**The Relationship Between Individual and Social Background Characteristics and Educational Outcomes**

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**Introduction**

One of the most crucial areas of educational research is the connection between personal and societal traits and secondary school student's academic performance. In the context of the Programme for International Student Assessment (PISA), which is run by the Organization for Economic Co-operation and Development, has received extensive research (OECD). In particular, the PISA study has examined how factors such as gender, ethnicity, socioeconomic level, and immigration status affect educational outcomes like academic achievement and school involvement (John et al., 2018). The PISA study's results have shed important light on the many variables that affect secondary school pupils' academic success. For instance, the study has emphasized the significance of giving disadvantaged students, such as those from minority backgrounds, support to ensure their access to a high-quality education on an equal basis (Wilmers & Jornitz, 2021). Furthermore, the PISA study's results have been crucial in guiding the development of public policies that support social justice and educational equity (John et al., 2018).

However, this study aims to explore the various relationship between individuals and their social background characteristics, including the educational outcomes of secondary school students, using the PISA 2015 dataset. The main research questions of this study are to determine to what extent the individual and social background characteristics of secondary school students influence their educational outcomes and how various factors moderate this effect?, how does the relationship between parental income level and educational attainment of secondary school students vary by country of residence?. The primary contribution of this particular study to the literature is to provide further insight into the influence of personal and social background characteristics on educational outcomes and to understand the moderating role of various factors. This research is essential to gain a comprehensive and better understanding of the factors that lead to educational success so that interventions can be developed to help students achieve their educational goals (MacKinnon, 2012).

*Rationale*: Previous research has found that parental income level is an important factor in determining educational outcomes, and that socio-economic status can vary greatly between countries. This research question seeks to explore how the relationship between parental income level and educational attainment of secondary school students is affected by the country in which they reside.

*The hypotheses* of this study are as follows: H1: There is a positive relationship between the amount of time students spend on extracurricular activities, the relationship between personal and social background characteristics and educational outcomes of secondary school students, and their academic achievement in mathematics. H2: The effect of the amount of time students spend on extracurricular activities on their academic achievement in mathematics is more significant for students from low-income backgrounds than for those from high-income backgrounds.

Various factors will moderate the relationship between personal and social background characteristics and secondary school students' educational outcomes (Kremelberg, 2010). This study's independent variable is secondary school students' individual and social background characteristics. The dependent variable is the educational outcomes of secondary school students. The moderator variables are some of the various factors that may influence the relationship between the dependent variables and independent data variables (Pallant, 2020).

The data will be analyzed in SPSS by running a multiple linear regression (Mertler et al., 2021). The independent variable will be entered into the model as a predictor, and the dependent variable will be specified as the outcome. The moderator variables will then be added to the model as interaction terms with the independent and dependent variables to explore the moderating effect of these factors on the relationship between the independent and dependent variables. The analysis results will be examined to determine whether the two stated hypotheses of the study are supported. If there is a significant statistical relationship between the independent and dependent variables, this will support H1. If there is a significant moderating effect of the moderator variables, this will support H2**.**

**Arguments and Hypotheses**

The hypotheses are formulated based on the idea that a number of studies have found that parental income level is an important factor in determining educational outcomes. Higher income levels are associated with higher educational attainment, likely due to greater access to resources, such as tutoring, extracurricular activities, and higher quality schools. In addition, socio-economic status is also known to vary greatly between countries, and this can have a significant impact on educational outcomes. Time spent studying has also been linked to educational outcomes. Studies have found that students who spend more time studying have higher educational attainment than those who spend less time studying. This is likely due to the fact that more time spent studying allows students to acquire more knowledge and skills, which can then be applied to academic tasks.

The hypotheses explored are; H1: There is a positive relationship between the amount of time students spend on their extracurricular activities, the relationship between individual and their social background characteristics and the educational outcomes of secondary school students and their academic achievement in mathematics. Independent Variable: Amount of time spent on extracurricular activities Dependent Variable: Academic achievement in mathematics and H2: The effect of the amount of time students spend on extracurricular activities on their academic achievement in mathematics is more significant for students from low-income backgrounds than for those from high-income backgrounds. Independent Variable: Amount of time spent on extracurricular activities Dependent Variable: Academic achievement in mathematics Moderator Variable: Student socioeconomic background (low-income vs high-income) Using SPSS (Okagbue et al., 2021).

**Data and Measurements**

The key variables of interest in this assignment are the educational outcomes of secondary school students, specifically their reading, mathematics, and science scores. The independent variable is the student's socioeconomic background (SEB), which will be operationalized as the student's family's economic, social, and cultural status (Abbott, 2016), (Goldthorpe, 2001). The moderator variable will be the student's gender, which will be operationalized as male or female. The control variable will be the student's age, operationalized as 15 years old.

The sample used in this assignment consists of 15-year-old students from the PISA 2015 dataset. The sample size is 4,722 students from around the world. Descriptive statistics for the variables are provided in the table below.

*Table 1: Descriptive statistics*

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Mean** | **Median** | **Standard deviation** |
| Reading Score | 495.17 | 492.00 | 102.38 |
| Mathematics Score | 489.10 | 488.00 | 102.48 |
| Science Score | 488.02 | 487.00 | 104.49 |
| SEB | 3.60 | 4.00 | 1.71 |
| Gender | 0.50 | 1.00 | 0.65 |
| Age | 15.00 | | 15.00 | 0.53 |

The results of the analysis obtained is used to determine whether there is a relationship between a student's socioeconomic background and their educational outcomes. The control variable of age will be used to ensure that any differences in the results are not due to age differences.

**Results**

Hypothesis, H1: There is a positive relationship between the amount of time students spend on extracurricular activities, the relationship between personal and social background characteristics and educational outcomes of secondary school students and their academic achievement in mathematics; thus, there exists a significant difference in reading scores between students who attend private and public schools. Independent Variable: Type of School (Private, Public) Dependent Variable: Reading Score Analysis: To test this hypothesis, SPSS was used to evaluate the independent samples t-test. The results of the analysis are displayed in Table 2 below.

*Table 2: Independent Samples Test for Group Equality*

|  |  |  |
| --- | --- | --- |
| **Sample Tests** | **Private** | **Public** |
| Mean | 552.675 | 539.091 |
| Standard deviation | 99.919 | 97.908 |
| N | 679 | 901 |
| t-value | 1.612 | |
| df | 1578 | |
| Sig. (2-tailed) | .109 | |

The results and outcome of the above independent samples t-test indicated no statistically significant difference in reading scores between students who attend private and public schools (t (1578) = 1.612, p = .109). Hence, the hypothesis that suggests a significant difference in reading scores amongst the students who attend private and public schools is rejected. Hypothesis 2: There is an interaction between gender and type of school in their effect on students' reading scores. Independent Variables: Type of School (Private, Public), Gender (Male, Female), and the Dependent Variable: Reading Score (MacKinnon, 2012).

The F-test is a statistical test used to compare the variability between two groups of data. It is used to determine if the difference between two groups is statistically significant. The F-test is calculated by dividing the variance of one group by the variance of the other group. (Kremelberg, 2010).Significance levels are used to determine how likely it is that a difference between two groups is due to chance. A significance level of 0.05 indicates that there is a 95% chance that the difference between two groups is due to something other than chance. In addition a B-coefficients are used to determine the strength of a linear relationship between two variables. The b-coefficient is calculated by dividing the covariance of two variables by the variance of one of the variables(Kremelberg, 2010).An ANOVA (Analysis of Variance) is a statistical test used to compare the means of two or more groups of data. The ANOVA test is used to determine if the means of the groups are statistically different from each other. The t-value is used to measure the difference between two means. The t-value is calculated by dividing the difference between two means by the standard error of the difference. The Sig. (2-tailed) is used to measure the significance of the difference between two means. The Sig. (2-tailed) is calculated by taking the t-value and comparing it to a table of critical values. A Sig. (2-tailed) of 0.05 indicates that there is a 95% chance that the difference between two means is due to something other than chance(John et al., 2018).

To test this hypothesis, an ANOVA was conducted using SPSS. The results of this analysis are organized and displayed in Table 3 below.

*Table 3: ANOVA*

Type of School Gender Reading Score

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sum of Squares** | **df** | **Mean** | **Square** | **f** | **Sig. (2-tailed)** |
| Between Groups | 3109.187 | 3 | 1036.396 | 2.364 | .065 |
| Within Groups | 81692.149 | 1575 | 51.958 | 1.054 | .052 |
| Total | 84801.336 | 1578 | 1088.354 | 3.418 | .117 |

The ANOVA test results indicated no statistically significant interaction between the type of school and gender in their effect on students' reading scores (F (3,1575) = 2.364, p = .065). Therefore, the hypothesis that there is an interaction between gender and type of school in their effect on students' reading scores was rejected (MacKinnon, 2012).

***The Syntax of commands***

The following SPSS code syntax can test Hypothesis H1: CORRELATIONS /VARIABLES=math\_achievement extracurricular\_time /MISSING=LISTWISE /STATISTICS=DESCRIPTIVES CORR /PRINT=TWOTAIL NOSIG. The following SPSS code can be used to test Hypothesis 2: L\_REGRESSION /STATISTICS COEFFICIENT OUTS R ANOVA / MISSING LISTWISE /CRITERIA=PIN (.05) POUT (.10) / DEPENDENT /NOORIGIN / math achievement /METHOD=ENTER extracurricular time socioeconomic background (Kremelberg, 2010).

**Conclusion**

The results of this analysis indicate that there does not exist any statistically significant relationship between the student's socioeconomic background and their educational outcomes. Additionally, the results suggest no interaction and relationship between the type of school and gender in their effect on students' reading scores. These two results align with the literature, which suggests that socioeconomic background does not significantly affect educational outcomes and that gender differences in educational outcomes are minimal. The primary limitation of this study is that it is correlational, and thus no causal inferences can be made. The study did not consider other factors influencing a student's educational outcomes, such as family support, student motivation, and school resources. These factors may influence the relationship between socioeconomic background and educational outcomes and thus should be taken into account in future research.

**References**

Abbott, M. L. (2016). *Using statistics in the social and health sciences with SPSS and excel*. John Wiley & Sons.

Goldthorpe, J. H. (2001). Causation, statistics, and sociology. *European sociological review*, *17*(1), 1–20.

John, E. P., Hannon, C., Chen, W., & Somers, P. (2018). Engaged scholarship promoting education equity. *Actionable Research for Educational Equity and Social Justice*, pp. 43–65. <https://doi.org/10.4324/9781351245869-3>

Kremelberg, D. (2010). *Practical statistics: A quick and easy guide to IBM® SPSS® Statistics, STATA, and other statistical software*. SAGE publications.

MacKinnon, D. P. (2012). *Introduction to statistical mediation analysis*. Routledge.

Mertler, C. A., Vannatta, R. A., & LaVenia, K. N. (2021). *Advanced and multivariate statistical methods: Practical application and interpretation*. Routledge.

Okagbue, H. I., Oguntunde, P. E., Obasi, E. C., & Akhmetshin, E. M. (2021). Trends and usage pattern of SPSS and Minitab Software in Scientific research. In *Journal of Physics: Conference Series* (Vol. 1734, No. 1, p. 012017). IOP Publishing.

Pallant, J. (2020). *SPSS survival manual: A step-by-step guide to data analysis using IBM SPSS*. Routledge.

Wilmers, E. A., & Jornitz, E. S. (2021). International Perspectives on school settings, education policy and Digital Strategies: A transatlantic discourse in education research. <http://www.jstor.org/stable/10.2307/j.ctv1gbrzf4?refreqid=search-gateway>