration) | | | | |
| High Minority Concentration | 1.39 | 0.18 | 7.95 | <0.01 |
| Model Equation: Combined <i>Trimesters and Final Exam Overall Attainment</i> ~ overall absences + gender + parental education + ethnicity + parental occupation + school minority concentration | | | | |
| Model Summary: Residual standard error: 2.82 on 2008 degrees of freedom, Multiple R-squared: 0.40, Adjusted R-squared: 0.40, F-statistic: 120.9 on 11 and 2008 DF, P-value<0.01 | | | | |

As shown in the tables above, the majority of examined factors (*overall absences, gender, ethnicity, parental education, parental occupation, generation status, school, school size, and school minority concentration*) had a statistically significant effect on the *Trimesters Overall Attainment* (Tables 5-8) and the *Combined Trimesters and Final Exams Overall Attainment* (Tables 9-12), but age and year group had no effect on either of the two analyses. That is, low absenteeism, being a female student, being a native student, high level of parental education, high level of parental occupation, attending certain schools, and attending medium-size schools or schools with high minority concentration had a significantly positive effect on student attainment in the *Trimesters Overall Attainment* as well as the *Combined Trimesters and Final Exams Overall Attainment*. Specifically, after controlling for a number of factors, these models suggest that:

- Student attainment decreases significantly as the number of the overall absences increases. That is, as the number of the overall absences increases by one unit, students' *Trimesters Overall Attainment* decreases by an average of 0.07 and the *Combined Trimesters and Final Exams Overall Attainment* decreases by an average of 0.08 (Table 5 and Table 9).

- As regards gender, male students achieve significantly lower than female students by an average of 1.62 in the *Trimesters Overall Attainment* and by an average of 1.75 in the *Combined Trimesters and Final Exams Overall Attainment* (Table 5 and Table 9).
- The attainment of Georgians and ‘Others’ is significantly lower than the attainment levels of Native students, with a bigger gap for Georgians. In the *Trimesters Overall Attainment*, Georgians achieve lower by an average of 1.30 and ‘Others’ by an average of 0.88, and in the *Combined Trimesters and Final Exams Overall Attainment*, Georgians achieve lower by an average of 1.57 and ‘Others’ by an average of 1.02 (Table 5 and Table 9).
- Minority students of first and second generation have significantly lower attainment levels compared to that of native students, with a bigger gap for those of first generation. That is, compared to natives, first-generation minorities achieve lower by an average of 1.25 in the *Trimesters Overall Attainment* and 1.48 in the *Combined Trimesters and Final Exams Overall Attainment*, and second-generation minorities by 0.61 in the *Trimesters Overall analysis* and 0.70 in the *Combined Trimesters and Final Exams Overall Attainment* (Table 6 and Table 10).
- Students whose parents have secondary education have significantly higher attainment than those whose parents have primary education alone by an average of 0.37 in the *Trimesters Overall Attainment* and by an average of 0.42 in the *Combined Trimesters and Final Exams Overall Attainment*. Students with parents with further education have significantly higher attainment compared to those whose parents have primary or secondary education alone by an average of 0.48 in the *Trimesters Overall Attainment* and by an average of 0.57 in the *Combined Trimesters and Final Exams Overall Attainment* (Table 5 and Table 9).
- As parental occupational level increases, student attainment increases too. That is, compared to students whose parents are unskilled manual workers, the attainment of those whose parents are skilled manual workers increases by an average of 0.49 in the *Trimesters Overall Attainment* and by an average of 0.59 in the *Combined Trimesters and Final Exams Overall Attainment*; those whose parents are civil private and public workers by an average of 0.87 in the *Trimesters Overall Attainment* and by an average of 1.03 in the *Combined Trimesters and Final Exams Overall Attainment*; those whose parents are teachers and higher private and higher public workers by an average of 1.72 in the *Trimesters Overall Attainment* and by an average of 2.01 in the *Combined Trimesters and Final Exams Overall Attainment*; and those whose parents are professionals and chief managers by an average of 1.90 in the *Trimesters Overall*

Attainment and by an average of 2.19 in the *Combined Trimesters and Final Exams Overall Attainment* (Table 5 and Table 9).

- School differences appeared as well. Compared to students from School A, students coming from four schools (Schools B, C, D, F) perform significantly lower; School B by an average of 1.01 in the *Trimesters Overall Attainment* and 1.18 in the *Combined Trimesters and Final Exams Overall Attainment*; School C by an average of 1.03 in the *Trimesters Overall Attainment* and 1.07 in the *Combined Trimesters and Final Exams Overall Attainment*; School D by an average of 0.81 in the *Trimesters Overall Attainment* and 1.15 in the *Combined Trimesters and Final Exams Overall Attainment*, and School F by an average of 0.65 in the *Trimesters Overall Attainment* and 0.66 in the *Combined Trimesters and Final Exams Overall Attainment*. Students from School E achieve significantly higher than students of School A by an average of 0.79 in the *Trimesters Overall Attainment* and 0.43 in the *Combined Trimesters and Final Exams Overall Attainment* (Table 5 and Table 9).
- Students attending medium-size schools perform significantly higher compared to those attending small schools by an average of 0.80 in the *Trimesters Overall Attainment* and 0.63 in the *Combined Trimesters and Final Exams Overall Attainment*. The attainment of students attending large schools is not significantly different from those attending small schools in the *Trimesters Overall Attainment*. However, in the *Combined Trimesters and Final Exams Overall Attainment* students attending large schools appear to do worse than those attending small schools by an average of 0.38 (Table 7 and Table 11).
- Students attending schools with high minority concentration have significantly higher attainment levels than those attending schools with low minority concentration, by an average of 1.48 in the *Trimesters Overall Attainment* and 1.39 in the *Combined Trimesters and Final Exams Overall Attainment* (Table 8 and Table 12).

The multiple regression analysis of the Large Attainment Study was followed by a multilevel regression analysis, which is presented in the next section.

4.3 Multilevel Regression Analysis

In this section, the parameter estimates of the multilevel regression model derived from the Subject Study and the Absences Study are presented in tables and interpreted. The model summary is also discussed at the end of the section.

4.3.1 Tables Content

The table presenting the multilevel regression model provides information firstly about the random-effects parameters. That is, the intercept, the intercept variance (the between-group variance that cannot be explained by the independent variables), the residual variance (the portion of variability in the dependent variable that is unexplained by the independent variables), the intercept standard deviation (standard deviation is the square root of the variance), and the residual standard deviation. Also, information is provided about the 95% confidence intervals for the parameters of the model. The confidence intervals indicate “the limits within which repeated samples can be expected to fall” (Hutcheson and Sofroniou 1999, p.59-60). At this part of the model, the number of observations to which the model is fit as well as the number of levels of any group factor used for the random effects are offered too. In the case of the Subject Study (Table 13), 8080 observations are examined and a single random effects term (i.e., an intercept term) is used with *StudentsID* as the grouping factor for that term. There is a total of 2020 students involved in the analysis. In the case of the Absences Study (Table 14), 7609 observations are examined and a single random effects term (i.e., an intercept term) is used with *StudentsID* as the grouping factor for that term. There is a total of 1906 students involved in the analysis.

Next, information is provided about the fixed-effects parameters. That is, the intercept, which represents the mean of the dependent variable when other explanatory variables are zero, and the estimate for each parameter in the model. For the interpretation of all non-intercept coefficients, in the case of a continuous independent variable, a regression coefficient indicates how much the dependent variable is predicted to change for a one unit increase in the independent variable, when all other variables are held constant. In the case of a categorical variable, the regression coefficient represents the difference between a particular level and the reference level on the dependent variable, when all other variables are held constant again. In the case of an interaction term with categorical variables - as in this model (*ethnicity* and *subjects*) - the regression coefficient indicates the effect of different values of the one variable (e.g., *ethnicity*) on the dependent variable (attainment) for different values of the other variable (e.g., *subject*), when all other variables are held constant again. The coefficients of the interaction terms are interpreted in relation to the coefficients of the main effects, and the main effects become meaningful, when the interaction coefficients are taken into account.

Also, information is given about *Standard Error* and *T-value* of any fixed-effects parameters in the model. *P-values* are not given, but inferences about that can be made by

the *T*-values; when they are greater than 2, a significant difference is indicated. In this case, the null hypothesis, that the explanatory variables used have no effect on (effect equal to zero) or no relationship with student attainment levels, is rejected and the examined variables are statistically significant in explaining student attainment.

Furthermore, the table presents the regression equation of the model and a model summary, which includes some summary statistics characterizing the model fit; Akaike Information Criterion (*AIC*) and Bayesian Information Criterion (*BIC*), with lower *AIC* and lower *BIC* indicating a better-fitting model; the log of the maximized restricted likelihood¹⁴ (*LogLik*); the *Deviance* for the maximum likelihood criterion (negative twice the log-likelihood) at the parameter estimates, with lower *Deviance* reflecting better model; and the *Deviance* for the *REML* criterion (*REMLdev*). With the last one, it is specified that the parameters have been estimated using the REstricted Maximum Likelihood (*REML*) criterion¹⁵. At the end, a reminder about the reference category of the variables examined in each model is offered.

The numbers that appear in the tables of this section represent student attainment out of 20.

4.3.2 Presentation and Interpretation of the Multilevel Regression Analyses

4.3.2.1 Model derived from the Subject Study

The multilevel regression model derived from the Subject Study is presented here. The table below presents the parameter estimates of the multilevel regression model for the *Combined Trimesters and Final Exams Overall Attainment*.

According to Table 13, all the individual variables examined have a statistically significant effect on student attainment. That is, low absenteeism, being a female student, high level of parental education, high level of parental occupation, being a native student, and coming from certain schools have a significantly positive effect on student attainment.

¹⁴ “Maximum likelihood estimators estimate the parameters of a model by providing estimated values for the population parameters that maximize the so-called ‘likelihood function’: the function that describes the probability of observing the sample data, given the specific values of the parameter estimates. Simply put, maximum likelihood estimates are those parameter estimates that maximize the probability of finding the sample data that we have actually found” (Hox 2010, p.16).

¹⁵ Two types of Maximum Likelihood estimates are used for multilevel modelling: the Full Information Maximum Likelihood (*FIML*) and the Restricted Maximum Likelihood (*REML*). With the Full Information Maximum Likelihood, the regression coefficients and the variance components are both included in the Likelihood Function, while with the Restricted Maximum Likelihood the variance components only are included in the Likelihood Function (Subramanian 2004). From the two of them, Restricted Maximum Likelihood “takes into account the degrees of freedom from the fixed effects and thus produces variance components estimates that are less biased” (Albright and Marinova 2010, p.12).

Table 13: Parameter Estimates of the Multilevel Regression Model for the Combined Trimesters and Final Exams Overall Attainment in the Subject Study

| Random Effects | | | | |
|--|-----------------|-------------------|---------------------------|---------------------------------|
| <i>Groups</i> | <i>Name</i> | <i>Variance</i> | <i>Standard Deviation</i> | <i>95% Confidence Intervals</i> |
| Students | (Intercept) | 7.42 | 2.72 | (2.64, 2.82) |
| Residual | | 1.98 | 1.41 | (1.38, 1.43) |
| Number of obs: 8080, groups: StudentID, 2020 | | | | |
| Fixed Effects | | | | |
| | <i>Estimate</i> | <i>Std. Error</i> | <i>T-value</i> | |
| (Intercept) | 15.53 | 0.37 | 41.93 | |
| OVERALL ABSENCES | -0.08 | 0.00 | -21.78 | |
| GENDER (ref. cat. = Female) | | | | |
| Male | -1.75 | 0.13 | -13.92 | |
| PARENTAL EDUCATION (ref. cat. = Primary Education) | | | | |
| Level 1 - Secondary Education | 0.43 | 0.16 | 2.71 | |
| Level 2 - Further Education | 0.57 | 0.07 | 8.12 | |
| ETHNICITY (ref. cat. = Natives) | | | | |
| Georgians | -1.71 | 0.24 | -7.05 | |
| 'Others' | -1.04 | 0.21 | -4.95 | |
| PARENTAL OCCUPATION (ref. cat. = Unskilled Manual Workers) | | | | |
| Skilled Manual Workers | 0.59 | 0.26 | 2.28 | |
| Civil Private and Public Workers | 1.03 | 0.24 | 4.23 | |
| Teachers and Higher Private and Higher Public Workers | 2.01 | 0.29 | 7.05 | |
| Professionals and Chief Managers | 2.19 | 0.39 | 5.52 | |
| SCHOOL (ref. cat. = School A) | | | | |
| School B | -1.18 | 0.31 | -3.85 | |
| School C | -1.07 | 0.34 | -3.15 | |
| School D | -1.15 | 0.31 | -3.68 | |
| School E | 0.43 | 0.32 | 1.36 | |
| School F | -0.66 | 0.34 | -1.98 | |
| SUBJECT (ref. cat. = Mathematics) | | | | |
| Modern Greek | 1.06 | 0.05 | 20.66 | |
| History | 0.65 | 0.05 | 12.55 | |
| Physics | 0.11 | 0.05 | 2.11 | |
| SUBJECT*ETHNICITY (ref. cat. = Mathematics: Natives) | | | | |
| Modern Greek: Georgians | 0.40 | 0.13 | 3.02 | |
| History: Georgians | -0.28 | 0.13 | -2.11 | |
| Physics: Georgians | 0.42 | 0.13 | 3.12 | |
| Modern Greek: 'Others' | 0.06 | 0.13 | 0.46 | |
| History: 'Others' | -0.19 | 0.13 | -1.46 | |
| Physics: 'Others' | 0.24 | 0.13 | 1.79 | |
| Model Equation: <i>Combined Trimesters and Final Exams Overall Attainment</i> ~ 1 + overall absences + gender + parental education + parental occupation + ethnicity + school + subject + subject*ethnicity + (1 students) | | | | |
| Model Summary: AIC: 34133, BIC: 34322, logLik: -17039, Deviance: 34014, REMLdev: 34079 | | | | |

Specifically, even after controlling for a number of factors, this model suggests that:

- With each absence from a teaching period (of the four subjects examined) student attainment decreases, on average, by 0.08.

- Compared to female students, the attainment of male students is, on average, significantly lower by 1.75.
- Students whose parents have secondary education have significantly higher attainment than those whose parents have primary education alone by an average of 0.42. Students with parents with further education have significantly higher attainment compared to those whose parents have primary or secondary education alone by an average of 0.57.
- Student attainment increases as parental occupational level goes up. That is, compared to students whose parents are unskilled manual workers, the attainment of those whose parents are skilled manual workers increases by an average of 0.59; those whose parents are civil private and public workers by an average of 1.03; those whose parents are teachers and higher private and higher public workers by an average of 2.01; and those whose parents are professionals and chief managers by an average of 2.19.
- Compared to students coming from School A, the average attainment of students from the majority of schools is significantly lower; by 1.18 for School B, 1.07 for School C, 1.15 for School D, and 0.66 for School F. The attainment level of students coming from School E is not significantly different from that of School A.
- Compared to Native students, both ethnic minority groups appear to have a significantly lower average attainment; Georgians by 1.71 and ‘Others’ by 1.04. Although, it seems that these differences between the groups are not consistent across all subjects (see the discussion about the interaction terms below).
- Compared to Mathematics, the average student attainment is significantly higher in Modern Greek by 1.06, in History by 0.65, and in Physics by 0.11. However, different ethnicity groups seem to have slightly different performance for different subjects (see the discussion about the interaction terms below).

As regards the interaction between *subject* and *ethnicity*, there appeared to be some interesting findings. Compared to the attainment of Native students in Mathematics, Georgians appeared to have an even lower attainment in the subject of History (by an average of 0.28) and significantly higher attainment in Modern Greek (by an average of 0.40) and Physics (by an average of 0.42) than that predicted by the main effects above. There were no such differences from the general model for ‘Others’.

4.3.2.2 Model Derived from the Absences Study

The multilevel regression model derived from the Absences Study is presented here. The table below (Table 14) presents the parameter estimates of the multilevel regression model for the *Combined Trimesters and Final Exams Overall Attainment*.

Looking at the main effects (individual variables), and after controlling for a number of factors, the model presented on Table 14 suggests that:

- Compared to female students, the attainment of male students is, on average, significantly lower by 1.26.
- Students whose parents have secondary education have significantly higher attainment than those whose parents have primary education alone by an average of 0.53. Also, students with parents with further education have significantly higher attainment compared to those whose parents have either primary or secondary education by an average of 0.66.
- Compared to students whose parents are unskilled manual workers, the attainment of those whose parents are skilled manual workers increases by an average of 0.82; those whose parents are civil private and public workers by an average of 1.31; those whose parents are teachers and higher private and higher public workers by an average of 2.09; and those whose parents are professionals and chief managers by an average of 2.05.
- Compared to students coming from School B (as School A was excluded from this analysis), the average attainment of those from Schools C, D, and F does not differ significantly. However, students coming from School E have significantly higher average attainment than students from School B by an average of 1.53.
- Compared to Native students, both ethnic minority groups appear to have a significantly lower average attainment; Georgians by 3.20 and 'Others' by 1.48.
- Compared to Mathematics, the average student attainment in all the other examined subjects is significantly higher; in Modern Greek by 0.99, in History by 0.65, and in Physics by 0.23.

Table 14: Parameter Estimates of the Multilevel Regression Model for the Combined Trimesters and Final Exams Overall Attainment in the Absences Study

| <i>Random Effects</i> | | | | |
|---|-------------|-----------------|---------------------------|---------------------------------|
| <i>Groups</i> | <i>Name</i> | <i>Variance</i> | <i>Standard Deviation</i> | <i>95% Confidence Intervals</i> |
| Students | (Intercept) | 7.34 | 2.71 | (2.62, 2.81) |
| Residual | | 1.94 | 1.39 | (1.36, 1.42) |
| Number of obs: 7609, groups: StudentID, 1906 | | | | |
| <i>Fixed Effects</i> | | | | |
| | | <i>Estimate</i> | <i>Std. Error</i> | <i>T-value</i> |
| (Intercept) | | 13.89 | 0.28 | 48.73 |
| GENDER (ref. cat. = Female) | | | | |
| Male | | -1.26 | 0.14 | -9.30 |
| PARENTAL EDUCATION (ref. cat. = Primary Education) | | | | |
| Level 1 - Secondary Education | | 0.53 | 0.16 | 3.33 |
| Level 2 - Further Education | | 0.66 | 0.07 | 9.15 |
| ETHNICITY (ref. cat. = Natives) | | | | |
| Georgians | | -3.20 | 0.32 | -10.15 |
| 'Others' | | -1.48 | 0.25 | -5.99 |
| PARENTAL OCCUPATION (ref. cat. = Unskilled Manual Workers) | | | | |
| Skilled Manual Workers | | 0.82 | 0.27 | 3.04 |
| Civil Private and Public Workers | | 1.31 | 0.25 | 5.15 |
| Teachers and Higher Private and Higher Public Workers | | 2.09 | 0.30 | 7.04 |
| Professionals and Chief Managers | | 2.05 | 0.41 | 5.05 |
| SCHOOL (ref. cat. = School B) | | | | |
| School C | | -0.07 | 0.23 | -0.32 |
| School D | | -0.31 | 0.17 | -1.78 |
| School E | | 1.53 | 0.22 | 7.03 |
| School F | | 0.31 | 0.21 | 1.48 |
| SUBJECT (ref. cat. = Mathematics) | | | | |
| Modern Greek | | 0.99 | 0.06 | 16.15 |
| History | | 0.65 | 0.06 | 10.62 |
| Physics | | 0.23 | 0.05 | 3.90 |
| EXCUSED ABSENCES | | -0.12 | 0.02 | -7.11 |
| UNEXCUSED ABSENCES | | -0.09 | 0.03 | -3.03 |
| SUSPENSIONS (ref. cat. = Never been suspended) | | | | |
| Been suspended | | -2.43 | 0.16 | -14.98 |
| SUBJECT*EXCUSED ABSENCES (ref. cat. = Mathematics:excused absences) | | | | |
| Modern Greek:excused absences | | 0.08 | 0.02 | 5.55 |
| History:excused absences | | 0.05 | 0.02 | 3.16 |
| Physics:excused absences | | 0.07 | 0.02 | 4.84 |
| SUBJECT*UNEXCUSED ABSENCES (ref. cat. = Mathematics:unexcused absences) | | | | |
| Modern Greek:unexcused absences | | -0.05 | 0.03 | -1.56 |
| History:unexcused absences | | -0.08 | 0.03 | -2.58 |
| Physics:unexcused absences | | 0.04 | 0.03 | 1.38 |
| ETHNICITY*SUSPENSIONS (ref. cat. = Natives:suspensions) | | | | |
| Georgian:suspensions | | 1.87 | 0.42 | 4.46 |
| 'Other':suspensions | | 0.15 | 0.40 | 0.37 |
| Model Equation: <i>Combined Trimesters and Final Exams Overall Attainment</i> ~ 1 + gender + parental education + parental occupation + ethnicity + school + subject + excused absences + unexcused absences + suspensions + subject*excused absences + subject*unexcused absences + ethnicity*suspensions + (1 studentsID) | | | | |
| Model Summary: AIC: 32067, BIC: 32276, logLik: -16004, Deviance: 31912, REMLdev: 32007 | | | | |

- As the number of excused and unexcused absences increases by one teaching period, student attainment decreases on average by 0.12 and 0.09 respectively. However, this effect is not consistently observed across all subjects (see below).
- Students who have been suspended from one or more teaching periods have on average 2.43 lower attainment than those who have never been suspended. However, there is a differential effect of *suspensions* among students of different ethnic groups (see below).

Looking at the interaction effects, this model suggests that:

- From the interaction of excused or unexcused absences with subject, some interesting findings appear. For each additional percentage of excused absences, the attainment of students in the subjects of Modern Greek, History, and Physics is significantly higher than that in Mathematics by an average of 0.08, 0.05, and 0.07 respectively. This indicates that the subject of Mathematics is more sensitive to the excused absences than the rest of the subjects. In other words, student attainment in Modern Greek, History, and Physics is more resistant to student excused absences.
- For each additional percentage of unexcused absences, the attainment of students in Mathematics is on average 0.08 points higher than their attainment in History, or the attainment of students in History is on average 0.08 points lower than their attainment in Mathematics. This indicates that the subject of History is more sensitive to the unexcused absences than the subject of Mathematics. In other words, unexcused absences tend to affect student attainment in History more significantly compared to the effect of those on Mathematics. No significant differences appear in terms of unexcused absences for the other examined subjects.
- As regards the variable suspensions, the interaction term suggests that, compared to Native students who have been suspended, Georgians who have been suspended have significantly higher attainment, by an average of 1.87, than that predicted by the main effects above. This indicates that suspension has a much more significant effect on the attainment of Native students compared to that of Georgians. No significant differences appeared for ‘Others’.

4.4 Model Fit of the Regression Models Presented Above

This section deals with a discussion about the model fit of the multiple regression models and multilevel regression models presented above. The model fit of the two types of analyses is discussed separately.

4.4.1 Multiple Regression Models

For each one of the regression models presented and discussed above, a model summary is provided (see Tables 1-12). The *R-squared* statistic is offered, which indicates the proportion of the response variable (the attainment in this case) that can be accounted for by the factors included in the model. However, as it tends to increase as more variables are added into the model, the adjusted *R-squared* statistic is calculated too, which takes account of the number of factors entered into the model and does not necessarily increase as more factors are added (Hutcheson and Sofroniou 1999, p.76). Both of them provide an indication of the strength of the linear relationship between the response variable (attainment) and the explanatory variables (examined factors). Looking at the models derived from the Small Study, the one based on the subject of Modern Greek (Table 1) has an *R-Squared* 0.26 and an Adjusted *R-Squared* 0.35, and the other based on the subject of Mathematics (Table 2) has *R-Squared* 0.32 and an Adjusted *R-Squared* 0.31. One can say that 35 percent of the variation in Modern Greek and 31 percent of the variation in Mathematics can be explained by the factors included in each model. In the case of the models derived from the Subject Study, the final model of the *Trimesters Overall Attainment* gives an *R-squared* 0.38 and an Adjusted *R-squared* 0.38 (Table 5) and the model of the *Combined Trimesters and Final Exams Overall Attainment* (Table 9) gives an *R-squared* 0.40 and an Adjusted *R-squared* 0.40. One can say that 37 percent or 40 percent respectively of the variation in the overall attainment levels is accounted for by the examined factors that entered the regression model¹⁶.

The residual standard error, which is the squared root of the *RSS* by the degrees of freedom, has reduced, in the case of the *Trimesters Overall Attainment* (Table 5), from 3.15 (null model) to 2.49 (full model), and, in the case of the *Combined Trimesters and Final Exams Overall Attainment* (Table 9), from 3.62 (null model) to 2.81 (full model). This decrease indicates that the addition of all the explanatory variables into the models

¹⁶ The model fit of the regressions from this study is similar to that in similar previous studies (such as, Fejgin 1995 and Goyette and Xie 1999).

enabled a better prediction to be made of attainment levels. The tables of the regression analyses of the Small Attainment Study (Tables 1-4), which were derived by the *SPSS*, offers information not about the *RSS*, but about the *R*, which is the square root of *R*-squared.

The *F* statistic and the *P*-value are also offered in the model summary. The *F* statistic provides a measure of model fit for the whole model. It can “test the null hypothesis that there is no linear relationship between the response and all of the explanatory variables in the model” (Hutcheson and Sofroniou 1999, p.77). In the case of the regression models built above, *F* statistic indicated that the contribution of all the variables entered into the model is significant, as shown by the *P*-value. The *P*-value of the model indicates the ability of the explanatory variables to predict the response variable. In order to show a statistically significant relationship between the explanatory variables and the response variable, the *P*-value needs to be lower than 0.05. Tables 1 to 12 show that, in all the regression models run for the subjects of Modern Greek (Table 1 and 3) and Mathematics (Table 2 and 4), as well as for the *Trimesters Overall Attainment* (Tables 5-8) and the *Combined Trimesters and Final Exams Overall Attainment* (Tables 9-12), the examined factors have a statistically significant relationship with student attainment ($P < 0.05$).

4.4.2 Multilevel Regression Models

In order to check the model fit of the final multilevel models presented above, those derived from the Subject Study and the Absences Study, first of all, the summary measures of fit of the full and the null models were examined. By comparing the two (nested) models, in the case of the Subject Study, it was clear that the values of *AIC*, *BIC*, and *Deviance* statistics were reduced; *AIC*: from 35807 in the null model to 34133 in the full model, *BIC*: from 35828 to 34322, *Deviance*: from 35798 to 34014. In the case of the Absences Study, *AIC*: from 33849 to 32067, *BIC*: from 33870 to 32276, *Deviance*: from 33840 to 31912. The reduction in those statistics indicates that the full model fits better than the null model.

Next, a comparison of the two models using *Anova* (Bates 2010, Gelman and Hill 2007) was made. The comparison showed the following: for the models of the Subject Study, after the estimation of 24 parameters (*ChiDf* number) in the full model, the *Chisq* statistic, 1674 (the difference between the two *AIC* values), corresponded to a *P*-value of <0.001 . Similarly, for the models of the Absences Study, after the estimation of 27 parameters in the full model, the *Chisq* statistic, 19270 corresponded to a *P*-value of <0.001 . This is an

indication that the extra parameters of the full models (in relation to null models) in both studies produced a significantly better fit. The conclusion is that the full models are preferable to the null ones. Of course, the Anova test was used at each step of the model building, whenever a variable was added or removed from the model.

It should be noted that, for the multilevel analyses of both the Subject Study and the Absences Study, the parametric bootstrap likelihood ratio method (suggested by Faraway 2013, p.11) was used to test the null hypothesis that the variance of the random effect is zero. Statistically significant results ($p < 0.001$) were obtained, so the null hypothesis was dropped. Findings were confirmed using the RLRsim package (see Crainiceanu, Ruppert 2004; Scheipl, Greven, Kuechenhoff 2008). From this one can infer that fitting a multilevel model (a mixed effects model) using the *StudentID* as a random variable is preferable to fitting a model with only fixed effects. In the case of the Subject Study, for the random effects, that is *StudentID*, the 95% confidence interval for the standard deviation is (2.64, 2.82) and for the residual variance is (1.38, 1.43). In the case of the Absences Study, the 95% confidence interval for the standard deviation is (2.62, 2.81) and for the residual variance is (1.36, 1.42).

4.5 Qualitative Data: Examples of Analytical Process

In this section, an attempt is made to demonstrate how qualitative data was analysed. For this purpose, some matrices are presented illustrating how the data was first coded into general categories, then how these categories were further refined and finally how data from other participants was brought together for individual factors. The hope is that the reader will be able to join the researcher in her journey and via the examination of the raw data examples ‘see’ what the researcher concluded.

The first example consists of a typical matrix with extracts in Greek from an interview with a Mathematics teacher (Table 15). This table shows how extracts were initially assigned to five broad categories; that is child, family, teachers, school, and society.

Then, another matrix is shown (Table 16) focusing on the first of the broad categories presented above and the sub-categories that were subsequently created. These are populated with extracts from Table 15 and the extracts are also translated in English. As the table shows, extracts from the broad category referring to child were further categorised in various sub-categories: language, generation status, paid employment, educational expectations, degree of interest and effort, gender, opportunities for extra support, and absenteeism. These sub-categories in each broad category indicate the identified factors. The factors identified from the answers of this teacher were compared with those offered by the other participants to check for similarities and differences.

Another matrix is presented next (Table 17). In this example we are looking specifically at the factor ‘lack of parental involvement’ and show how comments from different participants come to illustrate the same or similar point.

Finally, Figure 4 shows graphically how I proceeded through the different stages of data categorisation for the Interview Study. Factors that were allocated to the initial five broad categories were divided into a larger number of sub-categories through a series of reviews of the raw data. Further interpretation and inter-relation of the identified factors revealed that they all linked to two overarching modifiable themes; that of socioeconomic status of the family and that of the character of the local educational system. These stages are included in the thesis to enable the reader to participate in the journey that I followed and also to link the data with the interpretations that I made.

Table 15. Quotes From a Teacher; Initial Division Into Five Broad Categories (in Greek)

| | Quotes from TEACHER A2 (Maths Teacher) |
|--------------------------------------|---|
| <p>Factors relating to the CHILD</p> | <p>-Αυτό (το ότι οι ντόπιοι έχουν υψηλότερη επίδοση από ξένους) είναι το αποτέλεσμα της καλλιέργειας που έχουν δεκτεί από το ξεκίνημα της εκπαίδευσης τους, η γλώσσα που είναι βασικός παράγοντας, που είναι η μητρική, η Ελληνική. Όλες οι διατυπώσεις, εκφωνήσεις ασκήσεων κλπ, τα δεδομένα αν πρόκειται για Μαθηματικά, π.χ. γεωμετρία και σχήματα, είναι δοσμένα στα Ελληνικά. Άρα λοιπόν οι άλλοι, υστερώντας στη γλώσσα, κατ' επέκταση υστερούν και στην κατανόηση. Ναι μεν τα Μαθηματικά είναι παγκόσμια σύμβολα που χρησιμοποιούν, αλλά συνοδεύονται πάντα από γλωσσική διατύπωση.</p> <p>-Είναι θέμα γλώσσας. Το κάθε μάθημα φυσικά επιρεάζεται σε διαφορετικό βαθμό, αλλά... Πραγματικά αυτά τα παιδιά αδικούνται. Δε μπορούν να πάνε μπροστά αφού δεν έχουν κατακτήσει τη γλώσσα. Όσο ξύπνος και να είσαι, όσο και να θες να πας μπροστά, αν δε γνωρίζεις τη γλώσσα δε μπορείς να κάνεις τίποτα.</p> <p>- Τα Μαθηματικά συνδυάζουν το γλωσσικό με τα σύμβολα που είναι ήδη γνωστά τους και υπάρχει μια προηγούμενη καλλιέργεια. Αυτό διευκολύνει κάπως τον μαθητή. Όσον αφορά τα Φυσικά, εκτός από το ότι είναι πρακτικό μάθημα και είναι πιο εύκολο για τους ξένους να το παρακολουθήσουν, αυτά μπαίνουν πολύ αργότερα στη μαθητική ζωή. Οι πλείστοι μαθητές που έχουμε τώρα πια είναι ήδη από τουλάχιστον 2-3 χρόνια στην Κύπρο. Οπότε, επειδή τα Φυσικά ξεκινούν αργότερα, έχουν λιγότερες προαπαιτούμενες γνώσεις τις οποίες ίσως δεν έχουν... Σε σχέση με αυτά τα μαθήματα, νομίζω ότι τα γλωσσικά μαθήματα είναι πιο δύσκολα για τους ξένους μαθητές. Αυτό φυσικά ωφείλεται στο θέμα γλώσσας. Το θεωρώ φυσιολογικό.</p> <p>-Στο γυμνάσιο πιστεύω ότι είναι καθαρά θέμα εφηβείας, γιατί τα αγόρια καθυστερούν πιο πολύ να ξεκινήσουν.. οπότεν είναι ακριβώς στη φάση του γυμνασίου. Ενώ τα κορίτσια κάπου ωριμάζουν και κατασταλάζουν πιο νωρίς. ... τα αγόρια νιώθουν ότι το σχολείο δεν τους ικανοποιεί, λίγο τους ενδιαφέρει το σχολείο. Τα κορίτσια σε αυτή την ηλικία είναι πιο συνεπή, προσπαθούν περισσότερο.. οπότεν φαίνεται αυτή η διαφοροποίηση.</p> <p>-οι μαθητές της δεύτερης γενιάς τα πηγαίνουν καλύτερα στο σχολείο. Επειδή ακολούθησαν το εκπαιδευτικό σύστημα που ακολούθησαν και οι Κύπριοι. Διότι μιλούμε πλέον για εκπαίδευση. Την εκπαίδευση τη δέχτηκαν ακριβώς με τον ίδιο τρόπο όπως και οι Κύπριοι. Σε αντίθεση με τους ξένους πρώτης γενεάς. Αυτός είναι ένας λόγος. Δηλαδή, ότι έχουν μάθει οι ντόπιοι, το έχουν μάθει κι αυτοί. Επίσης, οι μαθητές δεύτερης γενιάς έχουν εξοικειωθεί πλέον με το περιβάλλον, το νιώθουν σαν δεύτερη πατρίδα τους, δε νιώθουν ξεριζωμένοι. Οι γονείς τους έχουν τακτοποιηθεί επαγγελματικά, οικονομικά, κοινωνικά. Δεν νιώθουν ξένοι. Νιώθουν σαν στη δική τους πατρίδα. Ούτε ότι ήρθαν εδώ προσωρινά, ως μετανάστες που θα φύγουν πάλι. Νιώθουν μια μόνιμη κατάσταση. Έτσι πλέον προσπαθούν για το δικό τους το καλό, για το μέλλον τους πλέον.</p> |

| | |
|----------------------------------|--|
| | <p>-Άλλος λόγος είναι ότι οι μαθητές δεύτερης γενιάς μιλούν και τη γλώσσα καλύτερα. Αυτό λειτουργεί υπέρ τους.</p> <p>-Πιστεύω ότι η σχολική αποτυχία δημιουργεί και τάσεις φυγής. Φυγή με την έννοια ότι, αφού κάτι δε με ευχαριστεί, όσο μπορώ να το αποφύγω, το αποφεύγω.</p> <p>-κάνουν τις απουσίες...καμιά φορά εσκεμμένα ... γιατί δεν τους ευχαριστεί το μάθημα. Φαντάσου τον εαυτό σου να είσαι καθηλωμένος 7.30-1.30 σε ένα χώρο που δε σου είναι ευχάριστος.</p> <p>-Αφού δημιουργούνται γνωσιολογικά κενά, είναι επόμενο ότι θα παρουσιάσουν χαμηλότερη επίδοση. Διότι αυτές οι περιπτώσεις είναι συνήθως και μαθητές που δε θα ενδιαφερθούν κιόλας να καλύψουν το κενό της απουσίας τους από μόνιμοι τους ή να ζητήσουν τη βοήθεια του διδάσκοντα για να το καλύψουν. Καμιά φορά δε θα αντιγράψουν τι κάναμε ή δε θα ρωτήσουν τι έγινε στο μάθημα που έχασαν. Δε μπαίνουν σε τέτοιο κόπο.</p> |
| Factors relating to the FAMILY | <p>-Δηλαδή, το γεγονός ότι είναι από πιο φτωχές οικογένειες στις πλείστες περιπτώσεις, όπου οι γονείς είναι υποχρεωμένοι να δουλεύουν νυχθημερόν, παραμελούν την εποπτεία των παιδιών τους όσον αφορά τα άλλα θέματα. Δηλαδή, όταν μια οικογένεια έχει προτεραιότητα να ζήσει πρώτα, να επιβιώσει, να τραφεί, τα υπόλοιπα μπαίνουν σε δεύτερη και τρίτη μοίρα. Οπότε, δεν υπάρχει άνεση για συμπληρωματική βοήθεια, φροντιστηριακή..</p> <p>-Άλλοι και κάποιας ηλικίας, δηλ μετά τα 14-15 προτιμούν να δουλέψουν και εκείνοι κάπου για κάποιες ώρες, για μερική απασχόληση, για εξασφάλιση των προς το ζείν.</p> <p>-Άλλος λόγος είναι το ότι από το σπίτι δεν υπάρχει παρακολούθηση, επίβλεψη, για να έρχονται τακτικά. Γιατί η εκπαίδευση δεν είναι στις προτεραιότητες τους.</p> |
| Factors relating to the TEACHERS | <p>-Οπότεν όσον αφορά την προετοιμασία των καθηγητών...αυτό δεν υπάρχει. Κατάρτιση δεν υπάρχει. Καθοδήγηση υποτίθεται ότι υπάρχει... είναι αυτή που έρχεται από το υπουργείο παιδείας με το αναλυτικό πρόγραμμα. Έχεις ένα αναλυτικό πρόγραμμα που πρέπει να ακολουθήσεις.</p> <p>-Το αναλυτικό πρόγραμμα δεν είναι προσαρμοσμένο στα δεδομένα του σχολείου. Πραγματικά όταν έρχεται κάποιος για πρώτη φορά εδώ, μπαίνοντας μέσα στην τάξη σε πιάνει πανικός.</p> <p>-Νιώθω ότι είναι απαράδεκτο από πλευράς υπουργείου να σε ρίχνουν μέσα σε μια θάλασσα και να σου λέει ψάρεψε χωρίς καλάμι.</p> |

| | |
|---------------------------------------|---|
| <p>Factors relating to the SCHOOL</p> | <p>-Έχουμε μικροπροβληματάκια ρατσιστικά από μικρές ομάδες που μπορεί να μη τους θέλουν. Αυτό δε μπορούμε να το αγνοήσουμε. Υπάρχουν μικρές ομάδες με ρατσιστικές αντιλήψεις, που κάθε τόσο ξεπετιούνται και δημιουργούν αναστάτωση. Υπάρχουν όμως και ομάδες Κυπρίων που αγκαλιάζουν τους ξένους με πολύ καλό και στοργικό τρόπο. Το πρόβλημα όμως δε θα έλεγα ότι είναι σε μεγάλο βαθμό.</p> <p>-Ξέρεις, οι δικοί μας οι μαθητές δε δέχονται τόσο εύκολα κυρίως παιδιά που προέρχονται από το Ιράκ... Τουρκοκύπριους, που έχουμε νομίζω δύο εδώ, τέτοια παιδιά.. Δεν υπάρχει και τόσο μεγάλο πρόβλημα με τα παιδιά από Ευρωπαϊκές χώρες. Το πιο μεγάλο πρόβλημα δημιουργείται με παιδιά που έρχονται από αυτές τις χώρες. ... με παιδιά μουσουλμάνους, που έχουμε 4-5 περιπτώσεις στο σχολείο. Εδώ το ρατσιστικό πρόβλημα είναι πιο μεγάλο.</p> <p>-Επειδή δεν είναι από την Ευρώπη και είναι από άλλες χώρες... Το Ιράκ δηλαδή, εκτός από το ότι είναι μια χώρα που είναι μακριά, είναι και μουσουλμάνικη... αυτό είναι μια αιτία για τους μαθητές, μια αφορμή για να ξεκινήσουν κάτι. Οι δικοί μας μερικές φορές αρέσκονται κιόλας σε τέτοια, μικροκαβγάδες... Για να μιλήσουμε και έξω από τα δόντια..</p> <p>-Έρχονται οι γονείς των ξένων μαθητών αλλά όχι πολλοί. Και λόγω της γλώσσας και λόγω της δουλειάς τους. Δηλαδή αν θα έρθει ένας γονιός θα έρθει πολύ νωρίς το πρωί, όταν μπαίνεις για μάθημα, και σε παρακαλεί να του μιλήσεις .. Και επειδή εμείς ξέρουμε το πρόβλημα που έχουν ουδέποτε ακολουθήσαμε το πρόγραμμα επισκέψεων γονέων που βγάζουμε ως σχολείο. Ποτέ δεν ήρθε κανένας τη μέρα που ορίσαμε ότι δεχόμαστε γονείς. Ή θα έρθουν την ώρα που θα έχουν διάλειμμα από τη δική τους τη δουλειά, για να μας δουν στα γρήγορα, ή μπορεί να μας τηλεφωνήσουν. Τους δώσαμε οι ίδιοι το δικαίωμα του τηλεφώνου... να μιλήσουμε έστω και τηλεφωνικά μαζί τους. Πολλοί γονείς χρόνο με το χρόνο επειδή έχουν καταλάβει ότι θέλουμε να τους βοηθήσουμε και τους δίνουμε την ευκαιρία με οιοποδήποτε τρόπο να επικοινωνήσουν μαζί μας, μας πλησιάζουν όλο και περισσότερο. Χρόνο με το χρόνο βλέπω ότι έχουμε καλύτερη επικοινωνία με τους γονείς.</p> |
| <p>Factors relating to SOCIETY</p> | <p>Πιστεύω πως εμείς οι Κύπριοι είμαστε πολύ ρατσιστές... και ο τρόπος με τον οποίο μιλούν οι γονείς για όσους έχουν διαφορετική εθνικότητα, κουλτούρα, και θρησκεία ενθαρρύνει τον ρατσισμό στα παιδιά τους</p> |

Table 16: A Focus on the 1st of the 5 Broad Categories Above (extracts in Greek and English)

| Factors relating to the CHILD | Quotes from TEACHER A2 (Mathematics Teacher) |
|-------------------------------|--|
| Language | <p>Greek: Αυτό (το ότι οι ντόπιοι έχουν ψηλότερη επίδοση από ξένους) είναι το αποτέλεσμα της καλλιέργειας που έχουν δεκτεί από το ξεκίνημα της εκπαίδευσης τους, η γλώσσα που είναι βασικός παράγοντας... που είναι η μητρική, η Ελληνική. Όλες οι διατυπώσεις, εκφωνήσεις ασκήσεων κλπ, τα δεδομένα αν πρόκειται για Μαθηματικά, π.χ. γεωμετρία και σχήματα, είναι δοσμένα στα Ελληνικά. Άρα λοιπόν οι άλλοι, υστερώντας στη γλώσσα, κατ'επέκταση υστερούν και στην κατανόηση. Να μεν τα Μαθηματικά είναι παγκόσμια σύμβολα που χρησιμοποιούν, αλλά συνοδεύονται πάντα από γλωσσική διατύπωση.</p> <p><i>English: This (that Native Cypriots have a higher attainment than ethnic minority students) is a result of the more prolonged exposure to the local educational system; language is a major factor... for them Greek is their mother-tongue. All explanations, instructions, descriptions of data etc when one focuses on Mathematics, are in Greek. Therefore, if they (non-natives) are behind in terms of mastering Greek they will be behind in Mathematics also. In Mathematics there is definitely some reliance on international symbols but these can only be put in context by understanding the written instructions</i></p> <p>Greek: Είναι θέμα γλώσσας. Το κάθε μάθημα φυσικά επιρεάζεται σε διαφορετικό βαθμό, αλλά... Πραγματικά αυτά τα παιδιά αδικούνται. Δε μπορούν να πάνε μπροστά αφού δεν έχουν κατακτήσει τη γλώσσα. Όσο ξυπνος και να είσαι, όσο και να θες να πας μπροστά, αν δε γνωρίζεις τη γλώσσα δε μπορείς να κάνεις τίποτα.</p> <p><i>English: It is a question of mastery of language. Each subject is, of course affected to a different degree but... This is really unfair on these (ethnic minority) students. They cannot succeed because they have not mastered the language.</i></p> <p>Greek: Σε σχέση με αυτά τα μαθήματα, νομίζω ότι τα γλωσσικά μαθήματα είναι πιο δύσκολα για τους ξένους μαθητές. Αυτό φυσικά ωφείλεται στο θέμα γλώσσας. Το θεωρώ φυσιολογικό.</p> <p><i>English: With regards to the subjects in question, I think that those subjects which are more dependent on language are more difficult for the ethnic minority students. This is secondary to the mastery of language and I consider this a natural consequence.</i></p> <p>Greek: Άλλος λόγος είναι ότι οι μαθητές δεύτερης γενιάς μιλούν και τη γλώσσα καλύτερα. Αυτό λειτουργεί υπέρ τους.</p> <p><i>English: Another reason is that ethnic minority students of second generation have a better mastery of language; this works to their advantage</i></p> |

| | |
|---------------------------------|---|
| <p>Generation Status</p> | <p>Greek: Οι μαθητές της δεύτερης γενιάς τα πηγαίνουν καλύτερα στο σχολείο. Επειδή ακολούθησαν το εκπαιδευτικό σύστημα που ακολούθησαν και οι Κύπριοι. Διότι μιλούμε πλέον για εκπαίδευση. Την εκπαίδευση τη δέχτηκαν ακριβώς με τον ίδιο τρόπο όπως και οι Κύπριοι. Σε αντίθεση με τους ξένους πρώτης γενεάς. Αυτός είναι ένας λόγος. Δηλαδή, ότι έχουν μάθει οι ντόπιοι, το έχουν μάθει κι αυτοί. Επίσης, οι μαθητές δεύτερης γενιάς έχουν εξοικειωθεί πλέον με το περιβάλλον, το νιώθουν σαν δεύτερη πατρίδα τους... δε νιώθουν ξεριζωμένοι. Οι γονείς τους έχουν τακτοποιηθεί επαγγελματικά, οικονομικά, κοινωνικά. Δεν νιώθουν ξένοι. Νιώθουν σαν στη δική τους πατρίδα. Ούτε ότι ήρθαν εδώ προσωρινά, ως μετανάστες που θα φύγουν πάλι. Νιώθουν μια μόνιμη κατάσταση. Έτσι πλέον προσπαθούν για το δικό τους το καλό, για το μέλλον τους πλέον.</p> <p><i>English: Ethnic minority students of second-generation have a higher attainment (compared to those of first generation) because they have had the same exposure to the educational students like their native counterparts. Here we talk about education and these students have had the same educational experience as their native counterparts, in contrast to students of ethnic minority students of first generation status. Further, students of second generation status are more familiar with everything in the island; they see it as their own country... they do not feel uprooted. Their parents are settled in terms of employment, financial stability, and socially. They do not consider themselves "foreigners"; they feel at home. They do not consider their presence here as temporary; migrants on just another short-term stop. Their stay here is permanent. They therefore try hard to better their future and that of their families.</i></p> <p>Greek: Άλλος λόγος είναι ότι οι μαθητές δεύτερης γενιάς μιλούν και τη γλώσσα καλύτερα. Αυτό λειτουργεί υπέρ τους.</p> <p><i>English: Another reason is that ethnic minority students of second generation have a better mastery of language; this works to their advantage.</i></p> |
| <p>Home Responsibilities</p> | <p>-----</p> |
| <p>Paid Employment</p> | <p>Greek: Άλλοι και κάποιας ηλικίας, δηλ μετά τα 14-15 προτιμούν να δουλέψουν και εκείνει κάπου για κάποιες ώρες, για μερική απασχόληση, για εξασφάλιση των προς το ζείν.</p> <p><i>English: Some others, those older than 14-15, prefer to get paid employment for a few hours per week, to secure the necessary for a descent life.</i></p> |
| <p>Educational Expectations</p> | <p>Greek: Γιατί η εκπαίδευση δεν είναι στις προτεραιότητες τους.</p> <p><i>English: Because education is not among their priorities.</i></p> |

| | |
|---------------------------------|---|
| Degree of Interest and Effort | <p>Greek: Αφού δημιουργούνται γνωσιολογικά κενά, είναι επόμενο ότι θα παρουσιάσουν χαμηλότερη επίδοση. Διότι αυτές οι περιπτώσεις είναι συνήθως και μαθητές που δε θα ενδιαφερθούν κιόλας να καλύψουν το κενό της απουσίας τους από μόνοι τους ή να ζητήσουν τη βοήθεια του διδάσκοντα για να το καλύψουν. Καμιά φορά δε θα αντιγράψουν τι κάναμε ή δε θα ρωτήσουν τι έγινε στο μάθημα που έχασαν. Δε μπαίνουν σε τέτοιο κόπο.</p> <p><i>English: Because this (absenteeism) creates gaps in knowledge, it is to be expected that their attainment will be lower. For these are students that will not, usually, display any interest in covering the lost material either by themselves or with the help of their teachers. They will never try to get a copy of the material covered or ask what happened during the lesson lost. This is not something that they bother themselves with.</i></p> |
| Gender | <p>Greek: Ενώ τα κορίτσια κάπου ωριμάζουν και κατασταλάζουν πιο νωρίς. ... τα αγόρια νιώθουν ότι το σχολείο δεν τους ικανοποιεί, λίγο τους ενδιαφέρει το σχολείο. Τα κορίτσια σε αυτή την ηλικία είναι πιο συνεπή, προσπαθούν περισσότερο.. σπάνια φαίνεται αυτή η διαφοροποίηση.</p> <p><i>English: Girls tend to mature earlier... whilst boys feel that school is neither fulfilling nor interesting. Girls at this age tend to be more reliable and they try harder... so the differential attainment is obvious.</i></p> |
| Opportunities for Extra Support | <p>Greek: Δεν υπάρχει οικονομική άνεση για συμπληρωματική βοήθεια, φροντιστηριακή.</p> <p><i>English: There is no financial ability for extra help such as private tuition.</i></p> |

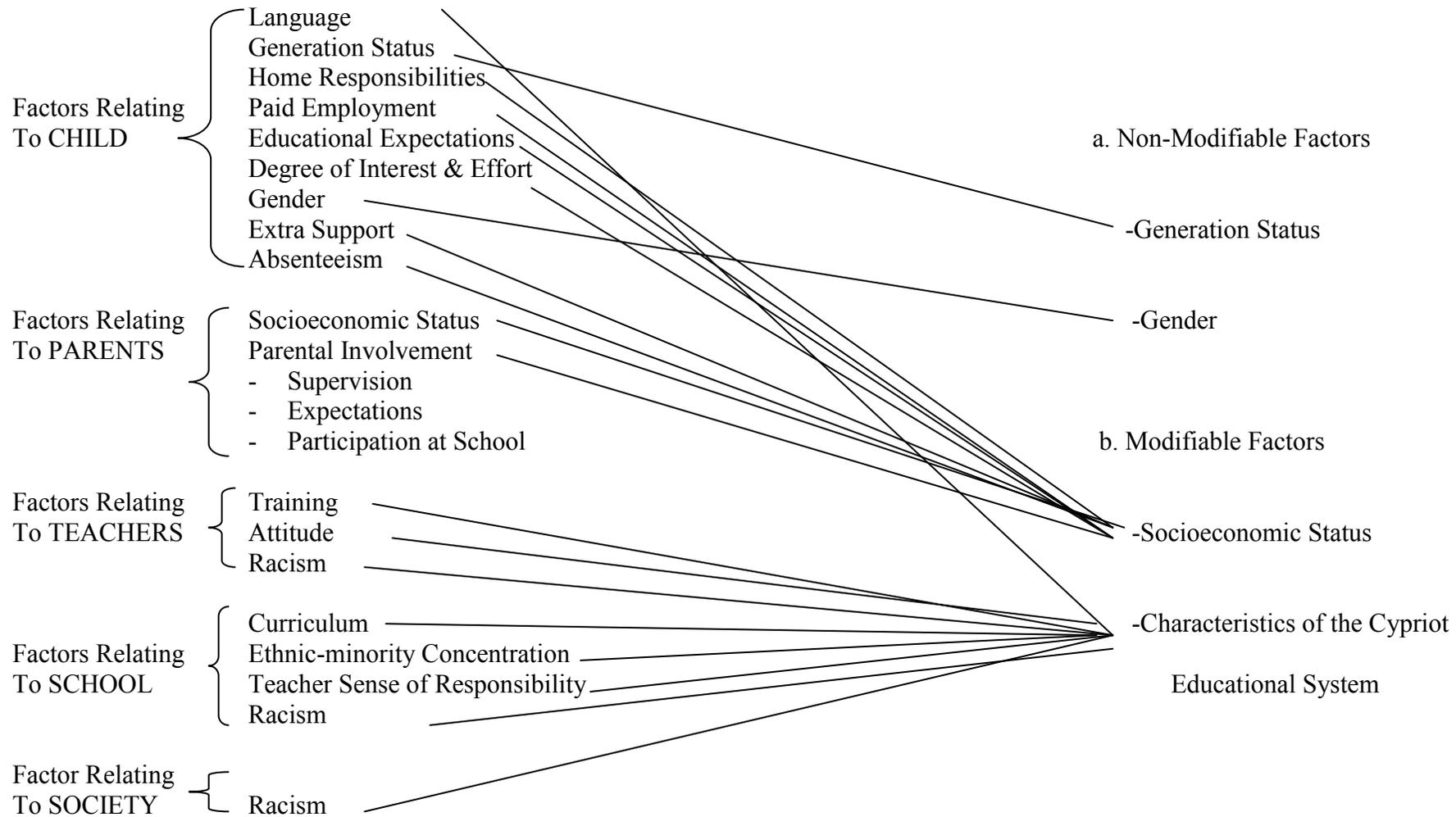
| | |
|-------------|---|
| Absenteeism | <p>Greek: Πιστεύω ότι η σχολική αποτυχία δημιουργεί και τάσεις φυγής. Φυγή με την έννοια ότι, αφού κάτι δε με ευχαριστεί, όσο μπορώ να το αποφύγω, το αποφεύγω. <i>English: I believe that failure in education leads to absenteeism. They run away because they are not happy in school and when one is not happy with something, he tries to avoid this as much as possible.</i></p> <p>Greek: κάνουν τις απουσίες...καμιά φορά εσκεμμένα ... γιατί δεν τους ευχαριστεί το μάθημα. Φαντάσου τον εαυτό σου να είσαι καθλωμένος 7.30-1.30 σε ένα χώρο που δε σου είναι ευχάριστος. (...) <i>English: they are absent... sometimes deliberately... because they are not happy with the subject. Imagine having to be restrained between 7.30-1.30 at a place that does not make you happy.</i></p> <p>Greek: Αφού δημιουργούνται γνωσιολογικά κενά, είναι επόμενο ότι θα παρουσιάσουν χαμηλότερη επίδοση. Διότι αυτές οι περιπτώσεις είναι συνήθως και μαθητές που δε θα ενδιαφερθούν κιόλας να καλύψουν το κενό της απουσίας τους από μόνοι τους ή να ζητήσουν τη βοήθεια του διδάσκοντα για να το καλύψουν. Καμιά φορά δε θα αντιγράψουν τι κάναμε ή δε θα ρωτήσουν τι έγινε στο μάθημα που έχασαν. Δε μπαίνουν σε τέτοιο κόπο. <i>English: Because this (absenteeism) creates gaps in knowledge, it is to be expected that their attainment will be lower. For these are students that will not, usually, display any interest in covering the lost material either by themselves or with the help of their teachers. They will never try to get a copy of the material covered or ask what happened during the lesson lost. This is not something that they bother themselves with.</i></p> |
|-------------|---|

Table 17: Quotes from Different Teachers Relating to the Factor ‘Lack of Parental Involvement’ (Extracts in Greek and English)

| Interviewees | Quotes Relating to the Factor ‘Lack of Parental Involvement’ |
|--|---|
| Interviewee A1 (female head teacher) | <p>Greek: Όταν έχουμε επισκέψεις γονέων, οι περισσότεροι ξένοι γονείς δεν έρχονται. <i>English: At parents’ evenings most of minority parents are absent.</i></p> |
| Interviewee A2 (female Modern Greek and Classics teacher) | <p>Greek: Οι γονείς τους όλη μέρα λείπουν από το σπίτι. (...) Οι ξένοι γονείς εργάζονται πολλές ώρες. Δηλαδή πιστεύω ότι υπάρχουν παιδιά που δε βλέπουν τους γονείς τους. Πηγαίνουν για ύπνο χωρίς να τους δουν, γιατί ακόμα δεν έχουν επιστρέψει από τη δουλειά. <i>English: Their parents are away from home all day. (...) Minority parents work long hours. I believe that there are children who do not see their parents. They go to bed without seeing them, because they have not returned home from work yet.</i></p> |
| Interviewee A3 (male Physics teacher) | <p>Greek: Οι ξένοι μαθητές έχουν λιγότερο έλεγχο από την οικογένεια τους παρά οι Κύπριοι. (...) Διότι οι γονείς τους έχουν παραπάνω σκοτούρες, υποχρεώσεις, δουλεύουν περισσότερο... Ξυπνούν και φεύγουν από το σπίτι από τα χαράματα... Τα παιδιά πρέπει να ξυπνήσουν, να ετοιμαστούν, και μόνα τους να έρθουν στο σχολείο. Ένας Κύπριο γονιός θα ετοιμάσει το παιδί και θα το φέρει στο σχολείο. <i>English: Ethnic minority students are not as well supervised by their families compared to Cypriots. (...) Because of their financial situation parents have to work longer hours. They wake up and leave home very early in the morning... as a result children need to wake up, get ready and come to school on their own. Natives will get their children ready and bring them to school.</i></p> |
| Interviewee E1 (female head teacher) | <p>Greek: Ένα παιδί 12 χρονών που είναι Α’ τάξη αν δεν έχει κάποιον να το ξυπνήσει, να το φροντίσει... αφού οι γονείς έφυγαν από το σπίτι πολύ νωρίς το πρωί... υπάρχει πιθανότητα να μην έρθει στο σχολείο ή τουλάχιστον θα χάσει τις πρώτες περιόδους. <i>English: A twelve-year old child who has nobody to wake him up and take care of him... because his parents left the house very early in the morning... the chances are that he will not go to school, or, at least, that he will miss the first few periods of teaching.</i></p> |

| | |
|---|---|
| Interviewee E3 (female History teacher) | Greek: Πολλοί απ' αυτούς είναι ανεξέλεγκτοι. Οι γονείς δουλεύουν πολλές ώρες και δεν έχουν χρόνο να ασχοληθούν με τα παιδιά τους. <i>English: Many of these (students) are unsupervised. Their parents work long hours and do not have time to devote to their children.</i> |
| Interviewee E4 (male Physics teacher) | Greek: Νομίζω ότι οι ξένοι μαθητές δεν ελέγχονται στο σπίτι. Δηλαδή σε πολλές περιπτώσεις οι γονείς δεν παίρνουν είδηση πως τα παιδιά τους σήμερα δεν πήγαν σχολείο και έμειναν σπίτι, διότι αυτοί δεν είναι στο σπίτι να τους δουν. <i>English: I think that ethnic minority students are unsupervised. For example, in many cases, parents are unaware that their children missed school, because they were not around to see them staying home.</i> |
| Interviewee F2 (female Classics deputy head teacher) | Greek: Πολλά παιδιά δεν έχουν καμιά φροντίδα. Όταν οι γονείς πηγαίνουν το πρωί στις δουλειές τους, τα παιδιά δε ξυπνούν να έρθουν στο σχολείο. <i>English: Many students are unsupervised. When parents go to work early in the morning, children do not wake up to come to school.</i> |
| Interviewee F3 (female Classics deputy head teacher) | Greek: Δεν ασχολούνται με τη μόρφωση των παιδιών τους. Οι πιο πολλοί μαθητές είναι αφημένοι στην τύχη τους... <i>English: They do not get involved in their children's education. Most of these students are left to manage things alone...</i> |
| Interviewee F4 (female Mathematics teacher): | Greek: Για τους ξένους γονείς που έχουν σοβαρές οικονομικές δυσκολίες, προτεραιότητα έχει το να επιβιώσουν, όχι το να μορφωθούν. <i>English: For minority parents with serious financial difficulties, the priority is to survive, not to be educated.</i> |
| Interviewee F4 (female Mathematics teacher) | Greek: Για πολλούς από αυτούς, από το σπίτι δεν υπάρχει παρακολούθηση για να έρχονται τακτικά. Οι γονείς δουλεύουν πολλές ώρες και δεν έχουν χρόνο για τα παιδιά τους. <i>English: Many minority students are unsupervised. Parents work long hours and they do not have time for their children.</i> |

Figure 4: Graphical Representation of the Different Stages of Data Categorisation for the Interview Study



CHAPTER 5: PAPERS

5.1 Introduction

As explained in the Introduction of the thesis, the study was divided into a number of manageable stages, and from each one a paper was derived. In total, five papers are presented here (the Large Attainment Study is not submitted as part of the thesis; it is however attached as Appendix 9 to help the reader follow the journey of the researcher).

5.1.1 Small Attainment Study

Attainment of Ethnic Minority Secondary School Students in Cyprus

This paper resulted from a preliminary study employing a student sample from two secondary schools in Cyprus. Its aim was to investigate the attainment patterns of ethnic minority students in secondary schools in the island and also whether specific factors were influencing attainment. This was the first study in Cyprus specifically looking at the attainment of minority students. It showed that the attainment of ethnic minority students was significantly lower compared to that of native students. The study also found that low attendance rates, low parental education, low parental occupation, low generation status, and being a male student had a significantly negative effect on school attainment. Apart from its local importance, the study could add to the international literature by the introduction of specific ethnic minority groups (i.e., Georgians or ‘Rossopontioi’) that have not been met previously. Whatsmore, specific methodological improvements provide extra strength to this study compared to some of its predecessors. For example, school attainment was examined using a combination of student scores during a whole academic year rather than a single measurement used in many previous studies. Similarly, family socio-economic status was examined using a combination of indicators therefore addressing concerns raised about use of single indicators of socioeconomic status as discussed earlier. In addition, absences were measured over a whole academic year and examined in individual subjects and related to student attainment in these subjects. Finally, to our knowledge, this was the first study to examine the performance of ethnic minority students by employing Rasch analysis for the processing of data. This paper has been published in the peer-reviewed journal *The Cyprus Review* (Theodosiou-Zipiti, West, and Lamprianou 2011).

5.1.2 Focus Group Study

Factors Affecting Ethnic Minority Students' Attainment in Secondary Schools in Cyprus – A Focus Group Study

This paper is based on a single focus group, which was conducted with a homogeneous group of six teachers from different schools. The study aimed to get the teacher perspective on factors leading to the poor academic achievement observed in ethnic minority secondary-school students in Cyprus. As this was the first such attempt in the island, the study was mainly of an exploratory nature. A number of issues were raised as potential factors influencing the attainment of ethnic minority students. These were related to the child and his personal characteristics, parents and home environment, teachers, school, and society. Findings suggest that factors identified in the international literature are also applicable to Cyprus. A closer look at the interrelationship between these factors revealed that the socio-economic status of the family and the characteristics of the current educational system were the main reasons for the disparity in attainment. To our knowledge, no study on the attainment of minority students has considered factors from so many areas (child, parents, teachers, school, and society) in the past. This allowed for the search of interrelationships and the conclusions mentioned above. This paper has been published in the peer-reviewed journal *Intercultural Education* (Theodosiou-Zipiti et al. 2010).

5.1.3 Interview Study

Attainment Gap - the Teacher Perspective

This study was conducted in four of the secondary schools that were included in the school sample of the thesis. Sixteen teachers of both genders and of different age, experience, and hierarchy (head-teachers, deputy head-teachers, and teachers) were interviewed. The intention was to interview teachers from schools that had already been examined in the quantitative studies. The first aim of the study was to investigate the teachers' perceptions on factors that influence the poor attainment among minority students. Its second, to explore the differential attainment of ethnic minority students between theoretical and practical subjects as observed in previous studies. A variety of factors relating to the child, family, teachers, schools, and society were identified as relevant by the participants. Interrelationship of the findings suggested that the socio-economic status of the family and characteristics of the Cypriot educational system are the main factors influencing attainment levels. The findings from this paper come to confirm the findings of the focus group study, which was largely exploratory in nature. The paper has been published in the peer-reviewed journal *The Cyprus Review* (Theodosiou-Zipiti and West 2012).

5.1.4 Subject Study

Factors Influencing Attainment Levels among Ethnic Minority Students in Cyprus:

Revisiting the Influence of Language

This paper aimed to investigate whether the academic attainment level of ethnic minority students is lower for more language-dependent subjects compared to less language-dependent subjects. At the same time, an attempt was made to strengthen the validity of results when compared to those from the Small Attainment Study and the Large Attainment Study, by using final examination results as well as teacher assessments as indicators of students' academic performance. The study employed a different and improved methodology to that of the two previous quantitative studies. The important modifications are: (a) the inclusion of new data regarding attainment in order to enrich the attainment measures, (b) the use of a more direct way (rather than the Rasch analysis) to process trimester grades and transform them from an ordinal into a linear scale, (c) the employment of two analytical methods, a multiple regression analysis and a multilevel regression analysis. The latter method was selected to examine differences in attainment across ethnic groups and school subjects. Findings from the multiple regression analysis were in agreement with those obtained in the Small and Large Attainment Studies. Findings from the multilevel regression analysis showed that ethnic minority students do not do less well than expected in subjects that are more language-dependent. To our knowledge, this is the first time that this is demonstrated in a quantitative study and it suggests that it might not be language that is the defining determinant in terms of attainment but other factors such as the content or relevance of a subject. Furthermore, the use of end-of-year examination scores as a second indicator of attainment helped deal, partially at least, with the ceiling effect noted in the data used in the Large Attainment Study; this further enhancing the validity of this study. This paper has been submitted for publication in the peer-reviewed journal *British Journal of Sociology of Education* (Theodosiou-Zipiti, Lamprianou, and West, submitted paper a).

5.1.5 Absences Study

Excused or Unexcused, Absences Matter; Suspension Has an Even More Dramatic Relation to Attainment

Absences appeared to be a significant explanatory variable of attainment in all the previous studies carried out for this thesis. This study, via use of a mixed methods design, aimed to further examine student absences. Specifically, the quantitative analysis of the study aimed to examine the explanatory power of three absence variables, excused absences, unexcused

absences, and having been suspended or not, on student attainment. To our knowledge, the simultaneous examination of the relation of these different types of absences on student attainment has not been examined previously. In addition, the study examined the three absence variables across a greater number of school subjects than that used in other studies on absenteeism. It was found that all types of absences are significantly associated with lower attainment, with suspensions being the strongest predictor. The qualitative analysis revealed that the family socioeconomic status and the character of the local educational system are the main factors responsible for the higher rates of absenteeism observed in ethnic minority students. Use of mixed methods design enabled a more complete picture to be obtained. This paper has been submitted for publication in the peer-reviewed journal *British Journal of Sociology of Education* (Theodosiou-Zipiti, Lamprianou, and West, submitted paper b).

5.2 Attainment of Ethnic Minority Secondary School Students in Cyprus*

Galatia Theodosiou-Zipiti, Mel West, Iasonas Lamprianou
School of Education, The University of Manchester, Oxford Road,
Manchester, M13 9PL, UK

5.2.1 Abstract

There is evidence that the attainment of ethnic minority children differs from that of native children. Examining this and the reasons behind it is important in ensuring equal opportunities and a sound education for all children. This paper identifies differences in attainment between minority and native students in Cyprus by examining the grades of students from two secondary schools in Modern Greek and Mathematics. Using the Rasch analysis, results showed that ethnic minority groups perform significantly lower than native students and regression analysis indicated that ethnic background, gender, family socio-economic status, generation status, absenteeism, and age have a significant effect on attainment. The study in Cyprus, homes in on the educational reality in Cyprus, highlights the need for immediate policy implementation on the part of the government and identifies areas of further study.

Keywords: education, attainment, quantitative study, minorities, Cyprus

5.2.2 Introduction

The arrival and settlement of immigrants in many countries, especially after the nineteenth century, is a phenomenon that has lent a heterogeneous character to many societies in different countries all over the world (Lynch, 1989). As a result, people with dissimilar cultural, religious, linguistic, and ethnic backgrounds have ended-up living in places and circumstances different to those of their 'homelands'. The student population is also affected by this change, with worrisome results regarding attainment¹⁷ being reported for ethnic minority groups in many different countries: black students in the UK (Connolly, 2006; Demack et al., 2000) and the US (Glick and White, 2003; Rumberger and Palardy,

* An earlier version of this paper was presented at the British Educational Research Association Conference in London, September 2007.

¹⁷ Attainment in educational studies refers to the standard of students' work compared to national and local benchmarks. In contrast, achievement refers to the progress students have 'made since they were last tested to gain their current test results' (Education, Children and Young People Scrutiny Board, 2008, p. 3).

2005), Pakistani (Demack, Drew, and Grimsley, 2000) and Bangladeshi students (Demie, 2001) in the UK, Hispanic students in the US (Fryer and Levitt, 2004; Ma, 2005), Turkish and Moroccan students in the Netherlands (Driessen, 1995; Hofman, 1994), Albanian students in Greece (Korilaki, 2004). The disparity in educational outcomes among different ethnic groups has become known in research as the 'minority achievement gap' (D'Amico, 2001; Olszewski-Kubilius, 2006).

Examining whether and for what reasons some minorities underachieve, and then tackling problem areas, is considered important for delivering a sound education to all students and thus preparing them for living their lives fully within a well-functioning society with equal opportunities. The international literature has identified a variety of factors as likely to affect attainment. These include gender, generation status, socio-economic status, absenteeism, and age. Some of the earlier findings on these factors are presented below.

Some studies suggest that females outperform males in most subjects, including Reading or Language or Writing (Fryer and Levitt, 2004; Hao and Bonstead-Bruns, 1998; Hoxby, 2002), and Mathematics (Bempechat et al., 1999; Lee and Smith, 1995; Roscigno and Ainsworth-Darnell, 1999). Other studies, however, have shown males outperforming females in Mathematics (Glick and White, 2003; Lee and Loeb, 2000) and others still have shown no significant gender differences (McCoy, 2005; Rong and Grant, 1992). Further, many studies have not examined gender in analyses (Condron and Roscigno, 2003; Portes and MacLeod, 1996; Sheldon and Epstein, 2005), or have not examined the attainment of male and female students in relation to minority and majority groups separately (Entwisle and Alexander, 1990; Sammons, 1995).

In terms of generational difference in immigrant populations, some studies show a tendency of lower generation status students towards better school performance. For example, Padilla and Gonzalez (2001) and Rumbaut (1995) found first-generation students to have better performance than second- or third-generation children. However, there are studies that show opposite results (Ream, 2005; Rong and Grant, 1992; Wojtkiewicz and Donato, 1995), and a plethora of studies that have not considered this factor (Hustinx, 2002; Orr, 2003).

There are many studies showing that students of higher socio-economic status tend to achieve higher than students of lower socio-economic status (Connolly, 2006; Cook and Evans, 2000; Fejgin, 1995; Zvoch and Stevens, 2006). Here also, there are many studies

that have not included this important factor in their analyses (Barnett et al., 2002; Callahan, 2005; Hoxby, 2002; Rong and Grant, 1992). Others have used a single (Demack et al., 2000; Driessen, 1995; McCoy, 2005; Pearce, 2006) or some weak indicators (e.g. free school meal) for the measurement of family status of students (Sheldon and Epstein, 2005; Zvoch and Stevens, 2006), thus potentially introducing bias through misclassification.

In the literature, low attendance levels appear to predict low performance (Caldas, 1993; Rumberger and Larson, 1998; Smyth, 1999). Many studies, though, have not examined absenteeism in relation to minority and majority students separately (Kahne et al., 2005; Smyth, 1999), or the effect of absenteeism on student attainment in particular (Kahne et al., 2005; Phillips, 1997). Also, the reviewed studies have not investigated absences for a long period, but only for a short time-period, such as a few days (Bos et al., 1992) or a single semester (Kahne et al., 2005; Rumberger and Larson, 1998). In addition, none of the reviewed studies has examined the effect of absences on student attainment in particular subjects.

Earlier studies have suggested that older students in a year group tended to perform better than younger students (Crosnoe, 2005; Fryer and Levitt, 2004; Sammons, 1995). However, in studies with students much older than their classmates, age appeared to have a negative effect on school performance (Driessen, 1995; Lee and Loeb, 2000; Ma, 2005). The majority of reviewed studies, though, have not included age in their analyses (Connolly, 2006; Pearce, 2006; Ream, 2005).

In Cyprus, a fairly new European country member, the school population has become progressively more heterogeneous (Oikonomidou, 2003) during the last decade, due to the settlement of immigrants. This situation is predicted to continue in an accelerated fashion with the expansion of the European Union. The rapid demographic changes have affected school composition (*ibid.*) as well. According to information supplied by the Ministry of Education and Culture of the Republic of Cyprus (where the research was conducted in 2004-2005¹⁸) regarding secondary schools, the number of minority students in the 2004-2005 academic year had doubled compared to the corresponding figure in the academic year 2001-2002, whilst the number of native students was similar. A more recent report of the Ministry of Education and Culture (Annual Report, 2009) showed that the number of

¹⁸ The current study has only considered schools under the control of the Republic of Cyprus as access to data across the divide was difficult.

foreign-language students in primary schools continues to increase. In particular, for the academic year 2005-2006, there were 3,759 students attending the local primary schools (6.7% of the total) for whom Greek was not their mother language. This number rose to 4,605 (9% of the total) for the academic year 2008-2009. No data is reported for secondary schools but one would expect a similar trend.

There are presently no studies on the attainment of ethnic minority secondary school students in Cyprus. Research related to minority students is limited to a few qualitative studies, which explore issues of multicultural/intercultural education in Cypriot schools (Angelides et al., 2003 and 2004; Martidou-Forsier, 2003; Panayiotopoulos and Nicolaidou, 2007, Papamichael, 2008). In some of these cases, there are hints of problematic performance on the part of ethnic minorities. For example, in the study by Panayiotopoulos and Nicolaidou (2007) there is reference to low academic performance among non-indigenous students. It is also suggested that the high concentration of minority students in a particular school was a factor pushing parents of native students to stop sending their children to that particular school because of perceived lower academic standards.

From the above, it is obvious that no firm conclusions can be reached about the attainment of minority secondary school students in Cyprus based on prior literature alone, especially because the school population has been changing so rapidly. Furthermore, as highlighted above, earlier studies on attainment of minority students are mired by methodological problems. A study examining the attainment of minority students in Cyprus and looking at a large number of possible factors responsible for this attainment is the one way of remedying this situation. On this basis, we conducted a study aiming to answer two research questions:

- (1) What are the patterns of attainment for minority and native secondary school students in the Republic of Cyprus?
- (2) Which of the examined factors influence the attainment patterns of these students?

5.2.3 Methodology

5.2.3.1 School and Student Sample: Two Greek-Cypriot public secondary schools (known as ‘gymnasia’) in different cities (Larnaca and Paphos) were included in the study. As the intention was to examine schools with a substantial number of ethnic minority students, the schools were randomly selected from the total number of schools with a concentration of minority students equal to or greater than 5%. All students (769 in total)

enrolled in these gymnasiums during the academic year 2004-2005 were included. Children from Georgia formed the largest ethnic minority group in these schools, whilst smaller numbers of other groups (Russians, British, Romanians, Bulgarians, Africans, and Americans) were pooled together under a category of 'Others'. Specifically, the sample included 72 'Georgians', 98 'Others', and 597 'Natives'. Across the Republic of Cyprus, these numbers would account for 10.4% of Georgian, 25.4% of 'Other' and 2.2% of Native children enrolled in all secondary schools (suggesting that the objective of capturing schools with a substantial number of ethnic minorities was achieved).

5.2.3.2 Academic Achievement: The attainment level of students was measured utilising student grades from three consecutive trimesters in two different subjects: Modern Greek, a subject of theoretical context where language is of paramount significance, and Mathematics, a practical subject which is less language-dependent. Other theoretical subjects, for example History, and practical subjects, such as physics, could also serve similar purposes and these areas could be used in future studies. As there are no external examinations, trimester grades from each gymnasium offer the only available indication of student attainment during an academic year. The trimester grades are to a large extent dependent on the curriculum taught during the trimester. They reflect the average of a number of tests over the period in question based on material of the national curriculum taught during the year. Even though we initially planned to examine the scores from end-of-year exams as well, and the relevant information was collected, it was realised that the term-time grades were much more consistent and tended to reflect the attainment of individual students much more accurately than the final exam scores. This might have been due to a tendency by students who had passed their year from semester grades, not to pay as much attention to the final exam, thus bringing down the mean score and not allowing for appropriate separation between different levels of ability among students.

5.2.3.3 Variables: Parental birthplace is the only accurate and available indicator for defining ethnicity in the population sample and is the method that schools and the Ministry of Education and Culture in Cyprus use. This way of defining students' ethnic background has been used in other studies as well (e.g. Hustinx, 2002). 'Georgians' were defined as those children who had at least one parent born in Georgia. These are known locally as 'Rossopontioi' or 'Ellinopontioi'. 'Others' were students who had at least one parent born in a country other than Cyprus or Georgia. Students who had one Cypriot parent and the other from another country were considered to belong to the ethnic group of the non-native parent. 'Natives' were mainly those whose parents had both been born in Cyprus. For

practical reasons, a very small number of students from Greece were also included in the native category; this was felt appropriate in view of the similarities in language, religion and culture. The population of Cyprus at large also includes Turkish-Cypriots as well as people from three 'religious groups', Maronites, Armenians and Latins but this particular student sample included nobody from these groups. This is not surprising as the overwhelming majority of Turkish-Cypriots study across the divide in the northern part of the island and those from the 'religious groups' tend to prefer English-speaking private schools.

Student generation status was indicated by place of birth. That is, students born abroad with at least one parent born abroad were defined as first-generation, and those born in Cyprus with at least one parent born abroad were defined as second-generation. This way of differentiating students between first and second-generation immigrants has been used in other studies (e.g. Goyette and Xie, 1999). Students born in Cyprus of parents born in Cyprus or Greece were defined as natives.

Other variables used were gender, socio-economic status (based on the highest level of parental education and parental occupation), and absenteeism (absences from teaching periods in the two examined subjects, as well as the overall number of absences for the whole academic year). Student age (measured in months), year group, and school were also controlled. Absenteeism was examined in relation to student performance in the particular subjects. The categories employed for each of these variables were:

- For gender: male and female;
- For parental education: primary education, secondary education, and further studies;
- For parental occupation: manual unskilled workers, manual skilled workers, civil servant and private workers, teachers and senior civil servants and senior private workers, and professionals and chief managers;
- For year group: first year, second year, third year;
- For school: School A and School B. Attainment, absenteeism, and age were used in the statistical analysis as continuous variables.

5.2.3.4 Analytical Methods: Rasch analysis was employed, in order for the student grades (A, B, C, D, E), which represent ordinal data, to be transferred into a linear scale which could then be used for the regression analysis (as linearity is a presupposition for this analysis). Rasch analysis processed the grades of all students from different trimesters and

gave an overall performance index for each student. A particular model of the Rasch ‘family’ was used for the needs of the present study – the Partial Credit Model (Wright and Masters, 1982)¹⁹.

Based on the Rasch scores, some descriptive statistics were created first. Then, a regression analysis (Ordinary least-squares regression) was employed to assess how accurately an independent variable predicts a dependent variable, determining the proportion of the variation in the dependent variable that can be accounted for by the variation in the independent variables. Regression analysis could also indicate whether or not a particular relationship is statistically significant (Allen, 1997). Two multiple regression models (one for each subject) with attainment as dependent variable and a number of factors as independent variables were performed to check on possible influences of the independent variables on student attainment. Due to the small population sample, the regression models included all students, despite the fact that they came from three different year groups. The age difference among students was, however, controlled by including their age and year group in the models. As the particular study dealt with data on different levels – that is student-level data and school-level data – multilevel models would normally be the appropriate method of analysis. But because the number of schools was small, this technique could not be used in this case. The statistical package SPSS Version 12.0 was used for the analyses.

5.2.3.5 Limitations: Some limitations of the present research need to be mentioned. Firstly, the findings may not be suitable for generalisations or assumed to be representative of the whole population, as the study is based on the population of two schools. Secondly, the student scores of attainment are based not on a standardised test but on marks given by teachers. This could introduce bias, which could invalidate results. Nevertheless, as this is the only assessment available in Cyprus at present, it represents a pragmatic approach. Also, the fact that a number of grades from three different trimesters are used reduces the possibility of introduction of bias from single measurements.

5.2.3.6 Sources of Information: Student grades and absences were obtained from the most accurate and valid available source: a database held by the Ministry of Education and Culture, which is based on the students’ official report cards. Parental origin, education, occupation, student birthplace, and age were collected from school-held records. All the information on school records was collected from parents. As parents are assumed to be

¹⁹ For more information about Rasch models, see Bond and Fox (2001).

the ultimate authority on student/family information (Entwisle and Astone, 1994), using school records as a source of information can, to a great extent, ensure the reliability of the information collected. It should be noted that the official interpretation of this data may introduce categorisation (e.g. as 'native' or 'non-native') that does not accurately reflect parents' or students' perceptions of themselves.

5.2.3.7 Ethics: Ethical issues arise from the nature of the research project itself, as it deals with ethnic differences and personal information of a sensitive kind. For this reason, a particular procedure of access and acceptance has been followed. Official permission for using students' grades and absences was obtained from the Ministry of Education and Culture in Cyprus. Student data was collected using an indicative number and not names. Schools were asked to participate on a voluntary basis. The right of students and schools to privacy has been protected, and their confidentiality and anonymity guaranteed. International guidelines dealing with ethical issues in educational research (e.g. Cohen et al., 2004), have also been honoured.

5.2.4 Results

5.2.4.1 Descriptive Statistics

In this section, a table of descriptive statistics and a number of graphs are presented. The table offers demographic data broken down into the three different ethnic groups examined, 'Natives', 'Georgians', and 'Others'. The graphs show patterns of attainment across the variables that the present study examines, i.e. ethnicity, gender, generation status, parental education, and parental occupation.

5.2.4.2 The Population Sample and the Variables Used in the Study

As Table 18 overleaf indicates, about three-quarters of the student population were 'Natives', while the remainder were 'Georgians' and 'Others'. In the group of 'Natives' and 'Georgians' about one half of them were female, while in the group of 'Others' 60% of the sample were female. All the 'Georgians' were of first-generation status, while approximately one-half of the 'Others' were of second-generation status, and the rest of first generation.

Regarding parental education, approximately one-third of native parents only, had received further studies while about one-half of the 'Georgian' and 'Other' parents had undertaken further studies. This indicates that minority parents possessed higher educational levels than native parents did. In terms of parental occupation, it appeared that about one-third of

native parents were in the two higher occupational categories. From the two minority groups, around one-quarter of the ‘Other’ parents and less than one-fifth of ‘Georgian’ parents were classed in these categories. ‘Georgian’ parents had the highest proportion of workers in the two lower occupational categories, followed by that of ‘Other’ parents. This indicates that minority parents had a lower occupational level than native parents, with ‘Georgian’ parents having the lowest level of all.

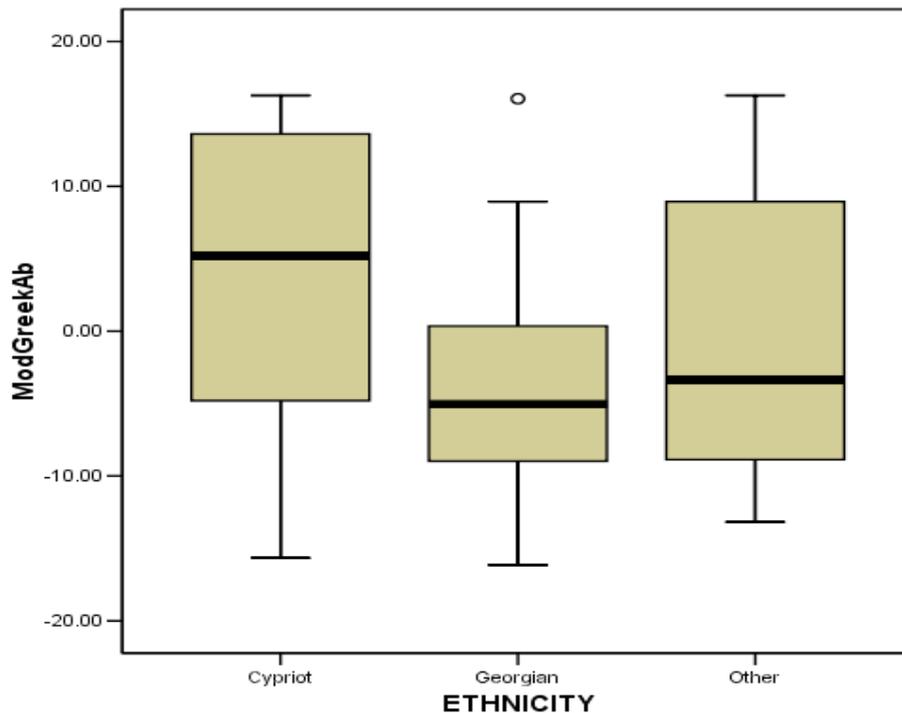
5.2.4.3 Student Attainment across Ethnic Groups

As regards student attainment, it appeared that the average score of ‘Natives’ was much higher than the score of the two minority groups in both subjects (Figure 5), for the graphical representation in Modern Greek). The average attainment of ‘Georgians’ and ‘Others’ was quite close in both subjects, even though ‘Others’ appeared to be performing slightly better.

Table 18: Descriptive Statistics for the Variables Used in the Study by Ethnicity

| | Natives (%) | Georgians (%) | Others (%) |
|---|-------------|---------------|------------|
| Population sample | 77.6 | 9.4 | 12.7 |
| Gender | | | |
| Male | 50.6 | 54.2 | 39.8 |
| Female | 49.4 | 45.8 | 60.2 |
| Generation status | | | |
| Natives | 100 | 0.0 | 0.0 |
| First generation | 0.0 | 100 | 57.1 |
| Second generation | 0.0 | 0.0 | 42.9 |
| Parental education | | | |
| Primary education | 4.5 | 1.4 | 1.0 |
| Secondary education | 61.3 | 54.2 | 42.9 |
| Further studies | 34.2 | 44.4 | 56.1 |
| Parental occupation | | | |
| Unskilled workers | 6.5 | 15.3 | 12.2 |
| Skilled workers | 16.2 | 38.9 | 21.4 |
| Civil servants and private workers | 47.6 | 37.5 | 41.8 |
| Teachers and senior civil servants and senior private workers | 22.1 | 8.3 | 19.4 |
| Professionals and chief managers | 7.5 | 0.0 | 5.1 |

Figure 5: Rasch Scores for Students from Each Ethnicity-related Category



5.2.4.4 Gender-correlated Student Attainment

Females from all ethnic groups had higher average attainment in Modern Greek than males (Figure 6). A similar pattern appeared for Mathematics.

5.2.4.5 Generation-correlated Student Attainment

The average attainment for both first- and second-generation minorities in Modern Greek was much lower than those of 'Natives', with second-generation students achieving slightly higher than first-generation students (Figure 7). A similar pattern appeared for Mathematics.

5.2.4.6 Parental Education-correlated Student Attainment

Students' average score rose as parental educational levels increased (Figure 8). As a consequence, the average score of children whose parents had received secondary education was higher than those whose parents had primary education alone. The children whose parents had received further studies achieved the highest average of all. This pattern was common to both subjects studied.

Figure 6: Rasch Scores for Student Attainment in Modern Greek Correlated with Gender

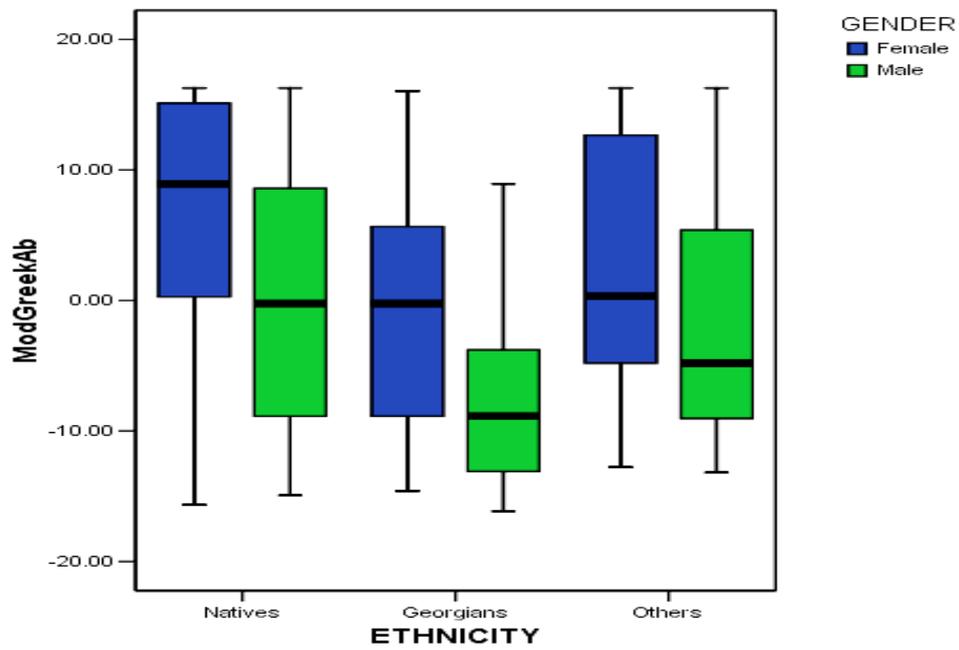


Figure 7: The Rasch Scores for Student Attainment in Modern Greek Correlated with Generation

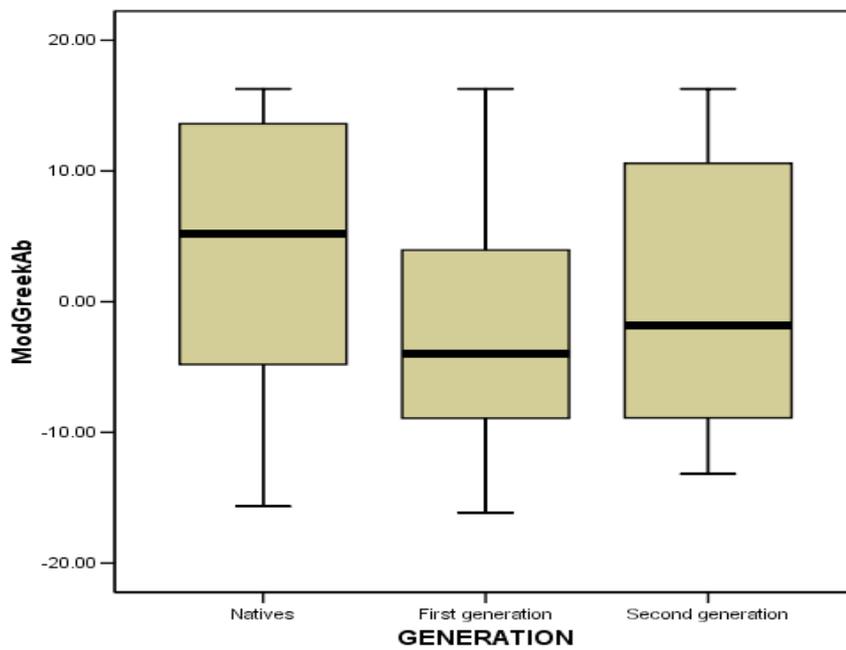
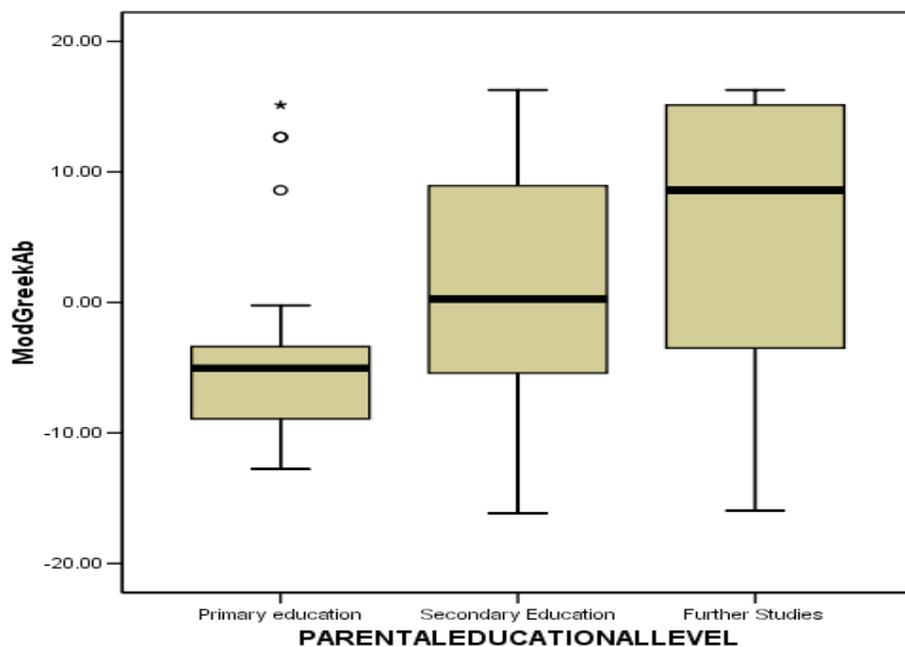


Figure 8: Rasch Scores for Students from Different Parental Educational Categories in Modern Greek



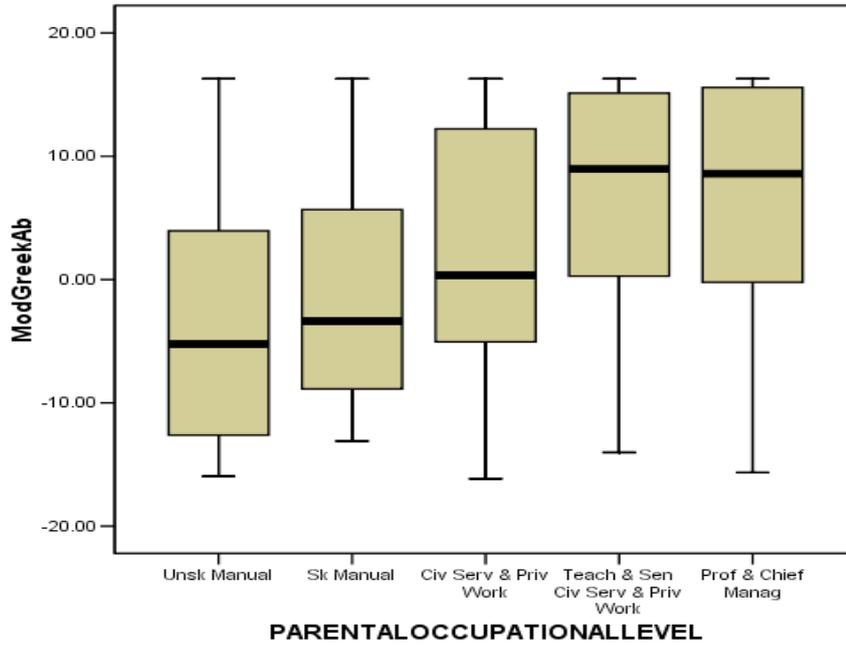
5.2.4.7 Parental Occupation-correlated Student Attainment

Students' average score improved along with increasing parental occupational levels (Figure 9). Hence, children whose parents were skilled workers achieved higher scores than children whose parents were unskilled workers. Children whose parents were civil servants and private workers were higher-achievers than children whose parents were grouped in the two lower occupational categories. Finally, children whose parents were teachers or senior civil servants and senior private workers or professionals and chief managers scored the highest of all.

5.2.4.8 Absenteeism Rates

'Natives' had fewer absences in both subjects (an average of 4.69 in Modern Greek and 3.66 in Mathematics) than children from the two minority groups (an average of 10.01 in Modern Greek and 8.58 in Mathematics for 'Georgians' and an average of 8.42 in Modern Greek and 6.53 in Mathematics for 'Others'). 'Georgians', in particular, had the highest average number of absences.

Figure 9: Rasch Scores for Student Achievement in Modern Greek Correlated with Parental Occupational Categories



5.2.4.9 Linear Regression

This section presents the results from the multiple regression models for the subjects of Modern Greek and Mathematics (Table 19 and Table 20 respectively). The tables show which of the examined factors had a significant effect on students' attainment in the two subjects. It appeared that, even after controlling for gender, generation status, parental education and occupation, absences, age, year group and school, the gap between native students and the two ethnic minority groups remained statistically significant in both subjects. 'Others' performed lower than native students in both Modern Greek and Mathematics whilst 'Georgians' performed even lower than 'Others'. The gap was more pronounced for both groups in the subject of Modern Greek.

Gender differences were quite large and statistically significant for both subjects. Specifically, males seemed to be in a disadvantaged position, consistently performing lower than females. The socioeconomic status of families appeared to affect attainment significantly with an increase in parental education or parental occupation level predicting an increase in student attainment in both subjects. As regards absenteeism, its effect on student attainment was statistically significant in both subjects. The model predicted a decrease in attainment in both subjects as the number of absences increased.

The effect of age on student attainment appeared to be statistically significant only for the subject of Mathematics. Its effect was negative, that is, as the age (in months) increased,

student attainment decreased. Also, school variable was statistically significant only for the subject of Mathematics. Students from School B appeared to have lower average attainment than students from School A. The year group appeared to have no significant effect and as such it was excluded from both regression models.

Table 19: Parameter Estimates of the Regression Analysis in Modern Greek (Rasch Score)

| <i>Factors</i> | <i>Unstandardised Coefficients</i> | | <i>Standardised Coefficients</i> | <i>t</i> | <i>Sig.</i> |
|------------------------------------|------------------------------------|-------------------|----------------------------------|----------|-------------|
| | <i>B</i> | <i>Std. Error</i> | <i>Beta</i> | | |
| (Constant) | -0.152 | 1.789 | | -0.085 | 0.932 |
| Georgians | -5.760 | 1.037 | -0.173 | -5.556 | 0.000 |
| ‘Others’ | -3.074 | 0.894 | -0.105 | -3.439 | 0.001 |
| Gender | -6.190 | 0.574 | -0.318 | -10.776 | 0.000 |
| Parent educational level secondary | 3.420 | 1.579 | 0.173 | 2.166 | 0.031 |
| Parent educational level further | 6.999 | 1.680 | 0.349 | 4.167 | 0.000 |
| Parent occupational level 1 | 2.926 | 1.202 | 0.117 | 2.435 | 0.015 |
| Parent occupational level 2 | 4.083 | 1.103 | 0.209 | 3.700 | 0.000 |
| Parent occupational level 3 | 5.803 | 1.268 | 0.245 | 4.577 | 0.000 |
| Parent occupational level 4 | 4.557 | 1.634 | 0.108 | 2.789 | 0.005 |
| Absences | -0.314 | 0.034 | -0.283 | -9.363 | 0.000 |

Model Summary: R: 0.601, R-square: 0.362, Adjusted R-square: 0.353, F: 42.479, Sig.: 0.000.

Table 20: Parameter Estimates of the Regression Analysis in Mathematics (Rasch Score)

| <i>Factors</i> | <i>Unstandardised Coefficients</i> | | <i>Standardised Coefficients</i> | <i>t</i> | <i>Sig.</i> |
|----------------------------------|------------------------------------|-------------------|----------------------------------|----------|-------------|
| | <i>B</i> | <i>Std. Error</i> | <i>Beta</i> | | |
| (Constant) | 9.782 | 3.345 | | 2.925 | 0.004 |
| Georgians | -4.076 | 0.707 | -0.187 | -5.765 | 0.000 |
| ‘Others’ | -1.931 | 0.603 | -0.101 | -3.200 | 0.001 |
| Gender | -2.901 | 0.388 | -0.228 | -7.481 | 0.000 |
| Parent educational level further | 2.822 | 0.481 | 0.215 | 5.865 | 0.000 |
| Parent occupational level 1 | 2.162 | 0.810 | 0.133 | 2.668 | 0.008 |
| Parent occupational level 2 | 2.413 | 0.741 | 0.189 | 3.257 | 0.001 |
| Parent occupational level 3 | 3.254 | 0.852 | 0.210 | 3.821 | 0.000 |
| Parent occupational level 4 | 3.148 | 1.107 | 0.114 | 2.844 | 0.005 |
| Absences | -0.224 | 0.027 | -0.262 | -8.224 | 0.000 |
| Age | -0.468 | 0.225 | -0.065 | -2.081 | 0.038 |
| School | -0.897 | 0.432 | -0.065 | -2.077 | 0.038 |

Model Summary: R: 0.565, R-square: 0.320, Adjusted R-square: 0.310, F: 31.977, Sig.: 0.000.

Generation status was also excluded from the final regression models of both subjects, as it assumed non-significant values when other variables were taken into account. In fact, it

caused multicollinearity²⁰ problems with the ethnicity variable. This would suggest that both variables (generation status and ethnicity) offer similar information. However, as both factors were important for a study of this nature, the regression models of both subjects were run again after replacing the variable ethnicity with generation, in order to examine its effect on student attainment. The results indicated that even after controlling for different factors, the first generation minorities achieved significantly lower scores than native students in both subjects. The difference for second-generation minorities was significant in Mathematics but not in Modern Greek. The gap for first-generation students was almost twice as large as that of second-generation students. The values of the other variables were similar to the regression models run with the ethnicity variable.

5.2.5 Discussion

We have shown that ethnic minority groups in Cyprus perform significantly lower than native students. Low attendance rate, low parental education, low parental occupation, low generation status, together with being a male student, has a significantly negative effect on school attainment. Despite controlling for gender, generation status, parental education and occupation, absences, age, year group and school, ethnic-minority, secondary-school students in Cyprus have been shown to achieve significantly worse than their native counterparts. That minority students underachieve has been reported previously in other countries (e.g. Glick and White, 2003; Zvoch and Stevens, 2006). From the three groups studied, ‘Georgians’ achieved the lowest average score, followed by ‘Others’, whereas ‘Natives’ scored the highest. The same pattern was followed in both subjects examined, with the gap in Modern Greek being greater. This is possibly because Modern Greek is a subject of theoretical context and more language-dependent. Other studies that examined Reading and Mathematics have found larger gaps in Reading (e.g. Cook and Evans, 2000), but there are also studies with opposite results (e.g. Hoxby, 2002; Ream, 2005).

Gender appeared to be a significant predictor of student attainment in both subjects. Females from all ethnic groups seemed to be in a more advantageous position academically than males. Gender differences found in this study are consistent with those of earlier studies which show females outperforming males in Language or Reading (e.g. Fryer and Levitt, 2004; Hao and Bonstead-Bruns, 1998; Hoxby, 2002) and Mathematics (e.g., Bempechat et al., 1999; Lee and Smith, 1995; Roscigno and Ainsworth-Darnell,

²⁰ This is a situation where an explanatory variable in a model is related to one or more of the other explanatory variables (see Hutcheson and Sofroniou, 1999).

1999). The fact that ‘Others’ performed better than ‘Georgians’ might also be partly explained by the fact that females formed the majority of the sample in the group of ‘Others’.

First-generation minorities had significantly lower attainment than native and second-generation students. Actually, the gap for first-generation minorities in Mathematics was twice as large as that of second-generation minorities, although compared to native students second-generation minorities had no significant differences in Modern Greek when other factors were taken into account. These findings are consistent with a number of studies that showed second-generation students performing better than first-generation students (e.g. Ream, 2005; Rong and Grant, 1992; Wojtkiewicz and Donato, 1995).

First-generation students are those that were born abroad, moved to Cyprus and entered gymnasiums at any stage and at any year group. Children with experience in the national education system of the country are expected to be more familiar with the local language, while children who migrated recently are likely to have more language problems, leading to lower academic achievement. Many researchers have argued that the lack of skills in the dominant language is one of the most important factors for the underachievement of minority students (Demie, 2001; May, 1994). Panayiotopoulos and Nicolaidou (2007) showed that the teachers who participated in their study perceived language difficulties of ethnic minority students in Cyprus to be a major factor in underperformance. In addition, the fact that all ‘Georgians’ in our dataset were of first generation status might go some way in explaining their lower attainment when compared to ‘Others’ – about one-half of which were of second-generation status. It should be mentioned that the effect of generation status was not detectable when the variable ethnicity was added to the regression models, as it pushed generation status into non-significance due to multicollinearity problems.

The effect of family socioeconomic status was significant for academic attainment. The findings are in agreement with those reported elsewhere (e.g. Connolly, 2006; Cook and Evans, 2000; Fejgin, 1995). The socio-economic make-up of each ethnic group might be an important reason for the differential attainment observed. Poor socio-economic status could affect attainment in a number of direct (e.g. able to afford private tuition or other educational resources) and indirect ways (e.g. children being forced to get jobs to supplement family income thus minimising time for study).

As regards the relationship between absenteeism and attainment, findings are in agreement with those studies showing that low attendance rates are associated with lower performance (e.g. Caldas, 1993; Smyth, 1999). The fact that minority students have a higher number of absences compared to ‘Natives’ might, in part, explain the lower performance of minorities. Being absent from the classroom has a significantly negative influence on school achievement, as it might lead to missing out important concepts and information from the lesson.

Findings regarding age, in terms of their attainment in Mathematics, are in line with previous studies showing a negative correlation between age and school performance (e.g. Driessen, 1995; Lee and Loeb, 2000; Ma, 2005). An explanation for this might be that higher age applied to those students with poor attainment who had to repeat one or more academic years. It might also reflect the situation whereby older ethnic minority students who were judged by the school as very deficient in the local language were placed in a class with younger students. The language deficiencies would probably lead these students to academic failure thus making the association between increasing age and lower attainment even stronger.

One of the participant schools appeared to have a significant negative effect on the attainment of students in Mathematics. This cannot be explained from the findings of this study and additional studies, sampling many more schools, would be needed to clarify this further. The international literature examined many factors relevant to school that might have a potential influence on student achievement. For example, the contextual effects, that is to say, the ‘differences in the racial and social class composition of the school ... can affect achievement over and above the effects associated with students’ individual characteristics and family background’ (Rumberger and Willms, 1992, p. 379). Also, the influence of peers, which, based on their high or low achievement and motivation levels, can create a “culture of success” in school or the opposite (Jencks and Mayer, 1990).

The differences in attainment between native and ethnic minority students appeared to be partly explained by the above-mentioned factors, which are basically related to the children themselves. Be that as it may, many other factors, which have not been examined in this study, might also be responsible for the attainment patterns identified. Some examples are the monocultural character of Cypriot schools (Angelides et al., 2003), the assimilationist character of the current educational system (Angelides et al., 2004), the lack of academic and psychological support for minority students (Panayiotopoulos and Nicolaidou, 2007),

and the absence of multicultural training of teachers (Angelides et al., 2007; Martidou-Forsier, 2003; Panayiotopoulos and Nicolaidou, 2007). The nationalistic element of the Cypriot educational system (Philippou, 2007), which largely reflects the Greek system as criticised for its ethnocentrism by Fragoudaki and Dragona (1997), and the racism in the wider society (ECRI, 2006a; ECRI, 2006b; Trimikliniotis, 2007; Trimikliniotis and Pantelides, 2003) might also be related. Furthermore, the negative feelings of Cypriots for particular ethnic groups, such as Turks (Loizos, 1998; Spyrou, 2002; Spyrou, 2006), the racist attitude on the part of native students towards minority students, Georgians and Russians in particular (Theodosiou-Zipiti et al., 2010), the biased and xenophobic attitudes on the part of teachers and students (Afantiti-Lamprianou et al., 2008; Papamichael, 2008), as well as racism in school policies (Theodosiou-Zipiti et al., 2010) might have an impact on the school life of ethnic minority students.

5.2.6 Conclusion and Recommendations for Policy and Further Research

In general, schools should be sensitive to, and inclusive of, students' cultural and linguistic needs, promote equal opportunities, and effectively deal with racism. The curriculum, teaching methods, teacher and student behaviour, school policies, and the whole school environment should be permeated by a multicultural ethos. Improving the conditions under which ethnic minority students are educated in Cypriot schools is fundamental in raising their attainment levels. This, in turn, should help the future work prospects of ethnic minority students and lift them, at least, out of relative, poverty. The cumulative effect of this could potentially help the state, by raising the level of revenue from taxed income; subsequently enabling savings on benefits paid out, and may also assist in curbing criminal activity.

Findings from the present study point to deficiencies in the educational system leading to an inability to meet the educational needs of students from ethnic minority backgrounds. The Ministry of Education and Culture has already implemented some changes (focusing on language teaching) and is working on a comprehensive educational reform. As regards the education of ethnic minority students, the policy of the Ministry is to implement 'educational measures and policies that will facilitate the smooth integration of groups from different cultural identities in a creative environment, regardless of background' (Annual Report 2009, p. 304). Within the framework of multicultural education, a number of measures have been promoted, including the creation of classes for fast acquisition of the Greek language through intensive instruction; preparation of the new curriculum and the school textbooks with the addition of intercultural elements; production and creation of

appropriate educational and pedagogical material; in-service training seminars for the teachers teaching Greek as a second and/or a foreign language organised by the Pedagogical Institute. At the primary level, extra teaching periods for language support of foreign-language students as well as educational material, which include books for the teaching of the Greek language, have been provided. Also, afternoon classes have been organised by the Adult Education Centres for students and parents who are interested in learning Greek as a second language.

Furthermore, in its aim to help students from economically and socially deprived areas, the Ministry has created Zones of Educational Priority, which were brought into existence around the time the study was carried out. These zones include nurseries, primary, and secondary schools in a number of neighbourhoods in different cities. As reported in the Ministry's 2009 Annual Report, in an attempt to 'ensure prevention of school failure and functional illiteracy' (p. 286) as well as the prevention of school exclusion, school leaving, and violence among other things, (p. 306), a series of extra measures have been implemented in these schools, including lowering the number of pupils per class, the provision of extra educational support, and free breakfast for all students.

As there is no previous research on this topic in Cyprus, this study offers a picture of the new reality of the local educational system. Also, the findings provide important information to educators, policymakers and politicians alike as it is by tackling the aforementioned factors that attainment levels can be raised. Moreover, the above results add further evidence to the international literature which show that ethnic minorities are underachieving. This paper offers possible reasons why this is so by examining a unique combination of possible contributing factors.

In addition, the attainment patterns of the particular ethnic groups observed in this study (e.g. native Cypriots and Georgians) have not previously been recorded. Furthermore, the focus of the study on year-long data (regarding school performance and absenteeism) adds to insights gained by single-measurement analyses. Student absences were, in fact, examined in particular subjects in relation to student attainment in these areas. Similarly, the employment of more than one socioeconomic status indicators offers a more robust measurement compared to single-indicator studies.

Further research is needed to confirm findings, including the expansion of the number of schools and students examined in order to allow the use of a multi-level approach. By

investigating both individual-level factors and school-level factors, students' attainment can then be examined in greater detail. Additionally, the impact of the policies introduced by the Ministry can be scrutinised in studies looking at the common, end-of-school exams used for admission to Higher Education (introduced approximately two years ago and beyond the scope of this particular study). Qualitative methodologies could integrate these and further results to clarify factors impacting on the achievement gap.

In the meantime, the need for immediate policy implementation from central government is urgent. The educational system should provide effective language programmes in all schools with ethnic minority students. Until students have increased their competency in the Greek language, perhaps the use of minority students' home languages could be an interim medium of instruction, especially in schools with large groups of students from a particular ethnic background. This could be best achieved by employing bilingual teachers and teachers from minority groups. The educational system ought to be able to offer a multicultural curriculum and a multicultural and antiracist school environment to students, as well as multicultural in-service training to teachers. Moreover, ethnic minority students should be encouraged to limit their absenteeism rates and be more engaged in school life and learning. Monitoring the achievement of students from ethnic minority groups would also help to assess the effectiveness of the educational practices employed. Furthermore, welfare schemes might be used to support those with serious socioeconomic problems. And finally, families with low socioeconomic status could benefit from the Zones of Educational Priority being extended into more economically- and socially-deprived areas.

5.3 Factors Affecting Ethnic Minority Students' Attainment in Secondary Schools in Cyprus – A Focus Group Study

Galatia Theodosiou-Zipiti, Mel West, Daniel Muijs
School of Education, The University of Manchester, Oxford Road,
Manchester, M13 9PL, UK.

5.3.1 Abstract

This is the first study in Cyprus aiming to gain an insight into the factors responsible for the low attainment of ethnic minority students observed in earlier studies. Teachers from different schools and cities on the island participated in a focus group discussion. Identified factors related to the child, parents, home environment, teachers, school, and society. Examination of these factors revealed that the socio-economic status of the family and the character of the current educational system were the main reasons for the disparity in attainment.

Keywords: minority students; attainment; focus group; education and social disadvantage; systemic monoculturalism

5.3.2 Introduction

In Cyprus, a fairly new European Union member, the school population has been getting progressively heterogeneous during the last decade (Oikonomidou 2003), due to settlement of new immigrants. Children from Georgia, known locally as 'Rossopontioi' or 'Ellinopontioi', form the largest ethnic minority group nationally. There are also smaller numbers of students from other ethnic groups, such as, British, Americans, Africans, Russians, Rumanians, Bulgarians, and Turks.

Work specifically on attainment of minority students in Cyprus' schools is limited to a single study (Theodosiou 2006). This essentially quantitative study investigated the attainment of ethnic minority students in two secondary schools based on their grades in Modern Greek and Mathematics. Findings indicate that the attainment of minority students is significantly lower compared to that of the native students.

Other studies in the island provide some helpful clues as to the reasons behind this attainment gap. Martidou-Forsier (2003) noted that fluency in the Greek language, being

accepted by both native students and teachers, parental interest and ability to help their children, and students' own aspirations and effort were important factors for school success of ethnic minorities. Furthermore, the majority of teachers expressed doubts about the appropriateness of their teaching methods in multicultural classrooms and their strategies for getting parents involved. Angelides et al (2003; 2004) suggested that the character of schools in Cyprus was monocultural and that of the educational system assimilationist. Panayiotopoulos and Nicolaidou (2007) noted serious deficiencies in the educational system including the absence of skills among teachers to function effectively in multiethnic classrooms.

Although the studies above allude to some potential factors affecting student attainment, none set out to specifically look at the factors responsible for the poor attainment of ethnic minority students. Our aims were, therefore, to identify factors leading to the relatively poor academic achievement of ethnic minorities in secondary schools in Cyprus.

5.3.3 Methodology

A focus group was conducted in Cyprus. Six Cypriot teachers were invited as participants from schools from all four major cities of the Greek-Cypriot side of the island. All were young, female, classics teachers from secondary state schools with a similar teaching experience in multiethnic classrooms (1-5 years). An attempt was made for the participants to "share common characteristics" (Knodel 1993, p.39) for a number of reasons. Firstly, participants with similar characteristics are less likely to feel "uncomfortable to disagree publicly" (Albrecht et al. 1993, p.56). Secondly, "individuals are more open and willing to share when the focus group is strictly homogeneous" (Krueger 1993, p.70). Thirdly, a homogeneous group helps "avoid mixing persons who may have sharp differences in opinion or behaviour associated with the topics under study" (Knodel 1993, p.40). Finally, participants with significantly different ages could have "different age-based perspectives" (Morgan 1988, p.46). The purpose of the particular selection of participants was to get an idea of the views of young teachers employed in secondary public schools (Knodel 1993).

We acknowledge that the composition of this focus group could have implications for the validity of the study by giving a skewed picture of events. Measures were taken to strengthen the validity of findings, such as encouraging everybody to participate and promoting the expression of individual opinions, thus minimizing the possibility of under-reporting of atypical behavior or deviant views (Nixon 2006). Furthermore, opinions from those with the shortest experience were sought first and from a different respondent each

time. This should minimize the tendency of some members “to echo the sentiments of those responding first” (Albrecht et al. 1993, p.56-7). Through active listening, clarifications and explanations for articulated thoughts and experiences (Kitzinger 1994) were invited regarding the different points raised.

A number of issues and questions were prepared in advance, but any point raised by the participants was pursued further. The main issues raised are listed below:

- Teachers’ experiences and impressions from their dealings with minority students and parents.
- Attainment of minority students and factors influencing their performance.
- Teachers’ degree of preparation for teaching in multicultural schools.
- The school environment in general and the classroom conditions in particular, with reference to the multicultural student population.
- The teachers’ concepts regarding attitudes, behavior, and feelings of students towards each other and towards their teachers.

The specific aims of the interview and the researcher’s own perceptions were not disclosed, so as not to influence responses (Krueger 1993; Morgan 1988).

The participants were explicitly informed about what was expected of them prior to the interview and their verbal consent obtained. Further, it was made clear to them that they had a right to withdraw at any stage or to refuse to answer any questions. Anonymity of findings was guaranteed, and permission to tape-record the discussion obtained. Tape-records were transcribed immediately afterwards. As the discussion happened in Greek, all relevant quotes were translated into English by the investigators and verified by a person unrelated to this study, who is fluent both in Greek and English.

Thematic analysis was undertaken. Initially, key themes were identified and then sub-themes, indicating the identified factors in each broad category. Finally, a synthesis was made of all pieces of data in order for the findings to form a cohesive piece of work (Knodel 1993; Nixon 2006).

5.3.4 Findings

A number of points raised in the discussion can be considered potential factors influencing minority student attainment. These are grouped in five broad categories as discussed below.

5.3.4.1 Factors relating to the child and his/her personal characteristics

Teachers agreed that many minority students have a negative attitude towards teachers and school, paying little attention to their education. One of the teachers said: “Some of them are completely negative. When you ask them to do something, they always say ‘no’, and that they are not interested... I have in mind a particular student, who every time I refer to him says ‘I do not understand any Greek’. Many of the participants referred to students’ degree of personal effort and interest to learn. As a participant said, “the weakest students in particular are not interested in learning... They do not concern themselves with schoolwork”. In addition, teachers mentioned that minority students are often absent from school. One of the teachers said: “Parents could be going to work very early in the morning and their children often stay in bed until late thus missing school... Minority students tend to have many absences”.

Participants seemed to agree that minorities’ degree of fluency in Greek language is linked to their academic attainment. Many of these students seriously lag behind in terms of language, as they can enrol into any year group at any stage of the academic year. They also said that “some students, who have been in the local education right from the beginning, have acquired solid foundations in the Greek language, in contrast to many others”. Teachers concluded: “Language is a major hindrance to their attainment”.

Finally, the fact that many minority students have a job is perceived to have an impact on their school attainment. As a teacher said: “Many of these students have part-time jobs and work either in the afternoons or in the evenings, thus coming to school feeling sleepy and tired... This, no doubt, has a negative impact on their attainment”.

5.3.4.2 Factors relating to parents and home environment

The dire economic circumstances that many minority families are in, can impact on the academic life of children in these families. Some of the participants said: “It is simply a matter of survival”, “they come to Cyprus as economic migrants”, “the standard of living for some of them is appallingly low”. A teacher remembered that once she was told by a group of minority students that: “we are here for our survival”.

The temporality of residence for many minority families in Cyprus is another factor thought to be relevant: “Many families have come to Cyprus only for a fixed time-period... their only aim is to make some money and go back... This attitude is being passed on to

the children and they consequently show little interest in academic achievement in contrast to children from families intending to stay for the long-term”. A teacher recalled one student displaying little effort saying: “I am going to leave the country. I only need to pass the year, not to distinguish myself”.

Teachers emphasized the importance of parental involvement in their children’s school life. They noted that “many parents work extremely long hours, because of their financial hardships” and it was suggested that “this did not allow them to devote time to their children’s education”. That the long hours at work could impact other aspects of involvement such as supervision, expectations, and involvement in school was also highlighted. On the issue of expectations, a teacher commented: “I believe that parental attitude towards learning and education is of paramount importance... If they show that they consider this to be important, and if they expect from them to succeed in school, they will”. Another teacher commented on parental involvement in school: “The mother of a Georgian student of mine came to ask about her son. She spoke no Greek and as such brought with her a neighbor to translate. Both of them were very disbelieving and negative... She kept repeating that her son did not understand any Greek... Unfortunately, she never implemented my suggestions and never returned or made any contact with me to check if problems persisted”.

5.3.4.3 Factors relating to the teachers

Teachers’ approach towards minority students is perceived to have an impact on their school performance. Somebody talked about the differential, biased approach of teachers towards students of different ethnic groups. “We should point out the general prejudice towards Georgians. If we had a group from families with European upbringing, I am sure that we would treat them differently. However, on a subconscious level we tend to underestimate this particular group... and this could have an effect on the way we deal with them”. They also talked about the potential benefits of a positive approach: “When you sense that they are trying, I have noticed that giving them an incentive makes them try even harder... ”.

In addition, they admitted a limited sense of responsibility for the education of minority students: “I believe that in public schools nobody takes Georgians into consideration. For example, when I go into the classroom to teach History or Modern Greek my priority is not to help the Georgian students, because their gaps are so great that you have to start from

the very beginning and teach the basics of spelling. I am sure that we should make some effort for these students... To be honest, I do not.” Another participant agreed: “There are targets to be met... this makes you prioritise... I regret saying this, but minority children are not my priority”.

Furthermore, teachers felt unprepared to deal with students from different ethnic backgrounds: “We have not been coached how to teach these children. We are amateurs in this domain. We do not have the relevant background, help and support... It is left up to the individual to judge what needs doing and respond appropriately... there was no preparation for all these either during our University years or during the Pedagogical Institute (PGCE equivalent)”.

5.3.4.4 Factors relating to school

Teachers referred to the school climate as a factor that could force minority students to “drop-out very quickly because the school environment did not facilitate their integration... and students felt isolated and marginalized; ...rejected right from the beginning ... both by students and teachers alike”. That racism was part of everyday life and obviously apparent was commented upon by most participants. One of them said: “I noticed a racist attitude on the part of native students... Some immigrants are treated as foreign bodies, especially those who joined school late”. On the other hand, “minority students who have been together with their local counterparts since primary school are accepted”. Another teacher pointed out an aspect of bullying against minority students: “name-calling is rife...” Racism has also been perceived in school policies with a teacher giving the example of “an Albanian girl being the senior student with the highest grades in a particular school and being considered to carry the school colors. This sparked protests and legal action was threatened, because, according to policy, this should be done by a Cypriot student”.

Some teachers felt that many minority students were alienated and isolated from the rest of the student population, tending to “talk about ‘us’ and ‘them’”. Also, students from the same ethnic group prefer to “hang out together isolating themselves from the rest”. Other teachers commented on attempts of minority students to blend-in with the local population by changing their first names to Greek ones: “I had a student called Helian and he came and asked me to call him Helias”. Another teacher said: “I used to address my students by

their surnames... Some came and asked me to stop this practice... because it emphasises the difference”.

5.3.4.5 Factors relating to society

Participants pointed out that society and social racism have a role to play as well: “I know for a fact that it is not just teachers that have a negative attitude towards Georgians..., it is any Cypriot that I know or have talked to”. Another teacher added: “Especially in Paphos, Georgians are handled with a great deal of racism... because crime levels have rocketed since their arrival...”

Teachers also argued that social perceptions about different ethnic groups are nurtured within families: “Girls of Russian origin were viewed in a particular manner... Because some local men had abandoned their Cypriot wives to live with women of Russian descend, all Russian girls are seen with this in mind; that they are breaking families up. This is evident even in classrooms”.

5.3.5 Concluding remarks

This is the first study to specifically look at the perceived reasons behind the attainment gap observed in secondary schools in Cyprus. A closer look at these factors would suggest that they can be grouped together in two main categories: family socio-economic status and the characteristics of the current educational system.

With respect to the former, findings indicate that the poor finances of some families could force parents into long working hours, thus rendering them unable to devote time for supervising and getting involved in their children’s learning. Furthermore, poor resources could impact on the home environment and the educational resources and opportunities offered. In addition, financial needs could force children into paid employment leading to absences from school and a lack of time to rest and prepare for school.

With respect to the latter, many of the factors related to the teachers, school, and the wider society could stem from the monocultural character of the current educational system in Cyprus. Its impact can be appreciated in the racially hostile and unsupportive school environment, the lack of multicultural and antiracist policies and the transference of racism from society into schools. The discrimination, alienation and isolation of some minority students, as well as the teachers’ prejudiced attitudes, lack of appropriate training, and

limited sense of responsibility for the learning of their minority students is further evidence of the deficiencies in the current educational system.

This multi-disadvantaged position of minorities can function as a barrier to academic success. Although we have identified factors that can be targeted for improving the education of minority students in Cyprus, further studies to confirm and triangulate findings would be welcome.

5.4 Attainment Gap – The Teacher Perspective

Galatia Theodosiou-Zipiti, Mel West

School of Education, The University of Manchester, Oxford Road,
Manchester, M13 9PL, UK.

5.4.1 Abstract

Differential attainment between ethnic minority and homeland students has been described in many countries. Lately, this has also been confirmed in Cyprus, a recent member of the European Union. This qualitative study aims to investigate the perceptions of teachers as regards the reasons behind the low academic achievement of ethnic minorities in Cyprus. It further hopes to provide clues for the lower attainment observed in theoretical subjects. Interviews were conducted with teachers from four secondary schools in different cities of Cyprus. A variety of factors relating to the child, parents, home environment, teachers, schools and society were identified as relevant by the participants, in agreement with findings from both the international and the limited local literature. Interrelationship of the findings suggests that the socio-economic status of the family and characteristics of the Cypriot educational system are the main influences on attainment levels.

Keywords: ethnic minorities; attainment gap; interview-study; Cyprus

5.4.2 Introduction

The disparity in achievement among different ethnic groups has been discussed in the international educational literature for decades. The general trend is for ethnic minorities to do worse than their majority counterparts. For example, Pakistani, Bangladeshi and Black students in the UK (Demie, 2001); Black (Rumberger and Palardy, 2005), Hispanic (Fryer and Levitt, 2004) and Mexican students (Ream, 2005) in the US; Turkish and Moroccan students in the Netherlands (Driessen, 1995); many ethnic minority groups in China (Zhou, 2001); Albanian students in Greece (Korilaki, 2004), and Georgian students in Cyprus (Theodosiou-Zipiti, West, and Lamprianou, 2011). This lower attainment of ethnic minorities compared to majority students has been coined the ‘attainment gap’ (Olszewski-Kubilius, 2006). Schools are nonetheless expected to offer a sound education to all students and also to equip them to live their lives fully within a well-functioning society. It is, therefore, imperative that we know whether and for what reasons some minorities underachieve, as this can help us tackle the problem.

The international literature refers to many studies that attempt to explain the reasons behind the attainment gap observed in different countries, and factors pertinent to individual children have been suggested as possible influences on attainment. These include aspects such as ethnic origin (Asanova, 2005), low motivation or effort (O'Connor, 1999; Uhlenberg and Brown, 2002), confused or unrealistic aspirations and inappropriate coping strategies (Reis et al., 1995). Other suggested possibilities include high absenteeism (Rumberger and Larson, 1998), low proficiency or fluency in the dominant language (Demie, 2001), fear of acting white (Fryer, 2006), and negative peer group pressure (Haynes et al., 2006).

Factors relating to the parents and home environment have also been put forward. Low parental educational level (Uhlenberg and Brown, 2002), limited interest in school performance and minimal monitoring, guidance and involvement in school (Demie, 2005; Lee and Bowen, 2006) are some of these. Additionally, low expectations (Goyette and Xie, 1999; Reis et al., 1995), parenting techniques, i.e. discipline style, interaction (Uhlenberg and Brown, 2002), low family socio-economic status (Reis et al., 1995), stress, or home problems (Villalba et al., 2007), and major life issues or events in the home (Hayes and Clay, 2007) are other such examples.

It has also been suggested that the attributes of certain teachers can potentially affect the performance of minority students. For instance, low expectations (Haynes et al., 2006; Uhlenberg and Brown, 2002), racist/biased behaviour (Lucas, 2000) and negative interactions with minority students (Reis et al., 1995) have been highlighted as important. Similarly, inappropriate or insufficient education and training for teachers (Warikoo, 2004) as well as an inability on their part to cater for the learning needs of a diverse classroom population (Tengtragul, 2006) have been identified as relevant.

Some school characteristics such as racial composition (Crosnoe, 2005), irrelevant curriculum (Glazier and Seo, 2005), problematic assessment (Li, 2004) or testing bias (Villalba et al., 2007) have also been proposed as potentially important elements. Other points such as school size (Rumberger and Palardy, 2005), large class size (Uhlenberg and Brown, 2002), inadequate use of students' first language (Bartley et al., 1999), the degree of prejudice against minority students (Reis et al., 1995), and poor communication with home (Bartley et al., 1999; Li, 2004; Villalba et al., 2007) have also been emphasised as significant.

Finally, societal ethnic stereotyping and oppression (Rubie et al., 2004), discrimination (Birman and Trickett, 2001) and racism (Codjoe, 2001) have all been identified as influential.

Most of the aforementioned factors have been recognised through quantitative studies. Nonetheless, it is widely accepted that quantitative and qualitative studies are complementary to each other. When used together, they can give a fuller picture, not only of the overall incidence and statistics, but also of the underlying processes and perceptions of people. There are some qualitative studies which aspire to investigate the circumstances behind the poorer achievement of minority students, but most of them concentrate on the effects of a single aspect or a few closely related factors. There are very few studies whose aim is to examine a broad range of contributory influences that might be responsible for the attainment gap (e.g., Haynes et al., 2006; Li, 2004; Reis et al., 1995; Tengtragul, 2006; Uhlenberg and Brown, 2002; Villalba et al., 2007). Although these studies might be useful in providing us with some information about what happens in other specific setups they do not go far enough to answer our research questions, and in some instances only deal with primary school education (Tengtragul, 2006; Villalba et al., 2007). Also, there are elements that might render some of these studies vulnerable to bias. The low number of schools used in some of these studies: one in Bartley et al. (1999), Reis et al. (1995), and Tengtragul (2006); two in Villalba et al. (2007); the handful of participants in Li (2004) with only two Chinese-Canadian students; or in Tengtragul (2006) with just five teachers, are such examples. Furthermore, Uhlenberg and Brown (2002) used a forced-choice items survey that could lead to bias by not identifying other important considerations that the participants might offer, if allowed. Moreover, some studies focused on specific school subjects, for instance, English literacy in Li (2004), whilst other studies did not exclusively concentrate on the achievement of minority students (Reis et al., 1995).

Cyprus, which joined the European Union in 2004, has seen its population become increasingly diverse during the past decade (Oikonomidou, 2003) due to the settlement of waves of immigrants. This change in demographics has also affected school populations. Data supplied by the Ministry of Education and Culture of Cyprus, for the academic year 2004-2005, shows that only eleven out of sixty-seven gymnasia (secondary schools) had no minority students, while other schools admitted up to 50% of their students from minority groups. Apart from Greek Cypriots, the population of the island also includes Turkish-Cypriots, plus people from three 'religious groups' – Maronites, Armenians and

Latins – and Greek people from the mainland. It also includes groups who more recently arrived on the island from a number of countries such as Georgia, Britain, Russia, Romania, Bulgaria, and Turkey. Georgians, known locally as ‘Rossopontioi’ or ‘Ellinopontioi’, form the largest ethnic minority group nationally, while immigrants from the other countries make up smaller numbers which are often grouped together under one category called ‘Others’ (Theodosiou-Zipiti, West, and Lamprianou, 2011). The Ministry of Education and Culture is currently working on educational reform which aims to implement educational measures and policies that will facilitate the smooth integration of children from different cultural backgrounds (Annual Report, 2010). For secondary schools, however, (which forms the basis of this study) with a low percentage of ethnic minority students the measures thus far have been limited mainly to language support.

Two quantitative studies have examined the attainment of ethnic minority students in Cyprus (Theodosiou-Zipiti, West, and Lamprianou, 2011; Theodosiou-Zipiti et al., 2011). They have both shown that students from ethnic minority groups have appreciably lower attainment than their native²¹ counterparts in a number of school subjects – Modern Greek, Mathematics, History, and Physics. Few studies have examined the determinants responsible for the above achievement gap in the island. Theodosiou-Zipiti, West, and Lamprianou (2011) and Theodosiou- Zipiti et al. (2011) suggest that low attendance rates, together with low levels of parental education, unskilled parental occupations, being a first-generation minority student and being a male student, significantly impact negatively on student attainment. There is also a single focus group study that specifically looks at the reasons behind the poor attainment of ethnic minority students in secondary schools in Cyprus (Theodosiou-Zipiti, West, and Muijs, 2010). The authors conclude that the socio-economic status of minority families and the monocultural character of the current educational system are the main influences behind the disparity in attainment between native and ethnic minority students. Having said that, this study was based on the perceptions of a limited number of teachers in a highly homogeneous group – all young, female, classics teachers with similar teaching experience in multiethnic classrooms – that could predispose it to bias.

Useful points can be extracted from other studies dealing with multicultural issues in Cyprus; it should be emphasised that these studies were not carried out specifically to look at the reasons behind the attainment gap. Martidou-Forsier (2003) advocates that fluency in

²¹ Natives are ‘those whose parents had both been born in Cyprus. For practical reasons, a very small number of students from Greece were also included in the native category; this was felt appropriate in view of the similarities in language, religion and culture’ (Theodosiou-Zipiti, West, and Lamprianou, 2011, p. 127).

the Greek language as well as acceptance by native students and teachers, parental interest in their children's learning, and students' educational aspirations and efforts are perceived to be important for ethnic minority attainment levels. Panayiotopoulos and Nicolaidou (2007) indicate that language problems are the most important cause of low academic performance.

To our knowledge, no study, either locally or internationally, has employed a methodology capable of detecting factors that would explain the differential attainment of ethnic minority students between the theoretical and practical subjects. This could be important given the larger gaps in theoretical compared to practical school subjects (e.g., Cook and Evans, 2000; Theodosiou- Zipiti, West, and Lamprianou, 2011; Theodosiou-Zipiti et al., 2011).

Our research plan is to identify those contributory factors responsible for the low academic attainment of ethnic minority students in secondary schools in Cyprus through a review of the perceptions of teachers. We also aim to see how the teachers themselves explain the differential attainment between theoretical and practical subjects.

5.4.3 Methodology

Semi-structured interviews were used. These were carried out in four of the secondary schools used in the larger quantitative study on the attainment of ethnic minority students in Cyprus conducted by Theodosiou-Zipiti et al. (2011). Two schools with a low ethnic minority concentration (about 10%) and two with a high concentration (about 50%) were selected for the study. The schools selected were chosen from three different cities of Cyprus (urban schools) and were of variable size. We decided to interview teachers because they are the ones directly responsible for the education of students. Specifically, sixteen teachers (i.e. four head-teachers, five deputy head-teachers, and seven teachers) of which seven were male and nine were female, of different ages and years of experience, who were appointed to the participating schools during the academic year 2006-2007, were included. In order to detect influences that explain the differential attainment patterns of ethnic minority students in the theoretical (Modern Greek and History) and practical subjects (Mathematics and Physics) as described by Theodosiou-Zipiti et al. (2011), only those teaching in these subject areas were interviewed. All interviewees, except head teachers, were a convenience sample; at the time of the interviewer's visit, the first available teachers who consented to take part were included. The head-teachers were approached at a pre-determined time by appointment.

An 'interview schedule' (Maykut and Morehouse, 1994, p. 88) with a number of issues and questions was prepared in advance, based predominantly on the findings of the study by Theodosiou-Zipiti et al. (2011). The main issues raised with the participants were:

- Attainment levels of ethnic minority students
- Attainment gap between different school subjects (theoretical and practical)
- Gender differences in attainment
- Student absenteeism
- Factors influencing the attainment levels of minority students
- Effect of ethnic minority concentration on student attainment
- Teacher preparation/training
- Relationships between teachers and minority students
- Relationships between native and minority students
- Relationships between teachers/school and minority families

Ethical issues raised by the study were considered and appropriate steps taken to ensure the proper conduct of this study. That is to say, participation was entirely voluntary. Each participant was informed in relation to the nature of the research by one of the researchers (Maurice, 1998; Robson, 1995), and was offered the right to withdraw at any stage of the interview or to refuse to answer particular questions (Mason, 1998). The participants were assured that the interviews were confidential and that their privacy and identity would be protected. Their verbal consent to participate was obtained, as well as their permission to tape-record the interviews (Cohen et al., 2004; Maurice, 1998; Robson, 1995). The specific city of each of the selected schools was not named because, despite the researcher's best efforts, this would possibly allow those with substantial knowledge of school demographics to identify the schools in question.

The interviews were tape-recorded and soon afterwards transcribed. All discussion was conducted in Greek and all relevant quotes were then translated into English. A person uninvolved in this study, but who is fluent in both Greek and English, verified the translation. To ensure anonymity and non-identification of schools or participants, the schools are represented by letters and the teachers by numbers.

For the data analysis, when initially going through the transcripts a number of times, the researchers noticed some common themes and patterns. A coding process was followed for the transcripts of all the participants, identifying themes/factors and developing five

general categories. These categories were related to the child, the family, teachers, school and society. It was observed that some aspects overlapped one another or fitted into more than one category; but the above general categories were kept for practical purposes. The segments of data that were relevant to each category were gathered together. Statements of participants were compared with one another and different pieces of data were related to each other in order to check for similarities and differences (Hammersley and Atkinson, 1995; Taylor and Bogdan, 1984). To begin with, some generalisations relating to each theme appeared. However, looking at the interrelationship of different aspects led the researchers 'from description to interpretation and theory' (Taylor and Bogdan, 1984, p. 133). The whole analysis procedure was refined to ensure that no important data relating to the identified themes was discarded and that 'the codes fitted the data and not vice versa' (ibid., p. 137).

5.4.4 Findings

5.4.4.1 Child-related Factors

Teachers pointed out that moving to another country was a difficult, traumatic experience: 'Children, whose families decided to emigrate, were greatly distressed by the move' (B3); 'Parents and children lived in agony ... Children had to change schools, friends, and environment' (B3); 'Georgians, in particular, whose parents are economic immigrants, were uprooted from their homecountry' (B1); 'Minorities have to adapt to a new attitude, a new culture' (C2); and, 'It is a culture shock for the newcomers' (A2). Teachers also thought that this experience had an impact on their school performance. As one teacher said: 'All this moving around, the insecurity, the change of culture and environment have a negative effect on children, and especially their school performance' (B3).

Interviewees were unanimous that the most important problem for minority students is their lack of proficiency in the dominant language: 'Some of them do not know a single word in Greek' (C1). They were also convinced that 'language is a major obstacle to their attainment. Many students are not able to follow what goes on in the class, because of language deficiencies' (A1). 'They may read an instruction in their book or handouts but they do not really understand it' (D3). This lack of Greek language was perceived to affect both theoretical and practical subjects: In a 'theoretical' or 'language dependent' (B1, B2) subject, such as Modern Greek, 'students do not understand what they are taught and they are unable to comment, analyse or expand and describe something in detail' (C2). At the same time, 'more practical subjects' or those felt to be 'easier in terms of language' (D4), such as Mathematics, 'which deal more with numbers and symbols' (D4) were also heavily

affected by limited language skills: 'When students cannot understand the instructions for an exercise, the meaning of a question, then ... they cannot answer, they cannot complete the exercise' (D1).

Generation status was also felt to have an important influence on academic achievement: 'Second-generation students have been born here; they have been through the local primary educational system just like the Cypriot children' (C3). 'They have a much better grasp of the Greek language and their attainment is consequently much higher' (B3). 'They are more likely to succeed academically' (B2) compared to 'minorities of first generation, who came to Cyprus when they were much older, have only partly or not at all attended primary education here and transferred directly into secondary schools with serious language problems' (D1).

Some of the teachers noticed that 'minority children, especially those from poorer families, such as the majority of Georgians, are assigned responsibilities at home at a very young age as their parents work very long hours' (C2), and 'the older children have to help and look after younger siblings' (C2). It was also mentioned that many minority children were in paid employment: 'many minority students ... especially Georgians ... work evenings and nights in order to supplement the family income. They come to school sleepless and tired. Having a job has a serious impact on the attainment levels of these students' (C2). Some teachers felt that there are parents and students who are not concerned by this '... just as long as they make money' (D3). The low priority given to education and low educational expectations were also highlighted: 'What is important for many of the minority students is not their learning, or further studies ... their priority is to get a job that will get them an income' (D3).

Teachers perceived that gender also has a role to play in terms of student attainment. A different tendency was described for male and female students. On the one hand, they argued that 'female students mature earlier than males' (F1, T2), and as such 'they become aware of their role as students more quickly than males' (F1). They are 'more mindful' (L2), 'consistent' (P1, P2) and 'restrained' (F3). 'They work harder than males and as such they achieve higher [attainment]' (P1). A head teacher pointed out that 'girls love and care more about learning compared to boys' (L2). On the other hand, participants suggested that 'boys mature later than girls' (T2). 'They get bored easily during lessons' (T2), and 'they are careless' (P2). Also, they are 'energetic and disobedient' (T2). 'Their priority, at this

age, is still playing rather than studying' (P1, F3). 'They do not spend much time on their school work' (P1).

A lack of interest and effort on the part of some minority students was also suggested as a potential explanation for the attainment gap: 'They make no effort to learn' (C2). 'I see that they do not concern themselves ... they do not try ... they do not make use of the special classes offered to those with deficiencies in the Greek language. Opportunities for learning are there ... but there is no interest from their part' (C3). Other teachers, however, pointed out the lack of opportunities for some minority students: 'not all minority students have the same opportunities for learning outside the school' (A2). This inequality was at least partly associated with the socio-economic status of the family: 'We know that wealthy families help their children by offering them extra support with private lessons. This is very helpful to them ... it can also impact on their language abilities' (C2). At the same time, 'we see that poor students, particularly Georgians, do not benefit from private tuition' (B2), and 'they cannot afford it' (C4).

Interviewees agreed that some minority students are absent from school quite often and that their low attendance might be another consideration which affects their performance: 'Minority students make more absences than native ones ... It is logical, [and] to be expected, that students with higher absenteeism will have a lower attainment' (C4). It was also felt that 'those with the highest levels of absenteeism tended to be the ones least interested in their education. As such, they are unlikely to ask for help from their teachers or fellow students to make up for lost ground' (C4).

5.4.4.2 Family-related Factors

'Low socio-economic status' was believed to 'affect most of minority families and impact on the school life of their children' (B3). The financial hardship of those from Georgia was highlighted most frequently: 'Georgian families are very poor. They work all day long' (A2), and still 'struggle to make ends meet' (C2). 'Regardless of [their] level of education and skills they are usually blue-collar workers' (C1) and will 'do any job in order to put food on their plates' (B3). Parents from other ethnic groups 'are mostly white-collar workers' (A2). 'They are better off financially than Georgians' (C1).

Limited parental involvement in, or supervision of, minority children's learning has been mentioned as a potential contributory factor impacting on attainment: 'These children lack even basic attention and support from their parents' (B1). 'Many minority parents are

never at home ... There are children who wake up in the morning and go to sleep at night without seeing their parents' (B3). 'There is nobody to help, supervise, or offer advice to them' (C1). Limited parental expectations are also thought to be important: 'for these parents, whose priority is to survive and provide food for the family, everything else, including their children's education, is of much lesser importance' (C4). Finally, limited involvement with the school on the part of minority parents is also mentioned: 'they do not have time to devote to their children's education' (B2). 'They do not come to ask how their children are doing in school' (C1), and 'do not come to the meetings with teachers' (D1). However, participants understand that 'it is difficult for parents to leave their job and come to school ... Many are afraid of losing their jobs' (B3).

5.4.4.3 Teacher-related Factors

All the interviewees agreed that they were appointed to schools with minority students without being trained or prepared to deal with multicultural issues: 'We have had no guidance, preparation, or scientific grounding' (D1), 'no help from the Ministry' (B1), and 'no relevant training' (B2) on how to work in a multicultural environment. Some teachers said that 'seminars organised from time to time were very philosophical and theoretical' and indicated that 'training in practical skills relevant to this situation is needed' (B2). Others expressed their frustrations: 'My love for children, my consciousness, and my goodwill are the only tools I have in this job' (D3). 'This is unacceptable from the part of the Ministry. It is like giving you a new airplane full of people to pilot, without any training or guidance' (B2).

Even though the relationship between teachers and minority students has been described as generally good, there have been some indications of a biased or racist attitude on the part of some teachers: 'In our school there are a couple of teachers whose racist attitude is apparent, even though they try to hide it ... They tend to be more lenient with Cypriots and stricter with minority students. Some students might feel that they are being treated unfairly' (B3). 'It is a matter of mentality. Some colleagues might continue to say "this Georgian student did this" ... or "this Georgian student said that" ... even after they have worked in a multicultural environment for a significant amount of time. Their attitude has not changed' (B3). Participants argued that a positive attitude on the part of teachers might have an upbeat effect on student performance, as 'minorities make more of an effort in class in order to repay you' (B2).

5.4.4.4 School-related Factors

The national curriculum which many feel remains essentially monocultural might also have an effect on the performance of minority students. The interviewees agreed that ‘the national curriculum is not suited to a multicultural student population’ (D1), and it was even suggested that ‘it should change completely’ (B1).

Some teachers referred to particular school subjects, such as History, as being difficult for minorities. One of them said: ‘minorities do not understand what I teach them. They are not familiar with the subject and really these things have no meaning or relevance to them. I have, on many occasions, received completely blank test papers in History’ (D3). Nonetheless, another teacher argued that ‘some particular topics in History attract enormous interest on the part of minorities ... topics related to their country of origin or something that they are familiar with’ (C1). The same person expressed the belief that ‘if the syllabus was somehow changed to make it more relevant to these students as well, then they would pay more attention’ (C1). Somebody else offered an example that demonstrates this point: ‘I had a female student who was always completely impervious to everything in the class, but the day we talked about how the Russians were introduced to Christianity, she was concentrating so hard ... and participating ... When we had a mini test on the particular subject she was the most knowledgeable ... The transformation was unbelievable’ (D3).

A high concentration of ethnic minority students in a school was argued to influence student attainment. This opinion was particularly prevalent among teachers from schools with high proportions of ethnic minority students. Several interviewees indicated that having a high number of minority students compared to the rest of the student body in a school creates a favourable environment: ‘In our school Cypriots and minorities are about half and half ... Children from different cultures coexist, grow up, play, and learn together ... this helps in the acceptance of ethnic minority students by other minority groups and especially, by native students’ (F1). Also, a school minority concentration was thought to be related to the teachers’ sense of responsibility for the learning of their students. A deputy head-teacher said: ‘As minority students represent about one half of the student population in our school, we cannot ignore their presence and deal with Cypriots only. Their large number forces us to take them seriously and work with them every day’ (F4). On the contrary, in schools with small numbers of minorities, teachers are thought to have a lower sense of responsibility for minorities’ learning: ‘when a teacher has a class of thirty students, of which only four or five are minorities, he cannot pay much attention to those

four or five who might not understand what is going on in the class ... He will concentrate his efforts on the other twenty-five students' (L2).

Several other teachers highlighted the negative effect of minority concentration on student attainment for all students. One said: 'the proportion of minorities in a class affects the way the lesson is delivered in the classroom. The presence of a large number of minority students with language difficulties in a class dictates the need for a lower quality [of] teaching in terms of [the] language used on the part of teachers, so that more of the minorities are able to understand what is being said' (F2). The same teacher pointed out the consequences of low-quality teaching for high-achieving students. She said: 'under these circumstances, it is up to the teacher to provide the right ammunition to these high-flyers so that they can continue to achieve at the highest level' (F2). A deputy head-teacher mentioned another negative aspect of having a high percentage of minority students in a single school in relation to the use of the local language on the part of minority students. She said that 'when the proportion of minorities in a school is high, minorities tend to hang out mainly with children from their own ethnic background and talk in their own language. This way, they do not practise the local language. We have noticed that minority children learn Greek better and more quickly when they hang out with local students' (F4).

Finally, the relationship between native and minority students in participating schools was mainly described as 'harmonious' (B2), 'perfect' (B3), with 'no racial problems and antipathy' (B2, B3), and 'no expression of confrontation or violence' (B3). There are, however, some indications of racist attitudes on the part of native students. A deputy head-teacher from one school said that 'there is a conflict between natives and minorities. Native students have not yet learned to accept people with different languages and cultures. It takes time ... many years for this to happen' (C3). A teacher from another school admitted that 'there are some minor racist problems ... There are students with a racist attitude, especially towards students from Iraq or Turkey ... students who are Muslims ... Native students do not accept these students as easily as those from European countries' (A1).

5.4.4.5 Society-related Factors

It is argued that racism in society permeates schools through the perceptions and attitudes that children pick up from their parents and other adults. One head-teacher said: 'I believe that we, Cypriots, are very racist ... and the way parents talk about people from other ethnic, cultural, and religious backgrounds encourages racist behaviour in their children' (A2). One of the teachers commented on remarks made by Cypriot parents when realising

that there are minority students in a classroom or school: ‘... look at all these foreigners ... no surprise our children’s education is suffering’ (B3).

5.4.5 Discussion

The traumatic experience of migration and the need of immigrant children to adapt to their new country are perceived to affect school performance of minority students. Earlier studies note that ‘the hardships that surround the migrant lifestyle have a detrimental impact on the educational advancement of students’ (Lopez et al., 2001, p. 254). The perceptions of our sample confirm this analysis.

A lack of proficiency in the dominant language is also thought to put minority students at a disadvantaged position academically. The importance of fluency in the dominant language for minority students’ academic success has been indicated by earlier studies in Cyprus (Martidou-Forsier, 2003; Panayiotopoulos and Nicolaidou, 2007) as well as elsewhere (Callahan, 2005; Demie, 2001). Schmid (2001) in a review paper on language proficiency and school success argued that poor proficiency in the dominant language limits educational achievement. Additionally, the more serious language problems faced by first-generation as compared to second-generation students might partly explain the lower attainment of first-generation students (Ream, 2005; Theodosiou-Zipiti, West, and Lamprianou, 2011; Theodosiou-Zipiti et al., 2011). Students who have been in the host country for a greater length of time and who participated in the local education system longer have been shown to perform better (Driessen, 1995).

Our findings indicate that the teachers perceive minority students’ deficiency in the Greek language to have a serious impact on their performance in all school subjects, and not just those that are more language-dependent. This supports the findings from previous quantitative studies of this issue in Cyprus (Theodosiou-Zipiti, West, and Lamprianou, 2011; Theodosiou-Zipiti et al., 2011). Conversely, it does seem reasonable to assume that the theoretical subjects are more dependent on the use of language and, hence, a lack of language skills would affect these subjects disproportionately.

A number of personal traits attributed to females, such as being conscientious, consistent, mindful, aware of the student role and eager to learn, are perceived to influence attainment positively. All these coincide with Tinklin’s (2003) opinion that females take school more seriously than males. That females mature earlier than males was also pointed out as an issue that favours female student attainment and this is consistent with earlier suggestions

(Eccles et al., 1993). Regardless, this was thought to influence attainment in general rather than act as a differential component, able to account for the attainment gap observed.

The lower socio-economic status of minority families, and especially that of Georgians, is argued to be a very important aspect that adversely influences the attainment of their children. Due to their financial hardship, minority parents often work extremely long hours in order to provide for their families. Their struggle for survival distracts them from the problems confronting their children as they try to adjust to a new school environment. Parents have little time to supervise their children's learning at home or to become involved in school matters, and do not seem to have high educational expectations for them. The favourable effect of high socio-economic status on minority students' educational attainment has been shown in earlier studies in Cyprus (Theodosiou-Zipiti, West, and Lamprianou, 2011; Theodosiou-Zipiti et al., 2011) as well as elsewhere (Pearce, 2006). Parents' involvement in the form of supervision (Izzo et al., 1999), their expectations (Lee and Bowen, 2006) and involvement in school (Demie, 2005), which are facets that have been shown to impact on student learning also emerge from this study as being important.

Several child-related factors mentioned by the interviewees might also stem from the disadvantaged socio-economic status of minority families. As many parents work all day, children are required to do the chores in the house as well as look after younger siblings. Some take on paid employment in order to supplement the family income. Home responsibilities can take minority students' minds off schoolwork and limit their preparation time for school. It has been reported that working students neglect homework and schoolwork (Yap, 1990) and have lower levels of attentiveness and engagement at school (Garvin and Martin, 1999). Previous research also indicated that work has an adverse effect on academic achievement (Robinson, 1999) and increases the likelihood of dropping out of school (Vickers, 2002). In addition, teachers perceive that students do not have high educational expectations for themselves, arguing that their minds are focused on the need to acquire a job to earn money rather than on studying. This can also be a reason for students' limited interest in their learning and the personal effort they make as well as for their relatively high absentee rates. The low attendance can also be partly explained by the need to rest for those who work nights. Students' low educational expectations (Marjoribanks, 2003), taking a limited interest in learning and making little effort towards learning (Uhlenberg and Brown, 2002) and low school attendance (Rumberger and Larson, 1998; Theodosiou-Zipiti, West, and Lamprianou, 2011) have all been linked to lower

academic attainment levels. It has also been suggested that many minority families cannot afford to offer their children extra help in the form of private tuition; in sharp contrast to the majority of native families.

All the above-mentioned elements contribute to the explanations of the different attainment levels previously observed in Cypriot schools (Theodosiou-Zipiti, West, and Lamprianou, 2011; Theodosiou-Zipiti et al., 2011). Georgians, in particular, the poorest of the immigrant groups, tend to do worse; whereas other immigrant groups do better than Georgians and are considered to be better-off financially. Finally, Cypriots do best and are the wealthiest group. The link between socio-economic status and attainment has also been shown elsewhere (Fryer and Levitt, 2004; Pearce, 2006).

Maslow (1943) proposed a theory classifying human needs hierarchically. The more basic needs are at the bottom and must be satisfied first. The needs in ascending order in the lower four layers of the pyramid are physiological needs (e.g. sleep, food, and water), safety needs (e.g. clothing, shelter, justice), social needs (e.g. sense of belonging, the need to love and be loved), and esteem needs (e.g. respect, self-esteem).

Drawing from the above, it appears that minority students are expected to succeed academically when their more basic needs have not even been satisfied. Their priority, as highlighted through some comments, is to work hard and earn money to meet their physiological and safety needs. Their social and esteem needs are not met either, because, in the school environment and in the rest of society they might not feel accepted or loved. Education is part of self-actualisation, which is a much higher point in the pyramid. Even though there are some who question Maslow's hierarchy of needs (Wahba and Bridgewell, 1976), it appears to offer a template on which a logical argument can be built for the reasons affecting minority attainment.

The teachers' inadequate training and support, alluded to by the interviewees, are other unfavourable factors for minority students' education. The participants acknowledged that they feel unprepared to work in a multicultural school environment and that they need more practical guidance. This has been identified previously (Angelides et al., 2007; Martidou-Forsier, 2003; Panayiotopoulos and Nicolaidou, 2007). In addition, some evidence of teachers' biased or racist attitudes towards minority students has been uncovered in this study. The teachers themselves admit that this can make minorities feel that they are treated differently from native students. A study by Afantiti-Lamprianou et al.

(2008), found that Cypriot teachers display ethnocentric, biased and even xenophobic characteristics. There is some evidence that negative perceptions of teachers (Gillborn, 1995) or school racism (Codjoe, 2001) might have an impact on the performance of minority students.

In terms of school factors, some teachers have blamed the ‘irrelevant’ school curriculum that has not been adapted to account for the increasingly diverse student population, for the lack of interest and motivation displayed by minority students in some school subjects. Oikonomidou (2003) pointed out the need to modify the national curriculum to make it more relevant to all and give every child the same opportunity for learning.

With regard to school minority concentration, teachers from schools with high percentages of minority students indicated both the positive and negative effects on student achievement. The high proportion of minority students in a school is seen as conducive to learning by fostering an accepting environment towards minority students and by encouraging teachers to develop a strong sense of responsibility for minorities’ learning. In an earlier study in Cyprus (Theodosiou-Zipiti, West, and Muijs, 2010) the character of the school environment and the degree of teachers’ sense of responsibility for minorities’ learning have been identified as influential in the attainment of ethnic minority students. This finding could partially explain the reported finding of the quantitative study by Theodosiou-Zipiti et al., (2011) that high minority student concentration has a positive effect on student attainment. Nevertheless, having a high proportion of minority students at one school is also argued to be related to lower-quality teaching in terms of the language used in the class (arguably limiting the attainment of native high-achievers rather than minority students) and a higher likelihood that minority students will hang out with other minorities and thus miss out on the opportunity to use the Greek language with their Greek-speaking friends. The negative effect of having a high concentration of minority students, which was identified in the present study, is in agreement with many earlier international studies that found a high proportion of minority students in schools to be related to lower achievement levels for majority and minority students (Schnepf, 2004), or especially for minorities (Goldsmith, 2004; Hoxby, 2002).

Finally, racist attitudes on the part of native students might also impact on minority students’ learning. There is evidence that racism and discrimination exist at both school and societal level (ECRI, 2011). Social racism in Cyprus (ECRI, 2006; Trimikliniotis and Pantelides, 2003) as well as the identification of racist and xenophobic attitudes and

behaviours within the family (Afantiti-Lamprianou et al., 2008) have been reported previously. Racism towards students of particular ethnic groups or religions, such as Turks or Muslims, might be related to the historical ethnic conflicts between Greeks and Turks and the 1974 Turkish invasion, after which 'each group constructs its ethnic identity through learning to hate the Other' (Zembylas, 2007, p. 183). Sadly, these findings indicate that schools have no policies for tackling racism. On the contrary, the many nationalistic elements of the Cypriot educational system, identified by earlier researchers (Fragoudaki and Dragona, 1997; Philippou, 2007), might encourage racism.

Looking at the factors relevant to teachers, school, and society together, an obvious deficiency within the current educational system is identified. Inadequate teacher training, the limited sense of responsibility teachers have for minorities' education, a curriculum which is mostly irrelevant to minorities, particularly in subjects such as History, the expression of biased or racist attitudes from teachers and native students towards minorities, and the permeation of racism from outside to inside the schools, all suggest that the educational system is not appropriately organised to accept and educate students from different ethnic backgrounds.

Interrelation of those aspects relevant to the child and family would suggest that the low socio-economic status of minority families is a major reason for the low attainment levels of minority students. The concept that the socio-economic status of minority families and the character of the current educational system are the main reasons for the attainment gap between native and ethnic minority students in Cyprus has been previously suggested by Theodosiou-Zipiti, West, and Muijs (2010). That our conclusions agree with those published earlier should increase confidence in our results.

We feel that the findings from this study are useful to education researchers and can help to shape appropriate school policies within the framework of an initiative for educational reform in Cyprus that has been announced recently. Based on the results of this and previous studies, the need for change and improvement in educational practice is imperative. Schools have a responsibility to ensure that all students, both native and minority, are able to achieve their full potential. A number of suggestions can be made.

■ Reception classes should be established in which students new to Cyprus are able to increase competency in Greek language through intensive tuition prior to joining mainstream schools.

- Support should be provided to newly-arrived students within the school system to help them understand and adjust to the requirements and expectations of the Cypriot school system.
- Parents should be encouraged to engage more with school and with their children's school life.
- Multicultural and antiracist training programmes should be offered to all teachers as a matter of priority.
- The teachers appointed to schools with a significant number of minority students should initially be selected on a volunteer basis. This might keep teachers with racist feelings away from such schools, until appropriate training has been provided to all.
- Bilingual teachers should be employed and appointed in those schools with a significant proportion of ethnic minority students in order to facilitate communication between teachers and students as well as with parents.
- The national curriculum needs to be modified to accommodate the needs of all students and become more relevant to all learners.
- School policies that respect and care for students from all ethnic backgrounds as well as clear antiracist policies should be implemented in all schools.
- The socio-economic problems of families should be addressed by the state through welfare schemes. The state also has an important role to play in making sure that immigrant children are not exploited through illegal employment.

Findings from this study are based on interviews conducted in a relatively small number of schools. The fact that the results are based on the perceptions of teachers and do not include the views of parents, students and others might mean that a skewed picture of attitudes or circumstances is painted. We believe, however, that a number of points strengthen the validity of our study. To begin with, our results are in agreement with both local and international literature. In addition, the data from this study has been derived from participants of different gender, age, hierarchy, and experience, and from different schools. Nevertheless, all data has come from teachers, and while we feel this study has produced an accurate picture of teachers' views, more research into the perspectives of students themselves or their parents would be useful to further explore the issue.

The conclusions from this study can, firstly, add to the existing research in the island and advise policy makers, teachers and the general public. Secondly, the findings can be used to inform international literature by providing information on ethnic minority groups not met before and also by adding to the debate on aspects responsible for the attainment gap.

Lastly, we have identified in this study a number of influences perceived by teachers to be contributory to the low academic achievement of ethnic minorities in secondary schools in Cyprus. The evidence suggests that the socio-economic status of ethnic minority families, language problems, and the deficiencies of the current educational system are all key elements. Some suggestions for further exploration of the issue are also made, together with proposals that might make it easier for immigrant children to achieve their potential in secondary schools in Cyprus.

5.5 Factors Influencing Attainment Levels among Ethnic Minority Students in Cyprus: Revisiting the Influence of Language

Galatia Theodosiou-Zipiti, Iasonas Lamprianou, Mel West
School of Education, The University of Manchester, Oxford Road,
Manchester, M13 9PL, UK

5.5.1 Abstract

Research in Cyprus, an EU member displaying rapid demographic changes typical to those seen in other EU member states, demonstrates that ethnic minority students underperform. Deficiency in the local language is considered one of the main factors behind this. There is a belief that language problems lead to lower attainment levels in those subjects that are more language-dependent. Here, we confirm that ethnic minority students underperform and show that while overall attainment levels are lower, ethnic minority students do not perform less well in subjects considered more language-dependent. Recommendations are offered regarding how policy-makers might respond to these findings.

Keywords: ethnic minority, attainment, multilevel, multicultural education, language

5.5.2 Introduction

The demography of school populations in Cyprus has changed rapidly from mono-cultural to multicultural. This followed three landmark events in the recent history of Cyprus: the abandonment of a restrictive immigration policy by the government in the 1990s (in order to meet labour shortages), the partial lifting of movement restrictions across the ‘Green line’ (which separates the northern part of Cyprus – controlled by Turkey – from the south) in 2003, and the accession of the island into the European Union in 2004. By 2005, the total number of non-Cypriot residents was estimated to be about 80,000, a number which corresponds to approximately 10% of the total population of the south part of the island (Trimikliniotis and Demetriou 2005). This rapid demographic change is very much in line with what has happened or is happening now in other EU member states such as the Czech Republic (Moree, Klaassen, and Veugelers 2008), Latvia (Brands-Kehris and Landes 2007), and Poland (Krzywosz-Rynkiewicz, Wolodzko, and Strzemecka-Kata 2006).

The resident population of Cyprus is made up chiefly of the native Greek Cypriots, who represent the overwhelming majority of citizens, though there are several other readily identifiable groups. There are Greek people from the mainland, and there are small

numbers of Turkish-Cypriots. Then there are the Roma or ‘Gypsies’, who are also considered to belong to the Turkish Cypriot community, and also those who are recognised in The Constitution as three distinct ‘religious groups’, Maronites, Armenians and Latins. Finally, Pontians comprise the largest immigrant group in Cyprus, having moved there from the Northern Black Sea region (from countries such as Russia, Georgia, and Ukraine) after the collapse of the former Soviet Union (Trimikliniotis and Demetriou 2005; Theodorou 2011; Theodorou and Symeou 2012).

The changes seen in the demographic make-up of the island can also be seen in its schools. The larger number of minority students in primary schools come from Georgia, Bulgaria, Romania, Greece and the United Kingdom (Ministry of Education and Culture 2012). The numbers of minority students seems to increase year-on-year. During the academic year 2006-07 the percentage of non-native-language students in primary schools was 7.3% (3951 students), but this percentage had jumped to 12.0% (6047 students) by the academic year 2010-11 (Ministry of Education and Culture 2012). Even though no data has been reported for secondary schools, one would expect a similar picture as children move up through the educational system.

From previous studies in secondary schools in Cyprus (Theodosiou-Zipiti et al. 2011; Theodosiou-Zipiti, West, and Lamprianou 2011) we know that ethnic minority students underachieve compared to their native counterparts. A major part of this underachievement has been ascribed to their deficiencies in the Greek language (e.g., Spyrou 2004; Symeou et al. 2009; Theodorou and Symeou 2012). There is a widely held belief that ethnic minority students tend to do even less well in those subjects that are more language-dependent. Although, on the face of it, this does sound like a reasonable proposition, the current study sets out to test whether this is true, especially when evidence from some qualitative studies (see for example Theodosiou-Zipiti and West 2012) does not support this.

5.5.3 Literature review

Studies carried out by Theodosiou-Zipiti, West, and Muijs (2010) and Theodosiou-Zipiti and West (2012) concentrate on the examination of factors affecting the attainment levels of ethnic minority secondary-school students in Cyprus as perceived from teachers’ perspectives. Scrutiny of the factors identified by teachers suggests that there are two main factors affecting attainment; the socioeconomic status of minority families and the traditional culture of the local educational system. Other researchers have also commented

on these issues in Cyprus, and a brief summary of the evidence for each of these factors is presented below.

Looking at the socioeconomic status of minority families, there is evidence that a significant proportion of immigrant families in Cyprus live in poverty. Spyrou (2004), describing the poor living conditions of Roma people, reports that many of their houses lack even basic necessities, such as electricity, water supply and facilities for hygiene. Some parents are too poor to buy school clothes for their children, or even to provide food for them, as unemployment seems to be a common problem among these families. Georgian families have also been depicted showing similar characteristics (Theodosiou-Zipiti, West, and Muijs 2010; Theodosiou-Zipiti and West 2012).

The financial circumstances of ethnic minority families appear to have an impact on the education of their children. When hunger is the problem, we see that children's education assumes lesser importance. Some Roma and Turkish-Cypriot parents avoid sending their children to school, because they cannot wash and clean their clothes (Spyrou 2004). It is not uncommon for Georgian students to wake up in the morning and go to sleep at night without even seeing their parents, who are forced to work long hours to make ends meet. In such a situation, parents do not have time to pay proper attention to their children or to get much involved in their education. They do not supervise their children's learning at home, are rarely involved in school matters; nor do they hold high educational expectations for them (Theodosiou-Zipiti, West, and Muijs 2010; Theodosiou-Zipiti and West 2012). Furthermore, many Georgian children are assigned domestic responsibilities that native students would not be expected to undertake. For example, they might be expected to look after younger siblings (Theodosiou-Zipiti and West 2012) or to work evenings and nights themselves in order to supplement the family income. This often leads to them going to school sleepless, tired, and unprepared, but also leads to high levels of absenteeism (Theodosiou-Zipiti, West, and Muijs 2010; Theodosiou-Zipiti and West 2012).

Focusing on the traditional culture within the Cypriot educational system, there is evidence that many teachers lack the skills and appropriate training to cater for multi-ethnic classrooms (Trimikliniotis and Demetriou 2004; Panayiotopoulos and Nicolaidou 2007; Karagiorgi et al. 2009; Symeou et al. 2009; Theodosiou-Zipiti and West 2012). Many teachers are also found to have stereotypical views of immigrants (Symeou et al. 2009), and sometimes xenophobic attitudes (Afantiti-Lamprianou, Xatzitheodoulou-Loizidou, and Michaelidou-Evripidou 2008), and even racist attitudes towards ethnic minority students

(Zembylas 2010; Theodosiou-Zipiti and West 2012). Further, the way that teachers assess students in Cyprus has been the focus of a case-control study in the island (Alexandrou 2006). From this study one can see that the assessment methods commonly used by teachers are biased against minority students.

Furthermore, researchers point out the inadequacy and unsuitability of the national school curriculum for a multicultural student population (Theodosiou-Zipiti and West 2012). The curriculum is believed to be relevant to “a uniform, homogeneous population of Greek, white, Greek-speaking, Christian-Orthodox children” (Trimikliniotis, Demetriou, and Papamichael 2012, p.16). Its content may well appear alien and distant to students from other ethnic backgrounds (Trimikliniotis and Demetriou 2004).

In addition, the school environment often appears to be unfavourable to ethnic minority students. They are frequently socially isolated and marginalised (Angelides, Stylianou, and Leigh 2004; Karagiorgi et al. 2009; Symeou et al. 2009; Theodosiou-Zipiti, West, and Muijs 2010; Theodorou and Symeou 2012). It is also reported that they experience stereotyping, xenophobia, prejudice, and discrimination, as well as racism from Greek-Cypriot peers (Panayiotopoulos and Nicolaidou 2007; Symeou et al. 2009; Theodosiou-Zipiti and West 2012; Zembylas, Michaelidou, and Afantiti-Lamprianou 2010).

There have been suggestions that part of the negativity and hostility against ethnic minority groups permeates into schools from the wider society. It is well documented that Cypriot society is negatively predisposed and hostile towards individuals who are not-Greek-Cypriot in origin (Gouliamos and Vryonides 2010). In several studies, Greek-Cypriot parents have been found to transmit attitudes, values, and beliefs to their children (Spyrou 2004; Afantiti-Lamprianou, Xatzitheodoulou-Loizidou, and Michaelidou-Evripidou 2008; Symeou et al. 2009; Theodosiou-Zipiti and West 2012), thus passing on their stereotypes and prejudices about ethnic minorities to the next generation.

All of the above studies add to the debate regarding the education of minority students in the island. Several other researchers suggest that the attainment levels of ethnic minorities is poor (Spyrou 2004; Panayiotopoulos and Nicolaidou 2007; Symeou et al. 2009) though they offer no data to back their claims. Poor attainment levels among ethnic minority students is mainly attributed to the serious problems that students experience with Greek, the official school language, which affects adversely both their oral and written

performance (Spyrou 2004; Alexandrou 2006; Symeou et al. 2009; Theodorou and Symeou 2012).

There have been studies looking specifically at the attainment of ethnic minority students in secondary schools in Cyprus. For example, in an earlier study the authors (Theodosiou-Zipiti, West, and Lamprianou 2011) show that students from two ethnic minority groups perform significantly less well when compared with native students. It is also shown that low attendance rates, low levels of parental education, low status parental occupation, low immigration-generation status, and being a male student all have a significant and negative effect on school attainment levels. In this study, students from all school years were pooled together for the regression analyses, due to the relatively small sample size (769 students from 2 schools). Also, the attainment indicator was based on grades from only two subjects (Modern Greek and Mathematics). In this study, data was analysed using multiple regression models (OLS), based on measures of attainment derived from a Rasch analysis of teacher assessments of students' academic performance over three trimesters.

A second study (Theodosiou-Zipiti et al. 2011) used a similar methodology to that described above, but with some important modifications, including: an increase in the number of schools from two to six and the number of students from 769 to 2023; in addition to Modern Greek and Mathematics, attainment levels in two additional subjects were considered (Physics and History); data relating to a wider set of school background variables were collected and included in the analysis. The results from this second study closely mirrored those from the first. Additionally, the school variable *high ethnic minority concentration* was shown to have a significantly positive effect on attainment levels (i.e. minority students tend to achieve higher levels of academic performance in schools that have a higher proportion of minority students).

In both papers mentioned above, the authors employed a two-step analysis where the three trimester teacher assessments were considered to be repeated measures of academic attainment. These were then transformed into a single linear measure of academic attainment for every student through a Rasch analysis. At the second step of the procedure, the output of the Rasch analysis was fed into an OLS regression model as a dependent variable. This two-step approach - arguably more laborious and complex - worked well for the intents and purposes of these two studies. It would, however, be interesting to see whether simpler and more parsimonious methods of analysis would produce similar results

One possible shortcoming of both studies was the fact that only one measure of academic attainment was used. This could lead to misleading results if the measure is biased in favour of or against groups of students. Recent research using academic attainment data from secondary schools in Cyprus has shown that teacher assessments may not always give the same outcomes as examination results (Lamprianou and Christie 2009). As Lamprianou and Christie (2009) caution, some students ‘please’ teachers, and some students ‘please’ tests, and often they do so across many or the full range of subjects. As a consequence, combining teacher assessment with test results could increase the validity of a study by reducing the probability of assessment bias (Koretz 2003).

Finally, a review of the database used for the second study (Theodosiou-Zipiti et al. 2011) reveals that the number of students in each year group with ‘perfect scores’ (i.e. those students consistently achieving the top grades across subjects) is relatively high. Given that a pronounced ‘ceiling effect’ has the potential to hinder efforts to compare the performance of different groups of students or to identify factors associated with high attainment levels, in the study reported here we decided to enhance the dependent variable with additional measures of attainment. This should help offset any ‘ceiling effect’.

As noted above, in the literature, there is an interesting proposition that among ethnic minority students there might be a differential attainment in different school subjects (Spyrou 2004, Theodosiou-Zipiti and West 2012). This is thought to be because some subjects, such as Mathematics and Physics, are more dependent on numbers and symbols, whereas other subjects, such as Modern Greek and History, are more language-dependent and consequently more difficult for language-deficient minority students to follow and understand. For example, Spyrou (2004), based on classroom observations and subsequent interviews with teachers about the educational needs of Turkish-speaking students, concluded that even though their overall performance level is weak, they “do better in courses where knowledge of Greek is not as important, for example, maths, physical education, etc” (p.11).

An interview study by Theodosiou-Zipiti and West (2012) raised questions about the extent to which language is a ‘major obstacle’ which affects the attainment level of ethnic minority students in subjects that are considered both more and less language-dependent. This is the only previous qualitative study in Cyprus that has looked specifically at the attainment levels of ethnic minority students from the perspective of teachers delivering two subjects generally considered to be more language-dependent – Modern Greek and

History – and two which are considered less language-dependent – Mathematics and Physics. Reviewing the raw interviews transcripts generated by this study, it is clear that the view that ethnic minority students tend to do less well in the more language-dependent subjects is one shared by many teachers- across the subject range. For example, one teacher who teaches Modern Greek and History proposes that ethnic minority students “have more difficulties in Modern Greek and History, as these subjects demand good comprehension and ability in expressing oneself”. In the same vein, a Mathematics teacher notes that the subject of Mathematics is easier for minority students as “it combines language with numbers and symbols which are universally understood”. Similarly, a Physics teacher points out that “Physics is not as difficult for minority students, because it deals mainly with numbers, symbols, terms, and equations which are common whatever the language, (...) and does not necessitate use of many words to explain” (Theodosiou-Zipiti 2007, unpublished data).

To our knowledge, however, there are no quantitative studies looking specifically at the possibility of differential attainment levels between more and less language-dependent subjects among ethnic minority students.

Consequently, the present study aspires to:

1. Investigate whether the academic attainment level of ethnic minority students is lower for more language-dependent subjects (such as Modern Greek and History) compared to less language-dependent subjects (such as Physics and Mathematics).
2. Strengthen the validity of results from previous studies, by using final examination results as well as teacher assessments as indicators of students' academic performance.

5.5.4 Methodology

5.5.4.1 School and student sample

The participants are all students (N=2020) enrolled in six gymnasia (lower secondary schools) from four different cities of the island (Nicosia, Limassol, Paphos, and Larnaca), selected using stratified sampling procedures in the academic year 2004-05. In line with the study by Theodosiou-Zipiti et al. (2011) we divided our participants into groups: two ethnic minority groups and the native group. The two ethnic minority groups identified in the study consist of 258 Georgians (known locally as ‘Rossopontioi’ or ‘Ellinopontioi’), and 266 ‘Others’ (a group of students coming from different smaller ethnic groups, such

as, Russians, Rumanians, British, Africans, and Americans). The rest of the sample belongs to the group Natives (N=1496).

5.5.4.2 Dependent variables

Two different measures for student attainment are used in this study. Firstly, grades awarded by teachers over three consecutive trimesters (one academic year) in four school subjects (Modern Greek and History, which are commonly believed to be more dependent on language ability, and Mathematics and Physics, which are considered less dependent on language ability). Secondly, scores from end-of-year examinations in these subjects. The large number of grades and scores from a variety of subjects should help decrease the possibility of bias. It is worth mentioning that, certainly at the time of data collection, these four subjects were considered by the Ministry of Education in Cyprus as the most important in the curriculum, and because of this, were the only four subjects to be examined through end-of-year exams.

The final exam scores are reported by schools in a numeric form on a scale ranging from 0 to 20. The trimester grades, though, are recorded in ordinal form (A, B, C, D, E) where A indicates the highest possible performance. They are transformed to a numeric form following the marking system in use in schools in Cyprus: According to the scheme, grade A corresponds to a numerical score range from 19 to 20; grade B covers the range 16 to, but not including, 19; grade C the range 13 to, but not including, 16; grade D the range 10 to, but not including, 13; and finally grade E represents a numeric indicator of performance below 10. For each grade-range a single number is then chosen as the indicator of student attainment: 19.5 for grade A, 17 for grade B, 14 for grade C, 11 for grade D and 8 for grade E. This conversion score is taken from the scheme that is followed by the Pancyprian Examination Board (University entrance exams) (Ministry of Education and Culture 2008).

Two dependent variables are created for the purposes of the analyses of this study. The first one, the *Trimesters Overall attainment*, is the average of the trimester grades of the four examined subjects. This overall score is based on twelve measurements (3 grades x 4 subjects = 12 scores). When divided by twelve, this gives the average attainment over the four examined subjects which may be reported as a number out of 20 (range 0-20). This facilitates comparisons with the final examination scores, and is also the method used by the Ministry of Education in Cyprus when reporting student attainment. The second dependent variable, the *Combined Trimesters and Final Exams Overall attainment*, is based on the *Trimesters Overall attainment* and the scores from the final exams in the four

examined subjects. This overall score for each student is based on sixteen measurements (12 scores from trimesters + 4 scores from end-of-year exams = 16 scores). Once again, for the sake of consistency and to facilitate comparisons, the average score is reported as a number out of 20. Each dependent variable is treated independently in separate statistical analyses as a continuous variable.

The appropriateness of combining trimester grades and final exam scores has been considered prior to the creation of the above variable, as the different measurements might reflect slightly different things. The trimester grades mainly reflect an aggregation of a number of teacher-administered paper-and-pencil tests, as well as informal continuous - mainly oral - assessments made in the class over the time period in question. Trimester grades are based on assessment of material from the national curriculum taught during the term. Teachers also take into consideration the overall performance of students in the class; for example, whether they consistently participate or do their homework regularly. The final exam score reflects the performance of students on a single written paper-and-pencil test for each one of the examined subjects, and is based on material from the national curriculum taught during the whole year. Recent research in the same context has suggested that combining teacher assessment and end-of-year examination results can give a more complete and less biased picture of student attainment and is therefore desirable (see the discussion by Lamprinou and Christie 2009). Further, combining the two measures of academic performance helps, partially at least, to deal with the ceiling effect which might have otherwise impacted on the validity of the results. Finally, this methodology is in line with the method followed by the Ministry of Education in Cyprus when computing student attainment scores (i.e., the average attainment score for each subject is a product of the semester grades (75% weight) and the end-of-year exam for that subject (25% weight)).

5.5.4.3 Independent variables

The continuous variables that are used as independent variables in this study are: *age*, measured in months, and *absences*, measured as the number of absences from all teaching periods in the four examined subjects. An overall number of absences is also constructed, *overall absences*, which combines the number of absences from the four examined subjects for the whole academic year.

The categorical independent variables are: *ethnicity* (Natives, Georgians, and 'Others'), *gender* (male and female), *parental education* (primary education, secondary education,

and further studies), *parental occupation* (manual unskilled workers, manual skilled workers, civil servant and private workers, educators and senior civil servants and senior private workers, and professionals and chief managers), *generational status* (natives, first generation, and second generation), *school*: school A, school B, school C, school D, school E, and school F), *school size* (small - up to 250 students -, medium - up to 450 students -, and large - up to 700 students -), *school minority concentration* (low - up to 25% - and high - more than 25% -), and *year group* (first year group, second year group, third year group).

For more details about the way independent variables are constructed, the coding of variables, sources of information and ethical considerations, see Theodosiou-Zipiti et al. (2011) and Theodosiou-Zipiti, West, and Lamprianou (2011).

5.5.4.4 Methods of analysis

Two regression analyses were run; one with *Trimesters Overall attainment* as the dependent variable and the other using the *Combined Trimesters and Final Exams Overall attainment*. The purpose of the former analysis is to establish whether the use of a more parsimonious procedure gives similar results to those obtained in previous studies (e.g. Theodosiou-Zipiti et al. 2011). The latter analysis will allow comparisons with a richer attainment indicator, as discussed by Lamprianou and Christie (2009). The purpose of the regression analysis is to explain the effect that each independent variable has on the dependent variable, whilst controlling for other variables in the model. The models also determine the statistical significance of this effect. The statistical package *R* was used for the multiple regression analysis.

Multi-level regression analysis is also employed, using the *Combined Trimesters and Final Exams Overall attainment* as the dependent variable. Multi-level analysis is the appropriate way to deal with data that have a “hierarchical or clustered structure” (Hox 1998, p.147). This is because single-level analysis (e.g., multiple regression) ignores the presence of clustering (Goldstein 1998) and this might lead to falsely accepting random variation as a real effect (Buxton 2008).

It should be mentioned that some outliers with high proportion of absences were identified in the dataset. We used a number of different techniques (i.e., square root, logarithmic transformation of absences, and exclusion of outliers) to see if any of these could affect the

results; as it turns out results were similar. For the sake of ease of interpretation, the final non-transformed models were preferred.

The Linear Mixed Effects (*lme4*) package (that offers the '*lmer*' function) was used for the multi-level regression analysis. The assumptions of the models were investigated and were found to be satisfactory for all practical intents and purposes of the study.

5.5.5 Analysis

Initially, separate models were run for each one of the four subjects examined. Separate models were also run for the trimester scores and the final-exam scores, as well as for each year group (results not shown). However, as findings were very similar, for reasons of practicality and simplicity, the scores from the four different subjects were combined creating an overall attainment score, and students from all year groups were pooled together. Here, one multiple regression model is run for the *Trimesters Overall attainment* and one for the *Combined Trimesters and Final Exams Overall attainment*. As both scores are treated as continuous variables, ordinary least-squares regression models are estimated. To build the models, a manual forward/stepwise selection procedure is employed. At some stage of the process, two cases of multicollinearity emerged (the first, between the variable *ethnicity* and the variable *generational status*, and the second, between the three school variables: *school*, *school size*, and *school minority concentration*). To resolve this problem, the variables *generational status*, *school size*, and *school minority concentration* have been excluded from the models. The variables *ethnicity* and *school*, as well as the majority of the remaining factors examined, that is *absences*, *gender*, *parental education*, and *parental occupation*, remain in the models. These appear to be significant explanatory variables of student attainment. The significance of each factor is examined by comparing nested regression models (see Hutcheson and Sofroniou 1999, p.94-5) (analyses not shown). *Age* and *year group* appear as non-significant, when other factors are taken into account, and are excluded from the final models presented in this study. Additional regression models are run with the variables *generational status*, *school size* and *school minority concentration*, in order to examine their effect on student attainment as well.

A single multi-level linear model is built, with the *Combined Trimesters and Final Exams Overall attainment* as a dependent variable. The majority of factors employed in the multiple regression analysis earlier are used here too; that is, *absences*, *gender*, *ethnicity*, *parental education*, *parental occupation*, *school*, *year group*, and *age*. In addition, as the aim here is to investigate whether there are any differences in terms of student attainment

across the different subjects, a new categorical (indicator) variable, *subject*, is created to include the four examined subjects. This way, instead of having one overall attainment score, each student has four records, one record for every subject score, in accordance with the example of Faraway (2006, p.195; also see the example of Gentleman et al 2012) (in effect, this is a repeated measures design with four measures/subjects per student). Each subject's score is made up of the average of the grades of the three trimesters and the end-of-year exam score.

This two-level model has the dependent variable and the independent variables at level one of the hierarchy, and the individual students at level two. In effect, the model incorporates both fixed and random effects: individual students are treated as random effects and the independent variables as fixed effects. The model is built employing a manual forward procedure. From the individual variables examined, *overall absences*, *gender*, *parental education*, *ethnicity*, *parental occupation*, *school*, and *subject* have a statistically significant effect on student attainment and remain in the model. By contrast, the variables *age* and *year group* do not appear to have a significant effect on student attainment and are therefore eliminated from the model.

Finally, an interaction between the variables *subject* and *ethnicity* is added to the model (placed at level-one and treated as a fixed effect). The aim is to check for differential attainment across the three different ethnic groups in the four subjects examined. The assumption here is that ethnic minority students have lower average attainment levels in subjects that are regarded as more language-dependent.

5.5.6 Findings

This section presents and discusses the findings derived from the two multiple regression analyses - one for the *Trimesters Overall attainment* (Table 21) and one for the *Combined Trimesters and Final Exam Overall attainment* (Table 22) - and one multilevel regression analysis for the *Combined Trimesters and Final Exam Overall attainment* (Table 23). Findings concerning the variables *generational status*, *school size*, and *school minority concentration* are derived from models not shown here because of limitations of space. The significance level of the examined variables in the multiple regression analyses is determined by the *P*-value ($P < 0.05$) and the multilevel regression analysis by the *T*-value ($T > 2$).

Table 21: Parameter Estimates of the Trimesters Overall Multiple Regression Analysis

| <i>Factors</i> | <i>Estimates</i> | <i>Std. Error</i> | <i>T-value</i> | <i>P-value</i> |
|--|------------------|-------------------|----------------|----------------|
| (Intercept) | 16.58 | 0.33 | 50.84 | <0.01 |
| OVERALL ABSENCES | -0.07 | 0.00 | -20.07 | <0.01 |
| GENDER (ref. cat. = Female) | | | | |
| Male | -1.62 | 0.11 | -14.55 | <0.01 |
| PARENTAL EDUCATION (ref. cat. = Primary Education) | | | | |
| Level 1 - Secondary Education | 0.37 | 0.14 | 2.70 | <0.01 |
| Level 2 - Further Education | 0.48 | 0.06 | 7.79 | <0.01 |
| ETHNICITY (ref. cat. = Natives) | | | | |
| Georgians | -1.30 | 0.20 | -6.46 | <0.01 |
| 'Others' | -0.88 | 0.17 | -5.16 | <0.01 |
| PARENTAL OCCUPATION (ref. cat. = Unskilled Manual Workers) | | | | |
| Skilled Manual Workers | 0.49 | 0.23 | 2.13 | 0.03 |
| Civil Private and Public Workers | 0.87 | 0.22 | 4.01 | <0.01 |
| Teachers and Higher Private and Higher Public Workers | 1.72 | 0.25 | 6.81 | <0.01 |
| Professionals and Chief Managers | 1.90 | 0.35 | 5.41 | <0.01 |
| SCHOOL (ref. cat. = School A) | | | | |
| School B | -1.01 | 0.27 | -3.73 | <0.01 |
| School C | -1.03 | 0.30 | -3.42 | <0.01 |
| School D | -0.81 | 0.27 | -2.96 | <0.01 |
| School E | 0.79 | 0.28 | 2.82 | <0.01 |
| School F | -0.65 | 0.30 | -2.20 | 0.03 |
| Model Equation: <i>Trimesters Overall Attainment</i> ~ <i>overall absences</i> + <i>gender</i> + <i>parental education</i> + <i>ethnicity</i> + <i>parental occupation</i> + <i>school</i> | | | | |
| Model Summary: Residual standard error: 2.49 on 2004 degrees of freedom, Multiple R-squared: 0.38, Adjusted R-squared: 0.38, F-statistic: 82.59 on 15 and 2004 DF, P<0.01 | | | | |

Table 22: Parameter Estimates of the Multiple Regression Analysis for the Combined Trimesters and Final Exams Overall Attainment

| <i>Factors</i> | <i>Estimates</i> | <i>Std. Error</i> | <i>T-value</i> | <i>P-value</i> |
|--|------------------|-------------------|----------------|----------------|
| (Intercept) | 15.98 | 0.37 | 43.31 | <0.01 |
| OVERALL ABSENCES | -0.08 | 0.00 | -21.78 | <0.01 |
| GENDER (ref. cat. = Female) | | | | |
| Male | -1.75 | 0.13 | -13.92 | <0.01 |
| PARENTAL EDUCATION (ref. cat. = Primary Education) | | | | |
| Level 1 -Secondary Education | 0.42 | 0.16 | 2.71 | <0.01 |
| Level 2 - Further Education | 0.57 | 0.07 | 8.12 | <0.01 |
| ETHNICITY (ref. cat. = Natives) | | | | |
| Georgians | -1.57 | 0.23 | -6.90 | <0.01 |
| 'Others' | -1.02 | 0.19 | -5.23 | <0.01 |
| PARENTAL OCCUPATION (ref. cat. = Unskilled Manual Workers) | | | | |
| Skilled Manual Workers | 0.59 | 0.26 | 2.28 | 0.02 |
| Civil Private and Public Workers | 1.03 | 0.24 | 4.23 | <0.01 |
| Teachers and Higher Private and Higher Public Workers | 2.01 | 0.29 | 7.05 | <0.01 |
| Professionals and Chief Managers | 2.19 | 0.40 | 5.52 | <0.01 |
| SCHOOL (ref. cat. = School A) | | | | |
| School B | -1.18 | 0.31 | -3.85 | <0.01 |
| School C | -1.07 | 0.34 | -3.15 | <0.01 |
| School D | -1.15 | 0.31 | -3.68 | <0.01 |
| School E | 0.43 | 0.32 | 1.36 | 0.17 |
| School F | -0.66 | 0.34 | -1.98 | 0.05 |

| |
|--|
| Model Equation: <i>Trimesters and Final Exams Overall Attainment</i> ~ <i>overall absences</i> + <i>gender</i> + <i>parental education</i> + <i>ethnicity</i> + <i>parental occupation</i> + <i>school</i> |
| Model Summary: Residual standard error: 2.81 on 2004 degrees of freedom, Multiple R-squared: 0.40, Adjusted R-squared: 0.40, F-statistic: 89.42 on 15 and 2004 DF, P<0.01 |

Table 23: Parameter Estimates of the Multilevel Regression Model (Repeated Measures) for the Combined Trimesters and Final Exams Attainment

| <i>Random Effects</i> | | | | |
|---|--|-----------------|---------------------------|-----------------------------|
| <i>Groups</i> | <i>Name</i> | <i>Variance</i> | <i>Standard Deviation</i> | <i>Confidence Intervals</i> |
| Students | (Intercept) | 7.42 | 2.72 | 95% (2.64, 2.82) |
| Residual | | 1.98 | 1.41 | 95% (1.38, 1.43) |
| Number of obs: 8080, groups: StudentID, 2020 | | | | |
| <i>Fixed Effects</i> | | | | |
| | | <i>Estimate</i> | <i>Std. Error</i> | <i>T-value</i> |
| | (Intercept) | 15.53 | 0.37 | 41.93 |
| | OVERALL ABSENCES | -0.08 | 0.00 | -21.78 |
| | GENDER (ref. cat. = Female) | | | |
| | Male | -1.75 | 0.13 | -13.92 |
| | PARENTAL EDUCATION (ref. cat. = Primary Education) | | | |
| | Level 1 - Secondary Education | 0.43 | 0.16 | 2.71 |
| | Level 2 - Further Education | 0.57 | 0.07 | 8.12 |
| | ETHNICITY (ref. cat. = Natives) | | | |
| | Georgians | -1.71 | 0.24 | -7.05 |
| | 'Others' | -1.04 | 0.21 | -4.95 |
| | PARENTAL OCCUPATION (ref. cat. = Unskilled Manual Workers) | | | |
| | Skilled Manual Workers | 0.59 | 0.26 | 2.28 |
| | Civil Private and Public Workers | 1.03 | 0.24 | 4.23 |
| | Teachers and Higher Private and Higher Public Workers | 2.01 | 0.29 | 7.05 |
| | Professionals and Chief Managers | 2.19 | 0.39 | 5.52 |
| | SCHOOL (ref. cat. = School A) | | | |
| | School B | -1.18 | 0.31 | -3.85 |
| | School C | -1.07 | 0.34 | -3.15 |
| | School D | -1.15 | 0.31 | -3.68 |
| | School E | 0.43 | 0.32 | 1.36 |
| | School F | -0.66 | 0.34 | -1.98 |
| | SUBJECT (ref. cat. = Mathematics) | | | |
| | Modern Greek | 1.06 | 0.05 | 20.66 |
| | History | 0.65 | 0.05 | 12.55 |
| | Physics | 0.11 | 0.05 | 2.11 |
| | SUBJECT*ETHNICITY (ref. cat. = Mathematics: Natives) | | | |
| | Modern Greek: Georgians | 0.40 | 0.13 | 3.02 |
| | History: Georgians | -0.28 | 0.13 | -2.11 |
| | Physics: Georgians | 0.42 | 0.13 | 3.12 |
| | Modern Greek: 'Others' | 0.06 | 0.13 | 0.46 |
| | History: 'Others' | -0.19 | 0.13 | -1.46 |
| | Physics: 'Others' | 0.24 | 0.13 | 1.79 |
| Model Equation: <i>Combined Trimesters and Final Exams Overall Attainment</i> ~ 1 + <i>overall absences</i> + <i>gender</i> + <i>parental education</i> + <i>parental occupation</i> + <i>ethnicity</i> + <i>school</i> + <i>subject</i> + <i>subject*ethnicity</i> + (1 <i>studentsID</i>) | | | | |
| Model Summary: AIC: 34133, BIC: 34322, logLik: -17039, Deviance: 34014, REMLdev: 34079 | | | | |

5.5.6.1 Individual and school level factors

According to findings presented in Tables 21, 22, and 23 *overall absences* are inversely and significantly linked to attainment. Male students have significantly lower overall attainment than female students. As regards the variable socioeconomic status, both indicators show similar patterns. That is, attainment increases with increasing levels of *parental education*. An increase in attainment is also seen as one moves along the defined *parental occupation* categories (from manual unskilled workers to professionals and senior managers). In terms of the variable *ethnicity*, Georgians and ‘Others’ appear to have significantly lower overall attainment than native students, with a bigger gap for Georgians. Finally, minority students of first- and second-generation have significantly lower attainment levels compared to that of native students, with a bigger gap for those of first-generation.

Findings concerning the examined school variables show some differences across *schools* (compared to students from school A, students attending schools B, C, D, and F perform significantly lower). As regards *school size*, there seems to be a favourable effect on attainment for those students attending medium-size schools (250-450 students) compared to those attending small-size schools (<250 students). However, in relation to large-size schools (>450 students), findings are either not significant or students attending large schools appear to do worse than those attending small schools. Considering *school minority concentration*, students attending schools with high minority concentration have significantly higher attainment levels than those attending schools with low minority concentration. This last finding, which replicates findings of previous studies (Theodosiou-Zipiti et al. 2011), may seem counter-intuitive, as one might expect the impact of native student performance levels to be greater when there are small concentrations, pulling up the attainment levels of minority students. However, this does not seem to be the case.

5.5.6.2 Ceiling effect

In this study, an attempt was made to tackle the ceiling effect noted in the dataset used in a previous study (Theodosiou-Zipiti et al. 2011). Table 24 shows the percentages of ‘perfect scores’ identified in the *Overall Trimester attainment* and the *Combined Trimesters and Final Exam Overall attainment* across the three year groups. One can see that the inclusion of the scores obtained in the end-of-year exams for the four examined subjects in the attainment variable led to a substantial decrease in the number of ‘perfect scores’. Therefore, this objective was achieved.

Table 24: ‘Perfect Scores’ in Attainment Indicators

| <i>Year Group</i> | <i>‘Perfect scores’ for Trimesters Overall attainment (%)</i> | <i>‘Perfect scores’ for Combined Trimesters and Final Exams Overall attainment (%)</i> | <i>% Change</i> |
|-------------------|---|--|-----------------|
| First Year | 10.6 | 6.0 | -43.4 |
| Second Year | 11.4 | 6.7 | -41.2 |
| Third Year | 8.7 | 5.5 | -36.8 |

5.5.6.3 Subject areas

The multi-level regression analysis has been employed for the examination of student attainment across individual *subjects*. Looking at all students together, their average attainment is significantly higher in Modern Greek, History, and Physics when these are compared individually to Mathematics. Using the interaction term, one can see that students from different ethnic groups have different attainment for different subjects. Compared to the attainment of Native students in Mathematics, Georgians appear to record even lower attainment levels in the subject of History than that predicted by the main effects. At the same time, compared to the attainment of Native students in Mathematics, in the subjects of Modern Greek and Physics, Georgians have significantly higher attainment levels than that predicted by the main effects. No such differences appear for ‘Others’ in the model.

5.5.7 Discussion

The negative effect on attainment of high absenteeism has been described in the international literature previously (e.g., Condrón and Roscigno 2003). High absenteeism among ethnic minority students in Cyprus has been reported by Theodosiou-Zipiti and West (2012) as one of the factors responsible for their underachievement. Elsewhere, they suggest that “being absent from the classroom (...) might lead to missing out important concepts and information from the lesson” Theodosiou-Zipiti, West, and Lamprianou (2011, p.137).

That female students tend to reach higher overall attainment levels than male students is also well charted in the international literature (e.g., Fryer and Levitt 2004). Relevant local studies (e.g. Theodosiou-Zipiti and West 2012) suggest that this might be because female students mature earlier, are more mindful of their responsibilities as students, care more about learning, and work harder than male students.

The positive effect of increasing levels of family socio-economic status on attainment has been described by researchers elsewhere (e.g., Connolly 2006). In Cyprus, earlier qualitative studies describe how Georgian families in particular struggle to make ends meet, and conclude that this low socioeconomic status with its concomitant disadvantages is one of the major reasons underlying the observed low attainment levels of Georgian students in secondary schools (Theodosiou-Zipiti, West, and Muijs 2010; Theodosiou-Zipiti and West 2012). Theodosiou-Zipiti, West, and Muijs (2010) have argued that this is because “the poor finances of some families could force parents into long working hours, thus rendering them unable to devote time to supervising and getting involved in their children’s learning” (p.487).

The findings that Georgians and ‘Others’ have significantly lower overall attainment levels than Native students confirm the results of both previous studies in the island (Theodosiou-Zipiti et al. 2011; Theodosiou-Zipiti, West, and Lamprianou 2011). There is also agreement with findings from studies carried out in other countries, which show differential attainment levels between different ethnic groups with, usually, lower attainment among minority groups. Some examples include the UK (Connolly 2006), the US (Zvoch and Stevens 2006), China (Sun and Qi 2007), Italy and Spain (Azzolinia, Schnellc, and Palmerd 2012), the Netherlands (Driessen 1995), and Greece (Korilaki 2004). Theodosiou-Zipiti and West (2012) suggested that this is a consequence of the unfavourable situations immigrant communities often experience, such as the traumatic experiences of migration, the need to adapt to a new country and a new culture, to learn a new language, cope with financial difficulties, negotiate an unfamiliar educational system and a potentially hostile school environment and to contend with a hostile society.

That students with second-generation status do better than students with first-generation status is also in agreement with both earlier international (e.g., Ream 2005) and local studies (e.g., Theodosiou-Zipiti et al. 2011). The higher attainment of second-generation status students might be attributed to their longer residence in the island compared to first generation students. Longer stay could result in increased language skills in the local language, extra familiarity with the educational system (Theodosiou-Zipiti and West 2012), as well as increased acceptance by local students (Theodosiou-Zipiti, West, and Muijs 2010).

With regard to school size, it is difficult to make comparisons or extrapolations from international studies, because of the heterogeneous categorisation of schools. It is clear that

there is no standardisation in the international literature with regards to school size - what counts as a 'big' or a 'small' school is locally determined. This makes generalisation or extrapolation of results from studies dealing with this issue difficult if not impossible. For example, a medium-sized school has been defined as a school with up to 750 students (Lee and Loeb 2000), 1,200 students (Rumberger 2005), or even 2,000 students (Stiefel et al. 2000). Nevertheless the inconsistency in relation to large-size schools, as well as the differences that appear across schools cannot be adequately explained in this study, due to the relatively small number of schools examined here.

As noted above, the significantly positive effect of high minority concentration found in the present study is a finding which is in sharp contrast to those from the international literature where an inverse relationship between minority concentration and student attainment is frequently demonstrated (e.g., Schnepf 2004). It is possible that specific school characteristics or the employment of particular practices might be responsible for these findings. It might be that the large numbers of minority students in these schools creates an ethos that fosters better attainment. Theodosiou-Zipiti and West (2012) previously suggested that a high concentration of minority students can create "a favourable environment" in the schools, which "helps in the acceptance of ethnic minority students by other minority groups and especially by native students" (p.107). They also argue that a high proportion of minorities in a school may 'force' teachers to pay attention to them and increases their sense of responsibility for the learning of these students.

In terms of particular subjects, one might assume that if language deficiency was the main problem behind the underperformance of ethnic minority students, the attainment levels of Georgians in Modern Greek would be lower than their attainment in Mathematics; (as is the case for History). But as this is not the case here, one needs to seek the reasons behind these findings elsewhere.

It appears that, for ethnic minority students, History is more "difficult" than other school subjects (Theodosiou-Zipiti and West 2012). On top of its heavy dependency on language, it might also be problematic in terms of its content. For Turkish Cypriots or Turks or Roma, for example, its content is considered unsuitable, as history textbooks produced in Cyprus include "inflammatory language derogatory of Turkish Cypriots and Turks" (USCRHRP 2005, section 5). It has been suggested that such materials help to create negative stereotypes and prejudices about the 'enemy-other', the Turks (Zembylas, Michaelidou, and Afantiti-Lamprianou 2010). But such content does not seem appropriate

for students of other ethnic backgrounds either because, as we have noted in an earlier study (Theodosiou-Zipiti and West, 2012), whether or not they are the target of such nationalist writing, minority students often find themselves unable to relate to what is being taught and the lesson is perceived as irrelevant. In short, it is not their history. In the same study we reported occasions when completely blank test papers were handed in by minority students who seemed completely alienated by the lesson content, and suggested that minority students might devote more energy to these lessons if the content was felt to be more relevant to their own lives, as with a Russian female student, who “was always completely impervious to everything in the class” (p.107). However, when the teacher talked about the introduction of Christianity to Russia, she was transformed into a student who concentrated, participated, seemed keen to learn everything about it, and scored the highest mark in the subsequent test. Indeed, the need for changes in particular school subjects, because of content which is considered outdated and inappropriate for the new student population has been expressed by several researchers (e.g., Konstantinou 2006; Philippou 2007) as well as the Council of Europe (ECRI 2006).

The design of a new curriculum for “a democratic and humanistic school” (Ministry of Education and Culture 2012, p.7) is high among the aims of the on-going educational reforms in Cyprus. The reformed curriculum, being introduced from 2011, aspires to create schools able to respect the linguistic, cultural, and religious diversity of both Cypriot and wider European society. It remains to be seen whether this can be achieved.

5.5.8 Conclusions

The use of a more direct way of transforming ordinal grades into linear ones and the inclusion of end-of-year exam scores has not changed the substantive findings from previous studies, and indeed results from this study are consistent with those we have published earlier on this topic (Theodosiou-Zipiti et al. 2011; Theodosiou-Zipiti, West, and Lamprianou 2011). In summary, these are that low generational status, low attendance rates, low levels of parental education, lower status parental occupation, being enrolled in a school with low minority concentration, and being male, all are found to have a significant negative relationship with school attainment levels among ethnic minority populations.

Further, use of end-of-year exam scores, partially at least, offsets the ceiling effect noted in the database used in a previous study (Theodosiou-Zipiti et al. 2011), though it should be noted that this ceiling effect is a direct product of the local marking scheme and not a problem of the study design. Nevertheless, our feeling is that by using all available

indicators of attainment, the validity of the findings is increased. Of course, we know from previous studies (e.g., Alexandrou 2006) that ethnic minority students may be further disadvantaged by biased assessment methods used by their teachers. However, as our objective was to capture a picture of the realities of the educational system in the island, it was felt appropriate to use the assessments routinely completed within the educational system by teachers, rather than create another measure of attainment. Use of the multi-level models has allowed proper testing of the widely held belief that ethnic minority students perform less well in those subjects that are more language-dependent. In fact, it turns out that currently in Cyprus at least, this is not the case. This places more emphasis on evidence from qualitative studies suggesting that the local content of subjects such as History may be more important than language deficits in reducing the engagement and attainment levels of ethnic minority students.

The fact that findings derived from both qualitative and quantitative studies come together and complement each other highlights the usefulness of combining these approaches in mixed method investigations, and we believe also endorses previous recommendations made to address the findings (Theodosiou-Zipiti and West 2012). Further, it might be useful to consider modification of the marking guidance for teachers or even the introduction of additional grades e.g., A* if teachers are wedded to ordinal grading of student work. This could further alleviate the issue of ceiling effect. But the main findings from the multi-level analysis offer clear evidence of the difficulties faced by minority students in the study of History in Cypriot schools and this is an issue that merits urgent attention from the Ministry of Education. Further, we suspect our findings may be applicable to other countries facing rapid demographic changes (e.g. other EU member states with recent accession to the Union) where multicultural education is not yet established.

5.6 Excused or Unexcused, Absences Matter; Suspension Has an Even More Dramatic Relation to Attainment

Galatia Theodosiou-Zipiti, Iasonas Lamprianou, Mel West
School of Education, The University of Manchester, Oxford Road,
Manchester, M13 9PL, UK

5.6.1 Abstract

To date, published studies have mostly concentrated on the explanatory power of aggregated absences on school attainment. Some studies have shown that the separation of excused and unexcused absences is necessary as they tend to influence academic achievement in different ways. In this study we show for the first time that a more detailed scrutiny of unexcused absences may yield yet more information. In addition, an examination of the explanatory power of various forms of absence across a range of school subjects leads to new insights into the relationship between patterns of absence and attainment levels. The use of mixed research methods also allows a more complete picture of this relationship to be unfolded.

5.6.2 Introduction

Absenteeism is a major problem for schools. It is considered a waste of educational resources, time and human potential, as well as causing additional work for teachers and consuming administrator time (Weller 2000). Absent students, miss out on learning opportunities available in school (NCES 2003), and frequent absence disrupts learning cycles. It is not surprising therefore that absenteeism has been found to be strongly related to a number of unfavourable schooling outcomes, including low test scores (Chang and Romero 2008; Gottfried 2009; Philbeck Musser 2011) and low graduation rates or high risk of school dropout (Balfanz et al. 2007). High absenteeism, it is also argued, contributes to the ‘attainment gap’ observed between students from different socioeconomic classes, as well as those from different ethnic groups (Chang and Romero 2008, Ready 2010, Philbeck Musser 2011).

While the majority of studies have examined student absences as an aggregate/total number, there has been some discussion of the need to differentiate absences between ‘excused’ and ‘unexcused’ categories. Excused absence is defined as absence where a student is not present in class, but the absence is justified because the reason for it is

210

accepted by the school. Unexcused absence is defined as absence where a student is not present in class and this is without acceptable cause or authorisation from parents or school (NFES 2009, p.5). Another form of absence, which is usually combined with unexcused absence even though this data is commonly registered separately, is suspension. Suspension occurs when a student is “temporarily removed from regular school activities either in or out of school (...) due to behaviour problems” (Aud et al. 2010, p.92).

From those studies that acknowledged the excused/unexcused distinction, few have examined the type of absence in relation to student attainment. In these studies, higher unexcused absences are seen to have a much stronger association with lower attainment than excused absences. For example, in the NCSE (2006) study, students with excessive unexcused absences have significantly poorer grades in reading and mathematics than students with excessive excused absences. Clement (2006) also found that greater numbers of unexcused absences were associated with lower attainment in the Florida Comprehensive Assessment Test scale scores in reading and mathematics. In addition, in the study of Gottfried (2009), unexcused absences were found to be an accurate predictor of lower attainment in the reading and math SAT 9 Scores. Similarly, Kay (2010) concluded that unexcused absences adversely affected student attainment levels in the Georgia high schools’ Social Studies Graduation Test more than excused absences. Some of the above studies reported that excused absences were also negatively related to student attainment, but the association was not as strong as that of the unexcused absences (Gottfried 2009, Kay 2010, NCSE 2006). Elsewhere, no significant association was found between excused absences and attainment (Clement 2006).

Suspension has also been shown to be associated with lower school attainment. For example, Rausch and Skiba (2004), who examined out-of-school suspensions, found a negative association with attainment levels in the math and English/language arts sections of the Indiana State Test of Educational Progress. Similar findings have also been reported by Harrison (2011) who found a negative association between total suspensions and reading and mathematics learning gains.

In terms of subjects, it seems that earlier research on the examination of excused/unexcused absences and suspensions is mainly focused on maths and reading/English. Interestingly, though, there are cases where missing school seems to have a differential relationship with different subjects. For example, Gottfried (2009) found that having a high proportion of unexcused absences has more severe, negative effects on maths

attainment compared to reading. However, none of the other studies cited above examine category of absence in relation to academic attainment. Apart from Gottfried, who indicates that he does not distinguish between suspensions and other unexcused absences, the rest of these studies offer no information on the type of absences students accrue. Nor, in any of these studies, is it acknowledged that exclusions are qualitatively different from other unexcused absences.

The literature has historically viewed absences as a ‘strict indicator of delinquency’ (Gottfried 2009). However, Gottfried disagrees with this premise, and argues that students with high levels of excused absences are not necessarily academically disengaged, and may not face academic, family or social problems. However, those with high levels of unexcused absences are considered more likely to be delinquent or academically disengaged. This differentiation of absences into two different variables is shown to be useful to our understanding of how absences interplay with attainment (Gottfried 2009). However, unexcused absences in his study (Gottfried 2009) remain a single undifferentiated grouping. We would suggest that this category needs to be further differentiated into those absences that indicate a lack of interest or negative attitudes towards school, and those that signify delinquent behaviour.

5.6.3 The case of Cyprus

Cyprus, a country which gained accession to the European Union relatively recently, has seen rapid demographic change over the last decade. This is in line with demographic changes seen in other EU member states such as the Czech Republic (Moree et al. 2008), Hungary (Gordon-Gyori et al. 2011), and Latvia (Brands-Kehris and Landes 2007). In addition to offering general insights into educational pressures and problems in the more recent EU member states, we have established that there is a lot of information available regarding students and their educational progress in the island. This makes Cyprus an instructive location in which to examine the issue of absenteeism in more detail.

Qualitative studies carried out in Cyprus, looking at the lower attainment levels of ethnic minority students (Theodosiou-Zipiti and West 2012; Theodosiou-Zipiti et al. 2010), suggest that the high absenteeism of minority students, and especially Georgians who live in relative poverty, is a possible factor behind their low attainment levels. Other studies, focusing on the educational needs and inclusion of Turkish-speaking students (e.g., Roma or Gypsies) in Cyprus, also report high absenteeism rates among these students (Karagiorgi et al. 2009; Spyrou 2004; Symeou et al. 2009). In these studies, the participant

interviewees often explained the low attendance patterns of Roma children in cultural terms - "education is not a part of Gypsy culture" (Spyrou 2004, p.12) -, in terms of their family circumstances - as their families frequently move from one place to another (Karagiorgi et al 2009) -, and also in terms of a particular habit among these children of coming to school but not attending all classes (Karagiorgi et al 2009).

In a number of previous studies we have also looked at the attainment of ethnic minority groups, both Georgians and 'Others', compared with the attainment of native Cypriots (Theodosiou-Zipiti et al. 2011a; Theodosiou-Zipiti et al. submitted paper; Theodosiou-Zipiti et al. 2011b). These studies demonstrated a significant, negative association between absenteeism and student attainment. One of these studies (Theodosiou-Zipiti et al. 2011a), looked, among other things, at the absenteeism rates of students in the subjects of Modern Greek and Mathematics. Both Georgians and 'Others' were found to have more frequent absences than local students, with Georgians having the highest average number of absences of all groups. This was suggested to be one possible explanation for the low attainment of ethnic minority groups and Georgians in particular.

Even though absenteeism appears to be a significant explanatory variable for the attainment of ethnic minority students, to our knowledge, there have been no studies specifically designed to look in detail at student attendance in Cyprus. The information derived from the qualitative studies cited at the beginning of this paper is based largely on an analysis of teachers' perceptions, with a focus on the attainment levels of minority students rather than on the influence of absenteeism. Further, such findings relating to absence rates in different ethnic groups as are available are derived from a relatively small-scale quantitative study (sample size 769). Therefore, even basic questions such as whether ethnic minority students in Cyprus have significantly lower attendance rates than Greek-Cypriot students have yet to be answered definitively.

Furthermore, previous studies elsewhere have not, to our knowledge, simultaneously looked at the explanatory power of excused absence, unexcused absence and suspension from school on attainment. As discussed earlier, these three variables describe quite different states. Gottfried (2009) has demonstrated the potential value of differentiating between excused and unexcused absence. However, there was no differentiation between unexcused absence (indication of lack of interest or negative attitudes toward school) and suspension (indication of delinquency). In this study, we feel that this could be important as disaffection and delinquency are not the same thing; though they may result in similar

behaviour. Further, although unexcused absences are in many ways under the control of students themselves, as they are able to choose to be absent or not, suspension is a measure imposed on the students by the school. For these reasons, an exploration of what might be shown by further delineation of unexcused absences was considered a worthwhile extension of previous studies in this area.

We therefore carried out a study to determine whether separate identification of excused absence, unexcused absence, and being suspended from school would allow a more finely grained picture of the impact of absenteeism on attainment to be uncovered. Further, this delineation was applied to student attainment levels across different ethnic groupings and different subject areas. Finally, we sought to gather teachers' views on the attendance and attainment patterns of their students, and the explanations they offered for any differences between students.

5.6.4 Methodology

A mixed methods design was employed for this inquiry. In this type of methodology, quantitative research offers numbers and precision, while qualitative research offers 'words and pictures', thus adding meaning to numbers (Johnson and Onwuegbuzie 2004).

5.6.4.1 Data

For the quantitative elements, we both collected new data and also utilised part of a dataset used in previous studies in the island (Theodosiou-Zipiti et al. submitted paper; Theodosiou-Zipiti et al. 2011b). In summary, the database included information for the student population from six gymnasia (lower secondary schools) from four different cities in Cyprus for the academic year 2004-05. From this dataset, a number of variables are used in this study: an attainment variable which is viewed as a dependent variable, and several student and school variables, which are viewed as independent, controlled variables. The original dataset included a variable for the overall number of absences, but for the purposes of this study the data was enriched to allow for closer differentiation of student absences into the three absence variables reflecting the categories identified in this study: excused absence, unexcused absence, and having been suspended from school. This additional information was obtained from a database held by the Ministry of Education and Culture of Cyprus. This records the number of excused and unexcused absences per subject for each student, and also information as to whether a student had ever been suspended. One school from the original study was excluded from the analyses, because the available information regarding the three variables on absences as described above was not complete. As such,

the final sample size was made up of 1906 students (209 Georgians, 255 ‘Others’, and 1442 natives) enrolled in the remaining five schools.

As the number of teaching periods varies by subject, for the analysis, we standardised the excused and unexcused absences to facilitate comparisons between subjects. This was achieved by dividing the total number of absences for each subject by the total number of teaching periods for that subject in the year and then multiplying by 100. The way the information on suspensions was recorded in the Ministry’s database only allowed binary coding of this variable. All variables used in the study are listed and described in Table 25. For more information about the creation of the attainment variable, see Theodosiou-Zipiti et al. (submitted paper). For the construction of the categorical variables, the sources of information and ethical considerations for access to and collection of the data, see Theodosiou-Zipiti et al. (2011b).

Table 25: Description of the dependent and independent variables used in the study

| Variables | Description |
|--|--|
| <i>Dependent variable</i> | |
| Combined Trimesters and Final Exams Overall Attainment | Continuous variable: Based on student grades (transformed from ordinal into a numeric form) from three consecutive trimesters (one academic year) and scores from end-of-year exams in the subjects of Modern Greek, Mathematics, History, and Physics |
| <i>Independent variables</i> | |
| <i>Controlled variables</i> | |
| Age | Continuous variable: Measured in years |
| Year group | Categorical variable (dummy coding): First year group, Second year group, Third year group |
| Gender | Categorical variable (dummy coding): Male, Female |
| Ethnicity | Categorical variable (dummy coding): Georgians, ‘Others’, Natives |
| Parental education | Categorical variable (helmert contrast coding): Primary education, Secondary education, Further education |
| Parental occupation | Categorical variable (dummy coding): Unskilled manual workers, Skilled manual workers, Civil private and public workers, Teachers and higher private and higher public workers, professionals and chief managers |
| School | Categorical variable (dummy coding): School B, School C, School D, School E, School F |
| Subject | Categorical variable (dummy coding): Modern Greek, Mathematics, History, Physics |
| <i>Absences variables</i> | |
| Excused absences | Continuous variable: The percentage of excused absences from all teaching periods in the four examined subjects (a % of the total teaching periods for each subject). |
| Unexcused absences | Continuous variable: The percentage of unexcused absences from all teaching periods in the four examined subjects (a % of the total teaching periods for each subject) |
| Suspensions | Categorical variable (dummy coding): Been suspended, Never been suspended (during the specific year of study) |
| <i>Interaction variables</i> | |

For the qualitative element of the study, the raw data from a teacher focus group and from the individual teacher interviews carried out by Theodosiou-Zipiti (in 2006 and 2007 respectively) is re-examined. This data was felt to be relevant to the current study as it deals with attainment of secondary school students with a focus on the attainment of ethnic minority students. These two studies are the only qualitative studies specifically designed to look at this issue in secondary schools in Cyprus. Further, prior to running these studies, the authors knew that absences were significantly related to attainment and they also had some provisional results indicating that the absence rates of minority students were higher than those of native students. It was therefore felt that a re-examination of the raw data with a different focus might shed new light on the relationship between attainment and absence. For further details about the focus group and the individual teacher interview studies please see Theodosiou-Zipiti et al. (2010) and Theodosiou-Zipiti and West (2012) respectively.

5.6.4.2 Analysis

For the analysis of the quantitative data of the study, first some descriptive statistics are presented, in order to examine the types of absences and the suspension rates across different ethnic groups. Next, for the main analysis of the study, multi-level models which analyse data with a “hierarchical or clustered structure” (Hox 1998, p.147) are employed. In the data, for every single student there are four scores (one score from four subjects: Modern Greek, Mathematics, History, Physics), which are considered to be repeated measurements or multivariate responses. These individual measurements make up level-one data, which are nested within students, who comprise level-two data. Faraway (2006) describes this as a “multiple response multilevel models” design (p.195) and proposes that “we express the multivariate response for each individual [i.e. score from each subject] by introducing an additional level of nesting at the individual level [i.e., students]. So we might view this as just another nested model, except that there is a fixed subject effect associated with this lowest level of nesting” (p.195). A similar approach is also presented by Goldstein (2011) who uses a slightly different terminology, “multivariate multilevel data” (p.161). In a multilevel analysis, the dependent variable at the lowest level (level one) and the independent (explanatory) variables at different levels (any level of the hierarchy) can be analysed simultaneously. The purpose here is to investigate whether the effect of the variables *excused absences*, *unexcused absences*, and *suspensions* on the dependent variable differs between particular school subjects and among different ethnic

groups. Student attainment was used as a dependent variable. A number of controlled variables, that is the three variables describing absences, and some interactions were used as independent variables. The independent variables are treated as fixed effects and the individual students as random effects. In order to set up the code for the analysis of this dataset in a way consistent with advice from the relevant methodological literature, we followed the worked examples (and adapted the actual commands) of Faraway (2006, p.195-8) using the *lmer* package (Bates et al. 2013) as well as the examples of Doran and Lockwood (2006)(see especially the section on Multivariate Outcomes).

It should be mentioned that there were some students with a high number of absences that were deemed to be outliers. There was a slight issue of heteroscedasticity, but this did not seem to affect the coefficients or the standard errors of the model (heteroscedasticity can lead to misleading standard errors). Different techniques (i.e., square root, logarithmic transformation of absences, and exclusion of outliers) were used to check impact on results. In addition, the package *nlme* (Pinheiro et al. 2012) was used in order to fit models which take heteroscedasticity into account (see, for example Pinheiro and Bates 2000), section 4.3.1). As results were similar, for the sake of ease of interpretation the non-transformed model was used. The assumptions of the models were investigated following the examples presented by Pinheiro and Bates (2000) and were found to be satisfactory for all practical intents and purposes of the study.

A single two-level linear model is built with the variables entering into the model one by one (manual forward procedure). The factors with high levels of significance (*T*-value greater than 2) remained in the model, while others were excluded from the final model. From previous work carried out in this area, we are aware of an interaction between the variables *subject* and *ethnicity*. As the results of this interaction are not directly relevant to this study, and models run with this interaction do not change the presented results, this interaction is excluded for the sake of simplicity. For further details of this interaction please see Theodosiou-Zipiti et al. (submitted paper). The multilevel analysis was run with the statistical package *R*, and the Linear Mixed Effects (*lme4*) package that offers the '*lmer*' function (Bates et al. 2013).

For the analysis of the qualitative data of the study, a thematic analysis was undertaken following three main steps: data reduction, data display, and conclusion drawing/verification, as suggested by Miles and Huberman (1994). During the data reduction stage (this stage usually starts a long time before the transcripts are obtained but

as in this trial we used the raw data from other qualitative studies, some of this data reduction, e.g. choice of participants and formulation of questions, we were unable to perform), the transcripts under study were read through a number of times and data selected if it was felt to be relevant to the current study. A manual matrix was constructed to aid the process of analysis. Each row represented a provisional list of broad codes (this was based on issues identified in the relevant literature on absenteeism (e.g., Kearney 2008) and attainment (e.g., Theodosiou-Zipiti and West 2012) and each column a different teacher. Teachers were coded with a number at the beginning of the analysis and also marked out to clarify whether they took part in the focus group ('fg' denotes this) or the individual interviews study ('ii' denotes this). Those that took part in the individual interviews study were further subdivided according to school posted and subject area of specialisation. Different matrices were created sorting out the data depending on the type of study raw data originated from, gender, number of years teaching experience, and subject taught to check for differential patterns; none emerged.

The addition of new factors and the deletion of some pre-existing ones if no data seemed to fit them led to a modification of the initial list of codes. The repetition of this process led to the development of a more detailed set of sub-themes, allowing the data to be further segmented. These sub-themes represent individual factors in each broad category. In the end, the relevant sections of text that had been grouped together from each category and factor were synthesised. The resulting text bestows a deeper meaning on, and a new understanding of the findings.

5.6.5 Findings from the quantitative analysis

From the examination of the types of absences across ethnic groups (Table 26), it appears that Georgians and 'Others' have a higher percentage of excused and unexcused absences than native Cypriots across all subjects, with Georgians having the highest number, almost twice as high as natives.

Table 26: Mean number of absences (measured in teaching periods) by subject and ethnic group

| | Modern Greek | | Mathematics | | History | | Physics | |
|-----------|----------------|------------------|----------------|------------------|----------------|------------------|----------------|------------------|
| Ethnicity | <i>Excused</i> | <i>Unexcused</i> | <i>Excused</i> | <i>Unexcused</i> | <i>Excused</i> | <i>Unexcused</i> | <i>Excused</i> | <i>Unexcused</i> |
| Natives | 2.84 | 0.74 | 2.27 | 0.65 | 2.69 | 0.65 | 5.05 | 1.60 |
| 'Others' | 4.22 | 1.00 | 3.30 | 0.98 | 4.05 | 0.97 | 6.96 | 2.47 |
| Georgians | 5.10 | 1.65 | 4.21 | 1.49 | 5.19 | 1.62 | 9.30 | 3.23 |

As regards student suspensions (Table 27), native students have the lowest suspension rate of all, even though about one third have been suspended. About half of Georgian students have been suspended, while the suspension rate of ‘Others’ is in-between the two other groups.

Table 27: Student suspension rates across ethnic groups

| Ethnicity | Suspensions (%) |
|------------------|------------------------|
| Natives | 35 |
| ‘Others’ | 39 |
| Georgians | 52 |

The results of the multilevel analysis are presented in Table 28. Looking at the controlled variables, and after taking into account a number of factors, the model suggests that female students, students whose parents are of a higher educational or occupational level, and students coming from School E have significantly higher average attainment. With regards to school subjects, it appears that compared to Mathematics, the average student attainment in all other examined subjects is significantly higher. Also, in terms of ethnicity, compared to native students, both ethnic minority groups appear to have a significantly lower average attainment, with Georgians having the lowest average attainment levels of all.

Looking at the absences variables, the model suggests that as the number of excused and unexcused absences increases by one percent, student attainment decreases on average by 0.12 and 0.09 points respectively. However, the magnitude of this relationship is not consistent across the different subjects (see below). There was no difference in the explanatory power of *excused absences* and *unexcused absences* across ethnic groups (so the interaction term was not included in the final model presented in Table 28). Students who have been suspended have on average 2.43 points lower attainment than those who have never been suspended. However, there is a differential impact of *suspensions* on students from different ethnic groups (see below).

Table 28: Parameter Estimates of the Multilevel Regression Model (Repeated Measures) for the Combined Trimesters and Final Exams Attainment

| <i>Random Effects</i> | | | | |
|--|-------------|-----------------|---------------------------|---------------------------------|
| <i>Groups</i> | <i>Name</i> | <i>Variance</i> | <i>Standard Deviation</i> | <i>95% Confidence Intervals</i> |
| Students | (Intercept) | 7.34 | 2.71 | (2.62, 2.81) |
| Residual | | 1.94 | 1.39 | (1.36, 1.42) |
| Number of obs: 7609, groups: StudentID, 1906 | | | | |
| <i>Fixed Effects</i> | | | | |
| | | <i>Estimate</i> | <i>Std. Error</i> | <i>T-value</i> |
| (Intercept) | | 13.89 | 0.28 | 48.73 |
| GENDER (ref. cat. = Female) | | | | |
| Male | | -1.26 | 0.14 | -9.30 |
| PARENTAL EDUCATION (ref. cat. = Primary Education) | | | | |
| Level 1 - Secondary Education | | 0.53 | 0.16 | 3.33 |
| Level 2 - Further Education | | 0.66 | 0.07 | 9.15 |
| ETHNICITY (ref. cat. = Natives) | | | | |
| Georgians | | -3.20 | 0.32 | -10.15 |
| 'Others' | | -1.48 | 0.25 | -5.99 |
| PARENTAL OCCUPATION (ref. cat. = Unskilled Manual Workers) | | | | |
| Skilled Manual Workers | | 0.82 | 0.27 | 3.04 |
| Civil Private and Public Workers | | 1.31 | 0.25 | 5.15 |
| Teachers and Higher Private and Higher Public Workers | | 2.09 | 0.30 | 7.04 |
| Professionals and Chief Managers | | 2.05 | 0.41 | 5.05 |
| SCHOOL (ref. cat. = School B) | | | | |
| School C | | -0.07 | 0.23 | -0.32 |
| School D | | -0.31 | 0.17 | -1.78 |
| School E | | 1.53 | 0.22 | 7.03 |
| School F | | 0.31 | 0.21 | 1.48 |
| SUBJECT (ref. cat. = Mathematics) | | | | |
| Modern Greek | | 0.99 | 0.06 | 16.15 |
| History | | 0.65 | 0.06 | 10.62 |
| Physics | | 0.23 | 0.05 | 3.90 |
| EXCUSED ABSENCES | | -0.12 | 0.02 | -7.11 |
| UNEXCUSED ABSENCES | | -0.09 | 0.03 | -3.03 |
| SUSPENSIONS (ref. cat. = Never been suspended) | | | | |
| Been suspended | | -2.43 | 0.16 | -14.98 |
| SUBJECT*EXCUSED ABSENCES (ref. cat. = Mathematics:excused absences) | | | | |
| Modern Greek:excused absences | | 0.08 | 0.02 | 5.55 |
| History:excused absences | | 0.05 | 0.02 | 3.16 |
| Physics:excused absences | | 0.07 | 0.02 | 4.84 |
| SUBJECT*UNEXCUSED ABSENCES (ref. cat. = Mathematics:unexcused absences) | | | | |
| Modern Greek:unexcused absences | | -0.05 | 0.03 | -1.56 |
| History:unexcused absences | | -0.08 | 0.03 | -2.58 |
| Physics:unexcused absences | | 0.04 | 0.03 | 1.38 |
| ETHNICITY*SUSPENSIONS (ref. cat. = Natives:suspensions) | | | | |
| Georgian: suspensions | | 1.87 | 0.42 | 4.46 |
| 'Other': suspensions | | 0.15 | 0.40 | 0.37 |
| Model Equation: <i>Combined Trimesters and Final Exams Overall Attainment</i> ~ 1 + <i>gender</i> + <i>parental education</i> + <i>parental occupation</i> + <i>ethnicity</i> + <i>school</i> + <i>subject</i> + <i>excused absences</i> + <i>unexcused absences</i> + <i>suspensions</i> + <i>subject*excused absences</i> + <i>subject*unexcused absences</i> + <i>ethnicity*suspensions</i> + (1 <i>studentsID</i>) | | | | |
| Model Summary: <i>AIC</i> : 32067, <i>BIC</i> : 32276, <i>logLik</i> : -16004, <i>Deviance</i> : 31912, <i>REMLdev</i> : 32007 | | | | |

Looking at the interaction effects, some interesting findings appear. First, for each additional percentage point of *excused absences*, the attainment of students in the subjects of Modern Greek, History, and Physics is significantly higher than it is in Mathematics (by an average of 0.08, 0.05, and 0.07 points respectively), after taking the main effects into account. This suggests that the attainment levels of students in the subjects of Modern Greek, History, and Physics is more resistant to *excused absences* than their attainment in Mathematics. Secondly, for each additional percentage point of *unexcused absences*, the attainment level of students in History is on average 0.08 points lower than their attainment in Mathematics. This indicates that *unexcused absences* tend to affect student attainment in History more significantly compared to the effect of those on Mathematics. No significant differences appear in terms of *unexcused absences* for the other examined subjects. Thirdly, compared to Native students who have been suspended, Georgians who have been suspended have significantly higher attainment, by an average of 1.87 points, than that predicted by the main effects. This indicates that *suspensions* are more strongly related to lower attainment levels for native students than they are for Georgians. No significant differences appeared for ‘Others’.

The interactions between *excused/unexcused absences* and *ethnicity* or between *suspension* and *subject* were not found to have statistical significance and were thus not included in the final model.

5.6.6 Findings from the qualitative analysis

The inter-relation of factors as expressed by teachers has revealed two major factors that form over-arching themes to which the higher levels of absences observed among ethnic minority students are attributed: the low socioeconomic status of immigrant families and the predominantly mono-cultural character of the educational system in Cyprus.

Looking at the low family socioeconomic status first, it is clear that many teachers associate this with absenteeism, and are thus not surprised that ethnic minority students tend to clock up more absences from school compared to their more affluent native counterparts. This is in part because their family members tend to be in low paid occupations and have to work long hours to support even a frugal existence. This is perceived to impact on their children who “might be asked to stay at home on a particular day to look after a younger or unwell sibling...” (ii9), or to seek paid employment themselves to boost family income. Teachers also felt that students that are “working tend to neglect school” (ii10) and that students who work late often “stay at home the next day

to get some rest” (ii8). Similarly, the long working hours of parents was seen by teachers to mean that in relation to school work “many minority students were unsupervised” (ii2). Some felt that it should be expected that “... a twelve-year old child who has nobody to wake him up and take care of him... because his parents left the house very early in the morning... will not go to school, or, at least, that he will miss the first few periods of teaching” (ii1). The long working hours were also blamed for the perceived low levels of participation of minority parents in their children’s education: “At parents’ evenings most of minority parents are absent” (ii1). Further, long working hours were felt to encourage truancy as “parents are unaware that their children missed school, because they were not around to see them staying home” (ii3). Difficulties experienced by schools in making contact with minority parents was also felt to be a factor that made it more difficult to discourage truancy: “There is nobody at home to receive the sign-for letters sent by school. There is nobody there to answer the phone when we call... and if there is someone at home... it is frequently somebody that we can’t communicate with due to language problems” (ii8). In addition, the constant struggle to make ends meet was felt to affect the “attitude of minority parents towards schooling and education” (fg2) and the ideas “they have transmitted to their children in relation to school and learning” (fg1).

Focusing on the educational system itself, it is evident that teachers consider deficiencies in the language of instruction a major reason behind the high number of absences of minority students. Worryingly, the attitude of some of their colleagues towards ethnic minority students was also cited as a factor leading to non-attendance and was even described as “racist” in extreme cases (ii9). Many teachers appeared to be “more lenient with native students and stricter with minority students” (ii8). There was even admission from some teachers that they were themselves “prejudiced against Georgians” and that they “treated them differently”, and “underestimated them”, perhaps because they did not have a “European upbringing” (fg4). Shortcomings in the training of teachers was another point frequently brought up by the interviewees. They felt inadequately prepared to “...adapt their teaching methods...” (ii9). They also felt that minority students were not “a priority” for them (fg4) and several did not feel the need to “pay much attention” to them during a lesson (ii11). These teachers considered that for a large majority of their colleagues “... the purpose (of the teacher) was not to deliver a lesson that would be understood by the few ethnic minority students, but a good quality lesson to engage the majority of the class” (fg2). It should not come as a surprise therefore that minority students frequently appeared “bored and indifferent” during these lessons and started to “react” (ii9). This reaction was thought to be propelling teachers into action in ways that

were often unhelpful for minority student education: “At some stage I made the decision not to include these students in my lesson, but just give them handouts meant for illiterate students, to work on their own and not disturb the rest of the class” (fg2). “Some teachers send these students out of the class and mark them down as absent” (ii9). There are thus clear indications that students who had low levels of competency in Greek language were treated as low ability students, with little attempt to engage or stimulate them and little concern for their progress.

Another point that was frequently raised by the participating teachers as important for ethnic minority absences was the content of the national curriculum. They pointed out that children were taught subjects “of an alien content” (ii2), that “had no link to them” (ii4) or their lives, and many “did not feel comfortable with” (ii4). The students themselves were felt to “have no relevant grounding” (ii9) for these subjects, and as a consequence they “could not comprehend” (ii2) or “find any interest” (ii4) in them. Furthermore, “racist attitudes” from some groups of local students who “did not accept ethnic minority students” (ii10) were identified as generating “feelings of inferiority” (fg3), “marginalisation and stigma” (fg2) among minority populations. This, in turn, led to a need for the minority students to “build walls and isolate themselves” (fg2) and, perhaps as part of this withdrawal, to avoid school as well.

5.6.7 Discussion

We have shown that, in secondary schools in Cyprus, Georgians and ‘Others’ have significantly higher levels of (excused and unexcused) absences than native students. Qualitative information from the teacher interviews offers a number of possible explanations why this is so, and inter-relation of these reasons suggests the low family socioeconomic status and the mono-cultural character of the educational system in Cyprus as the two over-arching themes. From the international literature we already know that poverty (Hocking 2008; Zhang 2003) and low parental involvement in children’s education (Sheppard 2009) are important determinants of school absenteeism. Similarly, there are factors related to teachers, school, and community/society which are also thought to be influential (Hussein et al. 2007, Kearney 2008). Locally, the limitations of the mono-cultural educational system in Cyprus and its difficulty in catering for the needs of ethnic minority students have also been highlighted in previous studies (Theodosiou-Zipiti and West 2012).

These over-arching themes, in turn, reduce the degree to which ethnic minority students are attached to and engaged in school. Attachment refers to whether a student feels that he is “embedded in, and part of, the school” (Johnson et al 2001, p.320), while engagement refers to behaviours that show whether a student participates at school by, for example, “showing up, paying attention in class, and making an effort to learn” (Johnson et al. 2001, p.318). Attachment, and engagement are important aspects of the educational experience of students (Johnson et al 2001), and can have a profound influence on attainment levels. The lower attendance rates of ethnic minority students as well as the circumstances surrounding their school experiences as outlined by teachers, together point to relatively low levels of school attachment and engagement among ethnic minority students in Cyprus. Too often it seems their schools, teachers, and peers make them feel that they do not belong and in response they adopt certain behaviours. Through these behaviours, they express their desire to limit or even avoid participation at school (Johnson et al 2001). The behaviours in question include absenteeism, not trying as hard as they could, distracting behaviours and negative attitudes towards learning. The lack of attachment and engagement of many ethnic minority students could, at least partly, explain why they perform less well than native students, as is clearly shown in this and previous studies by the authors (Theodosiou-Zipiti et al. submitted paper; Theodosiou-Zipiti et al. 2011b). This seems a sensible inference, given that strong association between engagement and attachment on the one hand and academic attainment on the other has been reported in a number of studies (e.g., Connell and Spencer 1994; Lee and Smith 1995).

We have also shown that missing more teaching periods, whether the absence is excused or unexcused, is associated with a significantly lower attainment levels. This is broadly in agreement with other published studies (e.g., Gottfried 2009). However, Gottfried (2009) and also other studies (e.g., NCSE 2006, Kay 2010) also showed that unexcused absences were more strongly correlated with low attainment levels than excused absences. We could not confirm this finding. We did, however, discover that suspensions from school had a stronger negative impact on attainment than either excused or unexcused absences, and we speculate that because previous studies failed to differentiate between unexcused absences and suspensions, it is likely that the effect of the unexcused absences was artificially inflated. Our evidence suggests that while absence of any sort reduces attainment, suspension from the school reduces it more dramatically.

The high proportion of students that had been suspended in the school year in question has come as a surprise to us. However, we are confident that our data is correct. More recently,

there has been a Parliamentary debate in the island which dealt with this same problem, presenting data from other schools and in effect highlighting the very high rates of suspension from schools and suggesting that this is further investigated to delineate the reasons for the high rates of suspensions (Parliamentary Minutes 2005).

It is worthy of note that the explanatory power of excused and unexcused absences on attainment levels is not consistent across all subjects examined. Specifically, Mathematics is found to be more sensitive to excused absences than the other examined subjects. In other words, missing school, even for a legitimate reason, is associated with a lower attainment level in Mathematics. This may be because individual lessons in subjects other than Mathematics are more independent of one another, whereas in Mathematics, where learning seems to be a more linear and sequential process, skills missed on a particular day will have a longer-lasting effect as further lessons seek to build on those very skills. Further, it might be that some of the aspects examined in other subjects, such as reading skills, are things that some students might choose to pursue as a leisure activity. As Hixson (2012) suggests, this could make these less dependent on school instructional activity and thus a less reliable marker of the impact of absenteeism.

In addition, the subject of History was found to be more sensitive to unexcused absences than the subject of Mathematics. In other words, missing school for an unapproved or unaccepted reason is associated with lower attainment in History. Of course, the number of unexcused absences of a student might be an indication of a negative attitude towards either schooling or learning in general or a lack of interest in a particular school subject. This is where teacher comments on the content of the national curriculum seem most useful. We need to ask whether there is something specific about the content or processes of History teaching that might lead minority students to find this subject more difficult to engage with than any of the rest.

Given that the study found that suspension has a more significant influence on student attainment than either excused or unexcused absences, it is worrying to discover the disproportionately high suspension rate of ethnic minority students compared to native students and the disproportionate relationship of suspension with the attainment of native students compared to that of Georgians. This could indeed be a reflection of teacher attitudes towards different groups of students, as suggested in the teacher interviews. That is, it could reflect the fact that teachers start off with low expectations about what Georgian students can do, perceiving these as students destined for failure. Consequently, suspension

could be seen as having little impact on their attainment levels. At the same time, native students start off with higher expectations all round. Thus, suspension for them will be perceived as having a significant impact on their attainment and even on their life chances. This may make the decision to suspend native students one that teachers approach more cautiously. It might be said that teachers generally view Georgian students in a negative light unless they demonstrate that they deserve better. Similarly, teachers view native students in a more favourable light unless they demonstrate that they are not worthy of this. Suspension might, therefore in effect be a measure of teachers' perceptions of students from different ethnic groups. It should be remembered, however, that suspension is not just a type of absence; it is an indication of bad behaviour and disciplinary action against a student. As such, it might be that the differential influence of this indicator is a reflection of the differential handling of the two groups in question. That is, it could be that in the native group, only those students who perform less well tend to be punished, whereas in the Georgian group, students of all abilities are handed down punishments. This might well be related to racist, or otherwise prejudiced attitudes of some teachers, and the consequent stricter handling of ethnic minority students. Garcia and Taaca-Warren (2009) argued that suspensions can be biased, as the teacher can find room "to target a student based on their personal judgments as opposed to concrete evidence of particular acts" (p.44). That suspension might be discriminatory against specific ethnic/racial groups has been suggested by other researchers too (e.g., Skiba and Rausch 2006). However, it should be remembered that the influx of migrants into a stable and mono-cultural society has been both sizeable and rapid, and communities need time to adjust attitudes and meet the challenges this brings. While it is comforting to imagine that all teachers are fully focused on the needs of the children in front of them, whom they recognise as individuals, in fact teachers are also simply citizens, inhabiting and consuming the local culture and finding cultural adjustment no easier to make than any other group within the community.

5.6.8 Conclusions

In this study we examined for the first time the relationship between excused absence, unexcused absences and suspensions from school on student attainment in Cyprus. We show that all of them are significantly associated with lower attainment levels, with suspensions having the strongest explanatory power. Also, of the four subjects examined in this study, a high number of excused absences in mathematics seem to particularly reduce attainment in this subject. We postulate that this is due to the linearity of teaching and learning in mathematics; it seems that missed steps/gaps in knowledge in this subject are harder to catch up on, and are more likely to be exposed by the testing system.

Unexcused absence patterns would seem to suggest that while this has a negative impact on attainment levels in all subjects, the lack of progress in History is especially marked. Our hypothesis here is that absenting from history is a deliberate choice made in particular by minority students who feel especially alienated by the content of this subject, and therefore have no motivation to master it. In addition, we have identified a number of different factors thought to be important for the generally higher absenteeism levels observed among ethnic minority students. Interrelation of these factors shows that teachers attribute this phenomenon to two principal causes; the low socioeconomic status of many minority families and the routinely mono-cultural character of the local educational system. These factors seem to shape obstacles for minority students, leading to low levels of school attachment and engagement.

The use of mixed research methods proved to be valuable in this study. Quantitative data offered evidence demonstrating the higher rates of absenteeism in ethnic minority students and enabled quantification of the explanatory power of each of the absence variables on attainment. Qualitative data then proved useful in providing more detailed explanations of the links between attendance and attainment from the teachers' perspective. Putting the two together has led to a "more complete knowledge" (Johnson and Onwuegbuzie 2004, p.21).

It is clear that findings from this study have local policy implications. Some of these, for example addressing the relative poverty of minority households, require actions wider than those that can be implemented by the school system. But improvement of the local education system is needed too. Our suggestions here include: stronger encouragement of all students to come to school every day and attend all classes (e.g., by offering rewards to those with few or no absences); implementation of a school attendance policy which actively manages absences; the development/improvement of communication links between parents and school (e.g., by utilising bilingual teachers), and educating parents about the consequences of school absenteeism. Inside the school, actions are required too, the improvement of school ethos and conditions (e.g., teachers' and students' attitudes, the development of multicultural and antiracist policies) is urgently required, as is the development of a more relevant and engaging curriculum. Reflecting on the teachers comments, it appears that appropriate in-service teacher training would help too.

Beyond the local importance of this study there are also wider implications. First of all, by breaking down absences into three variables and showing that each relates to different

student traits and also that each has a different influence on student performance in the subjects looked at in this study, we hope to have demonstrated the importance of doing so in future studies. The separation of suspensions from unexcused absences has produced results which somewhat differ from those published previously thus further strengthening our argument for the need of more detailed classification of absences. Examination of absence variables across a larger number of school subjects has given us insight into the fact that different absence variables have a differential influence on different school subjects, thus pointing towards more careful sampling selection in future studies. We recommend that future studies look at the possibility of further differentiation of suspensions between those that are handed down for simple naughtiness and those that indicate more sinister behaviour.

CHAPTER 6: CONCLUSIONS

This final chapter presents the main conclusions of the present research study and some reflections and final thoughts. The first section presents the main findings and this is followed by a methodological note. The next section discusses the contribution of this study both locally and internationally along with some implications for practice. Next, are some reflections and finally areas for further research are highlighted.

6.1 Summary of Main Findings

This research study aimed to examine the attainment of ethnic minority students in lower secondary schools in Cyprus. This was the first such attempt in the island and the aspiration was to offer as complete a picture as possible. To facilitate this, a mixed research method was employed and the work broken down into a series of smaller chunks. These chunks have been written up and submitted as individual papers. The main findings are presented here.

Ethnic minority students do not perform as well as their native counterparts. Focusing on this attainment gap, one can see that both Georgians and ‘Others’ underperform, with Georgians having the lowest attainment. Further, ethnic minority students appear to have a differential attainment in different school subjects. Even though their attainment is consistently lower than that of their native counterparts in all examined subjects, compared to the attainment of native students in Mathematics, Georgians display significantly higher attainment in the subject of Modern Greek and significantly lower attainment in the subject of History than that predicted by the main effects. The expressed belief that ethnic minority students have a lower attainment in more language-dependent subjects has been disproven. This suggests that language is not the main obstacle to academic success for these ethnic minority students. Qualitative data come to shed some light into other likely explanations. Teachers report that minority students have a specific difficulty in the subject of History. They propose that as in this lesson ethnic minority students are taught things to which they cannot relate, they become alienated by its content and loose interest. One might argue that this leads to academic disengagement.

Having established that ethnic minority students underperform, it is of interest to look at the possible factors associated with this. A non-modifiable factor that appeared relevant

was that of generation status. More specifically, statistical analyses show that students of first-generation status do significantly less well than students of second-generation status. Qualitative data suggests that this might be because second-generation minorities have been in the island for longer and this is thought to increase their familiarity with the educational system, language skills in the local language, and also lead to better levels of acceptance by local students. These can be important in increasing their school attachment and engagement. Gender is another non-modifiable factor. In accordance with the general trend in other countries, female students in secondary schools in Cyprus appear to have a higher attainment than their male counterparts. The qualitative piece of work suggests that this is because female students mature earlier and as such are more able to appreciate the importance of education. This then focuses their minds on what they have identified as important.

Parental education and parental occupation were the two variables used as a proxy to the socioeconomic status of the family. This potentially-modifiable factor is shown in statistical analyses to be a highly significant predictor of student attainment. Qualitative analysis comes to confirm this by indicating that the low socioeconomic status of ethnic minority families is one of two main reasons thought by teachers as responsible for the low attainment of ethnic minority children. It is suggested that because of their financial hardship, many minority parents work extremely long hours. As a result, they find it difficult to participate in their children's education; they have little time to supervise their children's learning, to become involved in school matters, and have limited educational expectations of them. They also find it difficult to offer extra help in the form of private tuition to their children because of the cost implications that this would have. At the same time, many ethnic minority children have to undertake extra responsibilities at home (e.g., to look after younger siblings) or take on paid employment in order to supplement the family income. Survival rather than education is their priority. Teachers report that ethnic minority students have limited time for school preparation and schoolwork, and limited educational expectations of themselves. All these can be argued to lead to limited school engagement.

The other main reason indicated by qualitative analyses as responsible for the low attainment of ethnic minority children is the monocultural character of the local educational system; another potentially-modifiable factor. Qualitative analysis reveals a number of deficiencies within the educational system, which on the whole suggest that it is not appropriately organised to accept and educate students from different ethnic

backgrounds. Teachers themselves feel that their training has not been adequate; they feel unprepared and unsupported in working in a multicultural school. They report that some of their colleagues have biased or racist attitudes towards minority students and that these attitudes make minority students feel that they are treated unfairly. Teachers also recognise that given the diverse student population, the school curriculum is no longer fit for purpose. It is interesting to note the different responses and thus perceptions of teachers according to whether they were posted in schools with low or high minority concentration. Schools with low minority concentration are seen as fostering a non-accepting environment towards minority students. Teachers in these schools are felt to have little sense of responsibility for minorities' learning. This might come to explain why high minority student concentration in quantitative analyses is positively associated with student attainment. All these can also be argued to limit the degree to which ethnic minority students are attached to school.

All the factors postulated above as important for school attachment and engagement for ethnic minority students are also felt to result in the higher rates of absenteeism shown for ethnic minority students. Higher absenteeism was a highly significant predictor of student attainment in all statistical analyses. When absences are subdivided into more specific categories, excused absences, unexcused absences, and having been suspended from school or not, all remain important for student attainment. It is of note that the variable indicating delinquency (having been suspended) was the strongest predictor of attainment. Also, excused absences and unexcused absences appear to have a differential explanatory power on attainment across examined subjects. Mathematics is found to be more sensitive to excused absences, and it is hypothesized that this might be because problem-solving skills missed on a particular day have a longer-lasting effect on lessons down the line as they seek to build on previously acquired skills. Further, History is found to be more sensitive to unexcused absences. Unexcused absences are considered to be an indicator of ethnic minority students' negative behaviour for and attitude towards schooling and learning in general or a lack of interest towards the particular school subject.

6.2 Methodological Note

Use of mixed-methods research methodology proved a difficult and time-consuming undertaking. This is because I had to study and understand in detail a number of different research methods, organise and complete a number of different studies often employing different methodologies, and try and bring the results from the two research paradigms

together in an appropriate way. Despite the difficulties along this journey, I feel that the end-result is rewarding. I consider that the mixed research methodology has been valuable in the investigation of attainment of ethnic minority students in Cyprus. Words and pictures derived from the qualitative data added meaning to the numbers that the quantitative data offered. This way, the two research paradigms come to complement each other. Further, it can be argued that mixed methods can add insights and understanding that could have been missed with use of a single research method. Finally, the use of mixed methods has led to a more complete knowledge in relation to this subject and this knowledge can inform theory and practice (Johnson and Onwuegbuzie 2004, p.21, table 5).

The design of the particular research study offered opportunities for triangulation. First of all, the combination of quantitative and qualitative research methods constitutes a methodological triangulation. Next, the combination of different data sources, which are investigated at different times, places and persons, constitutes data-triangulation (Denzin 1970/1978, cited in Flick 1992, p.176). Furthermore, the use of more than one level of analysis, namely, the individual level (e.g., with the individual interviews) and the interactive level (e.g., with the focus group) offers combined levels of triangulation (Denzin 1970, cited in Cohen and Manion 1980). According to several researchers, triangulation “increases scope, depth and consistency in methodological proceedings” (Flick 2003, p.227). It helps “to approach their research questions from different angles” (Mason 1998, p.149). It “strengthen(s) the total research project, regardless of which method is the primary means of data collection” (Morgan 1988, p.31), and “improves the quality of data and in consequence the accuracy of findings” (Robson 1995, p.383).

6.3 Contribution to Knowledge and Implications for Practice

The present research study is important both locally and internationally. Locally, it is the first study specifically designed to examine the attainment of ethnic minority students in lower secondary schools in Cyprus. It offers the picture of the new reality in the local educational system. It verifies the attainment of ethnic minority students in Cyprus and the main factors influencing this. The recognition of the problems faced by ethnic minority students in schools in Cyprus has led to a number of specific suggestions on how to improve the language skills of these students, enhance teacher training, reform the school curriculum, increase their living standards, and limit their exposure to racist attitudes and discrimination. There are also implications for the educational system in general such as the problem with the large number of people with perfect scores; the addition of an extra

grade e.g. A* could help better classify these students. Whatsmore, the large number of students being suspended from school should make the relevant authorities question whether this tool is used appropriately and whether it still retains any of its deterrent power.

Internationally, this study contributes in terms of methodology and also in terms of its findings. As regards its methodological contribution, use of mixed research methods has produced a more complete picture and this should be encouraged in future studies. Also, the specific combination of factors examined for their potential association with the attainment of ethnic minority students has not been met previously. Furthermore, the use of multiple trimester grades and further addition of end-of-year exams to obtain a strong indicator of attainment represent an advancement compared to indicators of attainment used in earlier studies. In addition, the consistency of results obtained when analysing attainment by subject or all of them combined, analysing attainment as indicated by trimester grades alone or combined with end-of-year exams, using a variety of ways to transform ordinal to linear grades, and using analytical methods both at a single and at a hierarchical level, offers confidence that the results are a true reflection of the reality rather than a chance finding. Moreover, the specific way student absences have been examined has not been met previously. Not only were they examined in specific subjects over a whole academic year and in relation to attainment in these subjects, but also they were separated into categories relating to specific student traits. This last point will need to inform future studies in this area so that misleading results are avoided.

In terms of findings, in this study one meets ethnic minority groups not examined in previous studies in secondary education. Further, our findings come to add to the international debate on whether ethnic minority students underachieve and the influence of specific factors on their achievement levels. In addition, statistical testing of the widely held belief that ethnic minority students perform less well in those subjects that are more language-dependent has revealed that this is not the case; rather, our study suggests that the subject content may be more important than language deficits in reducing the attainment levels of ethnic minority students. Also, more recently, there is an emerging consensus in the literature that unexcused absences are more strongly correlated with low attainment levels than excused absences. Findings from this study suggest that suspension from school has a stronger negative impact on attainment than either excused or unexcused absences. The stronger correlation of unexcused absences and attainment in previous trials could have been reached because of a failure to differentiate between unexcused absences

and suspensions, thus potentially inflating the effect of unexcused absences. As mentioned in the previous paragraph, studies looking at absences in the future will need to examine them in at least the same level of detail as this study has, if misleading results are to be avoided. The differential influence of different absence variables on different school subjects is also important and relevant for future studies that will need to thoroughly consider their sample collection in the planning stages.

6.4 Reflections

The end of an eight-year academic and personal journey is now in sight. I began this journey in 2005 as a novice and enthusiastic researcher. I wanted to include all lower secondary schools in the Republic of Cyprus in the quantitative part of my study, because I was under the impression that the database held by the local Ministry of Education would provide all relevant data. I also wanted to carry out a large number of interviews with students (from ethnic minority and majority groups), their parents, and their teachers, in order to examine as many aspects of the issue as possible.

However, the reality of the situation and personal/family reasons meant that my original grand plans had to be revised. The database proved disappointing; it was difficult to navigate and only included student grades and absences. This meant a great deal of work and time was necessary to collect the other data items needed. These were collected from school-held records and led to an inevitable compromise on the number of schools included in the quantitative studies. Further, my two pregnancies and the significant health problems of my first-born daughter necessitated long interruption periods, and restricted the time I could devote to my studies upon their resumption. In addition, the data collection needed to be done in Cyprus and my family and I were living in England. Family responsibilities after the birth of my children meant it was difficult to be away for significant time-periods and this made travel for data collection especially hard. All these also altered my initial plans for the qualitative part of the research study.

The increasing family commitments and the limited time available led me to think about breaking down the task in hand into smaller, more manageable chunks of work while retaining my research goals. This interrupted, stop-start nature of my work led me to write up my progress as I went along; every chunk of work led to a different manuscript. Studies of this nature are largely new to Cyprus, so the pressure (and the temptation!) to publish my results as they became available was strong; each manuscript was subsequently

submitted for publication to a peer-reviewed journal. It was at that point that I began to discuss with my supervisor the possibility of submitting an 'alternative format' thesis, based upon these papers.

By the time of the first viva, three of the papers presented here had already been published or were in press. The papers based on the Small Attainment Study and the Interview Study were published in a local (Cypriot) peer-reviewed journal. This meant that, to a degree, I had established my presence in the local research literature. After the viva, and having received some useful comments from the examiners, I was able to develop my work resulting in the last two papers. I felt more confident and enabled to reposition my investigations in the context of the international literature. So, having identified gaps in the international literature, I re-oriented my studies, collected additional data and completed the last two pieces of work, each time using the previous studies and experience as a stepping stone.

It is perhaps unsurprising that at the very beginning of this research study I had no idea where this investigation would lead. Based on comments from colleagues who were more experienced than me in teaching ethnic minority students, I was getting two different messages. Some colleagues appeared interested when talking about minorities, and also caring and anxious about their education and future. Others appeared angry with and completely indifferent about them. Their opinion was that children from particular ethnic backgrounds were lazy, not interested in learning; disruptive and disrespectful. During data collection, and especially during the collection of qualitative data, I started realizing that the responses and behaviours reported by the latter group in relation to ethnic minority students might be a reaction to what they were experiencing or indeed a cry for help.

Now, at the end of this research study, I am convinced that ethnic minority students, and especially Georgians, are victims of particular situations. On one hand, the poverty that surrounds them and their families does not facilitate a focus on education. Their priority is to survive; everything else is much less important. On the other hand, schools in Cyprus do not provide the necessary educational environment that can help nurture ethnic minority students and encourage them to develop to their full potential; rather they appear to create educational barriers. The current national educational system in Cyprus does not appear to serve all students equally and it can be argued to be failing to meet the educational needs of ethnic minority students. These situations then further compromise school attachment

and engagement for minority students which are in turn thought contributory to their lower attainment.

There is one last reflection that I would like to share with the reader of this thesis; a few lines from the famous Greek poem “Ithaka”, which praises the benefits of a long journey. The poet encourages people to pray for a long journey. I used to teach this to my students in higher secondary schools in Cyprus and I think that it is pertinent here as I feel that I have just arrived from a very long journey!

*When you set out for Ithaka
ask that your way be long,
full of adventure, full of instruction.
The Laistrygonians and the Cyclops,
angry Poseidon - do not fear them:
such as these you will never find
as long as your thought is lofty, as long as a rare
emotion touch your spirit and your body.
The Laistrygonians and the Cyclops,
angry Poseidon - you will not meet them
unless you carry them in your soul,
unless your soul raise them up before you.*

[...]

*Have Ithaka always in your mind.
Your arrival there is what you are destined for.
But don't in the least hurry the journey.
Better it last for years,
so that when you reach the island you are old,
rich with all you have gained on the way,
not expecting Ithaka to give you wealth.
Ithaka gave you a splendid journey.
Without her you would not have set out.
She hasn't anything else to give you.*

*And if you find her poor, Ithaka hasn't deceived you.
So wise you have become, of such experience,
that already you'll have understood what these Ithakas mean.
(Constantine P. Cavafy)*

6.5 Further Research

There is always a need for more well constructed research. For example, it would be interesting to see, in a longitudinal research design, whether the attainment gap identified in this study persists throughout secondary education. Further, more recently, common end-of-school exams have been introduced as a gateway to admission to Higher Education.

It might be possible to get a more accurate measure of attainment from such a common test rather than the more subjective trimester grades and the locally designed end-of-year exam. In addition, it would be intriguing to examine suspensions in more detail and divide these into those that are handed down because of student appearance (e.g. long hair) and those that are initiated by delinquent student behavior.

Furthermore, more qualitative research to gain the perspective of ethnic minority students and their parents in relation to factors that influence student attainment would also be valuable. The perspective of the native students could also be helpful, as it could provide a different insight into the attainment of ethnic minority students. In addition, research post-introduction of the reformed curriculum, introduced in 2011, might be useful in examining its relevance to ethnic minority students and whether it has led to improvements in their attainment. Finally, research in schools where special measures are taken because of the presence of a large number of ethnic minority students could help identify which of these measures have a beneficial effect on students' academic success.

REFERENCES

- Abbas, T. (2002). The Home and the School in the Educational Achievements of South Asians. *Race Ethnicity and Education* 5:291-316.
- Abramson, J.H., Gofin, R., Habib, J., Pridan, H., and Gofin, J. (1982). Indicators of Social Class: a Comparative Appraisal of Measures for Use in Epidemiological Studies. *Social Science and Medicine* 16, 1739-46.
- Afantiti-Lamprianou, T., P. Xatzitheodoulou-Loizidou, and A. Michaelidou-Evripidou. (2008). The Perceptions of Cypriot Teachers as Regards Issues of Identity and Diversity (In Greek). Research Report Instigated as an Activity in the Realms of the European Year of Multicultural Dialogue. Department of Educational Research and Assessment. Pedagogical Institute of Cyprus.
- Ainsworth-Darnell, J.W. and D.B. Downey. (1998). Assessing the Oppositional Culture Explanation for Racial/Ethnic Differences in School Performance. *American Sociological Review* 63:536-53.
- Albrecht, T.L., G.M. Johnson, and J.B. Walther. (1993). Understanding Communication Processes in Focus Groups. Pp. 51-64 in *Successful Focus Groups*, edited by D. L. Morgan. London: Sage Publications.
- Alexander, K.L., D.R. Entwisle, and N.S. Kabbani. (2001). The Dropout Process in Life Course Perspective: Early Risk Factors at Home and School. *Teachers College Record* 103:760-822.
- Alexandrou, A. (2006). Χαμηλή Σχολική Επίδοση και Προβλήματα Μάθησης [Low School Attainment and Educational Difficulties]. Paper presented at the 9th Pancyprian Conference of Cyprus Pedagogical Association. Nicosia, Cyprus.
- Allen, M.P. (1997). *Understanding Regression Analysis*. New York: Plenum Press.
- AMMA. (1989). *Multi-Cultural and Anti-Racist Education Today*. London: Assistant Masters and Mistresses Association.
- Angelides, P., T. Stylianou, and J. Leigh. (2003). Forging a Multicultural Education Ethos in Cyprus: Reflections on Policy and Practice. *Intercultural Education* 14:57-66.
- Angelides, P., T. Stylianou, and J. Leigh. (2004). Multicultural Education in Cyprus: A Pot of Multicultural Assimilation? *Intercultural Education* 15:307-15.
- Angelides, P., T. Stylianou, and J. Leigh. (2007). The Efficacy of Collaborative Networks in Preparing Teachers. *European Journal of Teacher Education* 30:135-49.
- Asanova, J. (2005). Educational Experiences of Immigrant Students from the Former Soviet Union: A Case Study of an Ethnic School in Toronto. *Educational Studies* 31:181-95.
- Athanasou, A.J., and Lamprianou, I. (2002). *A Teachers' Guide to Assessment*. Sydney: Social Science Press.
- Aud, S., M. Fox, and A. KewalRamani. 2010. Status and Trends in the Education of Racial and Ethnic Groups (NCES 2010-015). Washington: U.S. Department of Education, National Center for Education Statistics.
- Azzolini, D., P. Schnellc, and J. Palmerd. (2012). Educational Achievement Gaps between Immigrant and Native Students in Two 'New Immigration Countries': Italy and Spain in Comparison. *The Annals of Political and Social Science* 643, no.1.
- Baker, P.B. (2005). The Impact of Cultural Biases on African American Students' Education. A Review of Research Literature Regarding Race Based Schooling. *Education and Urban Society* 37:243-56.
- Balfanz, R., L. Herzog, and MacIver D. (2007). Preventing Student Disengagement and Keeping Students on the Graduation Path in Urban Middle Grade Schools: Early Identification and Effective Interventions. *Educational Psychologist* 42: 223-35.

- Bankston, C. and S.J. Caldas. (1996). Majority African American Schools and Social Injustice: The Influence of De Facto Segregation on Academic Achievement. *Social Forces* 75:535-55.
- Bankston, C.L. and S.J. Caldas. (1998). Family Structure, Schoolmates, and Racial Inequalities in School Achievement. *Journal of Marriage and the Family* 60:715-23.
- Barnett, R.R., J.C. Glass, R.I. Snowdon, and K.S. Stringer. (2002). Size, Performance and Effectiveness: Cost-Constrained Measures of Best-Practice, Performance and Secondary-School Size. *Education Economics* 10:291-311.
- Bartley, S., R. Sutton, S. Swihart, and T. Thiery. (1999). Cultural Perspectives at Goshen Middle School: Examination of Internal and External Factors that Affect Hispanic Student Achievement. US Department of Education.
- Bates, D., M. Maechler, and B. Bolker. (2013). "lme4: Linear mixed-effects models using Eigen and Eigenfaces." R package version 0.999999-2." <http://CRAN.R-project.org/package=lme4>
- Bempechat, J., S.E. Graham, and N.V. Jimenez. (1999). The Socialization of Achievement in Poor and Minority Students - A Comparative Study. *Journal of Cross-Cultural Psychology* 30:139-58.
- Birman, D. and E. Trickett. (2001). Cultural Transitions in First-Generation Immigrants: Acculturation of Soviet Jewish Refugee Adolescents and Parents. *Journal of Cross-Cultural Psychology* 32:456-77.
- Blair, S.L., M.C. Legazpi Blair, and A.B. Madamba. (1999). Racial-Ethnic Differences in High School Students' Academic Performance: Understanding the Interweave of Social Class and Ethnicity in the Family Context. *Journal of Comparative Family Studies* 30:539-51.
- Bollen, K.A., Glanville, J.L., and Steklov, G. (2001). Socioeconomic Status and Class in Studies of Fertility and Health in Developing Countries. *Annual Review of Sociology* 27:153-85.
- Bond, T. and C. Fox. (2001). *Applying the Rasch Model: Fundamental Measurement in the Human Sciences*. New Jersey: Lawrence Erlbaum Associates.
- Borland, M.V. and R.M. Howsen. (2003). An Examination of the Effect of Elementary School Size on Student Academic Achievement. *International Review of Education* 49:463-74.
- Borman, K.M., T.M. Eitle, D. Michael, D.J. Eitle, R. Lee, L. Johnson, D. Cobb-Roberts, S. Dorn, and B. Shircluffe. (2004). Accountability in a Post-desegregation Era: The Continuing Significance of Racial Segregation in Florida's Schools. *American Educational Research Journal* 41:605-31.
- Bos, K.T., A.M. Ruijters, and A.J. Visscher. (1992). Absenteeism in Secondary Education. *British Educational Research Journal* 18:381-95.
- Brands-Kehris, I. , and X. Landes. (2007). Multicultural Education in Latvia. Latvian Centre for Human Rights. European Commission.
- Bryk, A.S., V.E. Lee, and P.B. Holland. (1993). *Catholic Schools and the Common Good*. Cambridge: Harvard University Press.
- Caldas, S.J. (1993). Re-examination of Input and Process Factor Effects on Public School Achievement. *Journal of Educational Research* 86:206-14.
- Caldas, S.J. and C. Bankston. (1997). Effect of School Population Socio-economic Status on Individual Academic Achievement. *The Journal of Educational Research* 90:269.
- Callahan, R.M. (2005). Tracking and High School English Learners: Limiting Opportunity to Learn. *American Educational Research Journal* 42:305-28.
- Chang, H.N., and M. Romero. (2008). Present, Engaged, and Accounted For - The Critical Importance of Addressing Chronic Absence in the Early Grades. National Center for Children in Poverty (NCCP).

- Clement, R.W. (2006). It's Not Being Absent that Affects a Student's Achievement; Florida Data Show It's Whether the Absences Are Excused or Unexcused. *ERS Spectrum* 24:24-32.
- Cline, T., G. De Abreu, C. Fihosy, H. Gray, H. Lambert, and J. Neale. (2002). Minority Ethnic Pupils in Mainly White Schools. Department of Education and Skills Research, Luton.
- Codjoe, H.M. (2001). Fighting a 'Public Enemy' of Black Academic Achievement - The Persistence of Racism and the Schooling Experiences of Black Students in Canada. *Race, Ethnicity and Education* 4:343-75.
- Coffey, A. and P. Atkinson. (1996) *Making Sense of Qualitative Data: Complementary Strategies*. Thousand Oaks CA: Sage.
- Cohen, J. (1988). *Statistica Power Analysis for the Behavioral Sciences*. London: Lawrence Erlbaum Associates Publishers.
- Cohen, L. and L. Manion. (1980). *Research Methods in Education*. London: Croom Helm.
- Cohen, L. and L. Manion. (1983). *Multicultural Classrooms: Perspectives for Teachers*. London: Croom Helm.
- Cohen, L., L. Manion, and K. Morrison. (2004). *Research Methods in Education*. London: RoutledgeFalmer.
- Condron, D.J. and V.J. Roscigno. (2003). Disparities within: Unequal Spending and Achievement in an Urban School District. *Sociology of Education* 76:18-36.
- Connell, J.P., and M.B. Spencer. (1994). Educational Risk and Resilience in African-American Youth: Context, Self, Action, and Outcomes in School. *Child Development* 65: 493-506.
- Connolly, P. (2006). The Effects of Social Class and Ethnicity on Gender Differences in GCSE Attainment: A Secondary Analysis of the Youth Cohort Study of England and Wales 1997-2001. *British Educational Research Journal* 32:3-21.
- Cook, M.D. and W.N. Evans. (2000). Families or Schools? Explaining the Convergence in White and Black Academic Performance. *Journal of Labor Economics* 18:729-54.
- Crainiceanu, C. and Ruppert, D. (2004). Likelihood Ratio Tests in Linear Mixed Models with One Variance Component, *Journal of the Royal Statistical Society: Series B*, 66,165-85.
- Crooks, T. and R. Caygill. (1999). New Zealand's National Education Monitoring Project: Maori Student Achievement, 1995-1998. in *Paper presented at the Joint Conference of the Australian Association for Research in Education and the New Zealand Association for Research in Education*. Melbourne, Australia, 29 November - 2 December 1999.
- Crosnoe, R. (2005). Double Disadvantage or Signs of Resilience? The Elementary School Contexts of Children From Mexican Immigrant Families. *American Educational Research Journal* 42:269-303.
- Currie, C.E., Elton, R.A., Todd, J., and Platt, S. (1997). Indicators of Socioeconomic Status for Adolescents: the WHO Health Behaviour in School-aged Children Survey. *Health Education Research - Theory and Practice* 12 (3): 385-97.
- D'Amico, J.J. (2001). A Closer Look at the Minority Achievement Gap. *ERS Spectrum*:4-10.
- Demack, S., D. Drew, and M. Grimsley. (2000). Minding the Gap: Ethnic, Gender and Social Class Differences in Attainment at 16, 1988-95. *Race, Ethnicity and Education* 3:117-143.
- Demetriou, C. and N. Trimikliniotis. (2007). The Cypriot Roma/Gypsies and the Failure of Education: Anti-discrimination and Multiculturalism as a Post-accession Challenge. *The Minorities of Cyprus: Past, Present and Future*, Nicosia, Cyprus.
- Demie, F. (2001). Ethnic and Gender Differences in Educational Achievement and Implications for School Improvement Strategies. *Educational Research* 43:91-106.
- Demie, F. (2005). Achievement of Black Caribbean Pupils: Good Practice in Lambeth Schools. *British Educational Research Journal* 31:481-508.

- Dey, A.N. and B. Bloom. (2005). Summary Health Statistics for US Children: National Health Interview Survey 2003. Vital Health Statistics.
- Dey, I. (1995). *Qualitative Data Analysis*. London: Routledge.
- Downey, D.B. (1995). When Bigger Is Not Better: Family Size, Parental Resources, and Children's Educational Performance. *American Sociological Review* 60:746-61.
- Drew, D. and J. Gray. (1990). The Fifth-year Examination Achievements of Black Young People in England and Wales. *Educational Research* 32:107-17.
- Driessen, G. (1995). The Educational Progress of Immigrant Children in the Netherlands. *Language, Culture and Curriculum* 8:265-80.
- Dube, S.R. and P. Orpinas. (2009). Understanding Excessive School Absenteeism as School Refusal Behaviour. *Children and Schools* 31:87-95.
- Duran, B.J. and R.E. Weffer. (1992). Immigrants' Aspirations, High School Process, and Academic Outcomes. *American Educational Research Journal* 29:163-81.
- Eccles, J.S., A. Wigfield, C. Midgley, D. Reuman, D. Mac Iver, and J. Feldlaufer. (1993). Negative Effects of Traditional Middle Schools on Students' Motivation. *The Elementary School Journal* 93:553-74.
- ECRI. (2006a). European Commission against Racism and Intolerance, Third Report on Cyprus. Council of Europe, Strasbourg.
- ECRI. (2006b). Racism in Cyprus, Denmark, Italy, Luxembourg and the Russian Federation. Council of Europe, Strasbourg.
- ECRI. (2011) European Commission against Racism and Intolerance (Fourth Monitoring Cycle). Council of Europe, Strasbourg.
- Education, Children and Young People Scrutiny Board (2008). Available at [www.solihull.gov.uk/akssolihull/images/att14928.doc], 4 June 2008.
- Ely, M., M. Anzul, T. Friedman, D. Garner, and A. McCormack Steinmetz. (1991). *Doing Qualitative Research: Circles within Circles*. London: The Falmer Press.
- Entwisle, D.R. and K.L. Alexander. (1990). Beginning School Math Competence: Minority and Majority Comparisons. *Child Development* 61:454-71.
- Entwisle, D.R. and K.L. Alexander. (1992). Summer Setback: Race, Poverty, School Composition, and Mathematics Achievement in the First Two Years of School. *American Sociological Review* 57:72-84.
- Entwisle, D.R. and N.M. Astone. (1994). Some Practical Guidelines for Measuring Youth's Race/Ethnicity and Socio-economic Status. *Child Development* 65:1521-40).
- Faraway, J.J. (2013). *Changes to the Mixed Effects Models Chapters in ELM* [An Update on the Book "Faraway, J.J. (2006). Extending the Linear Model with R. London: Chapman and Hall"]. Accessed at <http://www.maths.bath.ac.uk/~jif23/ELM/mixchange.pdf> on 8-2-2013.
- Faraway, J.J. (2006). *Extending the Linear Model with R*. New York: Taylor and Francis.
- Farkas, G., R.P. Grobe, D. Sheehan, and Y. Shuan. (1990). Cultural Resources and School Success: Gender, Ethnicity, and Poverty Groups within an Urban School District. *American Sociological Review* 55:127-42.
- Farrell, P. (1990). *Multicultural Education*. Warwickshire: Scholastic Publications Ltd.
- Fejgin, N. (1995). Factors Contributing to the Academic Excellence of American Jewish and Asian Students. *Sociology of Education* 68:18-30.
- Flick, U. (1992). Triangulation Revisited: Strategy of Validation or Alternative? *Journal for the Theory of Social Behaviour* 22:175-97.
- Flick, U. (2003). *An Introduction to Qualitative Research*. London: Sage Publications.
- Fox, J. (2002). An R and S-Plus Companion to Applied Regression. Oaks, CA: Sage.
- Fox, J. and Weisberg, S. (2011). An R Companion to Applied Regression, Second Edition, Sage. URL: <http://socserv.socsci.mcmaster.ca/jfox/Books/Companion>
- Fragoudaki, A. and T. Dragona. (1997). *What's Our Country? Nationalism in Education*. Athens.

- Frey, J.H. and A. Fontana. (1993). The Group Interview in Social Research. Pp. 20-34 in *Successful Focus Groups*, edited by D. L. Morgan. London: Sage.
- Frost, S., M. Reiss, and J. Frost. (2005). Count me in! Gender and Minority Ethnic Attainment in School Science. *School Science Review* 86:105-12.
- Fryer, R.G. and S.D. Levitt. (2004). Achievement Gap. *Education Next* Fall:64-71.
- Fryer, R.G. (2006). Acting White. *Education Next* Winter:52-9.
- Fuligni, A.J. (1997). The Academic Achievement of Adolescents from Immigrant Families: The Roles of Family Background, Attitudes, and Behaviour. *Child Development* 68:351-63.
- Garcia, M.V., and A.M. Taaca-Warren. (2009). Suspension: A Qualitative Study of High School Teachers' Perceptions. Sacramento: California State University.
- Gardner, P.W., S.N. Ritblatt, and J.R. Beatty. (1999). Academic Achievement and Parental School Involvement as a Function of High School Size. *High School Journal* 83:21-7.
- Garson, G.D. (2012). *Hierarchical Linear Modelling: Guide and Applications*, Sage Publications.
- Garvin, M. and A.J. Martin. (1999). High School Students' Part-time Employment and Its Relationship to Academic Engagement and Psychological Well-being. *Australian Journal of Guidance and Counselling* 9:1-14.
- Gillborn, D. (1995). *Racism and Antiracism in Real Schools*. Buckingham: Open University Press.
- Glazier, J. and J.A. Seo. (2005). Multicultural Literature and Discussion as Mirror and Window? *Journal of Adolescent and Adult Literacy* 48:686-700.
- Glesne, C. and A. Peshkin. (1992). *Becoming Qualitative Researchers: An Introduction*. London: Longman.
- Glick, J.E. and M.J. White. (2003). The Academic Trajectories of Immigrant Youths: Analysis within and across Cohorts. *Demography* 40:759-83.
- Goldsmith, P.A. (2004). Schools' Racial Mix, Students' Optimism, and the Black-White and Latino-White Achievement Gaps. *Sociology of Education* 77:121-47.
- Goldstein, H. (2011). *Multilevel statistical models*. Chichester, UK: John Wiley and Sons, Ltd.
- Gordon-Gyori, J., A. Boreczky, E. Czachesz, and A. Vamos. (2011). Multicultural Education in Hungary. Pp. 29-44 in *Cultural Diversity in the Classroom: A European Comparison*, edited by J-A. Spinthourakis, J. Lalor and B. Wolfgang: Wiesbaden: VS Verlag für Sozialwissenschaften.
- Gottfried, M.A. (2009). Excused Versus Unexcused: How Student Absences in Elementary School Affect Academic Achievement. *Educational Evaluation and Policy Analysis* 31: 392-415.
- Gouliamos, K. and M. Vryonides. (2010). *Perspectives of the Cypriot Society through the ESS Findings* [In Greek]. Nicosia, En Toipis.
- Goyette, K. and Y. Xie. (1999). Educational Expectations of Asian American Youths: Determinants and Ethnic Differences. *Sociology of Education* 72:22-36.
- Griffith, J. (2002). A Multilevel Analysis of the Relation of School Learning and Social Environments to Minority Achievement in Public Elementary Schools. *The Elementary School Journal* 102:349-442.
- Hammersley, M. and P. Atkinson. (1993). Recording and Organizing Data (chapter 7). in *Ethnography: Principles in Practice*. London: Routledge.
- Hanushek, E.A. (1997). Assessing the Effects of School Resources on Student Performance: An Update. *Educational Evaluation and Policy Analysis* 19.
- Hao, L. and M. Bonstead-Bruns. (1998). Parent-Child Differences in Educational Expectations and the Academic Achievement of Immigrant and Native Students. *Sociology of Education* 71:175-98.
- Harker, R. (2000). Achievement, Gender, and the Single-sex/coed Debate. *British Journal of Sociology of Education* 21:203-18.

- Harrison, J.W. (2011). An Examination of the Relationship between Unexcused Absences, Suspensions, and Learning Gains on the Florida Comprehensive Assessment Test. Educational Programs and Student Support. The School Board of Broward County, Florida.
- Hayes, S.G. and J. Clay. (2007). Progression from Key Stage 2 to 4: Understanding the Context and Nature of Performance and Underperformance between the Ages of 11-16. in *British Educational Research Association Annual Conference, September 5-8*. London, UK.
- Haynes, J., L. Tikly, and C. Caballero. (2006). The Barriers to Achievement for White/Black Caribbean Pupils in English Schools. *British Journal of Sociology of Education* 27:569-83.
- Hedges, L.V. and A. Nowell. (1999). Changes in the Black-White Gap in Achievement Test Scores. *Sociology of Education* 72:111-35.
- Herrnstein, R. and C. Murray. (1994). *The Bell Curve: Intelligence and Class Structure in American Life*. New York: Free Press.
- Hipp, J.L. (2012). The Achievement Gap from the Student's Perspective *Master of Social Work Clinical Research Papers*. Paper 36. http://sophia.stkate.edu/msw_papers/36
- Hixson, J.T. (2012). The Relationship of Student Family Structure and Absence Type to Reading Achievement. Liberty University.
- Hocking, C. (2008). The Contributing Factors to Student Absenteeism/Truancy and the Effectiveness of Social Services and Interventions. Social Work Theses, Paper 18.
- Hofman, W.H.A. (1994). School Effects on Performances of Minority Pupils. *School Effectiveness and School Improvement* 5:26-44.
- Hogan, J. and D.S. Ones. (1997). Conscientiousness and Integrity at Work. in *Handbook of Personality Psychology*, edited by R. Hogan, J. Johnson, and B. S. San Diego: Academic Press.
- Hornby, A.S. (2000). Oxford Advanced Learner's Dictionary. Wehmeier, S. (ed). Oxford: Oxford University Press.
- Hox, J. (1998). Multilevel Modelling: When and Why. Pp. 147-54 in *Classification, Data Analysis, and Data Highways*, edited by I. Balderjahn, R. Mathar and M. Schader. New York: Springer Verlag.
- Hoxby, C.M. (2002). The Power of Peers: How does the Makeup of a Classroom Influence Achievement? *Education Next* Summer:57-63.
- Hussein, A., M. Nur, M. Ibrahim, and O. Mohammed. (2007). Underlining Causes of School Absenteeism and Truancy among Somali Pupils in the London Borough of Camden. Camden Education Welfare Service, Institute of Education, University of London.
- Hustinx, P.W.J. (2002). School Careers of Pupils of Ethnic Minority Background after the Transition to Secondary Education: Is the Ethnic Factor Always Negative? *Educational Research and Evaluation* 8:169-95.
- Hutcheson, G. (2006a). Quantitative Methods and Analysis. Building Regression Models I: Multicollinearity. (Session 9).
- Hutcheson, G. (2006b). Quantitative Methods and Analysis. Building Regression Models II: Model Selection. (Session 10).
- Hutcheson, G. (2006c). Quantitative Methods and Analysis. Data Screening and Regression Diagnostics. (Session 21).
- Hutcheson, G. (2006d). Quantitative Methods and Analysis. Modelling Continuous Data II. (Session 6).
- Hutcheson, G. (2006e). Quantitative Methods and Analysis. Generalized Linear Models. (Session 4).
- Hutcheson, G. (2006f). Quantitative Methods and Analysis. Dummy Variable Coding. (Session 7).

- Hutcheson, G. (2008). Generalized Linear Models. Building Regression Models: Model Selection (Session 7).
- Hutcheson, G.D. and N.T. Sofroniou. (1999). *The Multivariate Social Scientist: Introductory Statistics Using Generalized Linear Models*: Sage Publications.
- Izzo, C.V., R.P. Weissberg, W.J. Kaspro, and M. Fendrich. (1999). A Longitudinal Assessment of Teacher Perceptions of Parent Involvement in Children's Education and School Performance. *American Journal of Community Psychology* 27:817-39.
- Jencks, C. (1998). Racial Bias In Testing. Pp. 55-85 in *The Black-White Test Score Gap*, edited by C. Jencks and M. Phillips. Washington: DC: Brookings Institution.
- Jencks, C. and S.E. Mayer. (1990). The Social Consequences of Growing Up In a Poor Neighborhood. Pp. 111-86 in *Inner-city Poverty In the United States*, edited by L. J. Lynn and M. G. H. McGeary. Washington,: National Academy Press.
- Johnson, M.K., R. Crosnoe, and G.H.J. Elder. (2001). Students' Attachment and Academic Engagement: The Role of Race and Ethnicity. *Sociology of Education* 74:318-40.
- Johnson, R.B. and Onwuegbuzie, A.J. (2004). Mixed Methods Research: A Research Paradigm Whose Time Has Come. *Educational Researcher* 33(7):14-26.
- Kahne, J.E., S.E. Spote, and J.Q. Easton. (2005). Creating Small Schools in Chicago: an Early Look at Implementation and Impact. *Improving Schools* 8:7-22.
- Kao, G. and M. Tienda. (1995). Optimism and Achievement: The Educational Performance of Immigrant Youth. *Social Science Quarterly* 76:1-19.
- Karagiorgi, Y., E. Roussounidou, C. Kaloyirou, and L. Symeou. (2009). Roma Inclusion in the Greek-Cypriot Educational System - Reflections on Teacher Training Needs. In *European Educational Research Association*. Vienna, Austria.
- Kay, J.E. (2010). Improving Academic Achievement of Students with Problematic Attendance by Implementing a Multi-systemic School-Based Model. Doctorate Thesis. Walden University.
- Kearney, C.A. (2008). An Interdisciplinary Model of School Absenteeism in Youth to Inform Professional Practice and Public Policy. *Educational Psychology Review* 20:257-82.
- Kearney, C.A. and A. Bensaheb. (2006). School Absenteeism and School Refusal Behavior: A Review and Suggestions for School-Based Health Professionals. *Journal of School Health* 76:3-7.
- Kinder, K., J. Harland, A. Wilkin, and A. Wakefield. (1995). *Three to Remember: Strategies for Disaffected Pupils*. Slough: NFER.
- Kitzinger, J. (1994). The Methodology of Focus Groups: the Importance of Interaction Between Research Participants. *Sociology of Health and Illness* 16.
- Klein, S.P., J. Jovanovic, B.M. Stecher, D. McCaffrey, R.J. Shavelson, E. Haertel, G. Solano-Flores, and K. Comfort. (1997). Gender and Racial/Ethnic Differences on Performance Assessments in Science. *Educational Evaluation and Policy Analysis* 19:83-97.
- Knodel, J. (1993). The Design and analysis of Focus Group Studies. in *Successful Focus Groups*, edited by D. L. Morgan. London: Sage.
- Konstantinou, A. (2006). The Teaching of 'History'; a View Through the Lens of Intercultural Education, Aiming at the Peaceful Living of the Two Communities [In Greek]. Paper presented at the 9th Pancyprian Conference of the Cyprus Pedagogical Association: Current educational research in Cyprus: priorities and prospects. Nicosia, University of Cyprus.
- Koretz, D. (2003). Using Multiple Measures to Address Perverse Incentives and Score Inflation. *Educational Measurement: Issues and Practice*, 22, 18-26.
- Korilaki, P. (2004). School Effects or Classroom Effects for Greek State Primary Schools? in *European Conference on Educational Research*. University of Crete, 22-25 September.
- Krueger, R.A. (1993). Quality Control in Focus Group Research. in *Successful Focus Groups*, edited by D. L. Morgan. London: Sage.

- Krzywosz-Rynkiewicz, B., E. Wolodzko, and J. Strzemecka-Kata. (2006). Multicultural Education in Poland – Case Studies of Good Practice. In *Citizenship Education: Europe and the World*, ed. Ross, A. London: CiCe, pp 29-36.
- Kysel, F. (1988). Ethnic Background and Examination Results. *Educational Research* 30:83-9.
- Laaksonen, M., Rahkonen, O., Karvonen, S., Lahelma, E. (2005). Socioeconomic Status and Smoking - Analysing Inequalities with Multiple Indicators. *European Journal of Public Health* 15(3): 262–9.
- Lamdin, D.J. (1995). Testing for the Effect of School Size on Student Achievement within a School District. *Education Economics* 3:33-43.
- Lamprianou, I. (2006). The Stability of Marker Characteristics across Tests of the Same Subject and across Subjects. *Journal of Applied Measurement*, 7:192-200.
- Lamprianou, I. (2008a). Analysis: Rasch Analysis (Ver. 2.0). [Computer program]. Cyprus: ReLabs Research Laboratories.
- Lamprianou, I. (2008b). High Stakes Tests with Self-Selected Essay Questions: Addressing Issues of Fairness. *International Journal of Testing*, 18:55-89.
- Lamprianou, I. and B. Boyle. (2004). Accuracy of Measurement in the Context of Mathematics National Curriculum Tests in England for Ethnic Minority Pupils and Pupils Who Speak English as an Additional Language. *Journal of Educational Measurement* 41:239-60.
- Lamprianou, I., and T. Christie. (2009). Why School Based Assessment is not a Universal Feature of High Stakes Assessment Systems? *Educational Assessment Evaluation & Accountability*, 21, no.4: 329-345.
- Lee, J.-S. and N.K. Bowen. (2006). Parent Involvement, Cultural Capital, and the Achievement Gap among Elementary School Children. *American Educational Research Journal* 43:193-218.
- Lee, V.E. and D.T. Burkam. (2003). Dropping Out of High School: The Role of School Organization and Structure. *American Educational Research Journal* 40:353-93.
- Lee, V.E. and S. Loeb. (2000). School Size in Chicago Elementary Schools: Effects on Teachers' Attitudes and Students' Achievement. *American Educational Research Journal* 37:3-31.
- Lee, V.E. and J.B. Smith. (1995). The Effects of High School Restructuring and Size on Gains in Achievement and Engagement for Early Secondary School Students. *Sociology of Education* 68:271-90.
- Lee, V.E. and J.B. Smith. (1997). High School Size: Which Works Best and for Whom? *Educational Evaluation and Policy Analysis* 19:205-27.
- Lee, V.E., J.B. Smith, and R.G. Croninger. (1997). How High School Organization Influences the Equitable Distribution of Learning in Mathematics and Science. *Sociology of Education* 70:128-50.
- Li, G. (2004). Perspectives on Struggling English Language Learners: Case Studies of Two Chinese-Canadian Children. *Journal of Literacy Research* 36:31-72.
- Lincoln, Y.S., and E.G. Guba. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage Publications, Inc.
- Lindsay, G. and D. Muijs. (2006). Challenging Underachievement in Boys. *Educational Research* 48:313-32.
- Lips, H.M. and N.L. Colwell. (1987). *The Psychology of Sex Differences*. Englewood Cliffs: NJ, Prentice-Hall.
- Loizos, P. (1998). How Might Turkish and Greek Cypriots See Each Other More Clearly? Pp. 35-52 in *Cyprus and Its People: Nation, Identity, and Experience In an Unimaginable Community, 1955-1997*, edited by V. Calotychos. Boulder: Westview Press.

- Lopez, G.R., J.D. Scribner, and K. Mahitivanichcha. (2001). Redefining Parental Involvement: Lessons from High-Performing Migrant-Impacted Schools. *American Educational Research Journal* 38:253-88.
- Lounsbury, J.W., R.P. Steel, J.M. Loveland, and L.W. Gibson. (2004). An Investigation of Personality Traits in Relation to Adolescent School Absenteeism. *Journal of Youth and Adolescence* 33:457-66.
- Lubienski, S.T. (2002). A Closer Look at Black-White Mathematics Gaps: Intersections of Race and SES in NAEP Achievement and Instructional Practices Data. *The Journal of Negro Education* 71:269-87.
- Lucas, J.W., Morrel, K., and Posard, M. (2013). Considerations on the 'Replication Problem' in Sociology. *Am Soc*
- Lucas, S.R. (2000). Hope, Anguish, and the Problem of Our Time: An Essay on the Publication of The Black-White Test Score Gap. *Teachers College Record*:461-73.
- Lynch, J. (1989). International Interdependence: Swann's Contribution. Pp. 118-31 in *Education for All: A Landmark in Pluralism*, edited by G. Verma. London: The Falmer Press.
- Ma, X. (2005). Growth in Mathematics Achievement: Analysis with Classification and Regression Trees. *The Journal of Educational Research* 99:78-86.
- Mackintosh, N.J., C.G.N. Mascie-Taylor, and A.M. West. (1988). West Indian and Asian Children's Educational Attainment. Pp. 87-99 in *Educational Attainments: Issues and Outcomes in Multicultural Education*, edited by G. Verma and P. Pumfrey. London: The Falmer Press.
- Malcolm, H., V. Wilson, J. Davidson, and S. Kirk. (2003). Absence from School: a Study of Its Causes and Effects in Seven LEAs. DfES Publications, Nottingham.
- Marjoribanks, K. (2003). Family Background, Individual and Environmental Influences, Aspirations and Young Adults' Educational Attainment: A Follow-up Study. *Educational Studies* 29:233-42.
- Martidou-Forsier, D. (2003). Multicultural Education in Cyprus: The Present Situation in Schools. *Parousia (Educational Magazine of Greek Scientists' Organisation in Secondary Education)*, pp. 33-43.
- Maslow, A.H. (1943). A Theory of Human Motivation. *Psychological Review* 50:370-96.
- Mason, J. (1998). Generating Qualitative Data: Interviewing. in *Qualitative Researching*. London: Sage.
- Maurice, P. (1998). Politics and Ethnics in Qualitative Research. in *The Landscape of Qualitative Research*, edited by N. K. Denzin and Y. S. Lincoln. London: Sage.
- May, S. (1994). *Making Multicultural Education Work*. Bristol: The Longdunn Press.
- Maykut, P. and R. Morehouse. (1994). Data Collection in the Natural Setting: Studying People, Studying Settings (chapter 7). in *Beginning Qualitative Research*. Bristol: Falmer Press.
- McCallum, I. and F. Demie. (2001). Social Class, Ethnicity and Educational Performance. *Educational Research* 43:147-59.
- McCoy, L.P. (2005). Effect of Demographic and Personal Variables on Achievement in Eighth-grade Algebra. *The Journal of Educational Research* 98:131-5.
- Mickelson, R.A. (1990). The Attitude-Achievement Paradox among Black Adolescents. *Sociology of Education* 63:44-61.
- Miles, M.B. and A.M. Huberman. (1994). *Qualitative Data Analysis: An Expanded Sourcebook*. 2nd ed., Sage Publications, Newbury Park, CA.
- Ministry of Education and Culture. (2005). Annual Report. Nicosia, Cyprus.
- Ministry of Education and Culture. (2009). Annual Report. Nicosia, Cyprus.
- Ministry of Education and Culture. (2008). Pancyprrian Exams Guide, Issue A, Nicosia.
- Ministry of Education and Culture. 2012. Annual Report 2011. Nicosia.
- Mitakidou, S., C. Tourtouras, and E. Tressou. (2008). Performance of Students from the Former USSR in Greek Schools. *Journal of Early Childhood Research* 6:163-87.

- Mocombe, P.C. (2006). The Sociolinguistic Nature of Black Academic Failure in Capitalist Education: A Re-evaluation of 'Language in the Inner City' and its Social Function, 'Acting White'. *Race Ethnicity and Education* 9:395-407.
- Modood, T. (1993). The Number of Ethnic Minority Students in British Higher Education: Some Grounds for Optimism. *Oxford Review of Education* 19:167-182.
- Mohandas, R. (1999). Mathematics and Science Achievement of Junior Secondary School Students in Indonesia. Flinders University of South Australia.
- Morgan, D.L. (1988). *Focus Groups as Qualitative Research*. London: Sage.
- Morgan, D.L. and R.A. Krueger. (1993). When to Use Focus Group and Why. Pp. 1-19 in *Successful Focus Groups*, edited by D. L. Morgan. London: Sage Publications.
- Moree, D., C. Klaassen, and W. Veugelers. (2008). Teachers' Ideas about Multicultural Education in a Changing Society: the Case of the Czech Republic. *European Educational Research Journal* 7: 60-73.
- NCES. (2003). Status and Trends in the Education of Hispanics. National Center for Education Statistics.
- NCSE. (2006). Jacksonville: How Do Students with Excused Absences Compare to Students with Unexcused Absences. National Center for School Engagement.
- NFES. (2009). Every School Day Counts: The Forum Guide to Collecting and Using Attendance Data (National Forum for Education Statistics 2009-804). Washington: U.S. Department of Education, National Center on Education Statistics.
- Nixon, D. (2006). Focus Groups for Social Research. Optional Course for Qualitative Research (Course Notes). University of Manchester.
- Novak, T. and D. Hoffman. (1998). Bridging the Racial Divide on the Internet. *Science Magazine* 280:390-2.
- O'Connell, A.A. (2006). Logistic Regression Models for Ordinal Response Variables. Thousand Oaks, CA: Sage.
- O'Connor, C. (1999). Race, Class, and Gender in America: Narratives of Opportunity among Low-income African American Youths. *Sociology in Education* 72:137-57.
- OECD. (2006). Where Immigrant Students Succeed - A Comparative Review of Performance and Engagement in PISA 2003 (Programme for International Student Assessment). OECD (Organisation for Economic Co-operation and Development).
- OECD. (2009). Untapped Skills. Realising the Potential of Immigrant Students. OECD Publishing.
- Ogbu, J. (1991). Minority Responses and School Experiences. *Journal of Psychohistory* 18:433-56.
- Ohinata, A. and van Ours, J.C. (2011). How Immigrant Children Affect the Academic Achievement of Native Dutch Children, IZA Discussion Paper No. 6212.
- Oikonomidou, M. (2003). Multicultural Education in Cyprus. *Parousia (Educational Magazine of Greek Scientists' Organisation in Secondary Education)*, pp. 44-51.
- Olszewski-Kubilius, P. (2006). Addressing the Achievement Gap Between Minority and Non-minority Children - Increasing Access and Achievement Through Project EXCITE. *Gifted Child Today* 29:28-37.
- Orr, A.J. (2003). Black-White Differences in Achievement: The Importance of Wealth. *Sociology of Education* 76:281-304.
- Ou, S.R. and A.J. Reynolds. (2008). Predictors of Educational Attainment in the Chicago Longitudinal Study. *School Psychology Quarterly* 23:199-229.
- Padilla, A.M. and R. Gonzalez. (2001). Academic Performance of Immigrant and US-born Mexican Heritage Students: Effects of Schooling in Mexico and Bilingual/English Language Instruction. *American Educational Research Journal* 38:727-42.
- Panayiotopoulos, C. and M. Nicolaidou. (2007). At a Crossroads of Civilizations: Multicultural Educational Provision in Cyprus through the Lens of a Case Study. *Intercultural Education* 18:65-79.

- Papamichael, E. (2008). Greek-Cypriot Teachers' Understandings of Intercultural Education in an Increasingly Diverse Society. *The Cyprus Review* 20:51-78.
- Parekh, B. (1986). The Concept of Multi-Cultural Education. Pp. 19-31 in *Multicultural Education: The Interminable Debate*, edited by S. Modgil, G. Verma, K. Mallick, and C. Modgil. London: The Falmer Press.
- Parliamentary Minutes (2005). *H' BOYAEYTIKH ΠΕΡΙΟΔΟΣ - ΣΥΝΟΛΟΣ Δ'*, Minutes from a Parliamentary Meeting, 23rd June 2005, No.36.
- Patterson, C.J., J.B. Kupersmidt, and N.A. Vaden. (1990). Income Level, Gender, Ethnicity, and Household Composition as Predictors of Children's School-Based Competence. *Child Development* 61:485-94.
- Patton, M.Q. (1990). *Qualitative Evaluation and Research Methods*. Beverly Hills: CA: Sage.
- Pearce, R.R. (2006). Effects of Cultural and Social Structural Factors on the Achievement of White and Chinese American Students at School Transition Points. *American Educational Research Journal* 43:75-101.
- Philbeck Musser, M. (2011). Taking Attendance Seriously - How School Absences Undermine Student and School Performance in New York City. The Campaign for Fiscal Equity, Inc.
- Philippou, S. (2007). Policy, Curriculum and the Struggle for Change in Cyprus: The case of the European Dimension in Education. *International Studies in Sociology of Education* 17:249-74.
- Phillips, M. (1997). What Makes Schools Effective? A Comparison of the Relationships of Communitarian Climate and Academic Climate to Mathematics Achievement and Attendance during Middle School. *American Educational Research Journal* 34:633-62.
- Phillips, M., J. Brooks-Gunn, G. Duncan, P. Klebanov, and J. Crane. (1998). Family Background, Parenting Practices, and the Black-White Test Score Gap. Pp. 103-145 in *The Black-White Test Score Gap*, edited by C. Jencks and M. Phillips. Washington: DC: Brookings Institution.
- Pinheiro, J.C., and D.M. Bates. (2000). *Mixed-Effects Models in S and S-PLUS*. New York: Springer-Verlag.
- Pinheiro, J., Bates, D., and DebRoy, S. and Sarkar, D. (2012). The R Development Core Team (2012). nlme: Linear and Nonlinear Mixed Effects Models. R package version 3.1-104.
- Plewis, I. (1988). Assessing and Understanding the Educational Progress of Children from Different Ethnic Groups. *Journal of the Royal Statistical Society* 151:316-26.
- Pollitt, E., K.S. Gorman, P. Engle, R. Martorell, and J. Rivera. (1993). Early Supplementary Feeding and Cognition: Effects Over Two Decades. *Monographs of the Society for Research in Child Development* 58.
- Popkin, B.M., Paerakatul, S., Zhai, F., Ge, K. (1995). A Review of Dietary and Environmental Correlates of Obesity with Emphasis on Developing Countries. *Obesity Research* 3:s145-53.
- Portes, A. and D. MacLeod. (1996). Educational Progress of Children of Immigrants: The Roles of Class, Ethnicity, and School Context. *Sociology of Education* 69:255-75.
- R Core Team (2012). R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing. Vienna, Austria. ISBN 3-900051-07-0, URL <http://www.R-project.org/>.
- Radnor, H. (2001). *Researching Your Professional Practice Doing Interpretive Research*. Buckingham: Open University Press.
- Rausch, M.K., and R. Skiba. (2004). Unplanned Outcomes: Suspensions and Expulsions in Indiana. *Education Policy Briefs* 2: 1-8.
- Rawlings, J.O., S.G. Pantula, and D.A. Dickey. (1998). *Applied Regression Analysis: A Research Tool*. New York: Springer.

- Ready, D.D. (2010). Socioeconomic Disadvantage, School Attendance, and Early Cognitive Development: the Differential Effects of School Exposure. *Sociology of Education* 83: 271-86.
- Ream, R.K. (2005). Toward Understanding How Social Capital Mediates the Impact of Mobility on Mexican American Achievement. *Social Forces* 84:201-24.
- Reid, K. (1999). *Truancy and Schools*. London: Routledge.
- Reid, K. (2000). *Tackling Truancy in Schools*. London: Routledge.
- Reid, K. (2005). The Causes, Views and Traits of School Absenteeism and Truancy. An Analytical Review. *Research in Education* 74:59-82.
- Reis, S.M., T.P. Hebert, E.I. Diaz, L.R. Maxfield, and M.E. Ratley. (1995). Case Studies of Talented Students Who Achieve and Underachieve In an Urban High School. The National Research Center of the Gifted and Talented. Office of Educational Research and Improvement., Washington.
- Rivkin, S.G. (2000). School Desegregation, Academic Attainment, and Earnings. *The Journal of Human Resources* 35:333-46.
- Robinson, L. (1999). The Effects of Part-time Work on School Students. Longitudinal Surveys of Australian Youth Research Report Number 9. Australian Council for Educational Research, Australia.
- Robson, C. (1995). Interviews and Questionnaires. in *Real World Research: A Resource for Social Scientists and Practitioner-Researchers*. Oxford: Blackwell.
- Rong, X.L. and L. Grant. (1992). Ethnicity, Generation, and School Attainment of Asians, Hispanics, and non-Hispanic Whites. *Sociological Quarterly* 33:625-36.
- Roscigno, V.J. (1998). Race and the Reproduction of Educational Disadvantage. *Social Forces* 76:1033-61.
- Roscigno, V.J. and J.W. Ainsworth-Darnell. (1999). Race, Cultural Capital, and Educational Resources: Persistent Inequalities and Achievement Returns. *Sociology of Education* 72:158-78.
- Rubie, C.M., M.A.R. Townsend, and D.W. Moore. (2004). Motivational and Academic Effects of Cultural Experiences for Indigenous Minority Students in New Zealand. *Educational Psychology* 24:143-60.
- Rubie-Davies, C., J. Hattie, and R. Hamilton. (2006). Expecting the Best for Students: Teacher Expectations and Academic Outcomes. *British Journal of Educational Psychology* 76:429-44.
- Rumbaut, R.G. (1995). The New Californians: Comparative Research Findings on the Educational Progress of Immigrant Children. Pp. 17-69 in *Californian's Immigrant Children: Theory, Research and Implications for Educational Policy*. Center for US-Mexican Studies, edited by R. G. Rumbaut and W. A. Cornelius. San Diego: University of California.
- Rumberger, R.W. and K.A. Larson. (1998). Toward Explaining Differences in Educational Achievement among Mexican American Language-Minority Students. *Sociology of Education* 71:68-92.
- Rumberger, R.W. and G.J. Palardy. (2005). Does Segregation Still Matter? The Impact of Student Composition on Academic Achievement in High School. *Teachers College Record* 107:1999-2045.
- Rumberger, R.W. and J.D. Willms. (1992). The Impact of Racial and Ethnic Segregation on the Achievement Gap in California High Schools. *Educational Evaluation and Policy Analysis* 14:377-96.
- Sammons, P. (1995). Gender, Ethnic and Socio-economic Differences in Attainment and Progress: a Longitudinal Analysis of Student Achievement over Nine Years. *British Educational Research Journal* 21:465-85.
- Sammons, P., D. Nuttall, and P. Cuttance. (1993). Differential School Effectiveness: Results from a Reanalysis of the ILEA's Junior School Project Data. *British Educational Research Journal* 19:381-405.

- Scheipl, F., Greven, S. and Kuechenhoff, H. (2008). Size and Power of Tests for a Zero Random Effect Variance or Polynomial Regression in Additive and Linear Mixed Models. *Computational Statistics and Data Analysis* 52(7):3283-99.
- Schmid, C.L. (2001). Educational Achievement, Language-Minority Students, and the New Second Generation. *Sociology of Education* Extra Issue:71-87.
- Schnepf, S. (2004). How Different Are Immigrants? A Cross-country and Cross-survey Analysis of Educational Achievement. Southampton Statistical Sciences Research Institute, Southampton, UK.
- Sharp, C., N. George, C. Sargent, S. Oconnell, and M. Heron. (2009). International Thematic Probe: the Influence of Relative Age on Learner Attainment and Development. National Foundation for Educational Research, England.
- Sheldon, S.B. and J.L. Epstein. (2005). Involvement Counts: Family and Community Partnerships and Mathematics Achievement. *The Journal of Educational Research* 98:196-206.
- Sheppard, A. (2009). School Attendance and Attainment: Poor Attenders' Perceptions of Schoolwork and Parental Involvement in their Education. *British Journal of Special Education* 36: 104-11.
- Silverman, D. (2003). *Doing Qualitative Research: A Practical Handbook*. London: Sage Publications.
- Sirin, S.R. (2005). Socio-economic Status and Academic Achievement: A Meta-Analytic Review of Research. *Review of Educational Research* 75:417-53.
- Smyth, E. (1999). Pupil Performance, Absenteeism and School Drop-out: A Multi-dimensional Analysis. *School Effectiveness and School Improvement* 10:480-502.
- Spencer, A.M. (2009). School Attendance Patterns, Unmet Educational Needs, and Truancy - A Chronological Perspective. *Remedial and Special Education* 30:309-19.
- SPSS Inc. (1999). SPSS Base 12.0 for Windows User's Guide. Chicago: SPSS Inc.
- Spyrou, S. (2002). Images of 'the Other': the Turk in Greek Cypriot Children's Imaginations. *Race, Ethnicity, and Education* 5:255-72.
- Spyrou, S. (2004). Educational Needs of Turkish-speaking Children in Limassol: Research Results of Project Supported by the Bi-communal Development Programme funded by USAID and UNDP and executed by UNOPS (February-March 2004). Nicosia.
- Spyrou, S. (2006). Constructing 'the Turk' As An Enemy: The Complexity of Stereotypes In Children's Everyday Worlds. *South European Society and Politics* 11:95-110.
- Stamm, M. (2007). School Absenteeism: Does the School Make a Difference? in *British Educational Research Association Annual Conference*. Institute of Education, University of London, 5-8 September.
- Stevenson, H.W., C. Chen, and D.H. Uttal. (1990). Beliefs and Achievement: A Study of Black, White, and Hispanic Children. *Child Development* 61:508-23.
- Stiefel, L., R. Berne, P. Iatarola, and N. Fruchter. (2000). High School Size: Effects on Budgets and Performance in New York City. *Educational Evaluation and Policy Analysis* 22:27-39.
- Strand, S. (1999). Ethnic Group, Sex and Economic Disadvantage: Associations with Pupils' Educational Progress from Baseline to the End of Key Stage 1. *British Educational Research Journal* 25:179-202.
- Strauss, A.L. and J. Corbin. (1998). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. London: Sage.
- Sue, S. and S. Okazaki. (1990). Asian-American Educational Achievements: A Phenomenon in Search of an Explanation. *American Psychologist* 45:913-20.
- Sun, B. and J. Qi. (2007). Development of Ethnic Education and Educational Equality in China. A Statistical Analysis Based on the Two Recent Population Censuses. *Frontiers of Education in China* 2:528-35.

- Swann, L. (1985). *Education for All: Report of the Committee of Enquiry into the Education of Children from Ethnic Minority Groups (The Swann Report)*. Department of Education and Science, London.
- Swann, M. (1986). Foreword. in *Ethnicity and Educational Achievement in British Schools*, edited by G. K. Verma and B. Ashworth. London: Macmillan.
- Symeou, L., Y. Karagiorgi, E. Roussounidou, and C. Kaloyirou. (2009). Roma and Their Education in Cyprus: Reflections on INSETRom Teacher Training for Roma Inclusion. *Intercultural Education* 20: 511-21.
- Taylor, S.T. and R. Bogdan. (1984). Working with Data. in *Introduction to Qualitative Research Methods: The Search for Meaning*. New York: Wiley.
- Tengtragul, A. (2006). Factors Affecting the Learning Outcomes of Hill Tribe Students in Elementary School: The Case of Sahasart Suksa School, Chiang Rai Province, Thailand. University of Queensland.
- Theodorou, E. (2011). I'll Race You to the Top: Othering from Within - Attitudes among Pontian Children in Cyprus towards Other Immigrant Classmates. *Childhood* 18, no.2: 242-60.
- Theodorou, E. and L. Symeou. (2012). Experiencing the Same but Differently: Indigenous Minority and Immigrant Children's Experiences in Cyprus. *British Journal of Sociology of Education* iFirst article: 1-19.
- Theodosiou, G. (2006). The Performance of Ethnic Minority Students in Secondary Education in Cyprus. Master Thesis, School of Education, University of Manchester, Manchester.
- Theodosiou-Zipiti, G., and M. West. (2012). Attainment Gap - the Teacher Perspective. *The Cyprus Review* 24: 99-117.
- Theodosiou-Zipiti, G., I. Lamprianou, M. West, and D. Muijs. (2011). Research Note: Attainment Gap and Responsible Factors - A Quantitative Study in Secondary Schools in Cyprus. *Intercultural Education* 22:529-44.
- Theodosiou-Zipiti, G., I. Lamprianou, and M. West. (Submitted Paper a). Factors Influencing Attainment Levels among Ethnic Minority Students in Cyprus: Revisiting the Influence of Language.
- Theodosiou-Zipiti, G., M. West, and I. Lamprianou. (2011). Attainment of Ethnic Minority Secondary School Students in Cyprus. *The Cyprus Review* 23:123-44.
- Theodosiou-Zipiti, G., M. West, and D. Muijs. (2010). Research Note: Factors Affecting Ethnic Minority Students' Attainment in Secondary Schools in Cyprus - A Focus Group Study. *Intercultural Education* 21:483-9.
- Theodosiou-Zipiti, G., I. Lamprianou, and M. West. (Submitted Paper b). Excused or Unexcused, Absences Matter; Suspension Has an Even More Dramatic Relation to Attainment.
- Tinklin, T. (2003). Gender Differences and High Attainment. *British Educational Research Journal* 29:307-25.
- Trimikliniotis, N. (2007) 'Report on Measures to Combat Discrimination', Cyprus Country Report - Directives 2000/43/EC and 2000/78/EC - drafted for European Network of Legal Experts in the non-discrimination field. Available at [<http://www.non-discrimination.net/content/media/2006%20Cyprus%20country%20report%20final.pdf>], accessed on 24 June 2010.
- Trimikliniotis, N. and C. Demetriou. (2004). RAcism and XEnophobia Network (RAXEN) Special Study: Roma, Sindi, Gypsies and Travellers in Public Education in Cyprus. Report for the Cyprus National Focal Point for the EUMC.
- Trimikliniotis, N. and C. Demetriou. (2005). Active Civic Participation of Immigrants in Cyprus. Country Report prepared for the European research project POLITIS. Oldenburg.

- Trimikliniotis, N. and C. Demetriou. (2006). Immigration to Cyprus. In *European Immigration: A sourcebook* (chapter three), eds. A. Triandafyllidou and R. Gropas, Ashgate, Aldershot.
- Trimikliniotis, N. and C. Demetriou. (2009). The Cypriot Roma and the Failure of Education: Anti-Discrimination and Multiculturalism as a Post-accession Challenge. In *The Minorities of Cyprus: Development Patterns and the Identity of the Internal-Exclusion*, eds. N. Coureas and A. Varnava, Cambridge Scholars Publishing.
- Trimikliniotis, N., C. Demetriou, and E. Papamichael. (2012). The Embodiment of Tolerance in Discourses and Practices Addressing Cultural Diversity in Schools. The Case of Cyprus. Country Reports on Tolerance and Cultural Diversity Discourses. SYMFILIOSI: ACCEPT PLURALISM Research Project. Florence, European University Institute.
- Trimikliniotis, N. and P. Pantelides. (2003). Mapping Discriminatory Landscapes in Cyprus: Ethnic Discrimination in the Labour Market. *The Cyprus Review* 15:121-46.
- Uhlenberg, J. and K.M. Brown. (2002). Racial Gap in Teachers' Perceptions of the Achievement Gap. *Education and Urban Society* 34:493-530.
- USCRHRP. (2005). United States Country Reports on Human Rights Practices for 2004 on CYPRUS, U.S. Bureau of Democracy, Human Rights, and Labour.
- Valanidou, A. and J. Jones. (2012). Teaching Greek in Multicultural, Primary Classrooms: Teachers' Perceptions of the Challenges in Four Greek-Cypriot Primary Schools. *The Cyprus Review* 24, 1:119-45.
- Verkuyten, M. (1994). Self-esteem among Ethnic Minority Youth in Western Countries. *Social Indicators Research* 32:21-47.
- Verma, G. and B. Ashworth. (1986). *Ethnicity and Educational Achievement in British Schools*. London: MacMillan.
- Verma, G. and K. Mallick. (1988). Self-Esteem and Educational Achievement in British Young South Asians. Pp. 152-64 in *Educational Attainments: Issues and Outcomes in Multicultural Education*, edited by G. Verma and P. Pumfrey. London: The Falmer Press.
- Verma, G.K. and K. Mallick. (1999). *Researching Education: Perspectives and Techniques*. London: Falmer Press.
- Vickers, M. (2002). Juggling School and Work: How Students Use Part-time Jobs as They Design their Futures. *Education Links* 65:19-22.
- Villalba, J.A., M. Brunelli, L. Lewis, and C. Wachter. (2007). Examining the Academic and Personal-Social Experiences of Latina/o Children in Southeastern U.S. Rural, Burgeoning Latino Communities. *The Rural Educator* 28:12-9.
- Wahba, A. and L. Bridgwell. (1976). Maslow Reconsidered: A Review of Research on the Need Hierarchy Theory. *Organizational Behavior and Human Performance* 15:212-40.
- Warikoo, N. (2004). Race and the Teacher-student Relationship: Interpersonal Connections between West Indian Students and their Teachers in a New York City High School. *Race, Ethnicity and Education* 7:135-47.
- Watt, T.T. (2003). Are Small Schools and Private Schools Better for Adolescents' Emotional Adjustment? *Sociology of Education* 76:344-67.
- Weller, L.D. (2000). School Attendance Problems: Using the TQM Tools to Identify Root Causes. *Journal of Educational Administration and History* 38.
- Wilson, V. (1997). Focus Groups: A Useful Qualitative Method for Educational Research? *British Educational Research Journal* 23:209-23.
- Wojtkiewicz, R.A. and K.M. Donato. (1995). Hispanic Educational Attainment: The Effects of Family Background and Nativity. *Social Forces* 74:559-74.
- Wright, B.D. and G.N. Masters. (1982). *Rating Scale Analysis*. Chicago: MESA Press.

- Yap, K. (1990). The Student Worker: A New Adolescent Lifestyle, Full-time Secondary Student and Part-time Employee. in *The Annual Conference of the Australian Association for Research in Education*. Sydney.
- Zembylas, M. (2007). The Affective Politics of Hatred: Implications for Education. *Intercultural Education* 18:177-92.
- Zembylas, M. (2009). Negotiating Co-existence in Divided Societies: Teachers, Students and Parents' Perspectives at a Shared School in Cyprus. *Research Papers in Education* iFirst Article: 1-23.
- Zembylas, M. (2010). Children's Construction and Experience of Racism and Nationalism in Greek-Cypriot Primary Schools. *Childhood* 17, no.4: 312-28.
- Zembylas, M., A. Michaelidou, and T. Afantiti-Lamprianou. (2010). Greek Cypriot Adolescent Attitudes toward Immigrants and 'Enemy-Others' in the Context of an Ethnic Conflict. *Mediterranean Journal of Educational Studies* 15, 1:5-39.
- Zhang, M. (2003). Links between School Absenteeism and Child Poverty. *Pastoral Care in Education* 21:10-17.
- Zhou, M. (2001). The Politics of Bilingual Education and Educational Levels in Ethnic Minority Communities in China. *International Journal of Bilingual Education and Bilingualism* 4:125-49.
- Zvoch, K. and J.J. Stevens. (2006). Longitudinal Effects of School Context and Practice on Middle School Mathematics Achievement. *The Journal of Educational Research* 99:347-56.

APPENDIX 1: Reviewed Studies

Table 29. Table of Reviewed Studies

| STUDIES | SAMPLE SIZE (students/schools) | SCHOOL SECTOR | COUNTRY | ETHNIC GROUPS | ANALYSIS METHOD | ATTAINMENT MEASURES |
|-----------------------------|---|--------------------------|----------------|--|----------------------------|---|
| Entwisle and Alexander 1990 | 800 stud | primary | United States | black, white | General Linear Models | mathematics score |
| Farkas et al 1990 | about 500 stud, 22 sch | secondary | United States | Anglo, African, Hispanic, Indian, Asian | General Linear Models | language and mathematics |
| Mickelson 1990 | about 1,200 stud, 8 sch, | secondary | United States | black, white | General Linear Models | grade-point average |
| Patterson et al 1990 | about 900 stud, 6 sch | primary | United States | black, white | General Linear Models | composite (reading/mathematics/language) |
| Stevenson et al 1990 | about 1,160 stud | primary | United States | black, white, Hispanic | General Linear Models | reading and mathematics scores |
| Duran and Weffer 1992 | about 160 stud | secondary | United States | Mexican | General Linear Models | mathematics, reading, English, natural sciences, social studies scores, grade point average |
| Entwisle and Alexander 1992 | 800 stud, 20 sch | primary | United States | African, white | General Linear Models | mathematics concepts/reasoning scores |
| Rong and Grant 1992 | about 22,700 stud | primary, secondary | United States | Hispanic, Asian, white | General Linear Models | school years attained |
| Rumberger and Willms 1992 | about 200,000 stud, 896 sch | secondary | United States | black, Asian, Hispanic, white | Hierarchical Linear Models | reading and mathematics scores |
| Caldas 1993 | about 1,300 sch | primary, secondary | United States | African, white | General Linear Models | composite (mathematics/English language arts/written composition/science/social studies) |

| | | | | | | |
|-----------------------------------|---------------------------------------|-----------------------|-----------------|---|--|--|
| Sammons et al 1993 | 1,240 stud, 49 sch | primary | England, Wales | Caribbean, Other, English, Scottish, Welsh, Irish, Asian, | Hierarchical Linear Models | reading and mathematics scores |
| Hofman 1994 | about 3,000 stud, 75 sch | secondary | The Netherlands | Surinamese, Turkish, Moroccan, South-East Asian, West-European, Dutch | Hierarchical Linear Models | language and mathematics scores |
| Driessen 1995 | about 20,000 stud, about 380 sch | secondary | The Netherlands | students from Moluccas, Surinam, the Antilles, Italy, Spain, Portugal, Greece, Yugoslavia, Turkey, Morocco, Western countries, and Dutch | General Linear Models | language tests |
| Fejgin 1995 | about 26,000 stud, about 2,050 sch | secondary | United States | black, Jewish, Asian, Hispanic, white | General Linear Models | reading and mathematics scores |
| Kao and Tienda 1995 | about 24,600 stud, about 1,050 sch | secondary | United States | black, Hispanic, Asian, white | General Linear Models | reading and mathematics scores |
| Lamdin 1995 | 97 sch | primary | United States | black, Indian, Asian, Hispanic, white | General Linear Models | reading and mathematics score |
| Lee and Smith 1995 | about 11,800 stud, 820 sch | secondary | United States | black, Hispanic, Native American, Asian, white | Hierarchical Linear Models | reading, mathematics, science, history scores |
| Sammons 1995 | about 2,000 stud | primary, secondary | England | Asian, Caribbean, English, Scottish, Welsh, Irish, other | Hierarchical Linear Models | reading and mathematics scores, total GCSE score |
| Wojtkiewicz and Donato 1995 | about 8,900 stud | secondary | United States | white, blacks, Native American, Asian, Mexican, Puerto Rican, Cuban, other Hispanic | General Linear Models | secondary school completion |
| Bankston and Caldas 1996 | about 42,000 stud | secondary | United States | African, white | General Linear Models | composite (mathematics/English language arts/written composition/science/social studies) |
| Portes and MacLeod 1996 | about 5,300 stud, 42 sch | secondary | United States | Cuban, Vietnamese, Haitian, Mexican | General Linear Models, Hierarchical Linear Models | reading and mathematics scores |

| | | | | | | |
|-----------------------------------|-------------------------------------|-----------------------|---------------|--|----------------------------|--|
| Caldas and Bankston 1997 | about 42,000 stud | secondary | United States | African, white | General Linear Models | composite (mathematics/English language arts/written composition/science/social studies) |
| Fuligni 1997 | 1,100 stud, 4 sch | secondary | United States | Latino, East Asian, Filipino, European | General Linear Models | mathematics and English grades |
| Klein et al 1997 | over 2,400 stud, 30 sch | primary, secondary | United States | black, Hispanic, Asian, white | Descriptive Statistics | science score and total performance assessment score |
| Lee and Smith 1997 | about 10,000 stud, about 800 sch | secondary | United States | black, Latino, Native American, Asian, white | Hierarchical Linear Models | reading and mathematics scores |
| Lee et al 1997 | about 9,630 stud, about 790 sch | secondary | United States | Hispanic, black, non-minorities | Hierarchical Linear Models | mathematics and science scores |
| Phillips 1997 | about 5,660 stud, 23 sch | secondary | United States | European, African | Hierarchical Linear Models | mathematics score |
| Ainsworth-Darnell and Downey 1998 | about 17,000 stud | secondary | United States | African, Asian, white | General Linear Models | mathematics, English, history, science scores |
| Bankston and Caldas 1998 | about 18,300 stud | secondary | United States | African, white | Hierarchical Linear Models | composite (mathematics/English language arts/written composition) |
| Caldas and Bankston 1998 | about 42,000 stud | secondary | United States | African, white | Hierarchical Linear Models | composite (mathematics/English language arts/written composition/science/social studies) |
| Hao and Bonstead-Bruns 1998 | about 14,760 stud | secondary | United States | Chinese, Filipino, Korean, Mexican, black, white | Hierarchical Linear Models | reading and mathematics scores, grade point average |
| Roscigno 1998 | about 11,000 stud, about 970 sch | secondary | United States | black, white | Hierarchical Linear Models | reading and mathematics scores |
| Rumberger and Larson 1998 | about 2,000 stud, 1 sch | secondary | United States | Mexican | General Linear Models | grade-point average, whether student graduated or left before graduating |
| Bempechat et al 1999 | about 600 stud, 11 sch | primary | United States | Caucasian, African, Latino, Indo-Chinese | General Linear Models | mathematics scores |

| | | | | | | |
|--|--|-----------------------|----------------|--|-------------------------------|---|
| Blair et al 1999 | about 16,000 stud, about 1,060 sch | secondary | United States | Asian, African, Hispanic, white | General Linear Models | mathematics, reading, science, history scores |
| Crooks and Caygill 1999 | 450 stud on each task (not clear the total sample) | primary, secondary | New Zealand | Maori and non-Maori | Descriptive Statistics | 15 curriculum areas (physical education, music, technology, speaking, health, art, social studies, writing, listening, information skills, science, viewing, mathematics, graphs/tables/maps, and reading) |
| Gardner et al 1999 | about 130 sch | secondary | United States | (no information) | General Linear Models | SAT scores |
| Goyette and Xie 1999 | about 25,000 stud | secondary | United States | Chinese, Filipino, Japanese, Korean, Southeast Asian, South Asian, white | General Linear Models | reading, mathematics, science scores |
| Hedges and Nowell 1999 | six data sets | secondary | United States | black, white | General Linear Models | reading, vocabulary, mathematics, science scores |
| Roscigno and Ainsworth- Darnell 1999 | about 16,000 stud | secondary | United States | black, white | General Linear Models | grade point average, mathematics and reading scores |
| Smyth 1999 | 116 sch | secondary | Ireland | (no information) | Hierarchical Linear Models | grade point average |
| Strand 1999 | about 5100 stud, 55 sch | primary | England | African, Caribbean, black Other, Indian, Pakistani, Chinese, English, Scottish, Welsh, Northern Irish | Hierarchical Linear Models | language, mathematics, reading, writing scores |
| Cook and Evans 2000 | about 6,000 stud | secondary | United States | black, white | General Linear Models | reading and mathematics scores |
| Demack et al 2000 | 81,000 stud | secondary | England, Wales | Indian, Chinese, black, Pakistani, Bangladeshi, British | Descriptive Statistics | GCSEs |
| Lee and Loeb 2000 | about 22,600 stud, 264 sch | primary, secondary | United States | black, Hispanic, Asian, white | Hierarchical Linear Models | mathematics scores |
| Rivkin 2000 | about 400 stud | secondary | United States | black, non-black | General Linear Models | reading and mathematics scores |
| Stiefel et al 2000 | 300,000 stud, 121 sch | secondary | United States | (no information) | General Linear Models | mathematics scores |

| | | | | | | |
|---------------------------|---------------------------------|-----------------------------|------------------|--|----------------------------|---|
| Demie 2001 | about 3,600 stud | primary and secondary | England | Caribbean, African, English, Scottish, Welsh | Descriptive Statistics | composite (English/mathematics/science), GCSEs |
| Johnson et al 2001 | about 8,100 stud, about 110 sch | secondary | United States | Hispanic, African, white | Hierarchical Linear Models | attachment and engagement |
| McCallum and Demie 2001 | about 1,100 stud | secondary | England | African, Caribbean, English, Scottish, Welsh, Irish | Descriptive Statistics | GCSEs |
| Padilla and Gonzalez 2001 | about 2,170 stud | secondary | United States | Mexican | General Linear Models | grade-point average |
| Zhou 2001 | 56 ethnic groups | primary, secondary, college | China | 55 officially recognised Chinese ethnic minorities and the Hans majority | Descriptive Statistics | average years of school attainment |
| Barnett et al 2002 | 152 sch | secondary | Northern Ireland | (no information) | Descriptive Statistics | GCSEs |
| Cline et al 2002 | 36 LEAs | primary, secondary | England | Chinese, Indian, Black, white | Descriptive Statistics | language and mathematics scores, GCSEs |
| Griffith 2002 | about 25,000 stud, 117 sch | primary | United States | African, Hispanic, Asian, white | Hierarchical Linear Models | grade point average |
| Hoxby 2002 | about 3,300 sch | primary | United States | black, Asian, Hispanic, Native American, Anglo | Descriptive Statistics | reading and mathematics scores |
| Hustinx 2002 | about 20,000 stud | primary, secondary | The Netherlands | Turkish, Moroccan, other groups, Dutch | Path Models | a national school achievement test score |
| Lubienski 2002 | about 71,000 stud | primary, secondary | United States | black, white | Descriptive Statistics | mathematics scores |
| Borland and Howsen 2003 | 31,500 stud, 654 sch | primary | United States | non-white, white | General Linear Models | composite (reading/language/mathematics) |
| Condron and Roscigno 2003 | 89 sch | primary | United States | non-white, white | General Linear Models | composite (reading/writing/mathematics/science/citizenship) |

| | | | | | | |
|-----------------------|--|-----------------------|--|--|---|--|
| Glick and White 2003 | about 16,380 stud | secondary | United States | black, Asian, Mexican, Puerto Rican, Other Hispanic, white | General Linear Models | mathematics scores |
| Lee and Burkam 2003 | 3,840 stud, 190 sch | secondary | United States | black, Asian, Hispanic, white | Hierarchical Linear Models | mathematics scores, grade point average |
| Orr 2003 | about 3,000 stud | primary | United States | black, white | General Linear Models | composite (mathematics/reading comprehension/reading recognition) |
| Borman et al 2004 | about 2,430 stud, 67 sch | primary, secondary | United States | black, Hispanic, white | General Linear Models | reading and mathematics scores |
| Fryer and Levitt 2004 | more than 20,000 stud | kindergarten, primary | United States | black, Hispanic, white | General Linear Models | reading and mathematics scores |
| Goldsmith 2004 | 25,000 stud, about 1,000 sch | secondary | United States | black, Latino, white | General Linear Models, Hierarchical Linear Models | reading and mathematics scores |
| Korilaki 2004 | about 1860 stud, 54 sch | primary | Greece | Greek, foreign/repatriated | Hierarchical Linear Models | language and mathematics |
| Schnepf 2004 | students from 2,879 sch, 3 datasets (TIMSS, PISA, PIRLS) | primary, secondary | 10 countries (Australia, Canada, France, Germany, the Netherlands, New Zealand, Sweden, Switzerland, the UK and the USA) | minorities, natives | General Linear Models | reading, mathematics, science |
| Callahan 2005 | 355 students, 1 sch | Secondary | United States | (no information) | General Linear Models | grade point average, language and mathematics scores, SAT scores, California High School Exit Exam (CAHSEE) scores |
| Crosnoe 2005 | about 14,910 stud, 1,000 sch | Primary | United States | Mexican, non-Mexican, African, Asian, white | General Linear Models | mathematics scores |

| | | | | | | |
|----------------------------|-----------------------------------|----------------------------------|---|--|---|---|
| Kahne et al 2005 | 5 sch | Secondary | United States | (no information) | Hierarchical Linear Models | test scores |
| Ma 2005 | about 3,120 stud, 51 sch | Secondary | United States | black, Hispanic, Asian, Other, white | Hierarchical Linear Models, Classification and Regression Trees | mathematics scores |
| McCoy 2005 | about 110 stud, 4 sch | Secondary | United States | non-white, white | General Linear Models | algebra score, score based on all subjects |
| Ream 2005 | about 13,000 stud | secondary | United States | Mexican, white | Structural Equation Models | reading and mathematics scores |
| Rumberger and Palardy 2005 | about 14,200 stud, 913 sch | secondary | United States | black, natives, Asian, Hispanic, white | Hierarchical Linear Models | reading, mathematics, science, social science scores, and composite score based on the mean of the four tests |
| Sheldon and Epstein 2005 | 18 sch | primary, secondary | United States | (no information) | Descriptive Statistics | mathematics scores and grades |
| Connolly 2006 | about 35,000 stud | Secondary | England, Wales | black, Chinese, Indian, Bangladeshi, Pakistani, white | General Linear Models | GCSEs |
| Pearce 2006 | about 8,520 stud | secondary, post- secondary | United States | Chinese, white | General Linear Models | composite (mathematics/reading/science/social science) |
| OECD 2006 | students from different countries | secondary, tertiary | 17 countries (Australia, Austria, Belgium, Canada, Denmark, France, Germany, Luxembourg, the Netherlands, New | (no information) | General Linear Models | reading, mathematics, science, problem solving |

| | | | | | | |
|-------------------------|---|-------------------------------|---|--|----------------------------|------------------------------------|
| | | | Zealand, Norway, Sweden, Switzerland, the United States, Hong Kong-China, Macao-China and the Russian Federation) | | | |
| Rubie-Davies et al 2006 | about 1100 | primary | New Zealand | Maori, Pacific Island, Asian and New Zealand European students | Descriptive Statistics | reading |
| Zvoch and Stevens 2006 | about 5,170 stud, 24 sch | secondary | United States | non-Anglo, white | Hierarchical Linear Models | mathematics scores |
| Sun and Qi 2007 | data of 2 population censuses (1990 and 2000) | primary, secondary, college | China | 56 nationalities + 2 other groups | Gini coefficient | average years of school attainment |
| Mitakidou et al 2008 | about 10.970 stud, 293 sch | primary | Greece | children from the former USSR, natives | Descriptive Statistics | language and mathematics scores |
| Qu and Raynolds 2008 | 1286 youth | mean age of the sample = 20.3 | United States | black, non-black | General Linear Models | years of completed education |
| Azzolini et al 2012 | about 50.000 stud | 15-year-old students | Italy and Spain | Natives, immigrants of first and second generation | Hierarchical Linear Models | Reading and mathematics |

APPENDIX 2

Descriptive Statistics

In this section one can find the descriptive statistics for each of the variables used in the analysis of the large quantitative study. Frequency tables and graphs appear first, followed by a cross-tabulation analysis examining the relationship of the variable ethnicity with some of the other variables.

Table 31 presents the descriptive statistics for all the continuous variables available for analysis. There are no missing cases.

Frequency Measures for Each Variable

Frequency tables for nominal and ordinal data and histograms or box plots for scale data are presented here.

Year Groups

Children are grouped into three year-groups (Table 30). Years two and three are of similar size (34.36%), whilst year one is slightly smaller (31.29%).

Table 30. Year Groups (Frequency Measures)

| <i>Year Groups</i> | <i>Frequency</i> | <i>Percent</i> |
|--------------------|------------------|----------------|
| First Year | 632 | 31.29 |
| Second Year | 694 | 34.36 |
| Third Year | 694 | 34.36 |
| Total | 2020 | 100.0 |

Table 31. Descriptive Statistics for Continuous Variables (part 1/3)

| | | <i>Modern Greek Attainment</i> | | | <i>Mathematics Attainment</i> | | | <i>History Attainment</i> | | |
|--------------------|--------|--------------------------------|-------------------------|-----------------------|-------------------------------|-------------------------|-----------------------|---------------------------|-------------------------|-----------------------|
| | | <i>Trimesters Score</i> | <i>Final Exam Score</i> | <i>Combined Score</i> | <i>Trimesters Score</i> | <i>Final Exam Score</i> | <i>Combined Score</i> | <i>Trimesters Score</i> | <i>Final Exam Score</i> | <i>Combined Score</i> |
| N | | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 |
| Median | First | 15 | 14 | 14.75 | 15 | 12 | 14.50 | 45 | 12 | 14.5 |
| | Second | 15 | 13 | 14.75 | 14 | 10 | 13.25 | 45 | 12 | 14.5 |
| | Third | 15 | 13 | 14.25 | 14 | 9 | 12.25 | 45 | 9 | 13.0 |
| Mean | First | 15.23 | 13.20 | 14.72 | 14.86 | 11.70 | 14.07 | 15.21 | 11.70 | 14.33 |
| | Second | 15.33 | 12.75 | 14.69 | 14.68 | 9.99 | 13.51 | 15.15 | 11.63 | 14.27 |
| | Third | 15.06 | 12.70 | 14.47 | 14.29 | 9.02 | 12.97 | 14.84 | 10.16 | 13.67 |
| Standard Deviation | First | 3.17 | 4.71 | 3.47 | 3.33 | 5.76 | 3.82 | 3.41 | 5.95 | 3.90 |
| | Second | 3.21 | 4.79 | 3.50 | 3.40 | 6.26 | 4.00 | 3.57 | 6.53 | 4.12 |
| | Third | 3.30 | 4.72 | 3.57 | 3.31 | 5.97 | 3.83 | 3.49 | 6.23 | 3.96 |

(part 2/3)

| | | <i>Physics Attainment</i> | | | <i>Overall Attainment</i> | | |
|--------------------|--------|---------------------------|-------------------------|-----------------------|---------------------------------|----------------------------------|--|
| | | <i>Trimesters Score</i> | <i>Final Exam Score</i> | <i>Combined Score</i> | <i>Overall Trimesters Score</i> | <i>Overall Final Exams Score</i> | <i>Overall Trimesters and Final Exams Combined Score</i> |
| N | | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 |
| Median | First | 15 | 11 | 14 | 15.25 | 11.75 | 14.37 |
| | Second | 45 | 9 | 13.25 | 15.21 | 10.75 | 14.09 |
| | Third | 42 | 9 | 12.75 | 14.25 | 9.75 | 13.00 |
| Mean | First | 15.14 | 10.93 | 14.09 | 15.11 | 11.88 | 14.30 |
| | Second | 14.96 | 9.76 | 13.66 | 15.03 | 11.03 | 14.03 |
| | Third | 14.56 | 9.79 | 13.37 | 14.68 | 10.42 | 13.62 |
| Standard Deviation | First | 3.38 | 5.97 | 3.90 | 3.13 | 5.19 | 3.59 |
| | Second | 3.29 | 5.99 | 3.84 | 3.16 | 5.46 | 3.67 |
| | Third | 3.32 | 5.52 | 3.74 | 3.14 | 5.17 | 3.58 |

(part 3/3)

| | Year Group | <i>Absences</i> | | | | | | | <i>Age</i> |
|--------------------|------------|------------------------------|-----------------------------|-------------------------|-------------------------|-------------------------|-------------------------|---------------------------|-------------------|
| | | <i>Modern Greek Absences</i> | <i>Mathematics Absences</i> | <i>History Absences</i> | <i>Physics Absences</i> | <i>Overall Absences</i> | <i>Excused Absences</i> | <i>Unexcused Absences</i> | <i>(in years)</i> |
| N | | 2020 | 2020 | 2020 | 2020 | 2020 | 1906 | 1906 | 2020 |
| Median | First | 3 | 2 | 2 | 1 | 8.0 | 4 | 0 | 11.98 |
| | Second | 4 | 2 | 2 | 3 | 11.5 | 8 | 0 | 12.90 |
| | Third | 6 | 2 | 2 | 6 | 19.5 | 12 | 0 | 13.91 |
| Mean | First | 4.54 | 3.81 | 2.67 | 1.84 | 12.86 | 9.84 | 2.12 | 12.07 |
| | Second | 6.21 | 3.74 | 2.47 | 3.84 | 16.26 | 11.8 | 2.96 | 13.01 |
| | Third | 7.70 | 6.34 | 2.98 | 7.65 | 24.68 | 18.68 | 6.44 | 13.99 |
| Standard Deviation | First | 5.42 | 4.59 | 3.33 | 2.48 | 15.01 | 12.13 | 3.68 | 0.44 |
| | Second | 6.15 | 4.03 | 2.69 | 4.07 | 15.98 | 12.61 | 6.13 | 0.52 |
| | Third | 6.49 | 5.46 | 2.81 | 6.66 | 20.12 | 17.44 | 19.67 | 0.55 |

Ethnicity

Table 32 shows that the majority of students are natives (74.06%). These students constitute 5.51% of the native population of this age group in Cyprus during the academic year 2004-2005. The two other groups, Georgians and ‘Others’ (Russians, British, Rumanians, Bulgarians, Africans, Americans, and others) are smaller, but similar in size (12.77% and 13.17% respectively). The sample of Georgians constitutes 37.18% of the population of Georgians and the sample of ‘Others’ 68.91% of the population of ‘Others’ of this age group in Cyprus in the academic year 2004-2005.

Table 32. Ethnicity – Sample and Population (Frequency Measures)

| <i>Ethnicity</i> | <i>Sample</i> | | <i>Population (across Cyprus)</i> | |
|------------------|------------------|-----------------------------------|-----------------------------------|---|
| | <i>Frequency</i> | <i>Percentage (of the sample)</i> | <i>Frequency</i> | <i>Sample (as a percentage of the population)</i> |
| Natives | 1496 | 74.06 | 27165 | 5.51 |
| Georgians | 258 | 12.77 | 694 | 37.18 |
| ‘Others’ | 266 | 13.17 | 386 | 68.91 |
| Total | 2020 | 100.0 | 28245 | 7.15 |

As Table 33 shows, the proportion of native children is quite similar in the three year-groups (range 72%-75%).

Table 33. Ethnicity Across Year Groups (Frequency Measures).

| <i>Year group</i> | <i>Ethnicity</i> | <i>Sample</i> | |
|-------------------|------------------|------------------|----------------|
| | | <i>Frequency</i> | <i>Percent</i> |
| First year | Native | 466 | 73.7 |
| | Georgian | 81 | 12.8 |
| | Other | 85 | 13.4 |
| Second year | Native | 503 | 72.5 |
| | Georgian | 94 | 13.5 |
| | Other | 97 | 14.0 |
| Third year | Native | 527 | 75.9 |
| | Georgian | 83 | 12.0 |
| | Other | 84 | 12.1 |
| Total | | 2020 | 100.0 |

This pattern is also followed for the group of Georgians (range 12%-13%) and ‘Others’ (range 12%-14%).

Gender

When the frequency of males to females is investigated (Table 34), it transpires that in each year group about half of the students are female (range 45%-51%) and half of them are male (range 48%-54%).

Table 34. Gender (Frequency Measures).

| <i>Year group</i> | <i>Gender</i> | <i>Frequency</i> | <i>Percent</i> |
|-------------------|---------------|------------------|----------------|
| First year | Female | 289 | 45.73 |
| | Male | 343 | 54.27 |
| Second year | Female | 357 | 51.44 |
| | Male | 337 | 48.56 |
| Third year | Female | 360 | 51.87 |
| | Male | 334 | 48.13 |
| Total | | 2020 | 100.0 |

Generation Status

Table 35 shows that the majority of minority students across all year groups are of first-generation status (range 18%-20%), while a smaller percentage is of second-generation status (range 5%-7%). The rest (range 72%-75%) are natives.

Table 35. Generation Status (Frequency Measures).

| <i>Year group</i> | <i>Generation</i> | <i>Frequency</i> | <i>Percent</i> |
|-------------------|-------------------|------------------|----------------|
| First year | Native | 466 | 73.73 |
| | First | 124 | 19.62 |
| | Second | 42 | 6.65 |
| Second year | Native | 503 | 72.48 |
| | First | 142 | 20.46 |
| | Second | 49 | 7.06 |
| Third year | Native | 527 | 75.94 |
| | First | 130 | 18.73 |
| | Second | 37 | 5.33 |
| Total | | 2020 | 100.0 |

Parental Educational Level

Table 36 indicates that across the three year-groups the largest group is the one with children whose parents completed secondary education (range 53%-57%). The next largest group up is that with students whose parents continued for further studies (range 36%-42%), while the highest parental educational level for a very small number of children is primary education (range 3%-5%).

Table 36. Parental Educational Level (Frequency Measures)

| <i>Year group</i> | <i>Parental educational level</i> | <i>Frequency</i> | <i>Percent</i> |
|-------------------|-----------------------------------|------------------|----------------|
| First year | Primary education | 26 | 4.11 |
| | Secondary education | 350 | 55.38 |
| | Further studies | 256 | 40.51 |
| Second year | Primary education | 27 | 3.89 |
| | Secondary education | 370 | 53.31 |
| | Further studies | 297 | 42.80 |
| Third year | Primary education | 40 | 5.76 |
| | Secondary education | 399 | 57.49 |
| | Further studies | 255 | 36.74 |
| Total | | 2020 | 100.0 |

Parental Occupational Level

Table 37 gives information about the parental occupation of children. Looking across the three year-groups, the highest proportion (range 43%-47%) is in the category of civil private and public workers. About one fifth of parents are teachers and higher private and higher public workers (range 21%). Another fifth are skilled workers (range 20%-21%), whilst less than 10% are unskilled manual workers (range 7%-9%), and an even smaller number are professionals and chief managers (range 3%-5%).

Table 37. Parental Occupational Level (Frequency Measures).

| <i>Year group</i> | <i>Parental occupational level</i> | <i>Frequency</i> | <i>Percent</i> |
|-------------------|---|------------------|----------------|
| First year | Unskilled manual workers | 61 | 9.65 |
| | Skilled manual workers | 132 | 20.89 |
| | Civil private and public workers | 279 | 44.15 |
| | Teachers and higher private and higher public workers | 138 | 21.84 |
| | Professionals and chief managers | 22 | 3.48 |
| Second year | Unskilled manual workers | 49 | 7.06 |
| | Skilled manual workers | 139 | 20.03 |
| | Civil private and public workers | 331 | 47.69 |
| | Teachers and higher private and higher public workers | 146 | 21.04 |
| | Professionals and chief managers | 29 | 4.18 |
| Third year | Unskilled manual workers | 57 | 8.21 |
| | Skilled manual workers | 151 | 21.76 |
| | Civil private and public workers | 301 | 43.37 |
| | Teachers and higher private and higher public workers | 149 | 21.47 |
| | Professionals and chief managers | 36 | 5.19 |
| Total | | 2020 | 100.0 |

Schools

The largest proportion of children of all year groups seems to come from school D (range 27%-30%) and school B (range 24%-27%). Smaller proportions of children come from school E (range 11%-16%), school F (range 13%), and school C (range 10%-12%). The smallest number of students (range 3%-7%) comes from school A (Table 38). This is expected since the sample is stratified, I deliberately sampled among three different groups of schools according to their size (for more information, see the Methodology chapter).

Table 38. Schools (Frequency Measures).

| <i>Year group</i> | <i>Schools</i> | <i>Frequency</i> | <i>Percent</i> |
|-------------------|----------------|------------------|----------------|
| First year | School A | 50 | 7.91 |
| | School B | 176 | 27.85 |
| | School C | 73 | 11.55 |
| | School D | 172 | 27.22 |
| | School E | 74 | 11.71 |
| | School F | 87 | 13.77 |
| Second year | School A | 37 | 5.33 |
| | School B | 173 | 24.93 |
| | School C | 70 | 10.09 |
| | School D | 207 | 29.83 |
| | School E | 113 | 16.28 |
| | School F | 94 | 13.54 |
| Third year | School A | 22 | 3.17 |
| | School B | 170 | 24.50 |
| | School C | 89 | 12.82 |
| | School D | 210 | 30.26 |
| | School E | 109 | 15.71 |
| | School F | 94 | 13.54 |
| Total | | 2020 | 100.0 |

School Size

Table 39 indicates that almost half of the student population of all year groups comes from large schools (about 54%-55%). A smaller percentage comes from medium schools (range about 25%-29%), while the smallest proportion comes from small schools (range 15%-19%).

Table 39. School Size (Frequency Measures).

| <i>Year group</i> | <i>School size</i> | <i>Frequency</i> | <i>Percent</i> |
|-------------------|--------------------|------------------|----------------|
| First year | Small | 123 | 19.46 |
| | Medium | 161 | 25.47 |
| | Large | 348 | 55.06 |
| Second year | Small | 107 | 15.42 |
| | Medium | 207 | 29.83 |
| | Large | 380 | 54.76 |
| Third year | Small | 111 | 15.99 |
| | Medium | 203 | 29.25 |
| | Large | 380 | 54.76 |
| Total | | 2020 | 100.0 |

School Minority Concentration

As regards minority concentration of participating schools, looking across all year groups (Table 40), it appears that the vast majority of the student population (range 78%-81%) is enrolled in schools with low percentage of ethnic minority children. About a fifth of the student population (range 18%-21%) is enrolled in schools with high percentage of ethnic minority students. Again, this is a feature of the sampling method I used.

Table 40. School Minority Concentration (Frequency Measures).

| <i>Year group</i> | <i>School minority concentration</i> | <i>Frequency</i> | <i>Percent</i> |
|-------------------|--------------------------------------|------------------|----------------|
| First year | Low | 508 | 80.38 |
| | High | 124 | 19.62 |
| Second year | Low | 544 | 78.39 |
| | High | 150 | 21.61 |
| Third year | Low | 563 | 81.12 |
| | High | 131 | 18.88 |
| Total | | 2020 | 100.0 |

Graphs for Attainment

Histograms of Attainment

This section presents the scores of the Trimesters Overall attainment (Figure 10), and the Combined Trimesters and Final Exams Overall attainment (Figure 11) using histograms. Histograms are also presented for each one of the subjects examined (Modern Greek, Mathematics, History, and Physics), combining the trimesters score and the final exam score (Figure 12, Figure 13, Figure 14, Figure 15 respectively). In these graphs, the bars on the right side of the graph represent students with higher ability, whereas those on the left of the graph represent students with lower ability. Histograms of attainment across the different year groups (not presented here) offer a similar picture.

As one can see from the histograms below, there is a spike consistently evident to the right side of the graphs. This represents the high achievers; those with three A marks (one for each semester) and/or a score of 19 or 20 at the end-of-year exams. The columns that follow represent those students with B and C marks and/or a score of 16-18 or 13-15 at the end-of-year exams respectively. The tallest columns to the left side of the graphs represent those students with borderline marks in trimesters and final exams. This is probably secondary to a directive by the Ministry of Education in Cyprus stating that teachers should only fail a small percentage of students. The columns to the far left of the graphs represent those with the lowest scores. The skewness presented in these graphs can cause concerns about the normality of distribution of the present data. However, the normality assumption is checked using the residuals and, as Appendix 3 shows, the particular assumption is not violated.

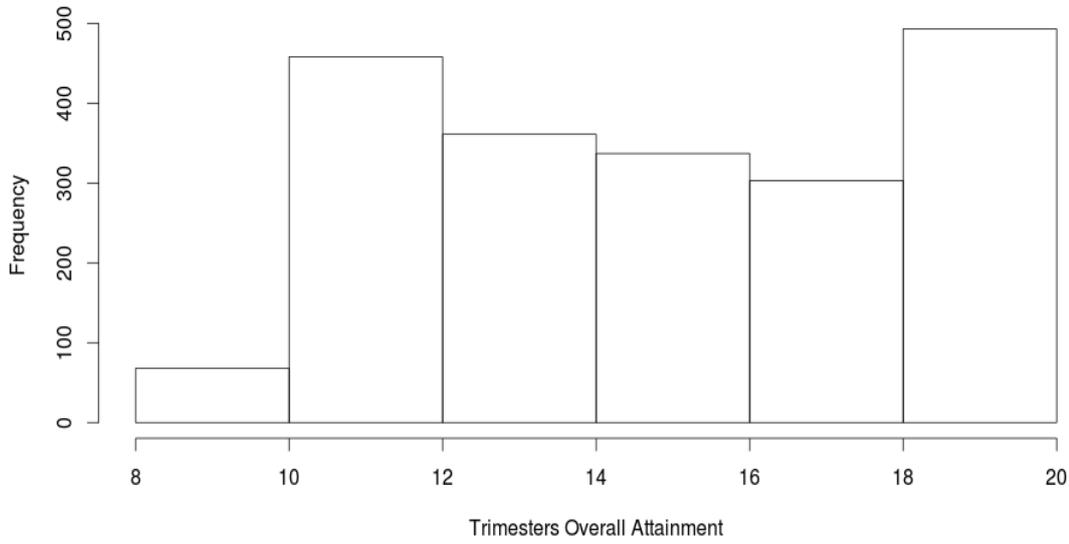


Figure 10. Histogram of the Trimesters Overall Attainment

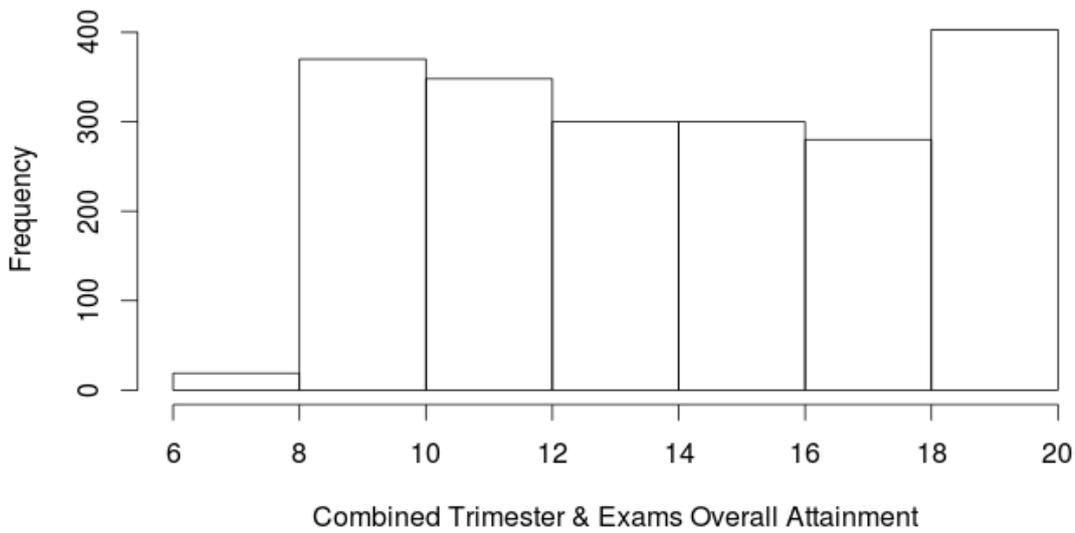


Figure 11. Histogram of the Combined Trimesters and Final Exams Overall Attainment

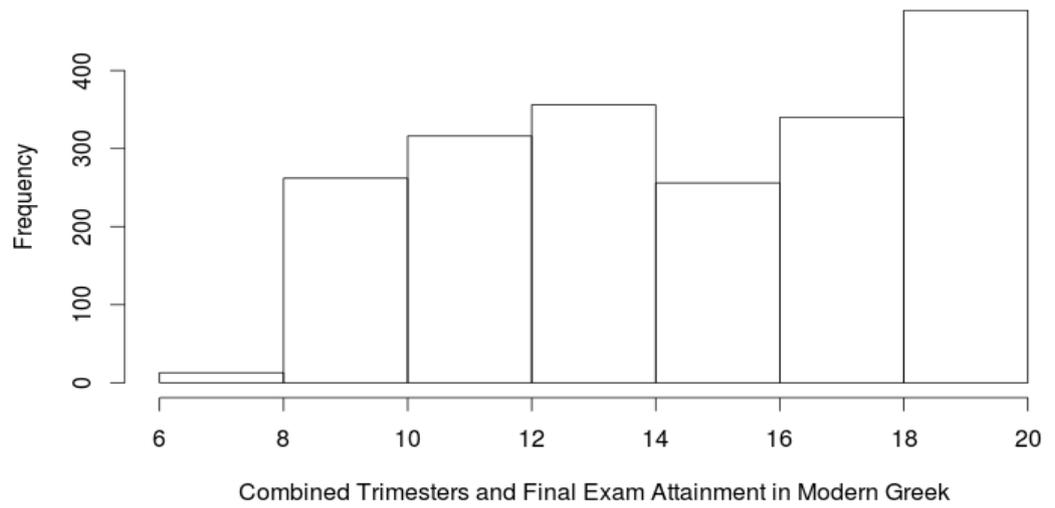


Figure 12. Histogram of the Combined Trimesters and Final Exam Attainment in Modern Greek

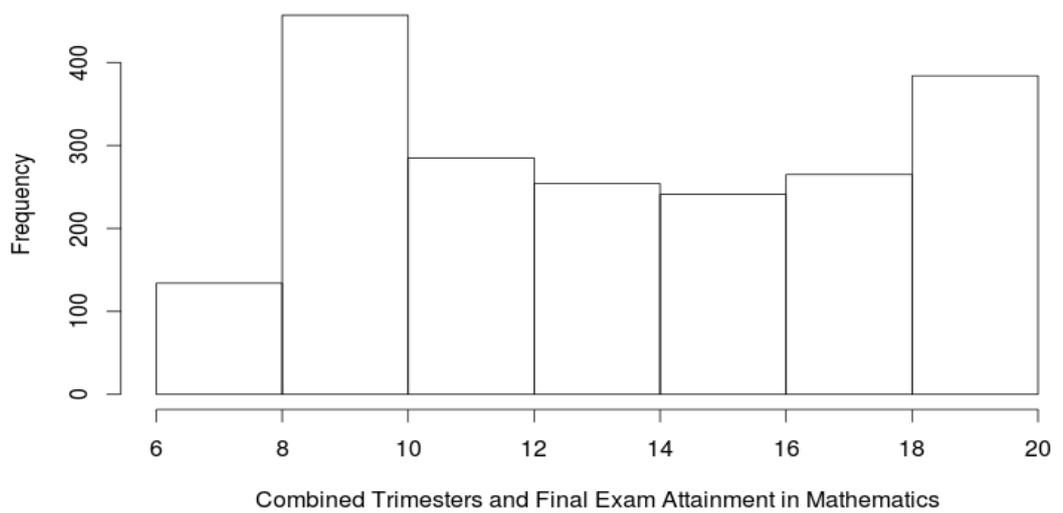


Figure 13. Histogram of the Combined Trimesters and Final Exam Attainment in Mathematics

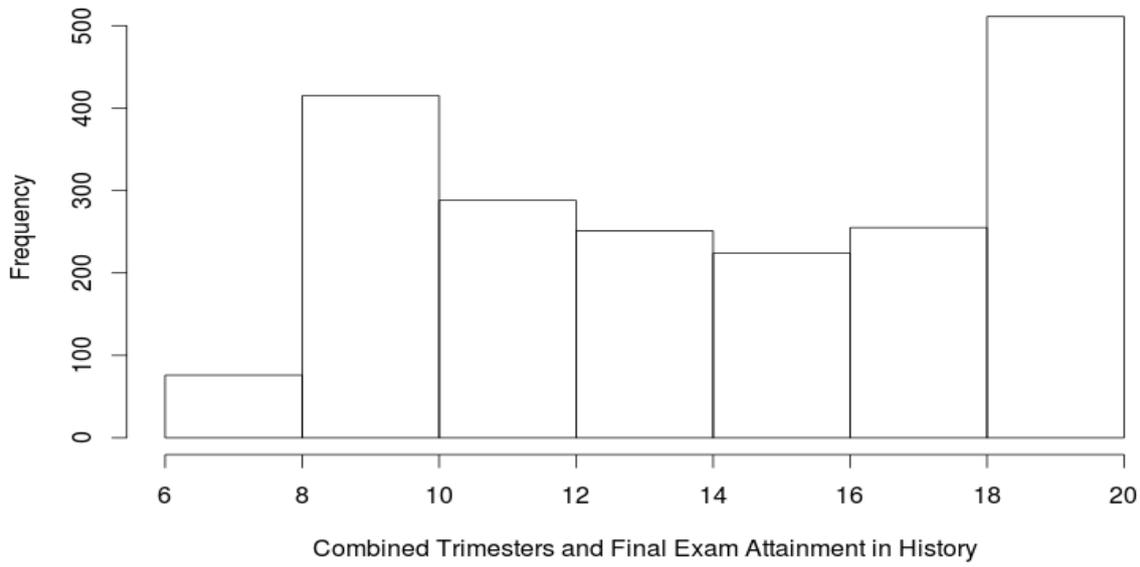


Figure 14. Histogram of the Combined Trimesters and Final Exam Attainment in History

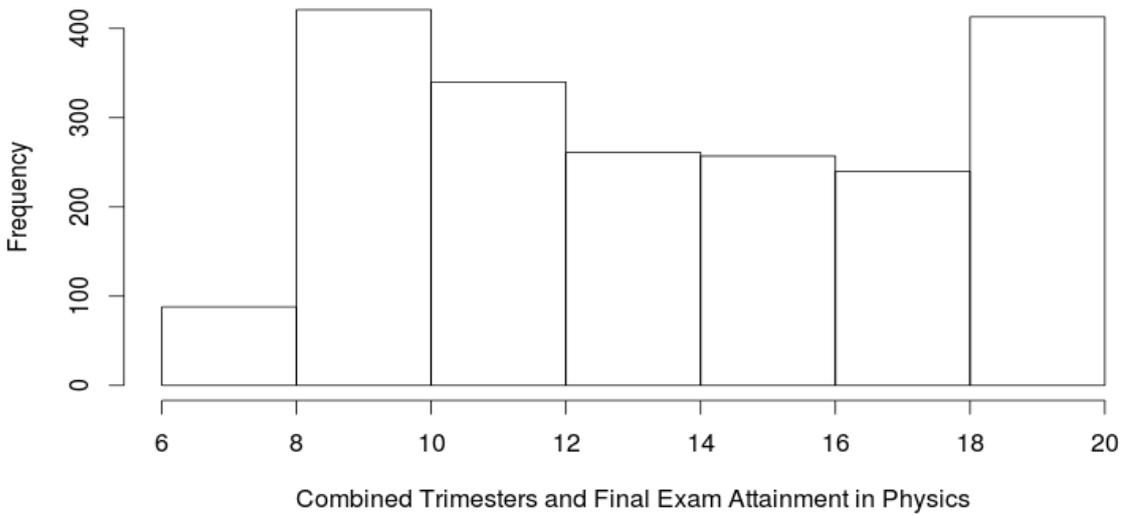


Figure 15. Histogram of the Combined Trimesters and Final Exam Attainment in Physics

Graphs for Absences

Histograms of Absences

Data on the Overall absences (Figure 16) as well as absences in the subjects of Modern Greek (Figure 17), Mathematics (Figure 18), History (Figure 19), and Physics (Figure 20) is presented below. As expected, the majority of students have a low number of absences and as the number of absences increases, the number of students having such a number of absences decreases dramatically.

The outliers that appear in the graphs below are dealt with in a different section (see ‘Methodology’ chapter), in order to check whether findings from the regression analyses would change if some of these outliers were removed. In the same chapter I also explain how I dealt with the extremely skewed nature of the distribution of absences.

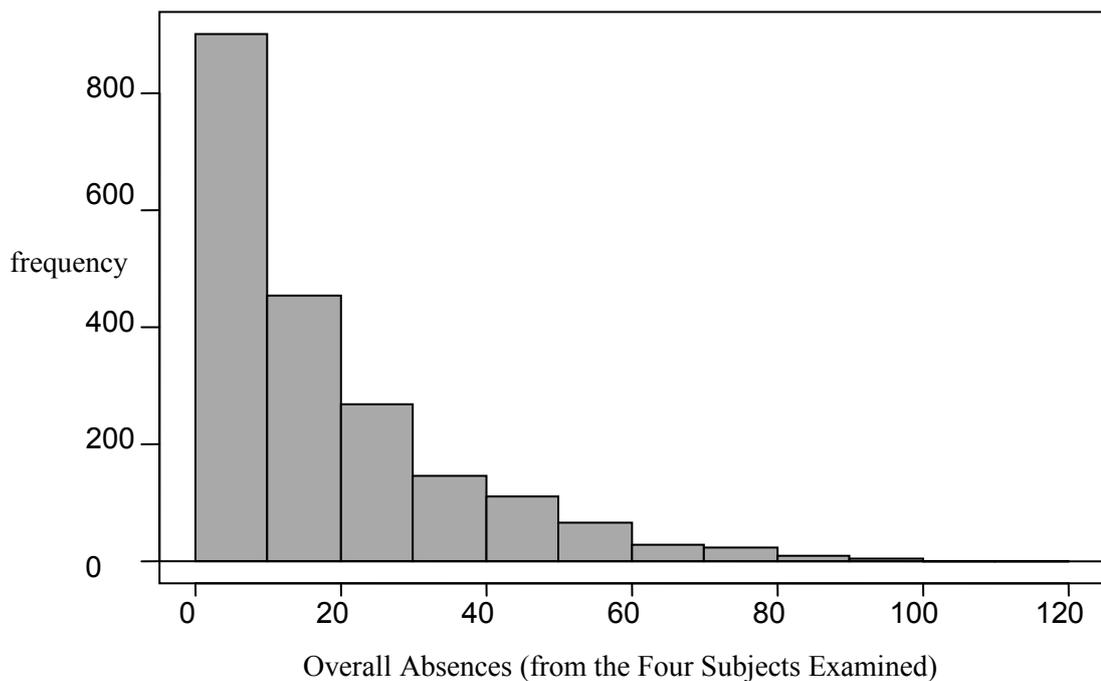


Figure 16. Histogram of Overall Absences (from All Subjects Examined)

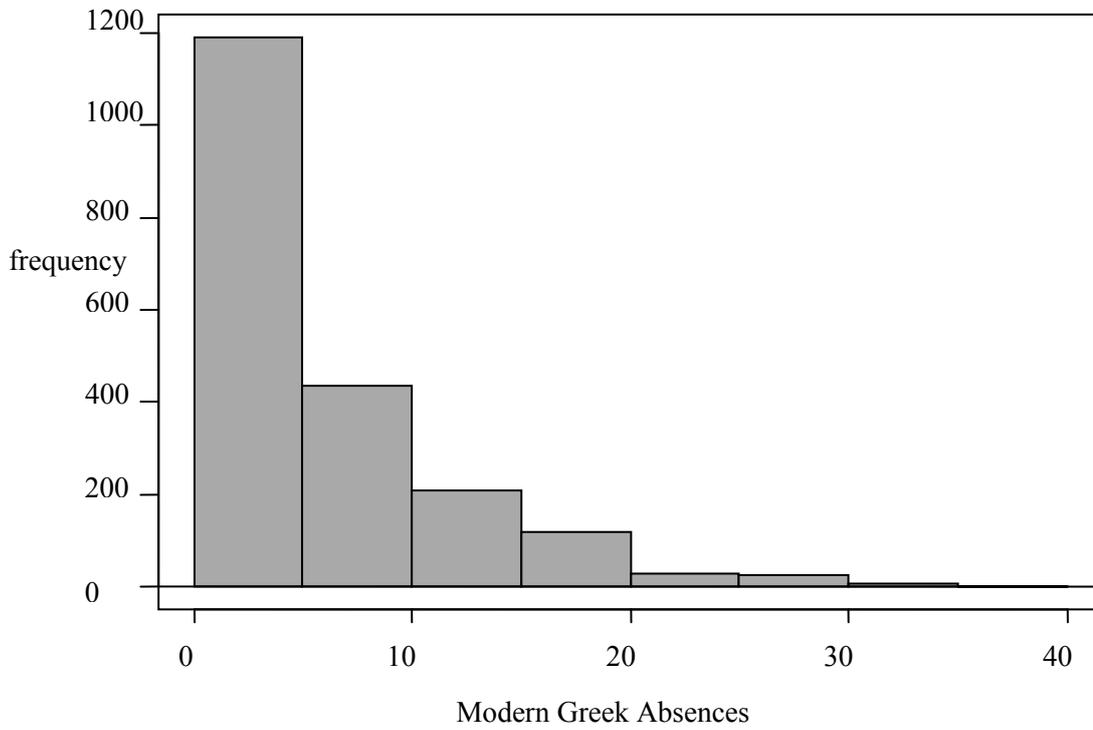


Figure 17. Histogram of Absences in Modern Greek

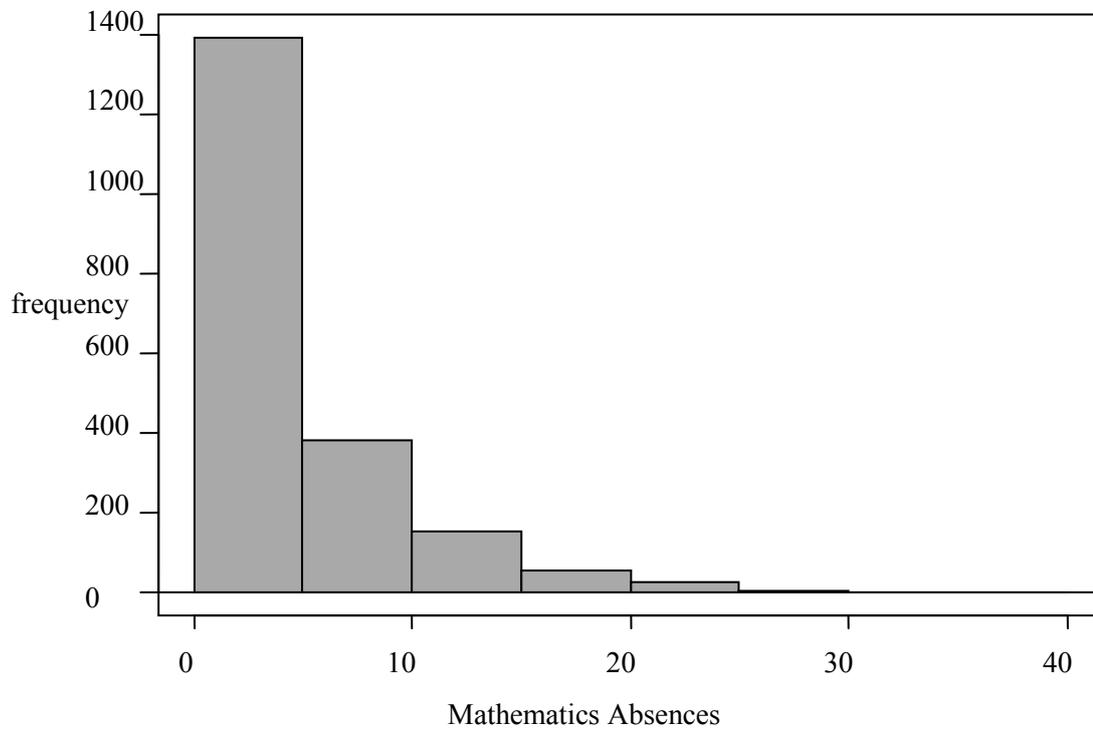


Figure 18. Histogram of Absences in Mathematics

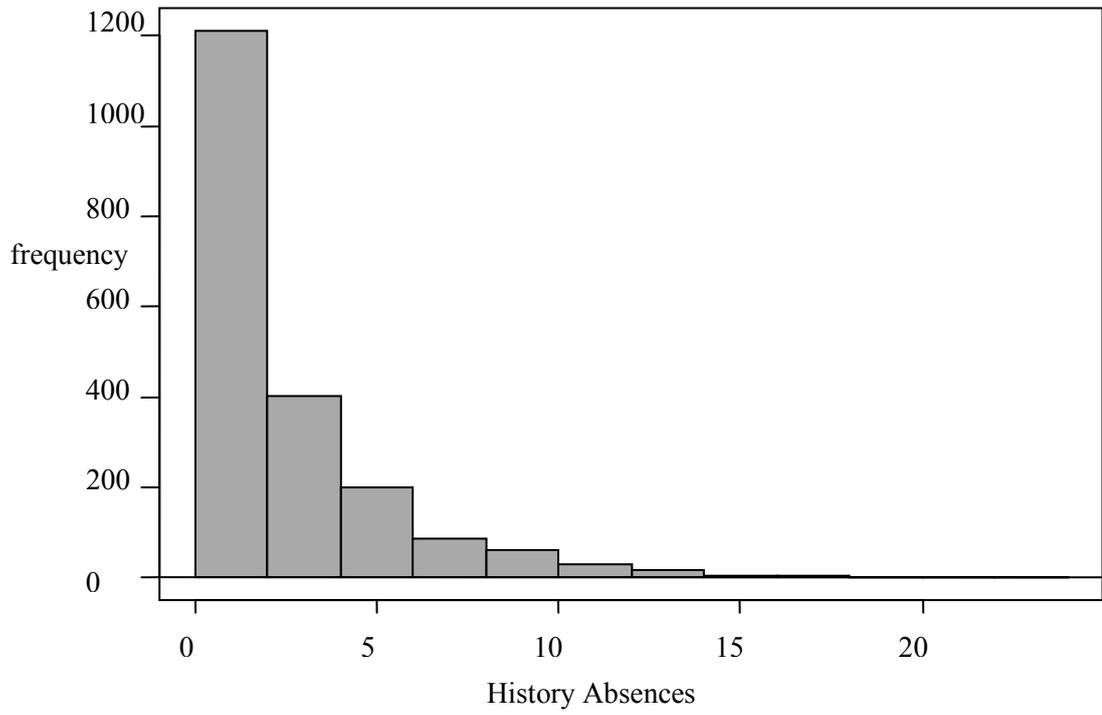


Figure 19. Histogram of Absences in History

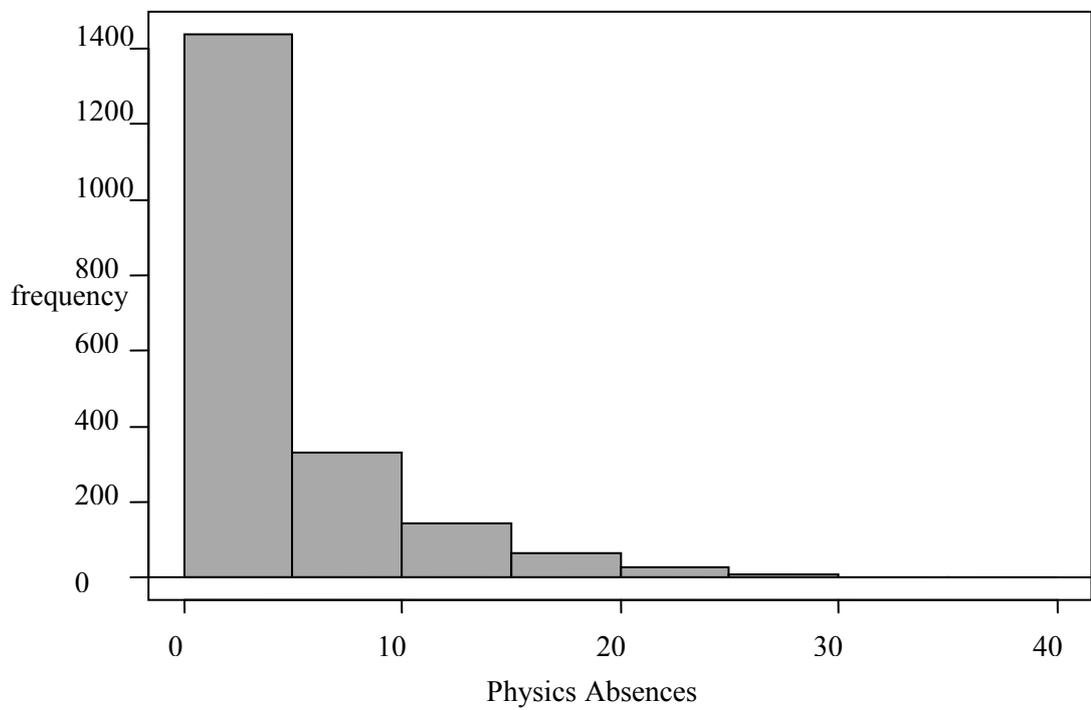


Figure 20. Histogram of Absences in Physics

Graphs for Age

Histograms of Age

Figure 21, Figure 22 and Figure 23 represent histograms of the different ages met in each year-group. As expected, the majority of the observations fall in the centre of the distribution, but there are small numbers of students towards the right of the graphs. These represent outliers and are dealt with (see 'Methodology' chapter).

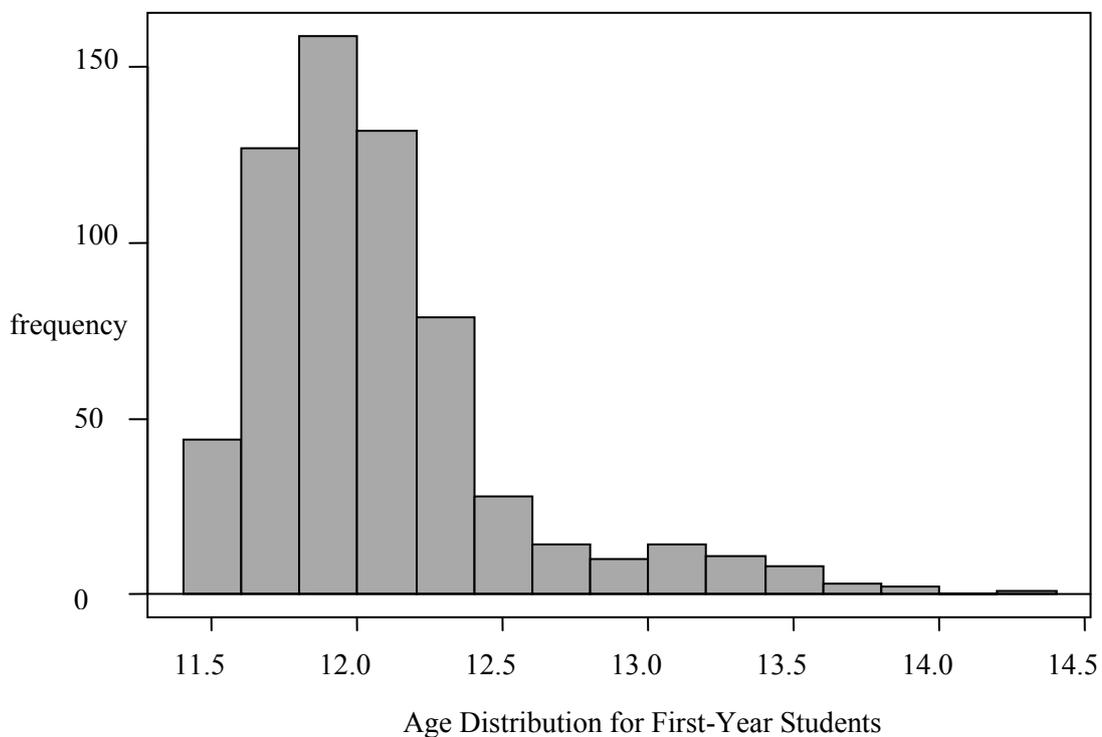


Figure 21. Age Distribution in First Year-Group

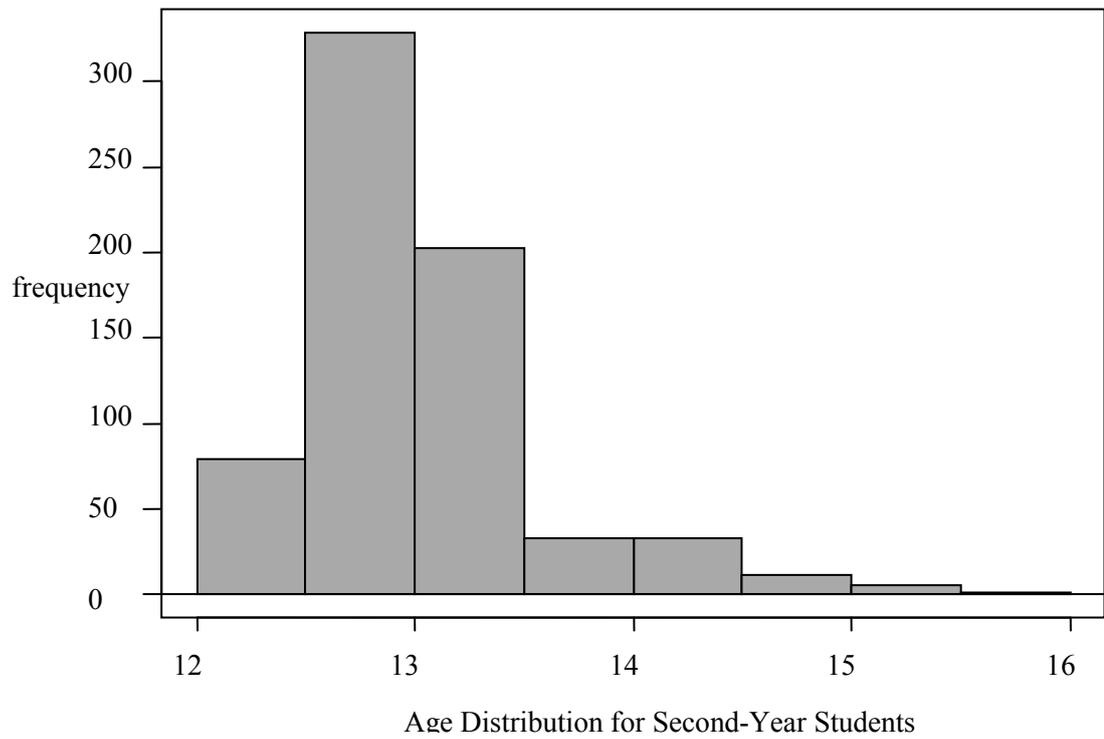


Figure 22. Age Distribution in Second Year-Group.

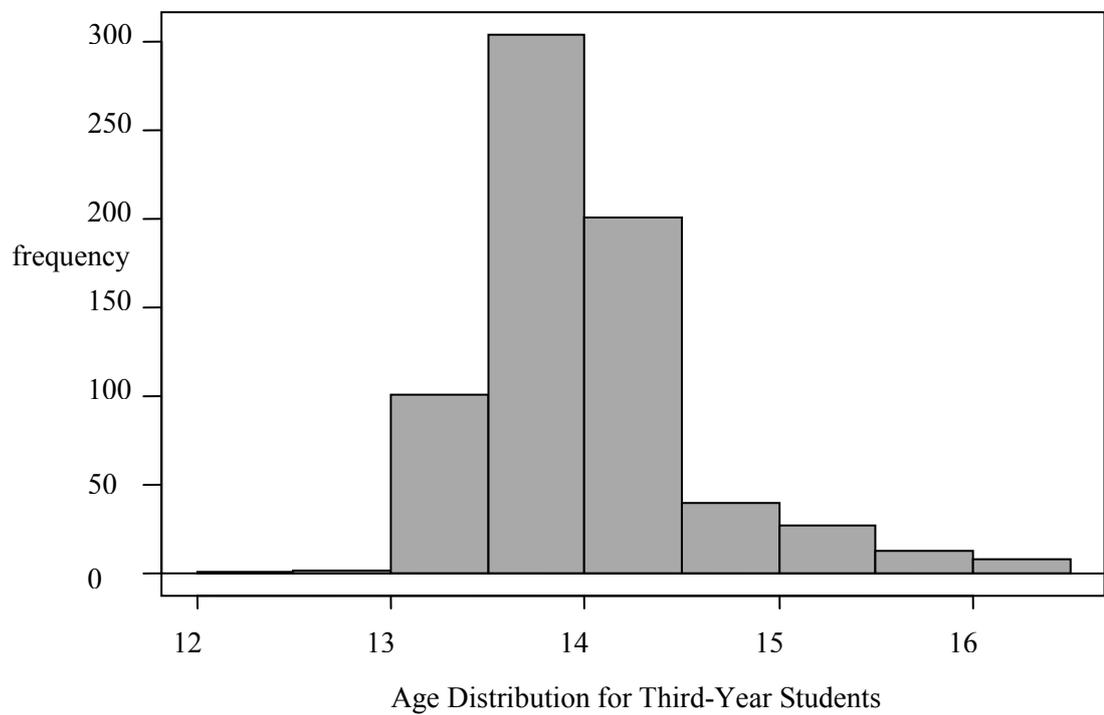


Figure 23. Age Distribution in Third Year-Group.

Cross-tabulations with Ethnicity and Other Variables

Cross-tabulation analysis is presented in this section. As the study is particularly interested in differences between ethnic groups, an examination of the relationship of the variable ethnicity with some of the other variables (generation status, parental education, parental occupation, school, school size, and school minority concentration) is made.

Ethnicity with Generation Status

Table 41 shows that all Georgian students are of first-generation status (100%). As regards ‘Others’, about half across all year groups are of first-generation status (range 50%-55%), and the rest of second-generation status (from about 45% to 50%).

Table 41. Ethnicity and Generation Status Cross-Tabulation.

| <i>Year Group</i> | <i>Ethnicity</i> | <i>Count Percent</i> | <i>Generation Status</i> | | |
|-------------------|------------------|--------------------------|--------------------------|--------------|---------------|
| | | | <i>Native</i> | <i>First</i> | <i>Second</i> |
| First Year | Native | Count | 466 | 0 | 0 |
| | | Percent | 100.0 | 0.0 | 0.0 |
| | Georgian | Count | 0 | 81 | 0 |
| | | Percent | 0.0 | 100.0 | 0.0 |
| | ‘Other’ | Count | 0 | 43 | 42 |
| | | Percent | 0.0 | 50.6 | 49.4 |
| Second Year | Native | Count | 503 | 0 | 0 |
| | | Percent | 100.0 | 0.0 | 0.0 |
| | Georgian | Count | 0 | 94 | 0 |
| | | Percent | 0.0 | 100.0 | 0.0 |
| | ‘Other’ | Count | 0 | 48 | 49 |
| | | Percent | 0.0 | 49.5 | 50.5 |
| Third Year | Native | Count | 527 | 0 | 0 |
| | | Percent | 100.0 | 0.0 | 0.0 |
| | Georgian | Count | 0 | 83 | 0 |
| | | Percent | 0.0 | 100.0 | 0.0 |
| | ‘Other’ | Count | 0 | 47 | 37 |
| | | Percent | 0.0 | 56 | 44 |

Ethnicity with parental educational level

Table 42 offers information about the parental educational level of children across year groups. The highest educational level for the majority of Native parents in all year groups is secondary education followed by those with further studies. The majority of Georgian parents follow the above pattern in the first and third year-groups, but in the second year-group most of them have further education followed by those with secondary education only. Only a small number of Native, Georgian, and ‘Other’ parents have received primary

education alone. The latter group has the highest number of parents who have gone on to further education.

Table 42. Ethnicity and Parental Education Cross-Tabulation.

| <i>Year Group</i> | <i>Ethnicity</i> | <i>Count Percent</i> | <i>Parental Education</i> | | |
|-------------------|------------------|--------------------------|------------------------------|--------------------------------|----------------------------|
| | | | <i>Primary Education</i> | <i>Secondary Education</i> | <i>Further Studies</i> |
| First Year | Native | Count | 24 | 270 | 172 |
| | | Percent | 5.2 | 57.9 | 36.9 |
| | Georgian | Count | 1 | 42 | 38 |
| | | Percent | 1.2 | 51.9 | 46.9 |
| | 'Other' | Count | 1 | 38 | 46 |
| | | Percent | 1.2 | 44.7 | 54.1 |
| Second Year | Native | Count | 24 | 286 | 193 |
| | | Percent | 4.8 | 56.9 | 38.4 |
| | Georgian | Count | 2 | 45 | 47 |
| | | Percent | 2.1 | 47.9 | 50.0 |
| | 'Other' | Count | 1 | 39 | 57 |
| | | Percent | 1.0 | 40.2 | 58.8 |
| Third Year | Native | Count | 33 | 322 | 172 |
| | | Percent | 6.3 | 61.1 | 32.6 |
| | Georgian | Count | 3 | 44 | 36 |
| | | Percent | 3.6 | 53.0 | 43.4 |
| | 'Other' | Count | 4 | 33 | 47 |
| | | Percent | 4.8 | 39.3 | 56.0 |

Ethnicity with Parental Occupational Level

Table 43 gives the percentage of parents in each of the predefined occupational categories. Most of the Native parents (almost half of them) are in the category of civil private and public workers. Another quarter are teachers and higher private and higher public workers. The next category up includes parents who are skilled workers. The two smallest categories are those with Native parents who are unskilled workers and professionals and chief managers.

Table 43. Ethnicity and Parental Occupation Cross-Tabulation.

| <i>Year group</i> | <i>Ethnicity</i> | <i>Count Percent</i> | <i>Parental Occupation</i> | | | | |
|-------------------|------------------|--------------------------|---|---------------------------------------|---|--|---|
| | | | <i>Unskilled manual workers</i> | <i>Skilled manual workers</i> | <i>Civil private and public workers</i> | <i>Teachers and higher private and higher public workers</i> | <i>Professionals and chief managers</i> |
| First Year | Native | Count | 36 | 75 | 217 | 121 | 17 |
| | | Percent | 7.7 | 16.1 | 46.6 | 26.0 | 3.6 |
| | Georgian | Count | 15 | 38 | 27 | 1 | 0 |
| | | Percent | 18.5 | 46.9 | 33.3 | 1.2 | 0.0 |
| | ‘Other’ | Count | 10 | 19 | 35 | 16 | 5 |
| | | Percent | 11.8 | 22.4 | 41.2 | 18.8 | 5.9 |
| Second Year | Native | Count | 37 | 75 | 246 | 119 | 26 |
| | | Percent | 7.4 | 14.9 | 48.9 | 23.7 | 5.2 |
| | Georgian | Count | 8 | 42 | 41 | 3 | 0 |
| | | Percent | 8.5 | 44.7 | 43.6 | 3.2 | 0.0 |
| | ‘Other’ | Count | 4 | 22 | 45 | 24 | 3 |
| | | Percent | 4.1 | 22.7 | 45.4 | 24.7 | 3.1 |
| Third Year | Native | Count | 32 | 92 | 242 | 132 | 29 |
| | | Percent | 6.1 | 17.5 | 45.9 | 25.0 | 5.5 |
| | Georgian | Count | 18 | 41 | 22 | 2 | 0 |
| | | Percent | 21.7 | 49.4 | 26.5 | 2.4 | 0.0 |
| | ‘Other’ | Count | 7 | 18 | 37 | 15 | 7 |
| | | Percent | 8.3 | 21.4 | 44.0 | 17.9 | 8.3 |

In the case of Georgian parents, most of them are in the category of skilled workers, followed by the category of civil private and public workers. The next category up is that with unskilled workers. A very small proportion is found in the category of teachers and higher private and higher public workers. There are no Georgian parents in the professional or managerial group. Similar to Natives, most parents from the group of ‘Others’ are in the category of civil private and public workers. The next two categories are those with parents who are skilled workers or teachers and higher private and higher public workers. There are few parents in the categories of unskilled workers and professionals or chief managers.

Ethnicity with Schools

Table 44 shows the schools from which children of different ethnic groups come. The largest percentage of Natives comes from School B and D. The largest percentage of Georgians comes from school E in the second and third year group, whilst the smallest percentage comes from Schools C and F. As regards ‘Others’, most of them come from School B, D, and E.

Table 44. Ethnicity and Schools Cross-Tabulation.

| <i>Year Group</i> | <i>Ethnicity</i> | <i>Count Percent</i> | <i>Schools</i> | | | | | |
|-------------------|------------------|----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | | | <i>School A</i> | <i>School B</i> | <i>School C</i> | <i>School D</i> | <i>School E</i> | <i>School F</i> |
| First Year | Native | Count | 20 | 126 | 67 | 149 | 36 | 72 |
| | | Percent | 4.3 | 26.8 | 13.9 | 32.0 | 7.7 | 15.2 |
| | Georgian | Count | 23 | 28 | 1 | 2 | 22 | 6 |
| | | Percent | 28.4 | 34.6 | 1.2 | 2.5 | 25.9 | 7.4 |
| | ‘Other’ | Count | 8 | 24 | 7 | 21 | 18 | 10 |
| | | Percent | 8.2 | 27.1 | 8.2 | 24.7 | 20.0 | 11.8 |
| Second Year | Native | Count | 15 | 129 | 56 | 182 | 48 | 77 |
| | | Percent | 3.0 | 25.6 | 11.1 | 35.6 | 9.5 | 15.1 |
| | Georgian | Count | 16 | 19 | 6 | 4 | 47 | 3 |
| | | Percent | 17.0 | 19.1 | 6.4 | 4.3 | 50.0 | 3.2 |
| | ‘Other’ | Count | 7 | 27 | 8 | 24 | 18 | 15 |
| | | Percent | 6.2 | 26.8 | 8.2 | 24.7 | 18.6 | 15.5 |
| Third Year | Native | Count | 12 | 141 | 73 | 192 | 44 | 75 |
| | | Percent | 2.1 | 26.4 | 13.7 | 35.5 | 8.3 | 14.0 |
| | Georgian | Count | 11 | 13 | 5 | 2 | 47 | 7 |
| | | Percent | 12.0 | 15.7 | 4.8 | 2.4 | 56.6 | 8.4 |
| | ‘Other’ | Count | 1 | 20 | 13 | 22 | 19 | 13 |
| | | Percent | 1.2 | 21.4 | 15.5 | 25.0 | 21.4 | 15.5 |

Ethnicity with School Minority Concentration

Considering the minority concentration of schools from which the participant ethnic groups come, Table 45 indicates that the majority of Natives and ‘Others’ (more than seventy percent) come from schools having a low percentage of minority students. The rest come from schools with a high percentage of minority children. In the case of Georgians, though, more than half come from schools with a high percentage of minority students.

Table 45. Ethnicity and School Minority Concentration Cross-Tabulation.

| <i>Year Group</i> | <i>Ethnicity</i> | <i>Count Percent</i> | <i>School Minority Concentration</i> | |
|-------------------|------------------|--------------------------|--------------------------------------|-------------|
| | | | <i>Low</i> | <i>High</i> |
| First Year | Native | Count | 410 | 56 |
| | | Percent | 88.0 | 12.0 |
| | Georgian | Count | 37 | 44 |
| | | Percent | 45.7 | 54.3 |
| | ‘Other’ | Count | 61 | 24 |
| | | Percent | 71.8 | 28.2 |
| Second Year | Native | Count | 440 | 63 |
| | | Percent | 87.5 | 12.5 |
| | Georgian | Count | 31 | 63 |
| | | Percent | 33.0 | 67.0 |
| | ‘Other’ | Count | 73 | 24 |
| | | Percent | 75.3 | 24.7 |
| Third Year | Native | Count | 472 | 55 |
| | | Percent | 89.6 | 10.4 |
| | Georgian | Count | 26 | 57 |
| | | Percent | 31.3 | 68.7 |
| | ‘Other’ | Count | 65 | 19 |
| | | Percent | 77.4 | 22.6 |

Ethnicity with Suspension

As regards suspensions from school, Table 46 indicates that native students have the lowest suspension rate of all, even though about one third have been suspended. Looking at the two ethnic minority groups, it appears that more than half of Georgian students have been suspended, while the suspension rate of ‘Others’ is in between the two other groups.

Table 46. Ethnicity and Suspension Cross-Tabulation.

| <i>Ethnicity</i> | <i>Count Percent</i> | <i>Suspension from School</i> | |
|------------------|--------------------------|---------------------------------|-----------------------|
| | | <i>Never been suspended</i> | <i>Been suspended</i> |
| Native | Count | 945 | 508 |
| | Percent | 65 | 35 |
| Georgian | Count | 101 | 109 |
| | Percent | 48 | 52 |
| ‘Other’ | Count | 156 | 101 |
| | Percent | 61 | 39 |

APPENDIX 3

Regression Diagnostics

Checking for Violations of Assumptions Using Residuals

In order to look for violations of assumptions, diagnostic information provided by the residuals was used. Residuals are “what are left over once a model has been fitted to the data – the difference between observed and predicted values” (Hutcheson and Sofroniou 1999, p.25). An examination of the data analysed in the Subject Study and the Absences Study follows to ensure whether a number of basic assumptions are met. As multiple regression models and multilevel regression models have similar assumptions (Gelman and Hill 2007, Hox 2010), their analyses are presented here together. Each of the assumptions was examined separately.

Normality

The first assumption checked was normality of the residuals. To investigate normality graphically, first of all, histograms of the residuals were created. If the histograms show “a symmetrical distribution with a single peak” (Hutcheson and Sofroniou 1999, p.27), there are no serious worries about the normality of the data.

Below, the histograms of the residuals are presented for all the models ran in the Subject Study and the Absences Study. These are the two multiple regression models ran in the Subject Study, the first for the *Trimesters Overall Attainment* (Figure 24) and the second for the *Combined Trimesters and Final Exam Overall Attainment* (Figure 25), and the two multilevel regression models for the *Combined Trimesters and Final Exam Overall Attainment*; one for the Subject Study (Figure 26) and one for the Absences Study (Figure 27). All graphs show a similar picture with a symmetrical distribution and a single peak, which indicates that the data to be used in this study meet the normality assumption.

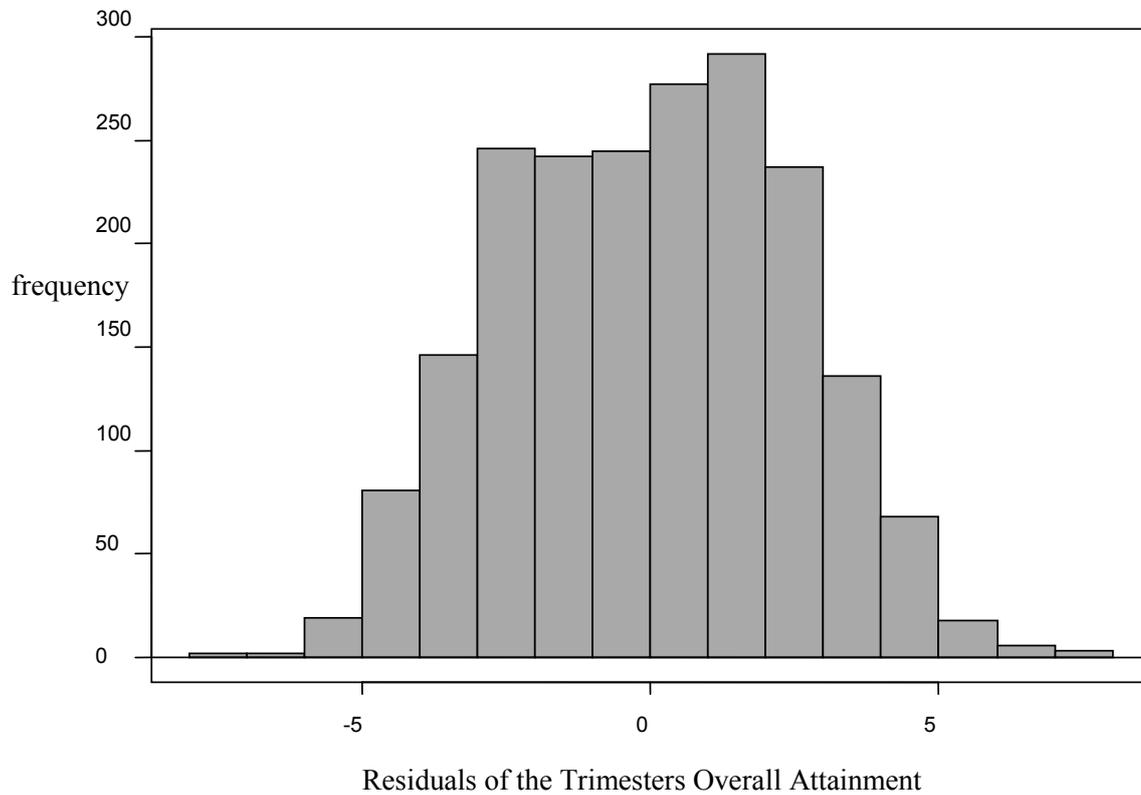


Figure 24. Histogram of the Residuals for the Trimesters Overall Attainment derived from the multiple regression analysis of the Subject Study

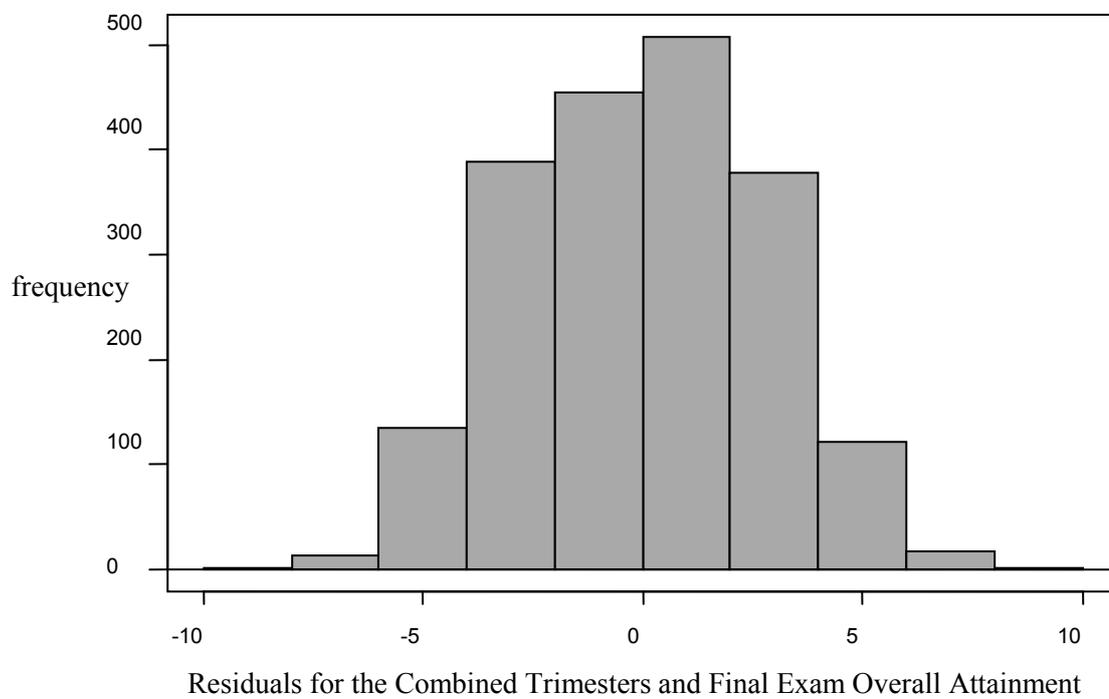


Figure 25. Histogram of the residuals for the Combined Trimesters and Final Exam Overall Attainment derived from the multiple regression analysis of the Subject Study

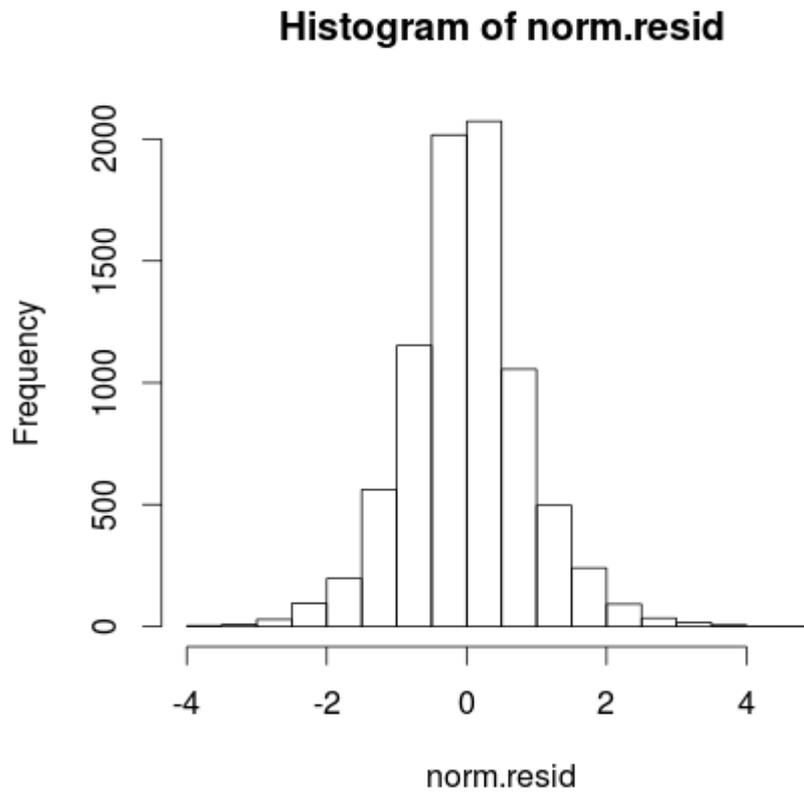


Figure 26. Histogram of the Residuals for the Combined Trimesters and Final Exam Overall Attainment derived from the multilevel analysis of the Subject Study

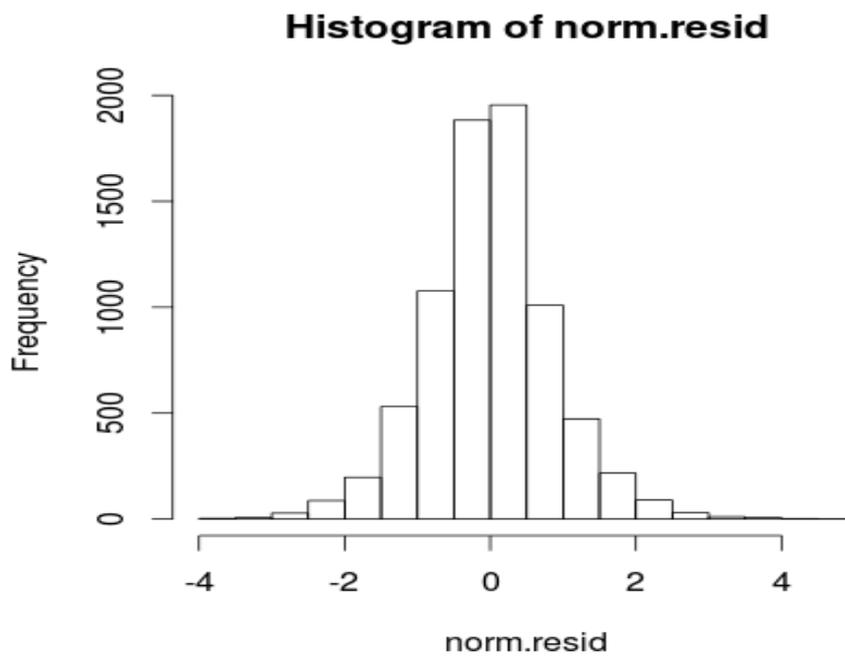


Figure 27. Histogram of the Residuals for the Combined Trimesters and Final Exam Overall Attainment derived from the multilevel analysis of the Absences Study

Another way to investigate normality graphically is by creating Normal probability plots of the residuals, also known as quantile-quantile plots or Q-Q plots. “In these plots a diagonal line drawn from lower left to upper right represents the expected values for a Normal distribution. If the actual distribution of the sample forms a diagonal, then we can conclude that this particular variable is Normally distributed” (Hutcheson and Sofroniou 1999, p.27-8).

Normal probability plots are presented below for the residuals of all the models ran in the Subject Study and the Absences Stud. These are the two multiple regression models ran in the Subject Study, the first for the *Trimesters Overall Attainment* (Figure 28) and the second for the *Combined Trimesters and Final Exam Overall Attainment* (Figure 29), and the two multilevel regression models for the *Combined Trimesters and Final Exam Overall Attainment*; one for the Subject Study (Figure 30) and one for the Absences Study (Figure 31).

The normal probability plots show a fairly straight, an almost diagonal line, with the exception of a few points at the lower left and upper right. Therefore, it can be assumed that the data is normally distributed.

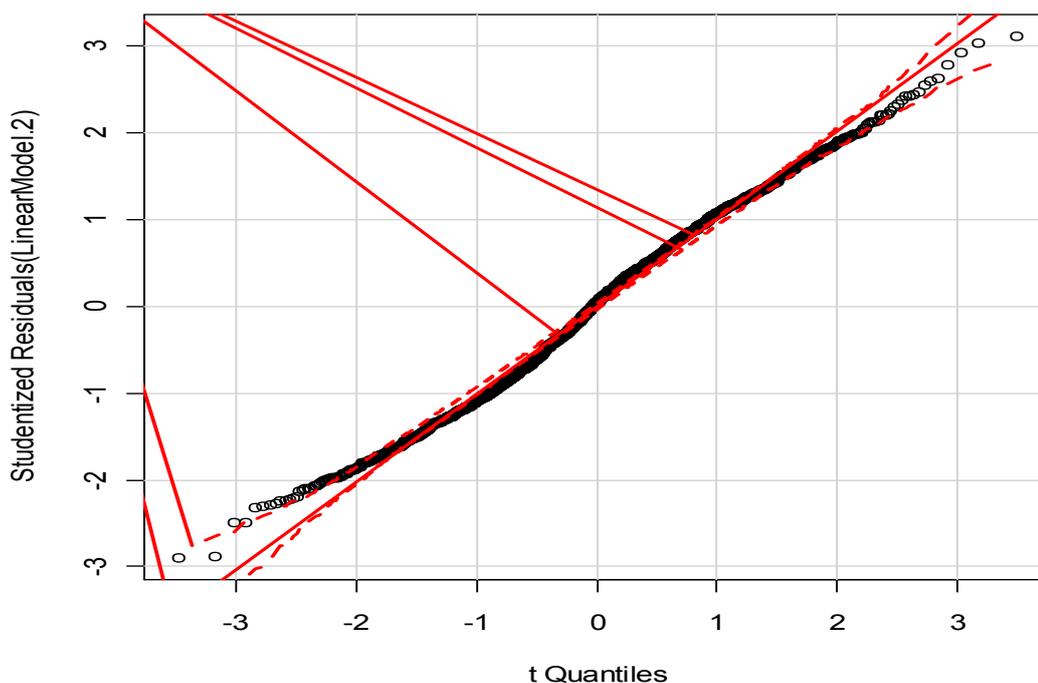


Figure 28: Q-Q Normal Plot for the Trimesters Overall Attainment derived from the multiple regression analysis of the Subject Study

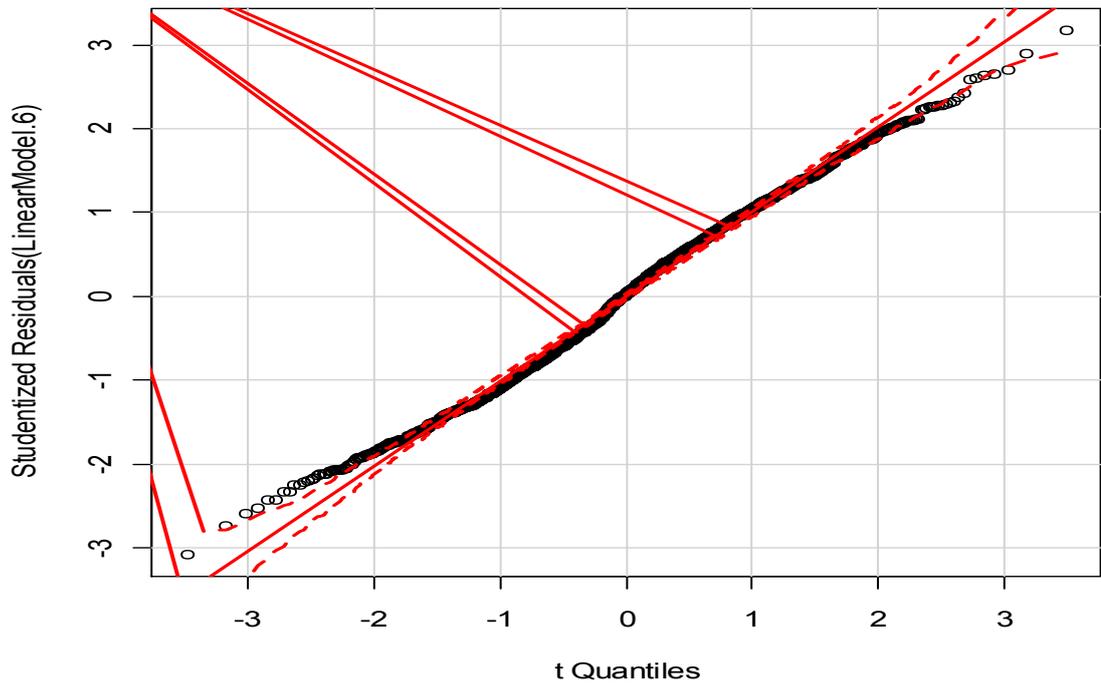


Figure 29: Q-Q Normal Plot for the Combined Trimesters and Final Exam Overall Attainment derived from the multiple regression analysis of the Subject Study.

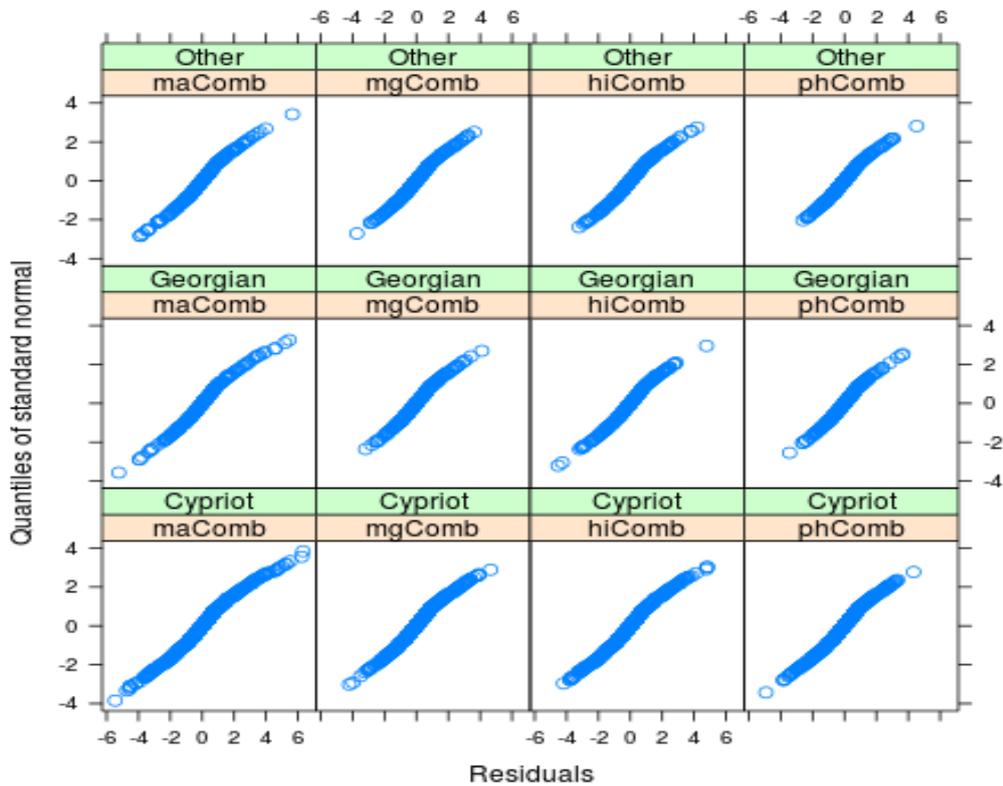


Figure 30. Q-Q Normal Plot for the Combined Trimesters and Final Exam Overall Attainment derived from the multilevel regression analysis of the Subject Study.

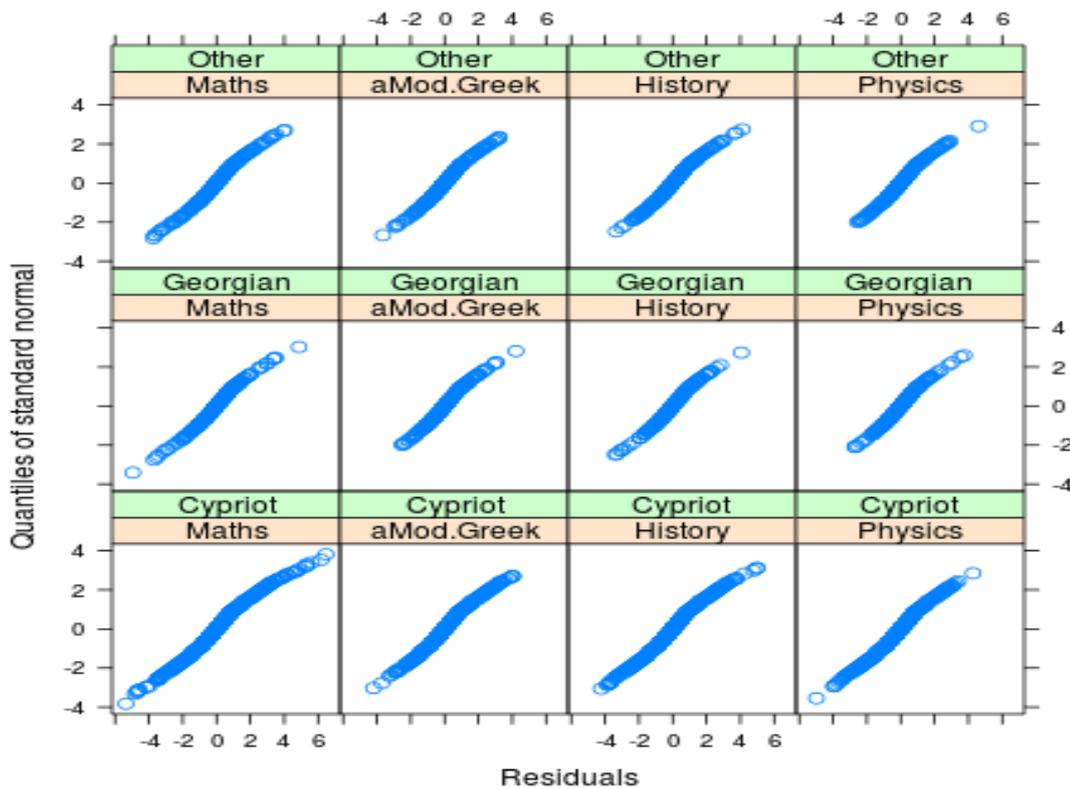


Figure 31. Q-Q Normal Plot for the Combined Trimesters and Final Exam Overall Attainment derived from the multilevel regression analysis of the Absences Study.

Constant Variance

The second assumption checked was constant variance. “One assumption for data with Normal errors is that the variance of one variable is about the same at each level of a second variable” (Hutcheson and Sofroniou 1999, p.28). This is also known as *homoscedasticity* or constant variance, while “different levels of variance are termed *heteroscedasticity*” (Hutcheson and Sofroniou 1999, p.28). Constant variance can be checked by scatterplots which examine the residuals of the fitted model. “A plot of the residuals versus the fitted values should lie in a horizontal band if the model is a good approximation and the variance is constant” (Hutcheson and Sofroniou 1999, p.28).

Scatterplots are presented below for the residuals versus the fitted values of all the models ran in the Subject Study and the Absences Study. These are the two multiple regression models ran in the Subject Study, the first for the *Trimesters Overall Attainment* (Figure 32) and the second for the *Combined Trimesters and Final Exam Overall Attainment* (Figure 33), and the two multilevel regression models for the *Combined Trimesters and Final Exam Overall Attainment*; one for the Subject Study (Figure 34) and one for the Absences Study (Figure

The scatterplots show that the majority of the points are distributed around the zero point in a horizontal band with the exception of a number of points at the higher and lower part of the graph whose variance is a bit larger than the majority of the points. This seems to be an indication of a mild violation of constant variance.

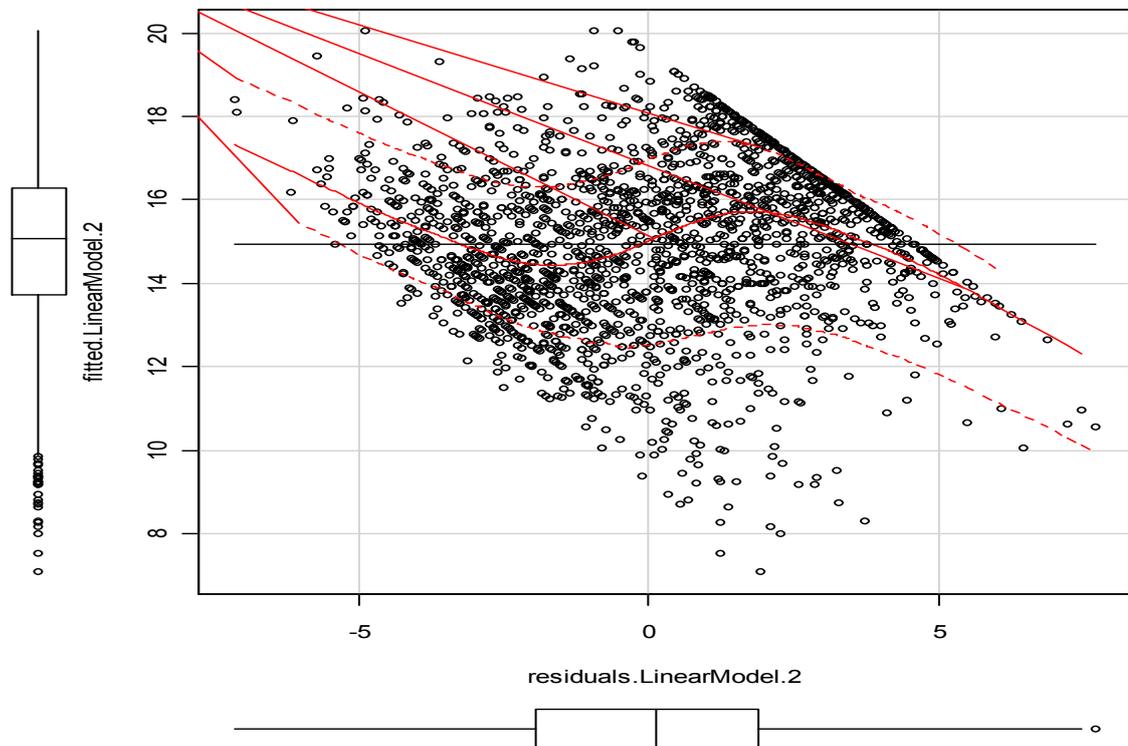


Figure 32. Scatterplot of the residuals versus Fitted Values for the Trimesters Overall Attainment derived from the multiple regression analysis of the Subject Study

Faraway (2005, p.49), suggests that a quick way to test for non-constant variance is the equation *summary(lm(abs(residuals(lm)) ~ fitted(lm)))* which investigates whether the fitted values are related to the residuals of the model. For this model, the one with the *Trimesters Overall Attainment* as a dependent variable, the regression results are non-significant $F(1, 2018)=0.369, p=0.544$. Although this test is not quite right (it has been argued that some weighting should be used and the degrees of freedom should be adjusted), it seems that there is no clear problem with non-constant variance with this specific model. For a more formal test, Fox(2002) suggests the use of the *ncv.test* function of the *car* package (Fox and Wisberg 2011). Running the function returns statistically non-significant results, meaning that the magnitude of heteroscedasticity in the data is not extensive $\chi^2(1)=0.45, p=0.499$. Running the function on the more general dependence of spread on the predictors in the regression returns statistically non-significant results,

meaning that the magnitude of heteroscedasticity in the data is not extensive $\chi^2(15)=19.14$, $p=0.207$.

However, even if heteroscedasticity is present in this data sample to some degree, the OLS estimator will still be unbiased and consistent, so there is no reason to doubt the coefficient estimates; there might, however, be some doubt about the error estimates of the coefficients. Thankfully, Fox and Wisberg (2011) provide a function in the *car* package in *R* which corrects the error estimates of the coefficients for the presence of heteroscedasticity. Using this function (`coeftest(lm,vcov=hccm(lm))`), I find that all the coefficient estimates remain statistically significant, in perfect agreement with the homoscedastic linear model I fitted originally. The same analyses were ran for the *Trimesters and Final Exams Overall Attainment* too (Figure 33) with similar results.

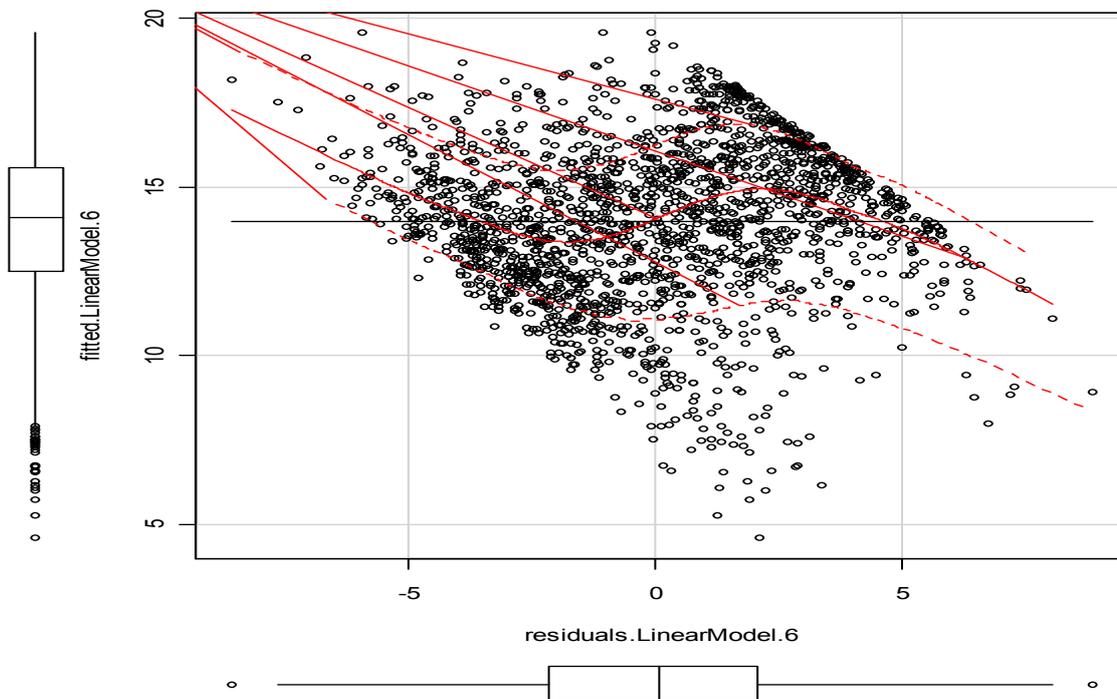


Figure 33. Scatterplot of the Residuals versus Fitted Values for the Trimesters and Final Exams Overall Attainment derived from the multiple regression analysis of the Subject Study.

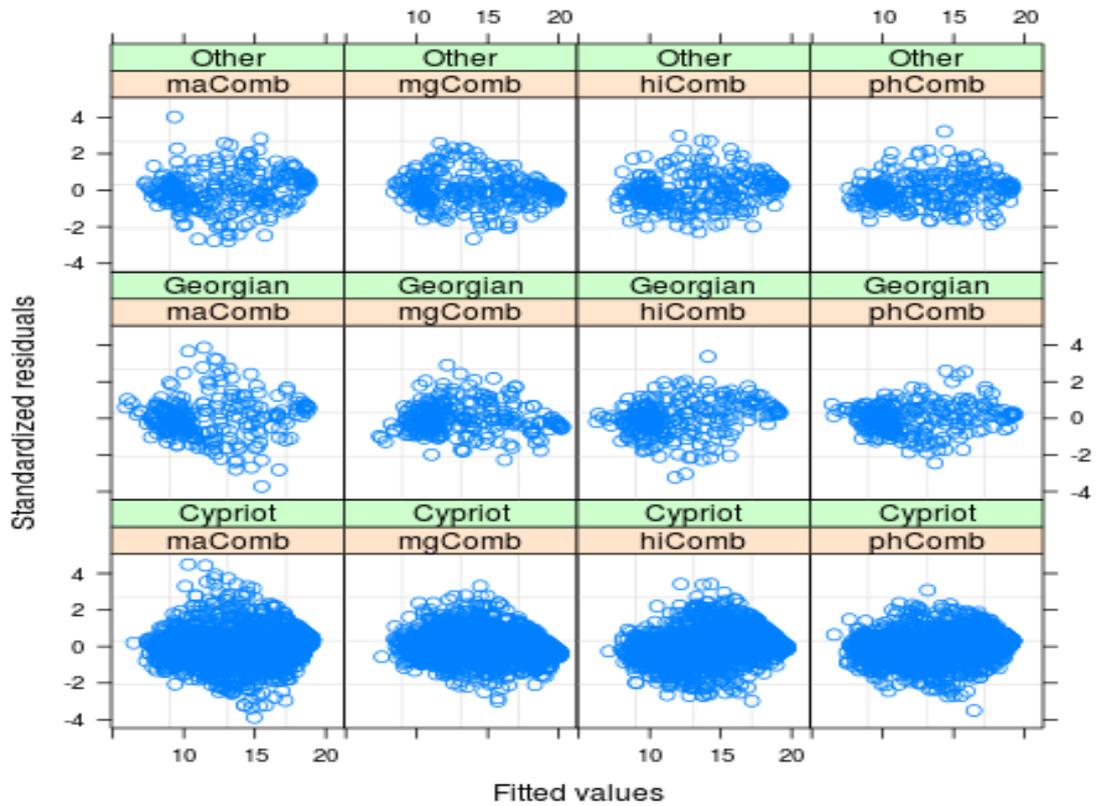


Figure 34. Scatterplot of the Residuals versus Fitted Values for the Trimesters and Final Exams Overall Attainment derived from the multilevel regression analysis of the Subject Study.

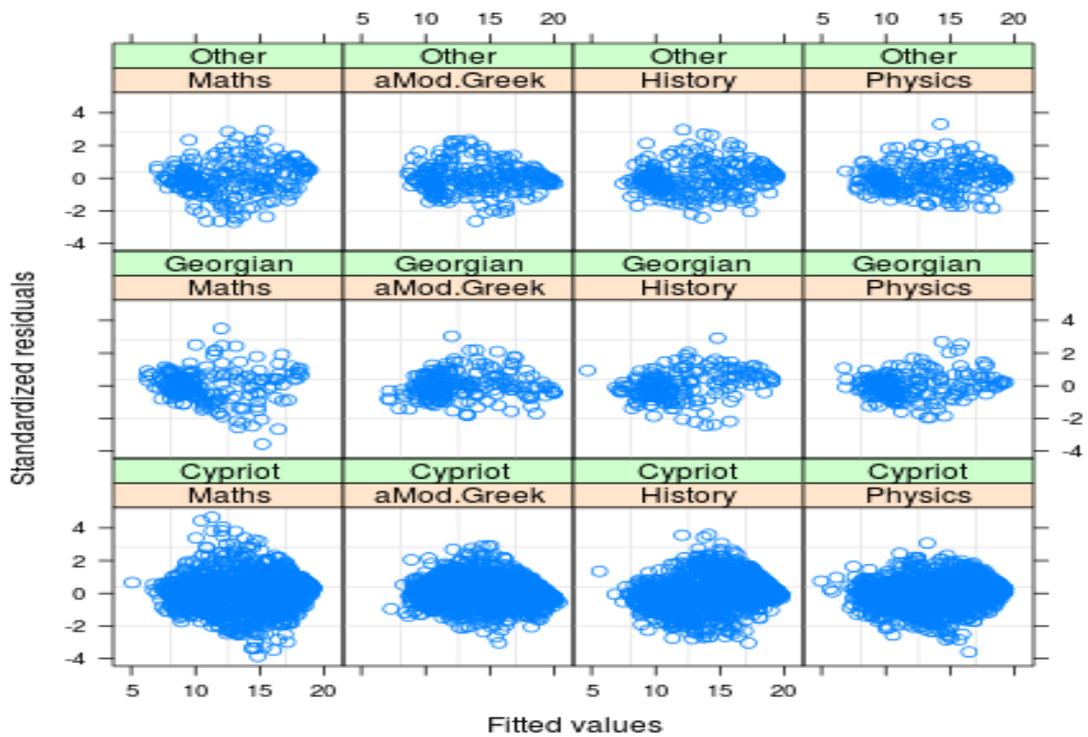


Figure 35. Scatterplot of the Residuals versus Fitted Values for the Trimesters and Final Exams Overall Attainment derived from the multilevel regression analysis of the Absences Study.

Linearity

Linearity was the third assumption checked. “A linear model is one in which the relations between variables are of the form of a straight line” (Hutcheson and Sofroniou 1999, p.29).

The scatterplots of the residuals versus the fitted values presented above can also be used to examine the data for non-linearity. As described earlier, the majority of the points are distributed around the zero point in a horizontal band. However, a number of points at the higher and lower part of the graph indicate a mild violation of linearity.

Independence

The fourth and final assumption checked was independence. “Independence means that one observation bears no relation to the value of any other observation – they are not linked or dependent in any way” (Hutcheson and Sofroniou 1999, p.31).

A Durbin-Watson test is a test suggested for the statistical examination of independence (Hutcheson and Sofroniou (1999). The test was run for all the models of the Subject and Absences Studies. The results showed no autocorrelation in the case of the two multiple regression models ran in the Subject Study, the one for the *Trimesters Overall Attainment* (DW = 1.93, p-value = 0.11) and the other for the *Combined Trimesters and Final Exam Overall Attainment* (DW = 1.96, p-value = 0.25).

APPENDIX 4: Multiple Regression Modelling Process

Table 47: The Manual Forward/Stepwise-Selection Procedure of the Multiple Regression Model for the Trimesters Overall Attainment in the Subject Study

| <i>Step 1</i> | | | | |
|--|----------------------|---|---------------------------|----------------|
| <i>Model Equation</i> | <i>Model Summary</i> | | | |
| | <i>RSS</i> | <i>R-squared / Adjusted R-squared</i> | <i>F-statistic</i> | <i>P-value</i> |
| Trimesters Overall Attainment = $\alpha + \beta$ absences | 2.85 on 2018 DF | 0.18/0.18 | 453.6 on 1 and 2018 DF | <0.01 |
| Trimesters Overall Attainment = $\alpha + \beta$ gender | 3.01 on 2018 DF | 0.09/0.09 | 191.3 on 1 and 2018 DF | <0.01 |
| Trimesters Overall Attainment = $\alpha + \beta$ parental education | 3.02 on 2017 DF | 0.08/0.08 | 86.91 on 2 and 2017 DF | <0.01 |
| Trimesters Overall Attainment = $\alpha + \beta$ parental occupation | 3 on 2017 DF | 0.08/0.08 | 52.82 on 4 and 2015 DF | <0.01 |
| Trimesters Overall Attainment = $\alpha + \beta$ age | 3.12 on 2018 DF | 0.02/0.02 | 43.38 on 1 and 2018 DF | <0.01 |
| Trimesters Overall Attainment = $\alpha + \beta$ ethnicity | 3.09 on 2017 DF | 0.04/0.04 | 38.63 on 2 and 2017 DF | <0.01 |
| Trimesters Overall Attainment = $\alpha + \beta$ school | 3.14 on 2014 DF | 0.01/0.01 | 3.80 on 5 and 2014 DF | <0.01 |

| | | | | |
|---|---------------------|-----------|--------------------------|------|
| Trimesters Overall Attainment = $\alpha + \beta$ year group | 37.75 on 2017 DF | 0.00/0.00 | 3.47 on 2 and 2017 DF | 0.03 |
|---|---------------------|-----------|--------------------------|------|

Based on Step 1 the model is: Trimesters Overall Attainment = $\alpha + \beta$ absences

Coefficients:

| | Estimate | St. Error | T-value | P-value |
|-------------|----------|-----------|---------|---------|
| (Intercept) | 16.30 | 0.09 | 181.15 | <0.01 |
| Absences | -0.08 | 0.00 | -21.30 | <0.01 |

Model summary: Residual standard error: 2.85 on 2018 degrees of freedom, Multiple R-squared: 0.18, Adjusted R-squared: 0.18, F-statistic: 453.6 on 1 and 2018 DF, P-value <0.01

Analysis of Variance

| <i>Compared Models</i> | <i>Res df</i> | <i>RSS</i> | <i>Df</i> | <i>Sum of Sq</i> | <i>F values</i> | <i>F values</i> |
|------------------------|---------------|------------|-----------|------------------|-----------------|-----------------|
| Null model | 2019 | 20032 | | | | |
| Model with 'absences' | 2018 | 16356 | 1 | 3676.2 | 453.58 | <0.01 |

Step 2

| <i>Model Equation</i> | <i>Model Summary</i> | | | |
|--|----------------------|---|---------------------------|----------------|
| | <i>RSS</i> | <i>R-squared / Adjusted R-squared</i> | <i>F-statistic</i> | <i>P-value</i> |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender | 2.72 on 2017 DF | 0.25/0.25 | 341.7 on 2 and 2017 DF | <0.01 |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 parental education | 2.73 on 2016 DF | 0.25/0.25 | 226.1 on 3 and 2016 DF | <0.01 |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 ethnicity | 2.83 on 2016 DF | 0.19/0.19 | 160 on 3 and 2016 DF | <0.01 |

| | | | | | | |
|---|---------------------------------------|------------|---------------------------|-----------------------------|--------------------|-----------------|
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 year group | 2.84 on 2016 DF | 0.19/0.19 | 155.1 on 3 and 2016 DF | <0.01 | | |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 parental occupation | 2.73 on 2014 DF | 0.25/0.25 | 135.9 on 5 and 2014 DF | <0.01 | | |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 school | 2.81 on 2013 DF | 0.21/0.21 | 87.88 on 6 and 2013 DF | <0.01 | | |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 age | Variable 'age' is found insignificant | | | >0.05 | | |
| Based on Step 2 the model is: Trimesters Overall Attainment = $\alpha + \beta$ absences + β_2 gender | | | | | | |
| Coefficients: | | | | | | |
| | Estimate | St. Error | T-value | P-value | | |
| (Intercept) | 17.07 | 0.10 | 165.80 | <0.01 | | |
| Absences | -0.07 | 0.00 | -21.20 | <0.01 | | |
| Gender [T.Male] | -1.67 | 0.12 | -13.71 | <0.01 | | |
| Model summary: Residual standard error: 2.72 on 2017 degrees of freedom, Multiple R-squared: 0.25, Adjusted R-squared: 0.25, F-statistic: 341.7 on 2 and 2017 DF, P-value <0.01 | | | | | | |
| <i>Analysis of Variance</i> | | | | | | |
| <i>Compared Models</i> | <i>Res df</i> | <i>RSS</i> | <i>df</i> | <i>Sum of Sq</i> | <i>F values</i> | <i>P values</i> |
| Model without 'gender' | 2018 | 16356 | | | | |
| Model with 'gender' | 2017 | 14962 | 1 | 1393.3 | 187.83 | <0.01 |
| <i>Step 3</i> | | | | | | |
| <i>Model Equation</i> | | | <i>Model Summary</i> | | | |
| | | | <i>RSS</i> | <i>R-squared / Adjusted</i> | <i>F-statistic</i> | <i>P-value</i> |

| | | | | |
|---|---------------------------------------|------------------|---------------------------|---------|
| | | <i>R-squared</i> | | |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education | 2.61 on 2015 DF | 0.32/0.32 | 233.6 on 4 and 2015 DF | <0.01 |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 ethnicity | 2.71 on 2015 DF | 0.26/0.26 | 178.6 on 4 and 2015 DF | <0.01 |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 year group | 2.72 on 2015 DF | 0.26/0.25 | 172.6 on 4 and 2015 DF | <0.01 |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental occupation | 2.60 on 2013 DF | 0.32/0.32 | 158 on 6 and 2013 DF | <0.01 |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 school | 2.68 on 2012 DF | 0.28/0.27 | 110 on 7 and 2012 DF | <0.01 |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 age | Variable 'age' is found insignificant | | | >0.05 |
| Based on Step 3 the model is: Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education | | | | |
| Coefficients: | | | | |
| | Estimate | St. Error | T-value | P-value |
| (Intercept) | 16.67 | 0.13 | 127.67 | <0.01 |
| Absences | -0.07 | 0.00 | -21.52 | <0.01 |
| Gender [T.Male] | -1.61 | 0.12 | -13.86 | <0.01 |
| Parental Educational Level 1 | 0.42 | 0.14 | 3.01 | <0.01 |
| Parental Educational Level 2 | 0.65 | 0.06 | 11.55 | <0.01 |
| Model summary: Residual standard error: 2.61 on 2015 degrees of freedom, Multiple R-squared: 0.32, Adjusted R-squared: 0.32, F-statistic: 233.6 on 4 and 2015 DF, P-value <0.01 | | | | |
| <i>Analysis of Variance</i> | | | | |

| <i>Compared Models</i> | <i>Res df</i> | <i>RSS</i> | <i>df</i> | <i>Sum of Sq</i> | <i>F values</i> | <i>P values</i> |
|---|---------------|----------------|-----------|------------------|-----------------|-----------------|
| Model without 'parental education' Model with 'parental education' | 2017 2015 | 14962 13686 | 2 | 1276.8 | 94 | <0.01 |

| Step 4 | | | | |
|--|---------------------------------------|---|---------------------------|----------------|
| <i>Model Equation</i> | <i>Model Summary</i> | | | |
| | <i>RSS</i> | <i>R-squared / Adjusted R-squared</i> | <i>F-statistic</i> | <i>P-value</i> |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 ethnicity | 2.57 on 2013 DF | 0.33/0.33 | 168.5 on 6 and 2013 DF | <0.01 |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 year group | 2.60 on 2013 DF | 0.32/0.32 | 157.9 on 6 and 2013 DF | <0.01 |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 parental occupation | 2.56 on 2011 DF | 0.34/0.34 | 130.7 on 8 and 2011 DF | <0.01 |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 school | 2.58 on 2010 DF | 0.33/0.33 | 111.3 on 9 and 2010 DF | <0.01 |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 age | Variable 'age' is found insignificant | | | >0.05 |
| Based on Step 4 the model is: Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 ethnicity | | | | |
| Coefficients: | | | | |
| | Estimate | St. Error | T-value | P-value |
| (Intercept) | 16.77 | 0.13 | 129.05 | <0.01 |
| Absences | -0.06 | 0.00 | -19.36 | <0.01 |
| Gender [T.Male] | -1.61 | 0.11 | -14.02 | <0.01 |
| Parental Educational Level 1 | 0.48 | 0.14 | 3.47 | <0.01 |
| Parental Educational Level 2 | 0.71 | 0.06 | 12.61 | <0.01 |

| | | | | |
|---|-------|------|-------|-------|
| Ethnicity [T.Georgian] | -1.10 | 0.18 | -6.15 | <0.01 |
| Ethnicity [T.Other] | -0.87 | 0.17 | -4.95 | <0.01 |
| Model summary: Residual standard error: 2.57 on 2013 degrees of freedom, Multiple R-squared: 0.33, Adjusted R-squared: 0.33, F-statistic: 168.5 on 6 and 2013 DF, P-value <0.01 | | | | |

| <i>Analysis of Variance</i> | | | | | | |
|---|---------------------------------------|---|----------------------------|------------------|-----------------|-----------------|
| <i>Compared Models</i> | <i>Res df</i> | <i>RSS</i> | <i>df</i> | <i>Sum of Sq</i> | <i>F values</i> | <i>P values</i> |
| Model without 'ethnicity' | 2015 | 13686 | | | | |
| Model with 'ethnicity' | 2013 | 13335 | 2 | 350.38 | 26.45 | <0.01 |
| <i>Step 5</i> | | | | | | |
| <i>Model Equation</i> | <i>Model Summary</i> | | | | | |
| | <i>RSS</i> | <i>R-squared / Adjusted R-squared</i> | <i>F-statistic</i> | <i>P-value</i> | | |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 year group | 2.57 on 2011 DF | 0.34/0.33 | 127.4 on 8 and 2011 DF | <0.01 | | |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 parental occupation | 2.55 on 2009 DF | 0.35/0.35 | 108.1 on 10 and 2009 DF | <0.01 | | |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 school | 2.52 on 2008 DF | 0.36/0.36 | 104 on 11 and 2008 DF | <0.01 | | |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 age | Variable 'age' is found insignificant | | | | >0.05 | |

Based on Step 5 the model is: Trimesters Overall Attainment = α + β_1 absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 year group

Coefficients:

| | Estimate | St. Error | T-value | P-value |
|------------------------------|----------|-----------|---------|---------|
| (Intercept) | 16.68 | 0.15 | 109.25 | <0.01 |
| Absences | -0.07 | 0.00 | -19.23 | <0.01 |
| Gender[T.Male] | -1.60 | 0.12 | -13.85 | <0.01 |
| Parental Educational Level 1 | 0.49 | 0.14 | 3.50 | <0.01 |
| Parental Educational Level 2 | 0.71 | 0.06 | 12.68 | <0.01 |
| Ethnicity [T.Georgian] | -1.06 | 0.18 | -5.94 | <0.01 |
| Ethnicity [T.Other] | -0.84 | 0.18 | -4.80 | <0.01 |
| Year Group [T.Second Year] | 0.03 | 0.14 | 0.20 | 0.84 |
| Year Group [T.Third Year] | 0.32 | 0.15 | 2.18 | 0.03 |

Model summary: Residual standard error: 2.57 on 2011 degrees of freedom, Multiple R-squared: 0.34, Adjusted R-squared: 0.33, F-statistic: 127.4 on 8 and 2011 DF, P-value <0.01

Analysis of Variance

| <i>Compared Models</i> | <i>Res df</i> | <i>RSS</i> | <i>df</i> | <i>Sum of Sq</i> | <i>F values</i> | <i>P values</i> |
|----------------------------|---------------|------------|-----------|------------------|-----------------|-----------------|
| Model without 'year group' | 2013 | 13335 | | | | |
| Model with 'year group' | 2011 | 13296 | 2 | 39.45 | 2.98 | 0.05 |

Step 6

| <i>Model Equation</i> | <i>Model Summary</i> | | | |
|--|----------------------|---------------------------------------|--------------------|----------------|
| | <i>RSS</i> | <i>R-squared / Adjusted R-squared</i> | <i>F-statistic</i> | <i>P-value</i> |
| Trimesters Overall Attainment = α + β_1 absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 year group + β_6 parental occupation | | | | >0.05 |

When 'parental occupation' entered the model, variable 'year group' was found insignificant. It was excluded and the model was rerun.

| | | | | |
|---|---|-----------|----------------------------|---------|
| Trimesters Overall Attainment = α + β 1 absences + β 2 gender + β 3 parental education + β 4 ethnicity + β 5 parental occupation | 2.55 on 2007 DF | 0.35/0.35 | 108.1 on 10 and 2009 DF | <0.01 |
| Trimesters Overall Attainment = α + β 1 absences + β 2 gender + β 3 parental education + β 4 ethnicity + β 5 year group + β 6 school | 2.52 on 2006 DF | 0.37/0.36 | 88.7 on 13 and 2006 DF | <0.01 |
| Trimesters Overall Attainment = α + β 1 absences + β 2 gender + β 3 parental education + β 4 ethnicity + β 5 year group + β 6 age | When 'age' entered the model, variables 'year group' and 'age' are found insignificant. | | | >0.05 |
| Based on Step 6 the model is: Trimesters Overall Attainment = α + β1 absences + β2 gender + β3 parental education + β4 ethnicity + β5 parental occupation | | | | |
| Coefficients: | | | | |
| | Estimate | St. Error | T-value | P-value |
| (Intercept) | 15.93 | 0.23 | 70.06 | <0.01 |
| Absences | -0.06 | 0.00 | -19.35 | <0.01 |
| Gender [T.Male] | -1.63 | 0.11 | -14.26 | <0.01 |
| Parental Educational Level 1 | 0.34 | 0.14 | 2.40 | 0.02 |
| Parental Educational Level 2 | 0.52 | 0.06 | 8.16 | <0.01 |
| Ethnicity [T.Georgian] | -0.67 | 0.19 | -3.52 | <0.01 |
| Ethnicity [T.Other] | -0.72 | 0.17 | -4.12 | <0.01 |
| Parental Occupational Level [T.Skilled Manual Workers] | 0.50 | 0.23 | 2.15 | 0.03 |
| Parental Occupational Level [T.Civil Private and Public Workers] | 0.81 | 0.22 | 3.65 | <0.01 |
| Parental Occupational Level [T.Teachers and Higher Private and Higher Public Workers] | 1.58 | 0.26 | 6.18 | <0.01 |
| Parental Occupational Level [T.Professionals and Chief Managers] | 1.62 | 0.36 | 4.55 | <0.01 |
| Model summary: Residual standard error: 2.55 on 2009 degrees of freedom, Multiple R-squared: 0.35, Adjusted R-squared: 0.35, F-statistic: 108.1 on 10 and 2009 DF, P-value <0.01 | | | | |

| <i>Analysis of Variance</i> | | | | | | |
|--|--|---|----------------------------|------------------|-----------------|-----------------|
| <i>Compared Models</i> | <i>Res df</i> | <i>RSS</i> | <i>df</i> | <i>Sum of Sq</i> | <i>F values</i> | <i>P values</i> |
| Model without 'parental occupation' Model with 'parental occupation' | 2013 2009 | 13335 13023 | 4 | 312.33 | 12.05 | <0.01 |
| Step 7 | | | | | | |
| <i>Model Equation</i> | <i>Model Summary</i> | | | | | |
| | <i>RSS</i> | <i>R-squared / Adjusted R-squared</i> | <i>F-statistic</i> | | <i>P-value</i> | |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 parental occupation + β_6 school | 2.49 on 2004 DF | 0.38/0.38 | 82.59 on 15 and 2004 DF | | <0.01 | |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 parental occupation + β_6 age | Variable 'age' is found insignificant | | | | >0.05 | |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 parental occupation + β_6 year group | Variable 'year group' is found insignificant | | | | >0.05 | |

Based on Step 7 the model is: Trimesters Overall Attainment = α + β_1 absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 parental occupation + β_6 school

Coefficients:

| | Estimate | St. Error | T-value | P-value |
|---|----------|-----------|---------|---------|
| (Intercept) | 16.58 | 0.33 | 50.84 | <0.01 |
| Absences | -0.07 | 0.00 | -20.07 | <0.01 |
| Gender [T.Male] | -1.62 | 0.11 | -14.55 | <0.01 |
| Parental Educational Level 1 | 0.37 | 0.14 | 2.70 | <0.01 |
| Parental Educational Level 2 | 0.48 | 0.06 | 7.79 | <0.01 |
| Ethnicity [T.Georgian] | -1.30 | 0.20 | -6.46 | <0.01 |
| Ethnicity [T.Other] | -0.88 | 0.17 | -5.16 | <0.01 |
| Parental Occupational Level [T.Skilled Manual Workers] | 0.49 | 0.23 | 2.13 | 0.03 |
| Parental Occupational Level [T.Civil Private and Public Workers] | 0.87 | 0.22 | 4.01 | <0.01 |
| Parental Occupational Level [T.Teachers and Higher Private and Higher Public Workers] | 1.72 | 0.25 | 6.81 | <0.01 |
| Parental Occupational Level [T.Professionals and Chief Managers] | 1.90 | 0.35 | 5.41 | <0.01 |
| School [T. School B] | -1.01 | 0.27 | -3.73 | <0.01 |
| School [T.School C] | -1.03 | 0.30 | -3.42 | <0.01 |
| School [T.School D] | -0.81 | 0.27 | -2.96 | <0.01 |
| School [T.School E] | 0.79 | 0.28 | 2.82 | <0.01 |
| School [T.School F] | -0.65 | 0.30 | -2.20 | 0.03 |

Model summary: Residual standard error: 2.49 on 2004 degrees of freedom, Multiple R-squared: 0.38, Adjusted R-squared: 0.38, F-statistic: 82.59 on 15 and 2004 DF, P-value <0.01

| <i>Analysis of Variance</i> | | | | | | |
|--|----------------------|---|-----------|--------------------|-----------------|-----------------|
| <i>Compared Models</i> | <i>Res df</i> | <i>RSS</i> | <i>df</i> | <i>Sum of Sq</i> | <i>F values</i> | <i>P values</i> |
| Model without 'school' Model with 'school' | 2009 2004 | 13023 12379 | 5 | 643.67 | 20.84 | <0.01 |
| <i>Step 8</i> | | | | | | |
| <i>Model Equation</i> | <i>Model Summary</i> | | | | | |
| | <i>RSS</i> | <i>R-squared / Adjusted R-squared</i> | | <i>F-statistic</i> | <i>P-value</i> | |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 parental occupation + β_6 school + β_7 age | | Variable 'age' is found insignificant | | | >0.05 | |
| Trimesters Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 parental occupation + β_7 year group | | Variable 'year group' is found insignificant | | | >0.05 | |

Based on Step 8 the model is: Trimesters Overall Attainment = α + β_1 absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 parental occupation + β_6 school

Coefficients:

| | Estimate | St. Error | T-value | P-value |
|---|----------|-----------|---------|---------|
| (Intercept) | 16.58 | 0.33 | 50.84 | < 0.01 |
| Absences | -0.07 | 0.00 | -20.07 | <0.01 |
| Gender [T.Male] | -1.62 | 0.11 | -14.55 | < 0.01 |
| Parental Educational Level 1 | 0.37 | 0.14 | 2.69 | 0.07 |
| Parental Educational Level 2 | 0.48 | 0.06 | 7.79 | < 0.01 |
| Ethnicity [T.Georgian] | -1.30 | 0.20 | -6.46 | < 0.01 |
| Ethnicity [T.Other] | -0.88 | 0.17 | -5.16 | < 0.01 |
| Parental Occupational Level [T.Skilled Manual Workers] | 0.49 | 0.23 | 2.13 | 0.03 |
| Parental Occupational Level [T.Civil Private and Public Workers] | 0.87 | 0.22 | 4.01 | < 0.01 |
| Parental Occupational Level [T.Teachers and Higher Private and Higher Public Workers] | 1.72 | 0.25 | 6.81 | < 0.01 |
| Parental Occupational Level [T.Professionals and Chief Managers] | 1.89 | 0.35 | 5.41 | < 0.01 |
| School [T. School B] | -1.01 | 0.27 | -3.73 | < 0.01 |
| School [T.School C] | -1.03 | 0.30 | -3.42 | < 0.01 |
| School [T.School D] | -0.81 | 0.27 | -2.96 | < 0.01 |
| School [T.School E] | 0.79 | 0.28 | 2.82 | <0.01 |
| School [T.School F] | -0.65 | 0.29 | -2.19 | 0.03 |

Model summary: Residual standard error: 2.49 on 2004 degrees of freedom, Multiple R-squared: 0.38, Adjusted R-squared: 0.38, F-statistic: 82.59 on 15 and 2004 DF, P-value <0.01

Analysis of Variance

| <i>Compared Models</i> | <i>Res df</i> | <i>RSS</i> | <i>df</i> | <i>Sum of Sq</i> | <i>F values</i> | <i>P values</i> |
|---|---------------|----------------|-----------|------------------|-----------------|-----------------|
| Model without 'age' Model with 'age' | 2004 2003 | 12379 12368 | 1 | 10.81 | 1.75 | >0.05 |
| Model without 'year group' Model with 'year group' | 2004 2002 | 12379 12347 | 2 | 31.79 | 2.58 | >0.05 |

Table 48: The Manual Forward/Stepwise-selection Procedure of the Multiple Regression Model for the Combined Trimesters and Final Exams Overall Attainment in the Subject Study

| <i>Step 1</i> | | | | |
|---|---------------------|---------------------------------------|---------------------------|----------------|
| Model Equation | Model Summary | | | |
| | <i>RSS</i> | <i>R-squared / Adjusted R-squared</i> | <i>F-statistic</i> | <i>P-value</i> |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta$ absences | 3.216 on 2018 DF | 0.21/0.21 | 543.2 on 1 and 2018 DF | <0.01 |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta$ gender | 3.476 on 2018 DF | 0.08/0.08 | 173.4 on 1 and 2018 DF | <0.01 |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta$ parental education | 3.469 on 2017 DF | 0.08/0.08 | 91.88 on 2 and 2017DF | <0.01 |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta$ age | 3.567 on 2018 DF | 0.03/0.03 | 63.22 on 1 and 2018 DF | <0.01 |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta$ parental occupation | 3.429 on 2015 DF | 0.11/0.10 | 59.45 on 4 and 2015 DF | <0.01 |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta$ ethnicity | 3.539 on 2017 DF | 0.05/0.05 | 48.64 on 2 and 2017 DF | <0.01 |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta$ year group | 3.613 on 2017 DF | 0.01/0.00 | 6.037 on 2 and 2017 DF | <0.01 |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta$ school | 3.613 on 2014 DF | 0.01/0.01 | 3.046 on 5 and 2014 DF | <0.01 |

Based on Step 1 the model is: Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta$ absences

Coefficients:

| | Estimate | St. Error | T-value | P-value |
|-------------|----------|-----------|---------|---------|
| (Intercept) | 15.66 | 0.10 | 154.07 | <0.01 |
| Absenteeism | -0.09 | 0.00 | -23.31 | <0.01 |

Model summary: Residual standard error: 3.22 on 2018 degrees of freedom, Multiple R-squared: 0.21, Adjusted R-squared: 0.21, F-statistic: 543.2 on 1 and 2018 DF, P-value <0.01

Analysis of Variance

| <i>Compared Models</i> | <i>Res df</i> | <i>RSS</i> | <i>Df</i> | <i>Sum of Sq</i> | <i>F values</i> | <i>F values</i> |
|-------------------------------------|---------------|----------------|-----------|------------------|-----------------|-----------------|
| Null model Model with 'absences' | 2019 2018 | 26483 20866 | 1 | 5617.2 | 543.25 | <0.01 |

Step 2

| <i>Model Equation</i> | <i>Model Summary</i> | | | |
|--|----------------------|---|---------------------------|----------------|
| | <i>RSS</i> | <i>R-squared / Adjusted R-squared</i> | <i>F-statistic</i> | <i>P-value</i> |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender | 3.088 on 2017 DF | 0.25/0.25 | 380.2 on 2 and 2017 DF | <0.01 |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 parental education | 3.068 on 2016 DF | 0.28/0.28 | 265.6 on 3 and 2016 DF | <0.01 |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 ethnicity | 3.193 on 2016 DF | 0.22/0.22 | 194 on 3 and 2016 DF | <0.01 |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 year group | 3.211 on 2016DF | 0.22/0.21 | 184 on 3 and 2016 DF | <0.01 |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 parental occupation | 3.06 on 2014 DF | 0.29/0.29 | 162.8 on 5 and 2014 DF | <0.01 |

| | | | | | | |
|---|---------------------------------------|----------------|--|---|---------------------------|-----------------|
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 school | 3.185 on 2013 DF | 0.231/0.23 | 99.71 on 6 and 2013 DF | <0.01 | | |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 age | Variable 'age' is found insignificant | | | >0.05 | | |
| Based on Step 2 the model is: Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta$ absences + β_2 gender | | | | | | |
| Coefficients: | Estimate | St. Error | T-value | P-value | | |
| Intercept) | 16.49 | 0.12 | 141.29 | <0.01 | | |
| Absences | -0.09 | 0.00 | -23.25 | <0.01 | | |
| Gender [T.Male] | -1.80 | 0.14 | -13.09 | <0.01 | | |
| Model summary: Residual standard error: 3.09 on 2017 degrees of freedom, Multiple R-squared: 0.27, Adjusted R-squared: 0.27, F-statistic: 380.2 on 2 and 2017 DF, P-value <0.01 | | | | | | |
| <i>Analysis of Variance</i> | | | | | | |
| <i>Compared Models</i> | <i>Res df</i> | <i>RSS</i> | <i>df</i> | <i>Sum of Sq</i> | <i>F values</i> | <i>P values</i> |
| Model without 'gender' Model with 'gender' | 2018 2017 | 20866 19233 | 1 | 1633.5 | 171.31 | <0.01 |
| Step 3 | | | | | | |
| <i>Model Equation</i> | | | <i>Model Summary</i> | | | |
| | | | <i>RSS</i> | <i>R-squared / Adjusted R-squared</i> | <i>F-statistic</i> | <i>P-value</i> |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education | | | 2.944 on 2015 DF | 0.34/0.34 | 260.2 on 4 and 2015 DF | <0.01 |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 ethnicity | | | 3.064 on 2015 DF | 0.29/0.28 | 201.3 on 4 and 2015 DF | <0.01 |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 year group | | | Variable 'year group' is found insignificant | | | >0.05 |

| | | | | | | |
|--|---------------------------------------|------------|---------------------------|------------------|-----------------|-----------------|
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental occupation | 2.929 on 2013 DF | 0.35/0.35 | 179 on 6 and 2013 DF | <0.01 | | |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 school | 3.056 on 2012 DF | 0.29/0.29 | 117.8 on 7 and 2012 DF | <0.01 | | |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 age | Variable 'age' is found insignificant | | | >0.05 | | |
| Based on Step 3 the model is: Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education | | | | | | |
| Coefficients: | | | | | | |
| | Estimate | St. Error | T-value | P-value | | |
| (Intercept) | 16.01 | 0.15 | 108.55 | <0.01 | | |
| Absences | -0.09 | 0.00 | -23.72 | <0.01 | | |
| Gender [T.Male] | -1.74 | 0.13 | -13.24 | <0.01 | | |
| Parental Educational Level 1 | 0.52 | 0.16 | 3.24 | <0.01 | | |
| Parental Educational Level 2 | 0.77 | 0.06 | 12.09 | <0.01 | | |
| Model summary: Residual standard error: 2.94 on 2015 degrees of freedom, Multiple R-squared: 0.34, Adjusted R-squared: 0.34, F-statistic: 260.2 on 4 and 2015 DF, P-value <0.01 | | | | | | |
| Analysis of Variance | | | | | | |
| <i>Compared Models</i> | <i>Res df</i> | <i>RSS</i> | <i>df</i> | <i>Sum of Sq</i> | <i>F values</i> | <i>P values</i> |
| Model without 'parental education' | 2017 | 19233 | | | | |
| Model with 'parental education' | 2015 | 17463 | 2 | 1770.1 | 102.13 | <0.01 |

| Step 4 | | | | |
|--|---------------------------------------|---|------------------------------|----------------|
| <i>Model Equation</i> | <i>Model Summary</i> | | | |
| | <i>RSS</i> | <i>R-squared / Adjusted R-squared</i> | <i>F-statistic</i> | <i>P-value</i> |
| Combined Trimesters and Final Exams Overall Attainment = α + β_1 absences + β_2 gender + β_3 parental education + β_4 ethnicity | 2.897 on 2013 DF | 0.36/0.36 | 190.6 on 6 and 2013 DF | <0.01 |
| Combined Trimesters and Final Exams Overall Attainment = α + β_1 absences + β_2 gender + β_3 parental education + β_4 year group | 2.939 on 2013 DF | 0.34/0.34 | 175.6 on 6 and 2013 DF | <0.01 |
| Combined Trimesters and Final Exams Overall Attainment = α + β_1 absences + β_2 gender + β_3 parental education + β_4 parental occupation | 2.881 on 2011 DF | 0.37/0.37 | 147.5 on 8 and 2011 DF | <0.01 |
| Combined Trimesters and Final Exams Overall Attainment = α + β_1 absences + β_2 gender + β_3 parental education + β_4 school | 2.928 on 2010 DF | 0.35/0.35 | 120 on 9 and 2010 DF | <0.01 |
| Combined Trimesters and Final Exams Overall Attainment = α + β_1 absences + β_2 gender + β_3 parental education + β_4 age | Variable 'age' is found insignificant | | | >0.05 |
| Based on Step 4 the model is: Combined Trimesters and Final Exams Overall Attainment = α + β_1 absences + β_2 gender + β_3 parental education + β_4 ethnicity | | | | |
| Coefficients: | Estimate | St. Error | T-value | P-value |
| (Intercept) | 16.14 | 0.15 | 110.33 | <0.01 |
| Absences | -0.08 | 0.00 | -21.34 | <0.01 |
| Gender [T.Male] | -1.74 | 0.13 | -13.43 | <0.01 |
| Parental Educational Level 1 | 0.59 | 0.16 | 3.77 | <0.01 |
| Parental Educational Level 2 | 0.84 | 0.06 | 13.31 | <0.01 |
| Ethnicity [T.Georgian] | -1.46 | 0.20 | -7.26 | <0.01 |
| Ethnicity [T.Other] | -1.03 | 0.19 | -5.23 | <0.01 |
| Model summary: Residual standard error: 2.90 on 2013 degrees of freedom, Multiple R-squared: 0.36, Adjusted R-squared: 0.36, F-statistic: 190.6 on 6 and 2013 DF, P-value <0.01 | | | | |

| <i>Analysis of Variance</i> | | | | | | |
|---|---------------|--|---|----------------------------|-----------------|-----------------|
| <i>Compared Models</i> | <i>Res df</i> | <i>RSS</i> | <i>df</i> | <i>Sum of Sq</i> | <i>F values</i> | <i>P values</i> |
| Model without 'ethnicity' Model with 'ethnicity' | 2015 2013 | 17463 16889 | 2 | 573.54 | 34.18 | 2.525e-15 |
| <i>Step 5</i> | | | | | | |
| <i>Model Equation</i> | | | <i>Model Summary</i> | | | |
| | | <i>RSS</i> | <i>R-squared / Adjusted R-squared</i> | <i>F-statistic</i> | <i>P-value</i> | |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 parental occupation | | 2.86 on 2009 DF | 0.38/0.38 | 122.9 on 10 and 2009 DF | <0.01 | |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 school | | 2.856 on 2008 DF | 0.38/0.38 | 112.6 on 11 and 2008 DF | <0.01 | |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 year group | | Variable 'year group' is found insignificant | | | >0.05 | |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 age | | Variable 'age' is found insignificant | | | >0.05 | |

Based on Step 5 the model is: Combined Trimesters and Final Exams Overall Attainment = α + β_1 absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 parental occupation

Coefficients:

| | Estimate | St. Error | T-value | P-value |
|---|----------|-----------|---------|---------|
| (Intercept) | 15.13 | 0.26 | 59.21 | < 0.01 |
| Absences | -0.079 | 0.00 | -21.38 | <0.01 |
| Gender [T.Male] | -1.75 | 0.13 | -13.71 | <0.01 |
| Parental Educational Level 1 | 0.41 | 0.16 | 2.62 | <0.01 |
| Parental Educational Level 2 | 0.60 | 0.07 | 8.58 | <0.01 |
| Ethnicity [T.Georgian] | -0.94 | 0.21 | -4.39 | <0.01 |
| Ethnicity [T.Other] | -0.85 | 0.19 | -4.34 | <0.01 |
| Parental Occupational Level [T.Skilled Manual Workers] | 0.59 | 0.26 | 2.27 | 0.02 |
| Parental Occupational Level [T.Civil Private and Public Workers] | 0.98 | 0.25 | 3.95 | <0.01 |
| Parental Occupational Level [T.Teachers and Higher Private and Higher Public Workers] | 1.91 | 0.29 | 6.65 | <0.01 |
| Parental Occupational Level [T.Professionals and Chief Managers] | 1.93 | 0.40 | 4.83 | <0.01 |

Model summary: Residual standard error: 2.86 on 2009 degrees of freedom, Multiple R-squared: 0.38, Adjusted R-squared: 0.38, F-statistic: 122.9 on 10 and 2009 DF, P-value <0.01

Analysis of Variance

| <i>Compared Models</i> | <i>Res df</i> | <i>RSS</i> | <i>df</i> | <i>Sum of Sq</i> | <i>F values</i> | <i>P values</i> |
|-------------------------------------|---------------|------------|-----------|------------------|-----------------|-----------------|
| Model without 'parental occupation' | 2013 | 16889 | | | | |
| Model with 'parental occupation' | 2009 | 16433 | 4 | 455.91 | 13.93 | <0.01 |

| Step 6 | | | | |
|---|--|---|----------------------------|----------------|
| <i>Model Equation</i> | <i>Model Summary</i> | | | |
| | <i>RSS</i> | <i>R-squared / Adjusted R-squared</i> | <i>F-statistic</i> | <i>P-value</i> |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 parental occupation + β_6 school | 2.814 on 2004 DF | 0.40/0.40 | 89.42 on 15 and 2004 DF | <0.01 |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 parental occupation + β_6 year group | Variable 'year group' is found insignificant | | | >0.05 |
| Combined Trimesters and Final Exams Overall Attainment = $\alpha + \beta_1$ absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 parental occupation + β_6 age | Variable 'age' is found insignificant | | | >0.05 |

Based on Step 6 the model is: Combined Trimesters and Final Exams Overall Attainment = α + β_1 absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 parental occupation + β_5 school

Coefficients:

| | Estimate | St. Error | T-value | P-value |
|---|----------|-----------|---------|---------|
| (Intercept) | 15.98 | 0.37 | 43.31 | <0.01 |
| | -0.08 | 0.00 | -21.78 | <0.01 |
| Gender [T.Male] | -1.75 | 0.13 | -13.92 | <0.01 |
| Parental Educational Level 1 | 0.42 | 0.16 | 2.71 | <0.01 |
| Parental Educational Level 2 | 0.57 | 0.07 | 8.12 | <0.01 |
| Ethnicity [T.Georgian] | -1.57 | 0.23 | -6.89 | <0.01 |
| Ethnicity [T.Other] | -1.02 | 0.19 | -5.23 | <0.01 |
| Parental Occupational Level [T.Skilled Manual Workers] | 0.59 | 0.26 | 2.28 | 0.02 |
| Parental Occupational Level [T.Civil Private and Public Workers] | 1.03 | 0.24 | 4.23 | <0.01 |
| Parental Occupational Level [T.Teachers and Higher Private and Higher Public Workers] | 2.01 | 0.29 | 7.05 | <0.01 |
| Parental Occupational Level [T.Professionals and Chief Managers] | 2.19 | 0.39 | 5.52 | <0.01 |
| School [T. School B] | -1.18 | 0.31 | -3.85 | <0.01 |
| School [T. School C] | -1.07 | 0.34 | -3.15 | <0.01 |
| School [T. School D] | -1.15 | 0.31 | -3.68 | <0.01 |
| School [T. School E] | 0.43 | 0.32 | 1.36 | 0.17 |
| School [T. School F] | -0.66 | 0.34 | -1.98 | 0.04 |

Model summary: Residual standard error: 2.81 on 2004 degrees of freedom, Multiple R-squared: 0.40, Adjusted R-squared: 0.40, F-statistic: 89.42 on 15 and 2004 DF, P-value <0.01

Analysis of Variance

| <i>Compared Models</i> | <i>Res df</i> | <i>RSS</i> | <i>df</i> | <i>Sum of Sq</i> | <i>F values</i> | <i>P values</i> |
|------------------------|---------------|------------|-----------|------------------|-----------------|-----------------|
| Model without 'school' | 2009 | 16433 | | | | |
| Model with 'school' | 2004 | 15865 | 5 | 568.44 | 14.36 | <0.01 |

| Step 7 | | | | |
|---|--|--|--------------------|----------------|
| <i>Model Equation</i> | <i>Model Summary</i> | | | |
| | <i>RSS</i> | <i>R-squared /Adjusted R-squared</i> | <i>F-statistic</i> | <i>P-value</i> |
| Combined Trimesters and Final Exams Overall Attainment = α + β_1 absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 parental occupation + β_6 school + β_7 age | Variable 'age' is found insignificant | | | >0.05 |
| Combined Trimesters and Final Exams Overall Attainment = α + β_1 absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 parental occupation + β_6 school + β_7 year group | Variable 'year group' is found insignificant | | | >0.05 |
| Based on Step 7 the model is: Combined Trimesters and Final Exams Overall Attainment = α + β_1 absences + β_2 gender + β_3 parental education + β_4 ethnicity + β_5 parental occupation + β_6 school | | | | |
| Coefficients: | Estimate | St. Error | T-value | P-value |
| (Intercept) | 15.98 | 0.37 | 43.31 | <0.01 |
| Absences | -0.08 | 0.00 | -21.78 | <0.01 |
| Gender [T.Male] | -1.75 | 0.13 | -13.92 | <0.01 |
| Parental Educational Level 1 | 0.42 | 0.16 | 2.71 | <0.01 |
| Parental Educational Level 2 | 0.57 | 0.07 | 8.12 | <0.01 |
| Ethnicity [T.Georgian] | -1.57 | 0.23 | -6.89 | <0.01 |
| Ethnicity [T.Other] | -1.02 | 0.19 | -5.23 | <0.01 |
| Parental Occupational Level [T.Skilled Manual Workers] | 0.59 | 0.26 | 2.28 | 0.02 |
| Parental Occupational Level [T.Civil Private and Public Workers] | 1.03 | 0.24 | 4.23 | <0.01 |
| Parental Occupational Level [T.Teachers and Higher Private and Higher Public Workers] | 2.01 | 0.29 | 7.05 | <0.01 |
| Parental Occupational Level [T.Professionals and Chief Managers] | 2.19 | 0.39 | 5.52 | <0.01 |
| School [T. School B] | -1.18 | 0.31 | -3.85 | <0.01 |
| School [T. School C] | -1.07 | 0.34 | -3.15 | <0.01 |
| School [T. School D] | -1.15 | 0.31 | -3.68 | <0.01 |
| School [T. School E] | 0.43 | 0.32 | 1.36 | 0.17 |
| School [T. School F] | -0.66 | 0.34 | -1.98 | 0.04 |
| Model summary: Residual standard error: 2.81 on 2004 degrees of freedom, Multiple R-squared: 0.40, Adjusted R-squared: 0.40, F-statistic: 89.42 on 15 and 2004 DF, P-value <0.01 | | | | |

| <i>Analysis of Variance</i> | | | | | | |
|---|---------------|----------------|-----------|------------------|-----------------|-----------------|
| <i>Compared Models</i> | <i>Res df</i> | <i>RSS</i> | <i>df</i> | <i>Sum of Sq</i> | <i>F values</i> | <i>P values</i> |
| Model without 'age' Model with 'age' | 2004 2003 | 15865 15862 | 1 | 2.43 | 0.31 | 0.58 |
| Model without 'year group' Model with 'year group' | 2004 2002 | 15865 15823 | 2 | 42.08 | 2.66 | 0.07 |

APPENDIX 5

Focus Group Schedule

Informative questions:

- How long have you been teaching in secondary schools?
- How long have you been teaching ethnic minority students?
- From which ethnic background are the minority students that you have met so far?
- Do you have any ethnic minority students in your teaching classes this academic year? How many minority students do you have?
- What are the first thoughts that come to your mind when you remember your minority students?

School environment and the classroom conditions - attitudes, behavior, and feelings between students and teachers:

(Ask for examples when appropriate)

- I would like to hear your first thoughts and feelings about having ethnic minority students in your school and classroom.
- How would you describe the climate in a classroom with a number of ethnic minority students?
- How would you describe the relationship between ethnic minority students and local students? What kind of attitudes, behavior, and feelings have you noticed between them?
- From your experience, what do you think minority students feel, being in the particular school environment?
- How would you describe the attitude of teachers towards these students? (You can talk about your own attitude or your colleagues' attitude, if you have something to say.)
- What do you think about the attitude of ethnic minority students towards teachers?

Student attainment and influencing factors:

(Ask for examples when appropriate)

- What is your impression about the attainment levels of ethnic minority students?

- Are there any factors that affect the performance of minority students in a positive or negative way?
- Do you expect ethnic minority students to achieve at the same level as local students?
- What do you do when you have minority students who are not fluent in Greek or do not speak Greek at all?
- How do you think minority students with serious language problems could be helped?

Teachers' work, preparation, and effectiveness:

(Ask for examples when appropriate)

- Does the presence of ethnic minority students in the classroom affect your work? In what way?
- Does your preparation for delivering your subject change when you have minority students in your class?
- Do you feel able to deal with ethnic minority students and educate them? Would you say that your teaching is effective for educating minority students? If not, what do you think should change to enable you to do that?
- To what extent do you feel the university or in-service training you had has prepared you to teach in multicultural schools/classrooms?

Teachers' experiences with minority parents:

(Ask for examples when appropriate)

- How would you describe your relationship with minority parents? Do they visit school or contact you about their children?
- Are you pleased with the degree of minority parents' involvement in school? If not, what do you consider to be the reasons behind this?
- Do you believe that families can play a role in the school life or performance of minority students? How?

Final questions:

- Do you have anything else to add in relation to the above-mentioned topics? Do you have any other topics that you wish to raise or consider important?
- Do you have any questions?

Thank you very much for your time and help!

APPENDIX 6

Interview Schedule

Informative questions:

- How long have you been teaching in secondary schools?
- What is your subject area?
- How long have you been teaching ethnic minority students?
- How many ethnic minority students have you got in your teaching classes this academic year? From which ethnic background are they?

Questions based on findings from quantitative analyses:

Attainment differences between ethnic groups

The attainment of ethnic minority groups lags behind the attainment of Natives in all subjects. 'Others' score higher than Georgians and Georgians have the lowest score of all groups in all subjects.

- From your experience is that something that you expected?
- Can you offer some explanations for this differential attainment between the three ethnic groups?

Attainment differences between subjects

The attainment gap between Natives and minority groups is larger in Modern Greek and History, and smaller in Mathematics and Physics, but in all cases the difference is significant.

- Can you explain the attainment differences in the examined subjects based on your experiences from teaching your own subject?

Attainment differences between minorities of different generation status

Second-generation minority students have slightly lower attainment than Native students, but greatly higher than first-generation students (The definition of first- and second-generation minorities is given).

- From your experience, is that something that you expected?
- Why do you think this is happening?

Attendance rates between ethnic groups

Ethnic minority students have many more absences than Natives in all subjects across all year groups.

- From your experience, is that something that you expected?
- Why do you think minority students miss school more often than Natives?
- Do you think that attendance level is related to the attainment of children? If yes, how?

School minority concentration and attainment

The average attainment level of students varies depending on the concentration of ethnic minority students in schools.

- What do you think is the relationship between ethnic minority concentration and student attainment? Does ethnic minority concentration affect student attainment positively or negatively?

Gender differences in attainment

Male students of all ethnic groups perform significantly lower than female students in all subjects.

- From your experience, is that something that you expected?
- How do you explain the attainment differences between males and females? What is it that, in your opinion, pushes females to outperform males?

Gender differences in attendance rates

Male students of all ethnic groups have, on average, a larger number of absences than females.

- From your experience, is that something that you expected?
- How do you explain this difference in attendance rates between males and females? Why, in your opinion, are male students more likely to be absent compared to females?

Socio-economic status and attainment

Student attainment increases as parental education and parental occupation increases.

- From your experience is that something that you expected?
- How do you think family socio-economic status affects student attainment?
- This trend does not appear to be reflected on the attainment of Georgians. Why do you think this happens?

Additional questions – mainly based on findings from earlier qualitative studies:

- In your opinion, does the presence of ethnic minority students in your school/classroom affect your work? If yes, how?
- Have you encountered any particular difficulties when teaching ethnic minority students?
- What kind of feelings do you experience being a teacher who teaches ethnic minority students?
- In your opinion, have you been trained appropriately to deal with and educate ethnic minority students?
- What does the school actually do and what, do you think, it can/should do to improve the attainment of minority students?
- Could you describe the relationship that you observe in your school between ethnic minority and native students? What do you notice when you see them in the classroom or the playground?
- Could you describe the relationship between ethnic minority students and teachers?
- Could you describe the relationship between school/teachers and ethnic minority parents?

Final questions:

- Do you have anything else to add in relation to the above-mentioned topics? Are there any other issues that you think might be important?
- Do you have any questions?

Thank you very much for your time and help!

APPENDIX 7

Letter to the Ministry of Education and Culture of Cyprus

Mr. Andreas Skoteinos
Chief of Secondary Education
Ministry of Education and Culture
1434 Nicosia
Cyprus

5th December 2005

Permission for Educational Research

I am writing to inform you that I am currently doing a PhD at the University of Manchester. During this programme, I am planning to conduct research to establish the performance of ethnic minority students in Cyprus.

The investigation will initially be based on a number of different grades of children (Greek-Cypriots and minorities): the grades of trimesters and the end of year examination grades at the subjects of Modern Greek, Mathematics, History, and Physics. The study will also take into account the absences of these students. All students enrolled in a number of secondary (gymnasium) schools at any class during the academic year 2004-05 will be participated. The schools will be selected based on particular characteristics. After that, a number of teachers, deputy teachers, and head teachers (from the above schools) will be interviewed.

I would therefore be grateful for your permission to do the following:

- To use data with students' grades and absences; this is kept by the Examination Department of the Ministry of Education.
- To have access to a number of schools.
- To be allowed to collect some personal information of students (e.g., their parent's origin, education and occupation) from the school records.
- To interview teachers after obtaining their informed consent.

I would also like to emphasise that all due processes will be observed to protect the rights of all participants, especially their right to refuse participation. Any objection for whatever reason at any stage of this study will be respected. In addition, I declare that care will be taken to prevent any harmful effects to the participants. Confidentiality, anonymity, non-identifiability and non-traceability are guaranteed.

The explicit permission of the University of Manchester and my supervisor, Professor Mel West, has been obtained for the above (his letter/written permission is enclosed).

I also enclose a copy of the Certificate of Clear Criminal Record for myself, issued by the Cyprus Police (Ministry of Justice and Public Order) recently.

Your help is greatly appreciated.

Yours sincerely.

Signature of student

Signature of supervisor

.....

.....

Galatia Theodosiou-Zipiti

Professor Mel West

APPENDIX 8

Letter to Head Teachers

To:

Head teachers' name

.....

Schools' name and address

.....

28th February 2006

Permission for Educational Research

My name is Galatia Theodosiou-Zipiti. I am a teacher of philological subjects, and now a second year PhD student in Education at the University of Manchester, UK.

I am writing to inform you that your school has been selected, based on specific criteria, for the conduct of educational research. This study examines the performance of minority students compared to that of native children. For this study, initially, I will need some information about the students, and then I will personally conduct some interviews with a small number of teachers.

Taking into account that ethical issues arise from the nature of my study, as the information I need is personal and confidential, I assure you that confidentiality, anonymity, non-identifiability and non-traceability will be guaranteed. Furthermore, when indicated, the consent of individual teachers will be sought prior to their participation in the study. Teachers' rights to privacy will be protected and their right to refuse participation guaranteed. Any objection for whatever reason at any stage of the study will be respected. Finally, assurances will be offered that care will be taken to prevent any harmful effects to the participants. No teaching time will be lost for the interviews.

For the conduct of my study, I have already obtained official permission from the Ministry of Education and Culture in Cyprus, and specifically from Mr. Andreas Skoteinos, Chief of

Secondary Education. Of course, your permission and help, as head teacher of this school, is also necessary.

The purpose of this letter is mainly to make you aware that I am carrying out a research study with the main aim of investigating the attainment of ethnic minority students compared to that of natives in secondary schools in Cyprus as well as looking at some factors that could enhance/inhibit achievement. For further information, explanations, and clarifications I am planning to meet with you in person at your school, after making an appointment, within the next few weeks. During my visit, I will be glad to answer any questions you may have on this issue.

As my stay in Cyprus will not be long, and it will primarily deal with data collection, I would be grateful if you could fill in the enclosed form and return it to me as soon as possible. This form asks you to indicate whether the school is willing to participate in the study or not by choosing 'Statement A' or 'Statement B' respectively.

Consent to participation of the school you lead in the study will give me great pleasure. However, I would like to stress that any agreement to participation is not binding. If at any stage of the study you feel dissatisfied with my work your school has the right to withdraw.

I conclude by reiterating the importance of your school's participation in investigating a subject that has not been examined previously in Cyprus. Further, with your help, we could identify particular strategies and policies that could enhance the education of an increasingly heterogeneous school population. Finally, findings emanating from this study could add to the international debates on the attainment of minority students.

Thank you very much for your time and effort.

Yours sincerely,

Galatia Theodosiou-Zipiti

To be filled in

Please, return this form by post as soon as possible. A self-addressed envelope is enclosed for your convenience.

Name of school (Please, give the name of your school)

.....

received the information letter for the conduct of the study.

Statement for the position of the school

Statement A

Our school is willing to participate in this educational research. The final consent will be offered when more clarifications on the nature of the study are given by the researcher.

Statement B

Our school is not willing to participate in this educational research. Whether more clarifications on the nature of the study are given by the researcher or not, our school, for particular reasons, has decided not to participate in the study.

Name of the head teacher

Signature of the head teacher

.....

.....

Date

APPENDIX 9

Attainment Gap and Responsible Factors – A Quantitative Study in Secondary Schools in Cyprus

Galatia Theodosiou-Zipiti, Iasonas Lamprianou, Mel West, Daniel Muijs
School of Education, The University of Manchester, Oxford Road,
Manchester, M13 9PL, UK.

Abstract

The population in Cyprus, a recent European country member, has become much more heterogeneous in the last decade. Here, we examine the attainment patterns of minority and native students enrolled in six secondary schools from different cities in Cyprus, and identify factors responsible for these patterns. The combination of examined factors has not, to our knowledge, been met in previous studies. Findings confirm that ethnic minority groups perform significantly lower than native students. In terms of aetiology, we show that ethnic background, gender, parental education, parental occupation, generation status, absenteeism, and school minority concentration have a significant effect on student attainment.

Key words: attainment gap, minority students, Cyprus

Introduction

Societies all over the world are becoming increasingly multicultural, something affecting many aspects of life, including education. This is also the case in Cyprus (Oikonomidou 2003), a recent EU member state.

In the international literature, a variety of factors (including gender, generation status, socio-economic status, absenteeism, age, school size, and school minority concentration) have been examined to assess their impact on the attainment of minority students. Unfortunately, for most of these factors the evidence is inconsistent and often conflicting, meaning that they have to be tested locally before any conclusions are drawn.

Theodosiou-Zipiti et al (2011), in a quantitative study in Cyprus, showed that ethnic minority students performed significantly worse compared to native students. They also showed that low attendance rate, low parental education, low parental occupation, low generation status, and being a male student had a significant negative effect on school attainment. However, all students were pooled together for the regression analyses because of the relatively small sample size (769 students) without differentiation of year groups. Furthermore, participants from only two schools were used. In addition, attainment was based on grades from only two subjects (Modern Greek and Mathematics). These could have implications for validity and ability to extrapolate results.

Given the limitations of the previous study in Cyprus and the inability to draw firm conclusions from the conflicting findings from the international literature, we conducted a study to identify patterns of attainment for native and ethnic minority students in Cyprus, and to investigate which of the examined factors affect these attainment patterns.

We used a similar methodology to that described by Theodosiou-Zipiti et al (2011). However, we included a higher number of schools (6) and students (2023), examined more school subjects (4), introduced more school variables, examined for interactions and run regression models separately for students of different year groups.

School and student sample: All children (2023 in total) enrolled in six secondary schools (age 12-15) in the academic year 2004-05 from four different cities of the island (Nicosia, Limassol, Paphos, and Larnaca) participated in this study. Stratified sampling was employed for the selection of schools, in order to ensure inclusion of schools with varying school size and ethnic minority concentration. Georgian students formed the largest ethnic minority group, while a small number of other ethnic groups (e.g., Russians, British, Rumanians, Bulgarians, Africans, and Americans) were pooled together in another category named 'Others'. Specifically, the sample included 259 Georgians (this represents 37.3% of all Georgians enrolled in secondary schools), 266 'Others' (representing 68.9% of all 'Others' enrolled in secondary schools), and 1498 Natives (representing 5.5% of all native students enrolled in secondary schools).

Dependent variable: In the absence of an external, common examination, attainment was measured utilising student grades from three consecutive trimesters in four different subjects: Modern Greek and History, which are theoretical subjects with language being of

paramount significance, and Mathematics and Physics, which are practical or numerical subjects and less language-dependent.

Independent variables: Ethnicity was based on parental birthplace, the only accurate and available indicator for defining ethnicity. Georgians (known locally as ‘Rossopontioi’ or ‘Ellinopontioi’) were those children who had at least one parent born in Georgia. Students who had at least one parent born in any other country except Cyprus and Georgia (for example, Britain, Russia and Bulgaria) were grouped in ‘Others’. Natives were those who had both parents born in Cyprus, but included a handful of students from Greece, because of the common language, religious and cultural backgrounds. No students from minority groups recognized in the Cyprus constitution (Turkish-Cypriots, Maronites, Armenians, or Latins) were enrolled in the participating schools during the study period.

Generation status was based on birthplace. That is, first-generation minority students were defined as those born abroad with at least one parent born abroad and second-generation students those born in Cyprus with at least one parent born abroad. Natives were defined as those born in Cyprus by parents born in Cyprus or Greece. In the participating schools there was no minority student beyond second generation.

Family socio-economic status was based on the highest level of parental education and parental occupation. Absenteeism was based on the number of absences from all teaching periods in the four examined subjects. An overall number of absences for the whole academic year was also created, which combined the number of absences from the four examined subjects. Absenteeism rate in particular subjects was investigated in relation to student attainment in these subjects. Also, gender, age measured in months, year group, and school were taken into account. School size, based on the number of students enrolled in the participant schools, and school minority concentration, based on the proportion of ethnic minority students were also considered.

For the categorical variables the specific categories employed are listed below:

- Ethnicity: Natives, Georgians, and ‘Others’.
- Gender: male and female.
- Parental education: primary education, secondary education, and further studies.
- Parental occupation: manual unskilled workers, manual skilled workers, civil servant and private workers, educators and senior civil servants and senior private workers, and professionals and chief managers.

- Generation status: natives, first generation, and second generation.
- School: School A, School B, School C, School D, School E, and School F.
- School size: small (up to 250 students), medium (up to 450 students), and large (up to 700 students).
- School minority concentration: low (up to 25%) and high (more than 25%).

Methods of analysis

Rasch analysis was used. The Rasch model acknowledges the possible non-linearity and transforms the raw scores into a linear, interval-scaled measure by a logistic function (Wright and Masters 1982). This way, the ordinal student grades (A, B, C, D, E), were transferred into a linear scale to allow use in regression analyses. For the Rasch analysis, the Analysis software (Lamprianou 2008a) was used. With the Rasch analysis, the grades of all students from different trimesters were processed and an overall performance index for each student was given. A particular model of the Rasch ‘family’ was used for this purpose, the Partial Credit Model (Wright and Masters 1982). As children come from different year groups, the analysis was run for each year group separately. The model-data fit of each of the Rasch models was evaluated using the Infit and the Outfit Mean Square statistics (Lamprianou and Boyle 2004).

Based on the Rasch scores, descriptive statistics for the examined variables were created first. Then, multiple regression models, and specifically Ordinary Least-Squares regression models, were built. This analytical method can, firstly, assess how accurately an independent variable predicts a dependent variable, determining the proportion of the variation in the dependent variable that can be accounted for by the variation in the independent variables. Secondly, it can indicate whether a particular relationship is statistically significant (Allen 1997, p.3). The regression analyses were run with the students divided into their respective year groups. Different models for each examined subject as well as for the Overall attainment (based on the combined scores of individual subjects) were built, employing manual, forward, stepwise selection. Student attainment, absenteeism, and age were used as continuous variables. Dummy (treatment) coding was used for non-ordered categorical variables (gender, ethnicity, generation status, parental occupation, school, school size, and school minority concentration) and Helmert contrast coding for ordered categorical variables (parental education). Interactions were sought in every regression model, but no interaction appeared to be significant in the presence of all the other examined factors. Each linear regression model was investigated for indications of major violations for its assumptions. The statistical package *R* was used for the analyses.

Sources of information: Student grades and absences were obtained from a database held by the Ministry of Education and Culture of Cyprus. This data is collected from the official report cards of students. Information on school population and ethnicity of students was also obtained from the Ministry. School-held records provided information about parental origin, education, occupation, student birthplace, and age.

Ethics: As the study deals with ethnic differences and personal information of a sensitive kind, a particular procedure of access and acceptance was followed. First of all, for using students' grades and absences, official permission was asked and obtained from the Ministry of Education and Culture in Cyprus. Further, school participation was voluntary and student data was collected under an indicative number and not names. Students' and schools' right to privacy were protected. The confidentiality and anonymity of the participants were guaranteed.

Analysis

Only the results from Overall attainment are presented in the Analysis section, as findings from the analyses of individual subjects were similar.

Descriptive statistics

About three quarters of the student population were Natives, with similar proportions of Georgians and 'Others' (Table 49). Similar numbers of students from each category were found in all three year-groups (Table 49). The average score of Natives was the highest and that of Georgians the lowest (Figure 36). About half of the students from each ethnic group were female (Table 49). An examination of student attainment across gender showed that the average attainment of females from all ethnic groups was higher than that of males (Figure 37). All Georgians were of first-generation status, while about half of 'Others' were of first generation (Table 49). In terms of attainment, the average attainment of both first- and second-generation minorities was much lower than the attainment of Natives, with the average score of second-generation students being closer to that of Natives (Figure 38).

Table 49. Descriptive statistics for the variables used in the study by ethnicity.

| | Natives (%) | Georgians (%) | Others (%) |
|---|-------------|---------------|------------|
| Population sample | 73.7 | 12.8 | 13.4 |
| <i>Year group</i> | | | |
| First | 31.0 | 31.3 | 32.0 |
| Second | 33.5 | 36.3 | 36.0 |
| Third | 35.5 | 32.4 | 32.0 |
| <i>Gender</i> | | | |
| Male | 50.0 | 54.2 | 48.0 |
| Female | 50.0 | 45.8 | 52.0 |
| <i>Generation status</i> | | | |
| Natives | 100 | 0.0 | 0.0 |
| First generation | 0.0 | 100 | 52.4 |
| Second generation | 0.0 | 0.0 | 47.6 |
| <i>Parental education</i> | | | |
| Primary education | 5.4 | 2.3 | 2.6 |
| Secondary education | 58.8 | 50.4 | 40.9 |
| Further studies | 35.9 | 47.3 | 56.5 |
| <i>Parental occupation</i> | | | |
| Unskilled workers | 7.0 | 16.0 | 8.1 |
| Skilled workers | 16.0 | 46.6 | 22.3 |
| Civil servants and private workers | 47.1 | 34.7 | 44.0 |
| Teachers and senior civil servants and senior private workers | 25.0 | 2.7 | 20.1 |
| Professionals and chief managers | 4.8 | 0.0 | 5.5 |
| <i>School size</i> | | | |
| Small | 16.1 | 23.7 | 16.0 |
| Medium | 23.2 | 50.4 | 33.8 |
| Large | 60.7 | 26.0 | 50.2 |
| <i>School minority concentration</i> | | | |
| Low | 88.4 | 36.6 | 74.2 |
| High | 11.6 | 63.4 | 25.8 |

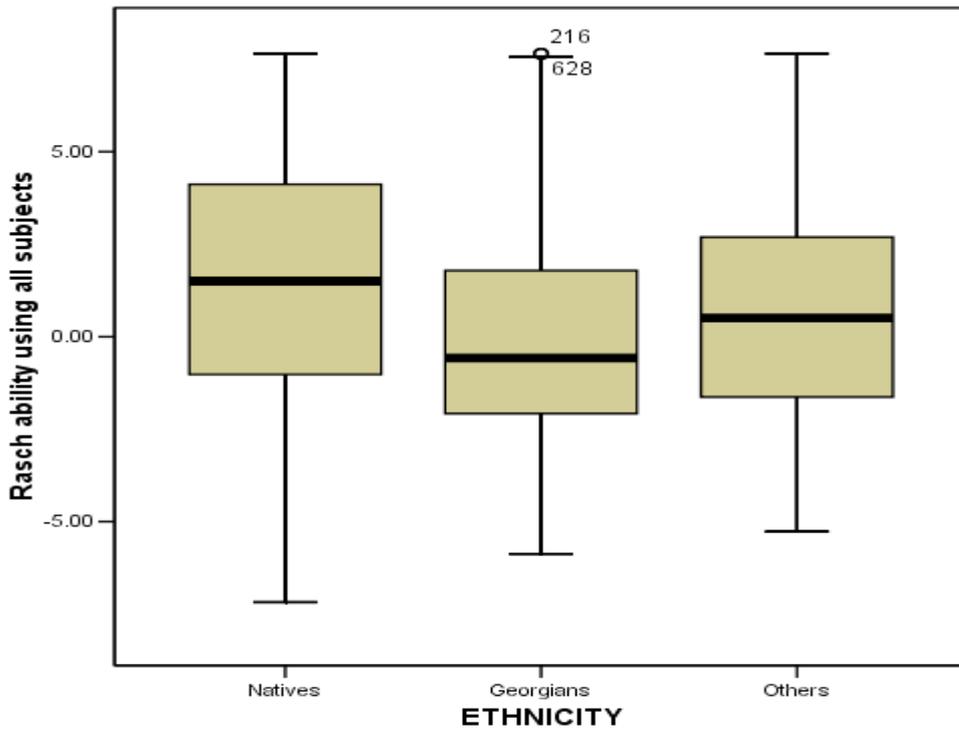


Figure 36: The Overall attainment (Rasch score) of students from each ethnic group.

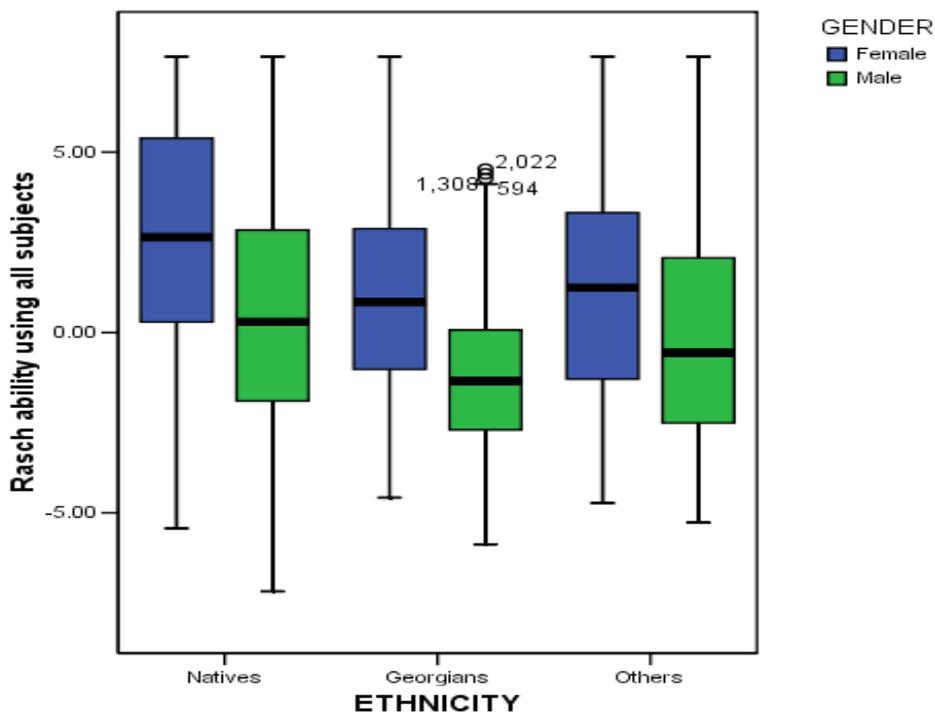


Figure 37: The Overall attainment (Rasch score) of students across gender.

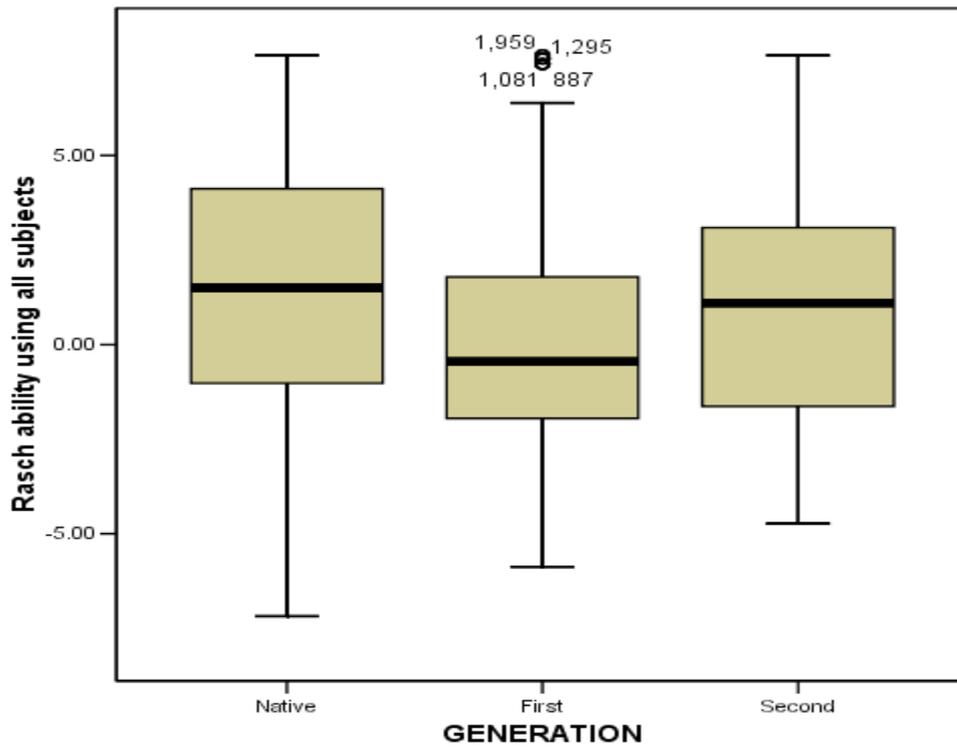


Figure 38: The Overall attainment (Rasch score) of students with different generation status.

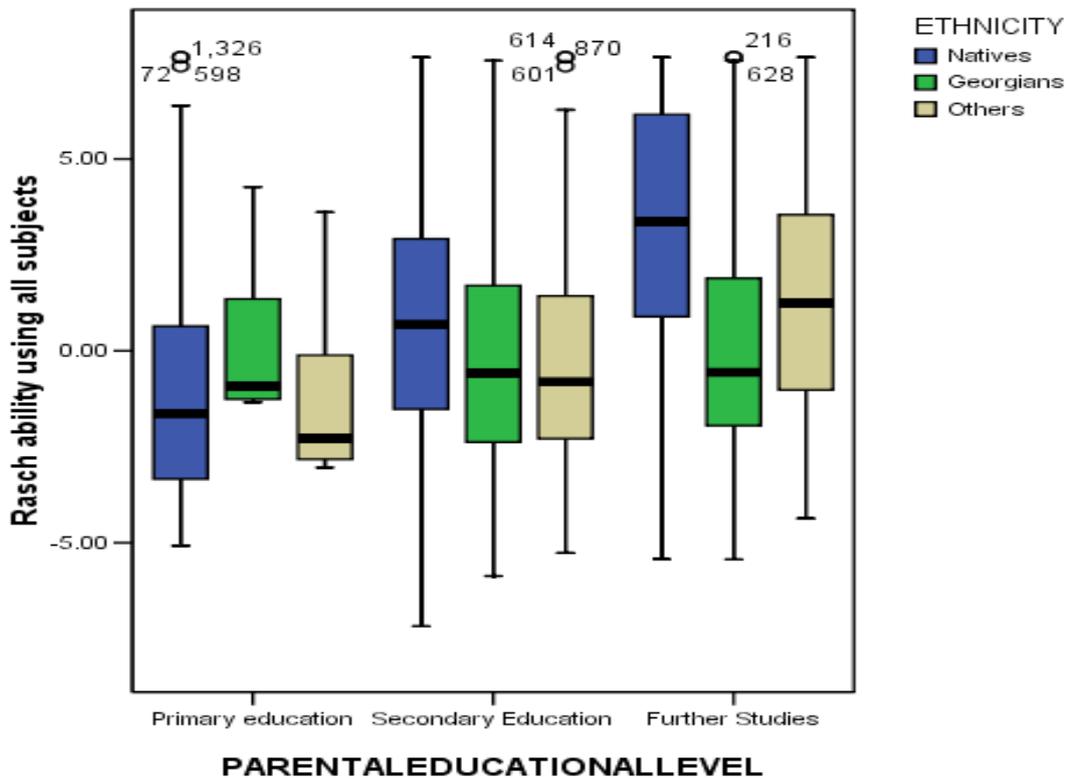


Figure 39: The Overall attainment (Rasch score) of students from different parental educational categories.

Regarding parental education, about a third of native parents had completed further studies. For the Georgian parents this figure was closer to 50% and for the ‘Other’ parents almost 60% (Table 49). This indicated that minority parents had higher educational levels than native parents. In terms of attainment, it appeared that the average attainment of Natives and ‘Others’ was increasing with increasing parental educational category (Figure 39); a pattern not observed for Georgians. As regards parental occupation, about a third of native parents were in the two higher occupational categories (Table 49). For the two minority groups, about a quarter of the ‘Other’ parents and less than three percent of Georgian parents were in these categories. Georgian parents had the highest proportion of workers in the two lower occupational categories, followed by that of ‘Other’ parents. This indicated that minority parents had lower occupational levels than native parents, with Georgian parents having the lowest level of all. From the examination of attainment with parental occupation, it appeared that the average score of Natives and ‘Others’ was increasing with increasing parental occupational category (Figure 40). Again, this pattern did not reflect the attainment of Georgians.

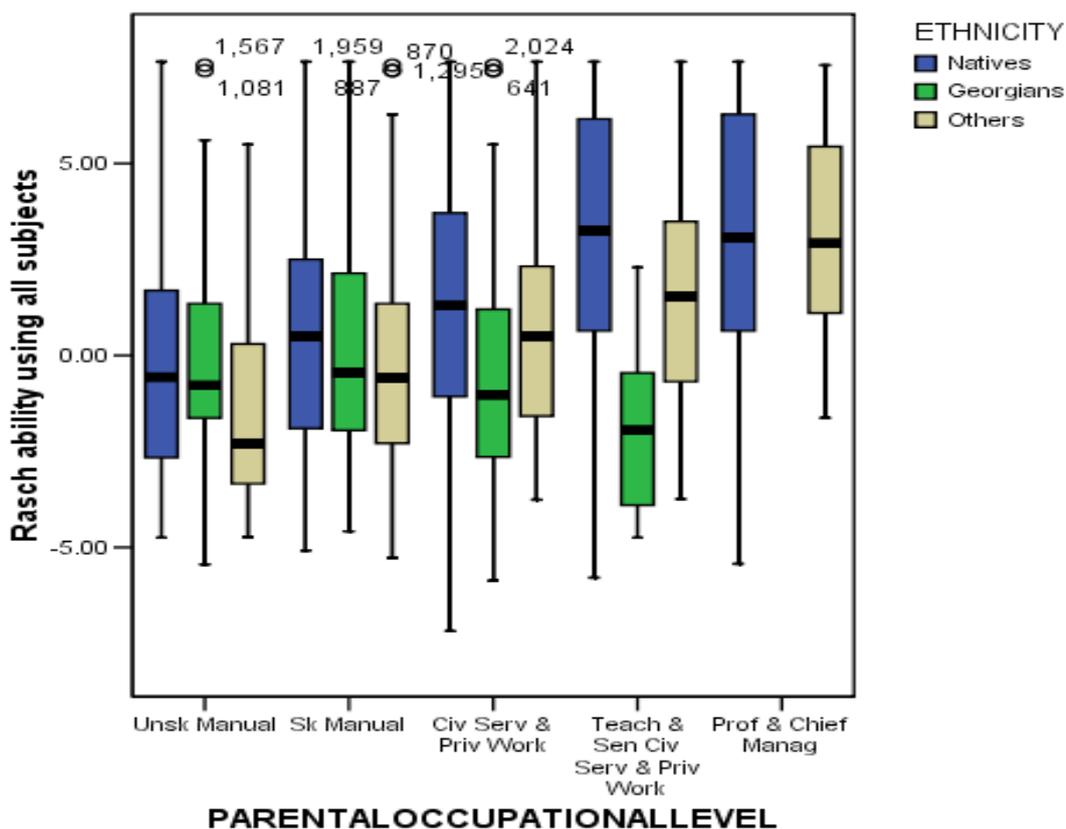


Figure 40: The Overall attainment (Rasch score) of students from different parental occupational categories.

In terms of the proportion of minority students in the schools examined, the majority of Natives and ‘Others’ came from schools with low minority concentration, while the

majority of Georgians from schools with high proportion of minority students (Table 49). Students from all ethnic groups had higher average attainment in schools with high minority concentration than in schools with low proportion of minorities (Figure 41). As regards school size, almost half of the Natives and ‘Others’ came from large schools and smaller percentages from small and medium-size schools, while the largest proportion of Georgians came from medium schools and the rest of them from small and large schools.

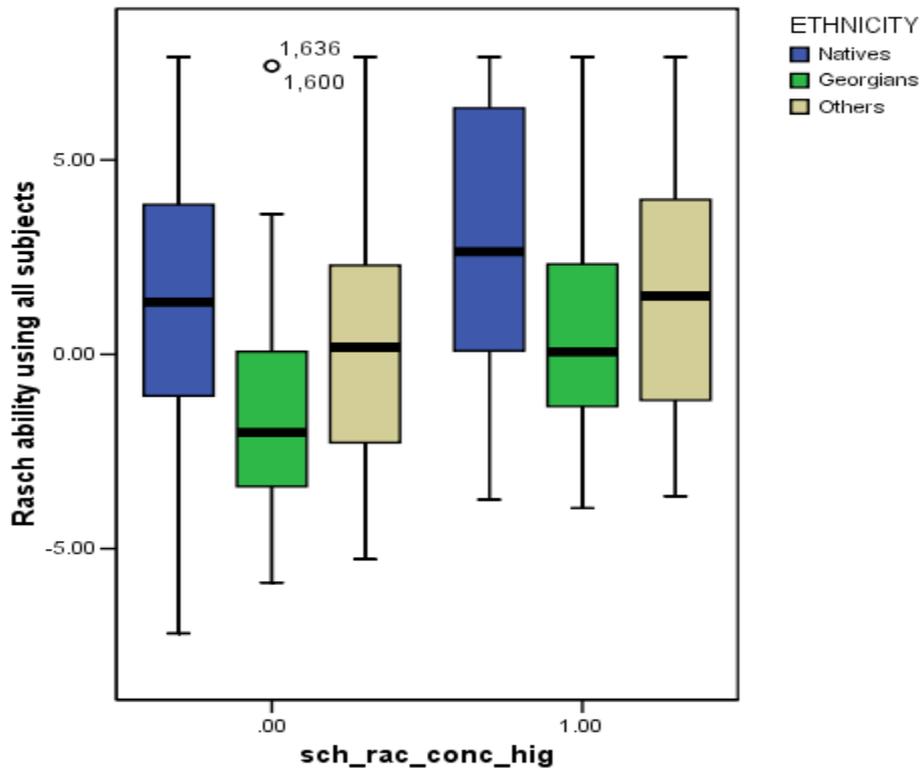


Figure 41: The Overall attainment (Rasch score) of students across schools with different minority concentration (0.00 = low, 1.00 = high).

Regression analysis

Table 50 shows the final regression models of the Overall attainment for the first-, second-, and third-year students. Many of the examined factors, e.g., absenteeism, gender, parental education, and parental occupation, appeared to have a significant effect on student attainment as shown in all models. Age was found insignificant when other variables were present and so it was excluded from all models. Due to multicollinearity problems between a number of factors, e.g., ethnicity and generation status (as they provide similar information) and between school variables (school, school size, and school minority concentration), the variables that remained in the final models were those that entered the models first offering the highest statistical significance. So, the table presents the final models with the generation status variable and the school variable included, but additional

models (not presented here) were run, one with the variable ethnicity instead of generation, another with the variable school minority concentration instead of school, and another with school size instead of school, in order for the effect of these factors to be examined as well.

Table 50: Parameter estimates of the regression analysis for the Overall attainment of students from first, second, and third year group.

| <i>Year Group</i> | <i>Factors</i> | <i>Estimates</i> | <i>Std. Error</i> | <i>T-value</i> | <i>P-value</i> |
|-------------------|--|------------------|-------------------|----------------|----------------|
| First Year | (Intercept) | 3.08 | 0.53 | 5.73 | <0.01 |
| | GENDER [male] | -2.07 | 0.22 | -9.50 | <0.01 |
| | GENERATION STATUS [first generation] | -1.83 | 0.32 | -5.78 | <0.01 |
| | GENERATION STATUS [second generation] | -0.09 | 0.44 | -0.21 | 0.04 |
| | PARENTAL EDUCATION [secondary education] | 0.53 | 0.55 | 0.96 | 0.34 |
| | PARENTAL EDUCATION [further studies] | 1.59 | 0.36 | 4.44 | <0.01 |
| | PARENTAL OCCUPATION [skilled manual workers] | 0.69 | 0.41 | 1.67 | 0.09 |
| | PARENTAL OCCUPATION [civil private and public workers] | 0.86 | 0.39 | 2.24 | 0.03 |
| | PARENTAL OCCUPATION [educators and higher private and higher public workers] | 1.83 | 0.44 | 4.12 | <0.01 |
| | PARENTAL OCCUPATION [professionals and chief managers] | 1.61 | 0.69 | 2.32 | 0.02 |
| | Absences | -0.06 | 0.01 | -8.33 | <0.01 |
| | SCHOOL [school B] | -0.80 | 0.44 | -1.84 | 0.07 |
| | SCHOOL [school C] | -0.27 | 0.51 | -0.52 | 0.60 |
| | SCHOOL [school D] | -0.49 | 0.45 | -1.11 | 0.27 |
| | SCHOOL [school E] | 1.23 | 0.49 | 2.53 | 0.01 |
| SCHOOL [school F] | -1.79 | 0.49 | -3.65 | <0.01 | |
| Second Year | (Intercept) | 3.70 | 0.63 | 5.92 | <0.01 |
| | GENDER [male] | -1.52 | 0.21 | -7.36 | <0.01 |
| | GENERATION [first generation] | -1.54 | 0.30 | -5.09 | <0.01 |
| | GENERATION [second generation] | -1.05 | 0.40 | -2.59 | 0.01 |
| | PARENTAL EDUCATION [secondary education] | 0.79 | 0.55 | 1.46 | 0.15 |
| | PARENTAL EDUCATION [further studies] | 1.74 | 0.35 | 4.96 | <0.01 |
| | PARENTAL OCCUPATION [skilled manual workers] | 0.34 | 0.45 | 0.75 | 0.45 |
| | PARENTAL OCCUPATION [civil private and public workers] | 0.99 | 0.42 | 2.33 | 0.02 |
| | PARENTAL OCCUPATION [educators and higher private and higher public workers] | 1.61 | 0.49 | 3.30 | 0.01 |
| | PARENTAL OCCUPATION [professionals and chief managers] | 1.83 | 0.67 | 2.74 | 0.01 |
| | Absences | -0.08 | 0.01 | -11.09 | <0.01 |
| | SCHOOL [school B] | -1.72 | 0.49 | -3.45 | <0.01 |

| | | | | | |
|---|--|-------|------|--------|-------|
| | SCHOOL [school C] | -2.08 | 0.56 | -3.69 | <0.01 |
| | SCHOOL [school D] | -1.53 | 0.50 | -3.05 | 0.00 |
| | SCHOOL [school E] | 0.12 | 0.51 | 0.23 | 0.82 |
| | SCHOOL [school F] | -0.94 | 0.55 | -1.71 | 0.09 |
| Third Year | (Intercept) | 3.09 | 0.71 | 4.39 | <0.01 |
| | GENDER [male] | -1.51 | 0.21 | -7.35 | <0.01 |
| | GENERATION [first generation] | -0.69 | 0.32 | -2.16 | 0.03 |
| | GENERATION [second generation] | -1.29 | 0.46 | -2.80 | 0.01 |
| | PARENTAL EDUCATION [secondary education] | 0.94 | 0.46 | 2.04 | 0.04 |
| | PARENTAL EDUCATION [further studies] | 1.18 | 0.34 | 3.48 | 0.01 |
| | PARENTAL OCCUPATION [skilled manual workers] | 0.57 | 0.42 | 1.37 | 0.17 |
| | PARENTAL OCCUPATION [civil private and public workers] | 0.89 | 0.40 | 2.21 | 0.03 |
| | PARENTAL OCCUPATION [educators and higher private and higher public workers] | 2.21 | 0.48 | 4.62 | <0.01 |
| | PARENTAL OCCUPATION [professionals and chief managers] | 2.60 | 0.63 | 4.13 | <0.01 |
| | Absences | -0.06 | 0.00 | -13.05 | <0.01 |
| | SCHOOL [school B] | -1.37 | 0.62 | -2.21 | 0.03 |
| | SCHOOL [school C] | -1.68 | 0.65 | -2.59 | 0.01 |
| | SCHOOL [school D] | -1.46 | 0.62 | -2.36 | 0.02 |
| | SCHOOL [school E] | 0.41 | 0.63 | 0.65 | 0.51 |
| | SCHOOL [school F] | -0.46 | 0.66 | -0.71 | 0.48 |
| Model Summary: First Year - Residual standard error: 2.637 on 616 degrees of freedom, Multiple R-squared: 0.4231, Adjusted R-squared: 0.409, F-statistic: 30.12 on 15 and 616 DF, p-value: < 0.001. Second Year - Residual standard error: 2.67 on 678 degrees of freedom, Multiple R-squared: 0.39, Adjusted R-squared: 0.37, F-statistic: 28.56 on 15 and 678 DF, p-value: < 0.001. Third Year - Residual standard error: 2.668 on 681 degrees of freedom, Multiple R-squared: 0.3879, Adjusted R-squared: 0.3744, F-statistic: 28.77 on 15 and 681 DF, p-value: < 0.001. | | | | | |
| Reference categories – For Gender: females, for Generation status: natives, for Parental education: primary education, for Parental occupation: unskilled manual workers, for Schools: School A. | | | | | |

Male students had significantly lower average attainment than females in all year groups. This could be because females tend to mature earlier (Eccles et al. 1993), take school more seriously (Tinklin 2003), have higher educational expectations, and are more concerned with attaining higher grades than males (Hao and Bonstead-Bruns 1998). In terms of subject, the gap between males and females was larger in Modern Greek across all year groups.

In terms of generation status, first-generation and second-generation minorities appeared to have significantly lower average attainment than native students in all year groups. Regression models ran with the ethnicity variable instead of the generation variable showed that Georgians and ‘Others’ had significantly lower average attainment compared to Natives in all year groups. The attainment of ethnic minority students, of first or second

generation status, could be partly explained by the language deficiencies that they usually have. One would expect children who are not very familiar with the local language to have more language problems, leading to lower academic achievement. Language problems are frequently encountered in the literature and suggested as a possible cause of school failure (Panayiotopoulos and Nicolaidou 2007). In terms of subject, the largest gap appeared in Modern Greek and History. This might be due to the fact that these subjects are more dependent on language capacity and competence compared to Mathematics and Physics.

Both indicators of family socio-economic status, parental education and parental occupation, had a significant, positive effect on student attainment in all year groups. As parental education level increases, student attainment increases too. Similarly, as one moves along the defined parental occupation categories (from manual unskilled workers to professionals and chief managers), student attainment increases too. This could be because parents with low socio-economic status take little interest in their children's schoolwork (Douglas 1967, cited in Cohen and Manion 1983) and can only provide limited educational resources to their children at home.

It is interesting to note that the average score for Natives and 'Others' increases with increasing parental educational and occupational category. Georgians did not follow this pattern and this could be because of the dire socioeconomic status of these families; forcing even those with further education to take up manual/unskilled occupations to make ends meet. This is supported by the fact that although around 50% of Georgian parents had completed further education, none were in the top parental occupation category and there was less than 3% in the penultimate category.

Absenteeism had a significant negative effect on student attainment in all year groups. Actually, as the number of absences increases, student attainment decreases significantly. It would make sense that those absent from the classroom miss out on important concepts and information, leading to lower attainment.

School variable appeared to have a significant effect on student attainment, but no clear pattern was observed among the three year groups in relation to the six schools examined. It is possible that specific school characteristics might be responsible for this result.

Also, regression models ran with the variable school minority concentration instead of school variable showed an interesting finding. In contrast to international studies (e.g.,

Crosnoe 2005), school minority concentration appeared to have a significant positive effect on student attainment in all year groups. Specifically, student attainment increases significantly with the increase of the percentage of ethnic minority students in schools. Specific school characteristics might possibly account for these findings but more studies would be needed to investigate this further.

The school size variable did not show any significant impact on student attainment.

Concluding remarks

As with any study, only a limited number of factors could be examined here. It would be interesting to examine the impact on attainment levels of ethnic minority students of factors such as utilization of mother tongue and appointment of teachers from ethnic minority backgrounds, implementation of multicultural education in Cypriot schools and provision of classes where minority students could learn more about their culture and religion. Any further studies should certainly make an effort to explore these and other factors further. Having said that, the combination of possible aetiological factors examined in this study has not been met in previous studies on the attainment of minority students.

The present study is the largest to date examining the attainment of ethnic minority students in Cyprus. Our findings come to verify that ethnic minority students in Cyprus underachieve. Low attendance rates, low parental education, low parental occupation, low generation status, being a male student, and being enrolled in a school with low minority concentration have a significant negative effect on school attainment.