

Education Attainment in UK

Summary Report

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Introduction

Does growing up in a small town versus a large city influence educational success? This project explores whether students' educational attainment, as measured by high school and college graduation rates, is affected by the demographics of their hometowns. The investigation was motivated by findings from the UK's Office for National Statistics (ONS), suggesting smaller towns may foster better academic outcomes. The dataset was derived from the Longitudinal Education Outcomes (LEO) database, containing aggregated and anonymized information on students who completed their GCSEs in the 2012-2013 academic year. Since the data does not reflect individuals privacy is ensured. Our key research questions examined the role of town size and income in shaping educational outcomes, using hypothesis tests to evaluate differences in graduation rates and associations between demographic factors.

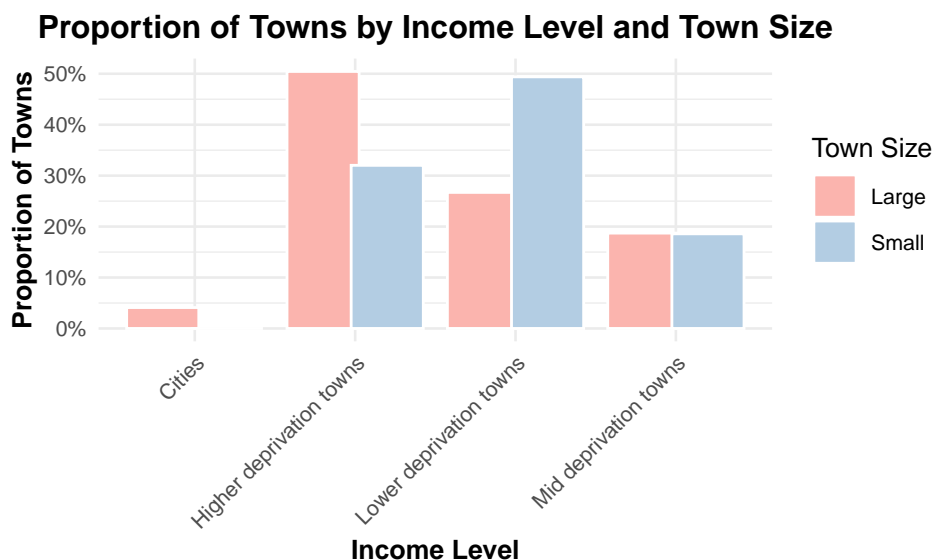
Exploratory Data Analysis

The pared down dataset comprised key variables such as town size, income levels, high school and college graduation proportions of the towns. Summary statistics revealed distinct trends in graduation rates for different town sizes. On average, small towns exhibited higher mean high school graduation rates (62.02%, SD = 10.94) compared to large towns (60.20%, SD = 8.60), and higher mean college graduation rates (31.59%, SD = 9.02) compared to large towns (27.53%, SD = 7.39).

| Characteristic | Large N = 437 ¹ | Small N = 432 ¹ |
|------------------------|----------------------------|----------------------------|
| High school Graduation | 60.19 (8.62) | 64.33 (10.14) |
| College Graduation | 27.48 (7.39) | 31.59 (9.03) |

¹Mean (SD)

It was also interesting to note that smaller towns(31%) were less likely to be flagged as higher deprivation as compared to larger towns(50%).



These trends suggest that students in smaller towns achieve better educational outcomes, raising questions about contributing factors, including socioeconomic and educational resource disparities.

Results and Findings

To test our hypotheses, we analyzed the differences in graduation rates between small and large towns using independent two-sample t-tests, ensuring that all statistical conditions, such as independence, normality, and sufficient sample size, were met.

For high school graduation rates, the test revealed a statistically significant difference, with small towns achieving higher rates (*test statistic: 3.077, p-value: 0.002, 95% confidence interval: [0.658, 2.974]*). Similarly, college graduation rates were significantly higher in small towns, as indicated by a test statistic of 7.260, a p-value of less than 0.05 (8.86×10^{-13}), and a 95% confidence interval of $[2.960, 5.153]$. A chi-squared test further showed a strong link between town size and income levels (*X-squared: 83.562, p-value: less than (2.2×10^{-16})*), with income deprivation being more common in large towns, potentially impacting educational outcomes. Finally, a linear regression analysis demonstrated that high school graduation rates strongly predict college degree completion. The regression model, (*College Graduation Rate = $-12.95 + 0.68 \cdot \text{High School Graduation Rate}$*), showed a clear positive relationship, emphasizing the critical role of high school success in driving higher educational attainment.

Conclusion

This study found that town size plays a key role in educational success, with students in small towns having higher high school and college graduation rates compared to those in larger towns. Income levels were also linked to town size, highlighting potential economic influences on education. However, the study had some limitations, such as not accounting for factors like school quality, parental involvement, or extracurricular activities, and focusing only on students who completed their GCSEs in 2012-2013 in the UK. Future research should explore additional factors influencing outcomes, such as extracurricular activities and teacher-student ratios. These results emphasize the need for policies that address educational inequalities, particularly in larger towns and cities. Policymakers should work on replicating the factors that contribute to small-town success, reducing income disparities, and expanding research to include a broader range of students to help create fairer and more effective educational systems.

References

- Office for National Statistics (2023). [Why do children and young people in smaller towns do better academically than those in larger towns?](#)