

Degrees of Happiness: Investigating the Influence of Educational Attainment on Life Satisfaction in the United Kingdom.

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Abstract

This study investigates whether educational attainment influences life satisfaction, posing two central questions: Does obtaining higher academic qualifications lead to greater life satisfaction, and if so, is this a direct effect, or mediated by other factors like income, health, or employment? The analysis is focused on individuals not in full-time education, employing fixed-effects regression models to assess the impact of education while controlling for variables such as income, health, age, and employment status. The results show a generally positive correlation between education and life satisfaction, with higher education associated with greater life satisfaction compared to having no qualifications. However, this effect diminishes as education levels rise, supporting the theory that higher expectations from advanced education, if unmet by the job market, can lead to dissatisfaction. When indirect factors like income and health are controlled for, the positive impact of education persists, but decreases, particularly for lower-level qualifications like GCSEs. However, robustness checks using pooled OLS and logit models produced contradictory findings, with education showing a negative or statistically insignificant relationship with life satisfaction. These mixed results suggest that the relationship between education and life satisfaction may be more complex than previously thought. The study calls for further research to better understand these nuances and their implications for education policy. It underscores the need to evaluate education not just through economic gains but also through its broader impacts on wellbeing, urging policymakers to take a more holistic approach when designing strategies to enhance life satisfaction across the population.

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1 INTRODUCTION

“The professed object of Dr Adam Smith’s inquiry is the nature and causes of the wealth of nations. There is another inquiry, however, perhaps still more interesting, which he occasionally mixes with it, I mean an inquiry into the causes which affect the happiness of nations.” (Malthus, 1798).

Quoted above, Thomas Malthus identifies a concept relatively unexplored by economists at the time, almost 200 years before Richard Easterlin first approached the economic analysis of happiness data. It highlights an early realisation of the importance in observing happiness, also termed life satisfaction or subjective wellbeing, as an indicator of economic success. Easterlin (1974) identified a paradox in which at one point happiness varies directly with income both among and within nations; although over time as incomes grow happiness does not possess an upwards trend. Despite this, he does find that those with higher incomes are happier than those with lower incomes. Stemming from this, literature has been developed to both test and critique Easterlin’s theory.

Building upon this, research has been carried out on the impacts of many other non-pecuniary variables like health, additional hours of work and employment status (Finkelstein, et al., 2013) (Golden & Wiens-Tuers, 2006) (Otken & Erben, 2013). Ultimately, the impacts on happiness can be narrowed to two directions: direct impacts, describing a correlation stemming entirely from the independent variable; and indirect impacts, in which the independent variable is influencing factors elsewhere that are taking effect. Figure 1 sets out this concept.

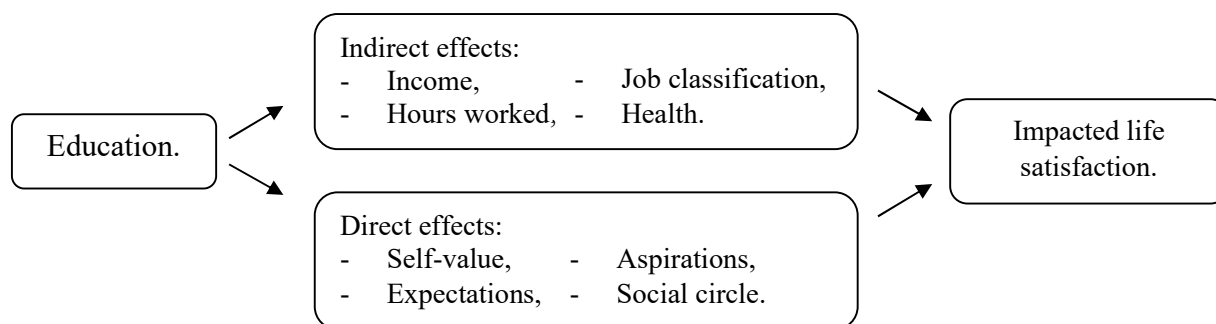


Figure 1: direct and indirect effects of education on life satisfaction flow-chart

Speaking more widely, a growing body of literature recognises the importance of happiness as an economic indicator. With arguments against the use of gross domestic product (GDP) as a sole measure of economic prosperity mounting, happiness indices can provide insight into aspects of society that cannot be bought or sold (Gaukroger, 2022) (Giannetti, et al., 2015) (Fraumeni, 2022). With this, there is consistent evidence tying happier nations to higher productivity, improved health prospects and economic growth; results suggest economic growth of 1% to 3% can be obtained by increasing happiness (Oswald, et al., 2015) (Kushlev, et al., 2020) (Lee & Goh, 2023).

In comparison to other areas of economic research, happiness economics is still relatively new and under-reported resulting in gaps in research. These gaps are exacerbated by the subjective

nature of individual happiness, specifically that it is based on individual experience and can be affected by so many aspects of life and society. Large scale cross-country studies also prove complex due to a lack of data collection and language and cultural differences (Ortiz-Ospina & Roser, 2017). Consequently, analysis of happiness is sparse and is often seen on smaller scales examining trends relative to income or other pecuniary variables. Research determining the influential factors of personal wellbeing is crucial in expanding the area. In addition to, realising the potential of happiness indices as an economic indicator and policy objective. Moreover, the investigation into non-pecuniary aspects of life that are shared amongst the vast majority of the population is crucial in understanding more about improving the happiness of society as a whole.

Using data from the Understanding Society survey, econometric techniques will be applied to estimate the relationship between educational attainment and individual life satisfaction. In the next chapter, a critical analysis of existing literature is explored to determine common themes, techniques, and analytical models. Then, the background of the dataset is explained, including reference to manipulations made to improve the quality of this analysis. Following from this, the empirical strategy, methodology, and assumptions are outlined to evaluate the hypothesis:

“Obtaining higher educational qualifications leads to improvements in the life satisfaction of individuals in the United Kingdom”.

The results of empirical analysis will also allow insight into the directness of the education attainment in increasing income, answering the following hypothesis:

“If life satisfaction is improved by obtaining higher educational qualifications, is this a direct or indirect relationship?”.

Once this has been presented alongside potential limitations of the study, results are defined, and a discussion of interpretations can commence. Finally, the analysis will be appraised drawing comparisons with similar literature, as well as identifying routes for further research and relevant policy implications.

2 LITERATURE REVIEW

2.1 HAPPINESS THEORY

The observation of happiness in economics differs from traditional studies of utility. Economic utility is the enjoyment that people gain from having wants and needs satisfied (Bernoulli, 1954). With typical utility functions measured in terms of revealed preferences (the observation of purchases that leads to the determination of one's preferences), it focuses upon the satisfaction gained from observable factors, like purchasing and consuming a good/service. This carries the assumption that satisfaction can only be improved through what an individual can afford to consume. In reality, this is only a factor contributing to overall wellbeing. Happiness economics takes account of the less easily observable characteristics of utility theory, like enjoyment that occurs outside of market settings. It takes happiness as a dependent variable comprised of any factor impacting quality of life, for instance income, leisure time, family circumstance, education, or health.

2.2 HAPPINESS DATA

A priority in happiness economics is the answer to the question: how far can we trust happiness data? Asking an individual to place a value on their overall happiness introduces academic scepticism in the form of potential bias. This bias stems mainly from differences in how survey respondents view their happiness; for instance, one may see themselves as happier relative to their peers and another may have just experienced a positive life event thus causing a higher rating. Bias can also be generated by the framing of the question. For instance, the question "How satisfied are you with your life?" is delivered at the end of the British Household Panel Survey (BHPS). Therefore, avoiding framing effects from other events dominating responses.

This then gives rise to another potential issue: question wording. Throughout similar literature, studies interchange happiness measures with wellbeing, life satisfaction, mental health, and job satisfaction. Happiness is often seen as more "immediate" and "in-the-moment", whilst life satisfaction tends to provide a more complete view of overall quality of life and is more multi-dimensional than happiness (Gilbert, 2009) (Helliwell, et al., 2017). Despite this, Fordyce (1988) shows through regression analysis that there is a positive correlation between the different measures of wellbeing and can therefore be of use interchangeably. In an applied discussion, Alesina et al. (2004) provides a review of happiness, life-satisfaction and wellbeing data and find them generally reliable. Firstly, since they have been widely used by psychologists, and secondly, that these psychologists have conducted "validation exercises" on the data.

2.3 EDUCATION AS AN ASSET

Education can be described as a normal good, with utility derived both in the current instance and via investment for the future. Education is a primary factor in both advancing an individual's position and promoting participation in the labour force. Becker (1994) finds that, when estimating before-tax income differentials between education classes in 1949, those with more than 16 years of schooling experience a higher income than those with 12 years of schooling after the age of 25. Whilst the marginal utility of income decreases at higher income levels, it can still be said that greater levels of education directly achieve gains to wellbeing (Layard, et al.,

2007) (Clark & Oswald, 1996). In undertaking analysis on the benefits of lifelong learning, Jenkins et al. (2003) only find significant wage differences associated with higher-level academic and occupational lifelong learning. Although they conclude that of those unemployed in 1991, individuals who had completed additional occupational learning were 22% and 12% more likely to enter the labour force in 2000.

2.4 THE POSITIVE IMPACT OF EDUCATION ON LIFE SATISFACTION

As discussed, education generates utility primarily through increased earnings and hence increased consumption. A trend amongst literature is conducting separate regressions with and without controls for income to identify direct and indirect effects of education on happiness. Cunado & Perez de Gracia (2012) use this format, conducting three ordinal logit models. The first two models conclude that education has a positive and significant effect on wellbeing. When controlling for income, education is no longer significant in explaining happiness, indicating an overall indirect effect parallel with theory. This paper lacks the depth and critical explanation shown in other literature, hence limiting its robustness. Contributing to arguments for the direct, non-pecuniary effects of education on happiness, Castriota (2007) discovers with similar methodology that the highly educated place around 30% to 40% less importance on the value of GDP. He explains that highly educated individuals on average have a more “active and stimulating” lifestyle, thus negating the importance of material goods whilst enjoying higher life satisfaction.

Whilst the literature discussed above utilised pooled cross-section data and logit regressions, Fitzroy & Nolan (2020) analyse the correlation between education and life satisfaction using BHPS data from over two decades. They found that the highly educated begin with the lowest life satisfaction, then after 2004/5 consistently have the highest life satisfaction. Summary statistics show that overall, those that are higher educated tend to have higher life satisfaction, however when splitting the sample by age they find this true only for under 45s. A fixed-effects regression reveals that no income variables are statistically significant in the explanation of life satisfaction in the higher educated cohort – despite upholding significance in the medium/low educated. This analysis holds strength due to its large sample size although its complex model lends more to discussions of the effects of income on life satisfaction as opposed to education.

Disputing the use of life satisfaction as a proxy for subjective wellbeing, Nikolaev (2016) states that this is behind studies finding insignificant or negative impacts from education. Analysing the first thirteen waves of the Australian HILDA data, he splits wellbeing measures into hedonic and eudaimonic happiness. Conducting a random-effects linear estimation, he finds that highly educated individuals are more likely to view their lives as more meaningful and experience more positive emotions. He also discovers a positive correlation between higher education and satisfaction with most life aspects, for instance, financial situation, employment, local community, and children. Whilst the study also concluded that positive effects of higher education on social wellbeing are increasing, but at a diminishing rate, there are limitations within this research. Most notably that the main dependent variable is the number of years spent in education. This could provide inaccuracies when measuring stages of schooling due to potential repeating of years or changes in schooling policies across the 12 years of data. Also, the use of a random-effects estimator assumes that there is no correlation between omitted variables and explanatory variables, which is unlikely to be true. For instance, income and wellbeing will

likely be correlated with unobserved and individual specific characteristics like background, character traits, and capabilities. A fixed-effects estimator, as used by Fitzroy & Nolan (2020), would be more suitable here to resolve this bias.

2.5 THE NEGATIVE IMPACT OF EDUCATION ON LIFE SATISFACTION

Earlier economic analysis of the relationship between education and happiness has tended to focus on the financial returns from academic achievement. Maintaining that education generates more income, consumption and therefore utility. However, the law of diminishing marginal utility dictates that as consumption rises, additional satisfaction per unit falls (Marshall, 1890). This is a general theme in explaining negative correlations found between education and life satisfaction.

Similar to this theory, Ruiu & Ruiu (2019) look in depth at the frustration felt by the highly educated. They create models in which an individual's perceived utility depends on their achieved income, as well as the distance between this and income aspirations. Using ordered logit regression, they conclude that the illusory superiority bias generated by achieving higher education produces negative impacts on happiness. Despite this, they find that graduated individuals tend to be happier than other members of the labour force. This research assumes that years of working has a direct effect on income expectations but does not have a direct effect on perceived happiness. This is a particularly strong assumption and may have produced biases within this research.

Like Fitzroy & Nolan (2020), Clark & Oswald (1996) analyse the first wave of BHPS data. Using job satisfaction as the dependent variable, they find that when income is held constant, the level of education negatively impacts satisfaction. They also find that comparison earnings levels are negatively related to worker's satisfaction levels. Castriota (2007) critiques this result, explaining that analysing one advanced economy may bias results due to returns on education being lower where it can be accessed more readily. When drawing comparison with other literature, it becomes apparent that job and pay satisfaction may not be appropriate proxies for life satisfaction, happiness, or wellbeing. Furthermore, there is no discussion of the econometric methodology used in Clark & Oswald's paper, potentially providing reasons for the differing results using the same dataset.

The HILDA survey also provides inconsistent results, used by Nikolaev (2016). When utilised in regressions controlling for socio-economic variables, many authors find that education is statistically significant and negative in explaining life satisfaction. Green (2011) finds a negative correlation using fixed-effects regression upon seven years of data. Ambrey & Fleming (2014) assesses ten years of data but test results from pooled OLS, conditional logit, fixed- and random-effects estimators. They find no significant relationship between education and life satisfaction in the logit model and fixed-effects model. In pooled estimation, there is a negative correlation between the variables. Powdthavee (2015) and Shields et al. (2009) also gather this result, although Shields et al. only use one wave of data despite more available to them - limiting the generalisability of the study.

3 DATA AND EMPIRICAL STRATEGY

4.1 DATA

The UK Household Longitudinal Study (UKHLS), also known as Understanding Society, is used in this analysis to explore the relationship between educational attainment and life satisfaction. Kent Economics Degree Apprentice Research Journal, Issue 2, 2024. 254

The panel survey collects information on household and individual circumstances from members of around 40,000 households in the UK (Understanding Society). The pseudo-anonymised data includes almost 10,000 variables, with key segments such as economic and financial situation, socio-demographic characteristics, opinions, attitudes, and education.

The UKHLS is conducted on a yearly basis, beginning in 2009 when its predecessor, the British Household Panel Survey (BHPS), ended. Similar literature uses a harmonised dataset combining the BHPS and UKHLS, allowing a maximum time scale of 1991 to 2023. When the BHPS ended in 2009, only 6,000 households surveyed agreed to be involved in the UKHLS. Given that for this analysis, only those individuals that were surveyed in all waves are included, there would be a far smaller sample size available should the BHPS data be included. Furthermore, the intention to study life satisfaction becomes more clarified when approaching survey data towards the end of, and after, the great recession of 2008. This is due to the lessening of framing effects of the general economic environment on subjective questions.

The main advantage of using the UKHLS for this analysis is the opportunity to assess the experiences of 9,988 individuals across the 13-year period. As mentioned, only those that have taken part in the survey in all waves are included to avoid unbalanced data which may distort results. Thus, explaining the lower sample size compared with other studies using this dataset. The survey uses multiple sampling methods to give appropriate weight to each nation of the United Kingdom. Specifically, using a clustered sample of addresses from England, Scotland, and Wales and an unclustered sample from Northern Ireland. Therefore, providing a representative sample of the population appropriate for this analysis.

Table 1 presents detailed descriptive statistics for variables used in this analysis. Further details of definitions and scales of variables are available (Annex 1).

Table 1: Summary Statistics	Life satisfaction score below 4				Life satisfaction score above/equal to 4			
	Mean	S.D.	Min	Max	Mean	S.D.	Min	Max
Life satisfaction (1-7)	3.04	0.95	1.00	3.00	5.93	0.60	4.00	7.00
Satisfaction with health (1-7)	3.44	1.57	1.00	7.00	5.27	1.41	1.00	7.00
Gross monthly income	£1,819	£1,483	£0.01	£24,583	£2,146	£1,754	£0.01	£27,916
Age	52.44	13.85	16.00	99.00	54.98	14.87	16.00	101.00

Male (%)	42.3%	49.4%	0.00	1.00	42.3%	49.4%	0.00	1.00
*Highest qualification (= degree)	25.8%	43.7%			34.7%	47.6%		
(= other higher degree)	13.0%	33.6%			14.7%	35.4%		
(= a-level etc.)	18.0%	38.4%			16.5%	37.2%		
(= gcse etc.)	21.6%	41.2%			17.3%	37.9%		
(= other qualification)	10.1%	30.2%			8.4%	27.8%		
(= no qualification)	11.5%	31.9%			8.3%	27.6%		
*Labour force status (= employed)	49.2%	50.0%			50.3%	50.0%		
(= unemployed)	5.7%	23.3%			1.8%	13.2%		
(= self-employed)	8.1%	27.3%			8.2%	27.5%		
(= retired)	22.1%	41.5%			33.7%	47.3%		
*Current job class (= professional)	3.3%	17.9%			4.6%	21.0%		
(= managerial & technical)	20.4%	40.3%			24.9%	43.3%		
(= skilled non-manual)	12.5%	33.0%			11.6%	32.1%		
(= skilled manual)	10.0%	29.9%			9.0%	28.6%		
(= part-skilled)	7.5%	26.3%			6.3%	24.3%		
(= unskilled)	2.1%	14.5%			1.3%	11.4%		
Observations	7739				9789			

*Represents a group of dummy variables

4.2 ASSUMPTIONS

Nikolaev (2016) decides to include only individuals above the age of 22. To improve the robustness of this assumption, in this analysis, those that reported in the survey that they were still taking part in full-time education have been excluded. It can be inferred that those that are not in full-time education would have had opportunity to complete education up their desired level and would have begun enjoying benefits associated with equivalent certification. In maintaining this assumption, endogeneity is avoided between current educational attainment and life satisfaction since there is a chance of reciprocal determinism. The analysis incorporates the respondents age by taking it's squared value, thus taking account of the non-linear relationship of happiness as one grows older.

To effectively assess the type of potential causality that education level has on life satisfaction, a well-defined and accurate income variable is necessary. The total monthly personal gross income has been used from the survey. This variable includes income from savings and investments, gross labour income and income from benefits and other sources. Upon evaluating the data, it was found that many negative income values were present. For the sake of this analysis, these values are assumed to be errors based on the calculation of the variable. Hence, they have been removed from the data to avoid bias and skewed results.

Life satisfaction is undoubtedly a measure that is affected by many different aspect of one's life, and these aspects may differ from person to person. In acknowledgement of this, forming a truly robust test of the components affecting life satisfaction, requires many added explanatory

variables. Given the nature of survey measurement, highly subjective variables may be difficult to accurately measure. The resulting multicollinearity between such variables would weaken statistical significance, therefore making such model impossible and unwise to construct. Therefore, great consideration has been applied to the explanatory and control variables included in all models. In conducting F-tests for the suitability of potential added explanatory variables, the decision was made to exclude marital status, job satisfaction and whether an individual has had children. Whilst these variables in reality may affect overall life satisfaction, they were not considered to improve any characteristics within the model.

Subjectivity within survey responses is an unavoidable fact, potentially leading to skewed results. Conformity and acquiescence bias particularly affects happiness data as individuals strive to be seen as more socially desirable, leading to upwards pressure on life satisfaction scores. In order to distribute these effects, the dependent variable will take a binary format, as in Ambrey & Fleming (2014). This takes the value of 0 when a life satisfaction score is below 4 and 1 when the score is above/equal to 4. This also intends to remove any issues with assuming cardinality of the data, as discussed in the following section.

4.3 EMPIRICAL STRATEGY

To reiterate, there are two hypotheses to be analysed using econometric modelling, these are:

- *Obtaining higher educational qualifications leads to improvements in the life satisfaction of individuals in the United Kingdom, and*
- *Life satisfaction is directly impacted by obtaining higher educational qualifications.*

With the null of the first hypothesis that there is no statistically significant relationship or a negative relationship between educational attainment and life satisfaction. The null of the second hypothesis is that there is only an indirect relationship, or that there are impacts on life satisfaction in both a direct and indirect manner.

A selection of regression models are utilised within similar literature, most commonly ordinal logit models and individual fixed-effects estimation. Ordinal logit models seem to be the ideal strategy given their interpretative ability, they assume that life satisfaction scales are ranked in natural, ordered categories. Kahneman & Krueger (2006) and Plant (2020) suggest that subjective wellbeing measures can be cardinally comparable, meaning that two individuals rating their life satisfaction at 5 should be as happy as each other. However, Kristofferson (2015) proposes that cardinality and ordinality must be treated as assumptions, he finds with evidence that both assumptions are valid. Intuitively speaking, life satisfaction in reality is cardinal with ranking Likert scales used for ease of surveying. This analysis upholds neither assumption and instead categorises the dependent variable into “satisfied with life” and “dissatisfied with life”.

When assessing happiness data, there is high potential for biased estimates due to correlation between the individual error term and regressors. This, combined with the use of a short panel and the execution of a Hausman test, lead strategy away from random-effects estimators. Hence, a within-group fixed-effects estimator is used for this analysis with model structures as follows:

Model (1):

$$life\ satisfaction\ (binary)_{it} = \alpha_i + \beta_1(education)_{it} + \beta_2(male)_{it} + \beta_3(age)_{it}^2 + \beta_4(health)_{it} + u_{it}$$

Model (2):

$$life\ satisfaction\ (binary)_{it} = \alpha_i + \beta_1(education)_{it} + \beta_2(male)_{it} + \beta_3(age)_{it}^2 + \beta_4(health)_{it} + \beta_5(economic\ status)_{it} + u_{it}$$

Model (3):

$$life\ satisfaction\ (binary)_{it} = \alpha_i + \beta_1(education)_{it} + \beta_2(male)_{it} + \beta_3(age)_{it}^2 + \beta_4(health)_{it} + \beta_5(economic\ status)_{it} + \beta_6(\log\ monthly\ income)_{it} + \beta_7(job\ class)_{it} + u_{it}$$

In establishing three models, there is opportunity to establish distinctions between the effects of obtaining each subsequent educational qualification on life satisfaction both with and without relevant controls. This aids in answering the second hypothesis.

Model (1) establishes the connection between education and life satisfaction inclusive of the effects of labour force status, income, and job classification. These coefficients can be regarded as incorporating the indirect impacts on life satisfaction of an individual attaining higher qualifications.

Model (2) applies controls for labour force status. This stands to add robustness to the first by creating association between life satisfaction and employment status. Whilst there may be correlation between education and employment status, it is deemed important to control for when identifying the effects on life satisfaction – therefore model (2) will provide the baseline for identifying the validity of the second hypothesis.

Model (3) applies the logarithm gross monthly income variable and the Registrar General’s Social Class (SC) of current job. Regressing monthly income allows the evaluation of the effects of educational attainment irrelevant of its impact on income, thereby revealing whether the significance of the educational variables is upheld.

5 RESULTS AND DISCUSSION

Table 2 presents the estimated coefficients from all three fixed-effects regression models.

Table 2: Coefficient Estimates (standard errors)	Dependent variable: Life satisfaction (binary)		
	Model (1)	Model (2)	Model (3)
*Highest qualification (= degree)	0.132*** (0.017)	0.130*** (0.016)	0.129*** (0.019)
(= other higher degree)	0.173*** (0.021)	0.174*** (0.019)	0.169*** (0.022)
(= a-level etc.)	0.147***	0.149***	0.138***

	(0.019)	(0.018)	(0.022)
(= gcse etc.)	0.155*** (0.023)	0.155*** (0.022)	0.142*** (0.025)
(= other qualification)	0.146*** (0.024)	0.145*** (0.023)	0.132*** (0.027)
(= no qualification)	0.114*** (0.030)	0.116*** (0.029)	0.108*** (0.033)
Male	0.057 (0.084)	0.055 (0.083)	0.032 (0.081)
Square of age	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
*Health (= completely dissatisfied)	0.437*** (0.009)	0.439*** (0.009)	0.438*** (0.009)
(= mostly dissatisfied)	0.475*** (0.007)	0.476*** (0.007)	0.476*** (0.007)
(= somewhat dissatisfied)	0.610*** (0.006)	0.611*** (0.006)	0.612*** (0.006)
(= neither satisfied nor dissatisfied)	0.594*** (0.007)	0.594*** (0.007)	0.596*** (0.007)
(= somewhat satisfied)	0.796*** (0.006)	0.797*** (0.005)	0.798*** (0.005)
(= mostly satisfied)	0.854*** (0.005)	0.854*** (0.005)	0.854*** (0.005)
(= completely satisfied)	0.871*** (0.005)	0.872*** (0.005)	0.871*** (0.005)
*Labour force status (= employed)		0.019*** (0.006)	0.009 (0.007)
(= unemployed)		-0.057*** (0.009)	-0.051*** (0.009)
(= self-employed)		0.014* (0.008)	0.003 (0.009)
(= retired)		0.049*** (0.007)	0.051*** (0.007)
Log of gross monthly income			0.000 (0.001)
Current job classification (= professional)			0.017 (0.009)
(= managerial & technical)			0.009 (0.006)
(= skilled non-manual)			0.016** (0.007)
(= skilled manual)			0.014** (0.007)
(= part-skilled)			0.014* (0.008)
(= unskilled)			0.001 (0.014)
Observations	127812 (9992 individuals)	127812 (9992 individuals)	124891 (9990 individuals)

LSDV R-Squared	0.532	0.533	0.533
F-stat	2857.77	2330.03	1587.91

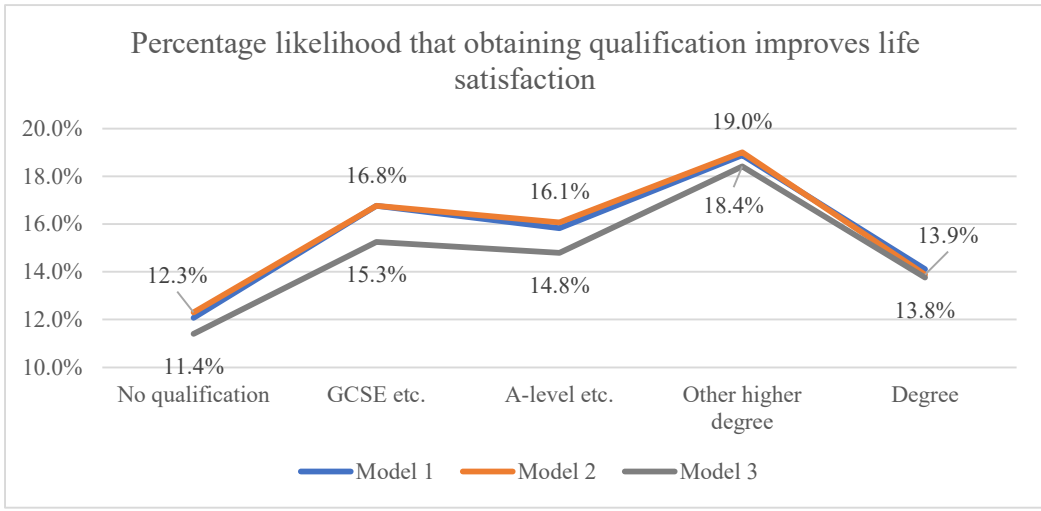
*Represents a group of dummy variables

P-value *<0.10, **<0.05, ***<0.01

The coefficient estimates in models (1) and (2) do not vary greatly; inference can be drawn from this that the addition of the labour force status does not significantly influence improvements in life satisfaction from education. This is not the case when comparing model (2) with model (3). When applying the income and job classification controls there is a clear shift in the coefficients of the educational variables. Through the use of eq(1), the coefficient estimates can be transformed into percentage terms. For the educational variables, this translates to the percentage likelihood that obtaining that qualification improves life satisfaction.

$$eq(1): (e^{coefficient} - 1) * 100$$

eq(1) is applied in figure 2, where a graphical comparison of results across model (1), (2) and (3) can be seen.



Overall, from the results of the fixed-effects models in table 2 as well as the plot in figure 2, we can observe the following about the relationship between educational attainment and life satisfaction:

- There is a statistically significant, positive relationship with all types of educational attainment and a person’s life satisfaction score. The weights of which are higher than the achievement of no qualifications across models (1), (2) and (3).
- The level of satisfaction gained from each subsequent qualification, across all models, is decreasing as the level of qualification rises. Gaining other higher degree qualifications is an outlier for this, producing the highest life satisfaction improvement at 18.4%-19.0%.
- When controlling for the effects of income and job classification (model (3)) the satisfaction gained from the achievement of all qualifications decreases. This reduction is

Figure 2: education coefficient comparison (%)

most significant for GCSE and equivalent qualifications and falls as the level of education rises. However, all education variables remain statistically significant.

Applying the results to the first hypothesis, it can be drawn that acquiring educational qualifications does have a significant impact on improving life satisfaction when compared to those with no qualifications; both directly and indirectly. Model (2) shows that a person with no qualifications is 12.3% more satisfied with their life, compared with an average of 16.5% more satisfaction from achieving any qualification. Although, the achievement of each subsequent higher qualification does not form a continuous upward trend in terms of life satisfaction - this is consistent with Castriota (2007).

Furthermore, these results prove similar to that of Easterlin (2004). When there are two subgroups formed, one with at least another higher degree, and another with an A-level education or less, the more educated subgroup is more satisfied with their life. As Easterlin states, this is consistent with his theory that there is a correlation between happiness and income at a point in time within a country, but not throughout time (Easterlin, 1974). Other explanations for these results may stem from higher employment probability, feelings of prestige or greater self-confidence.

Seen in figure 2, there is an M-shaped curve for education impact on life satisfaction across all models. This result draws on findings from both opposing groups of literature. Whilst Clark & Oswald (1996) find an entirely negative relationship between job satisfaction and comparison earnings, they comment on the fact that satisfaction is declining in the level of education. The latter is true in this analysis with the outlier of the achievement of other higher degrees. Potentially, the acquisition of GCSE and similar qualifications leads to a larger life satisfaction increase since it is typically the first qualification achieved. Thus, meaning that respondents would not have felt the disutility resulting from higher employment or income expectations as discussed by Ruiu & Ruiu (2019). This same reason could explain why the increase in life satisfaction for gaining a degree level qualification is lower. Alternatively, the reason for the significantly higher life satisfaction gained from other higher degrees may be due to the vocational nature of education included in this variable (see Annex 1). Evidence shows that those that take on more vocational education and careers, such as a tradesperson or plumber, are more likely to report being 'very happy' (Brunello, 2020).

Ultimately, these results lend towards the first hypothesis that obtaining higher educational qualifications improves life satisfaction. It must be caveated that as the levels of education rises, the utility gained decreases with the exception of other higher degree qualifications.

When controlling for the effects of income and job classification, the likelihood of each qualification leading to higher life satisfaction falls by between 0.1% and 1.5%. The differences between the percentages fall as the attainment level rises, excluding where no qualification is achieved. This highlights that as the level of education rises, the reliance on associated income and job class gains to improve life satisfaction falls. Cunado & Perez de Gracia (2012) find in their model including income as an explanatory variable, the level of education is no longer significant. They go on to explain that this signifies that education has an indirect effect on happiness – in which it improves happiness through income gains.

Across all models, education variables are significant and positive, albeit lower in model (3) controlling for income. The income variable itself is not statistically significant, likely due to the diminishing returns of income on life satisfaction (Masuda, et al., 2021) (Morris, et al., 2021)

(Lane, 2000). From the significance of educational qualifications across all models, it can be interpreted that there is a majority direct relationship between education and satisfaction. Furthermore, it is identified from model (3) that whilst income does not play a significant role in explaining happiness, it reduces the utility gained from achieving each qualification. Implying that income is a mitigating factor in achieving life satisfaction gains through academic achievement, with this affect most evident in GCSE attainment and reducing as education level rises.

The second hypothesis stating that education plays a direct role in improving life satisfaction can be accepted, but only to a certain extent. Generally, there is evidence here suggesting a strong, direct implication of education attainment on happiness. Despite this, results from model (3) imply that an element of education's impact on life satisfaction is mediated by job classification and gross monthly income. It can be concluded that higher education does directly affect life satisfaction, although there are indirect aspects of causation in the form of income and job classification.

Otherwise, conclusions can be drawn from socioeconomic explanatory variables which are closely aligned with economic theory. For example, unemployment has a significant negative impact on life satisfaction in models (2) and (3), irrelevant of the inclusion of income. This is likely due to the unemployed individuals receiving lower incomes and not realising life satisfaction gains. This assumption is familiar in wage bargaining models as well as models of income and substitution effects (Korpi, 1997).

5.1 ROBUSTNESS CHECKS

As detailed in the review of existing literature, many statistical models are used to provide insight into the relationship between education and life satisfaction. Given the range of models used elsewhere, it is necessary to evaluate the model using other techniques. Using the same model specifications as with the fixed-effects, the results of a pooled ordinary least squares (OLS) model and a binary logit model for models (2) and (3) are detailed in Annex 2.

Firstly, the estimated education coefficients for both models in both alternative strategies are entirely negative and mostly insignificant. Thus, depicting an entirely alternative result to that obtained in the fixed-effects model. Graphed in figures 3 and 4 are the coefficient estimates and marginal effects in percentage terms.

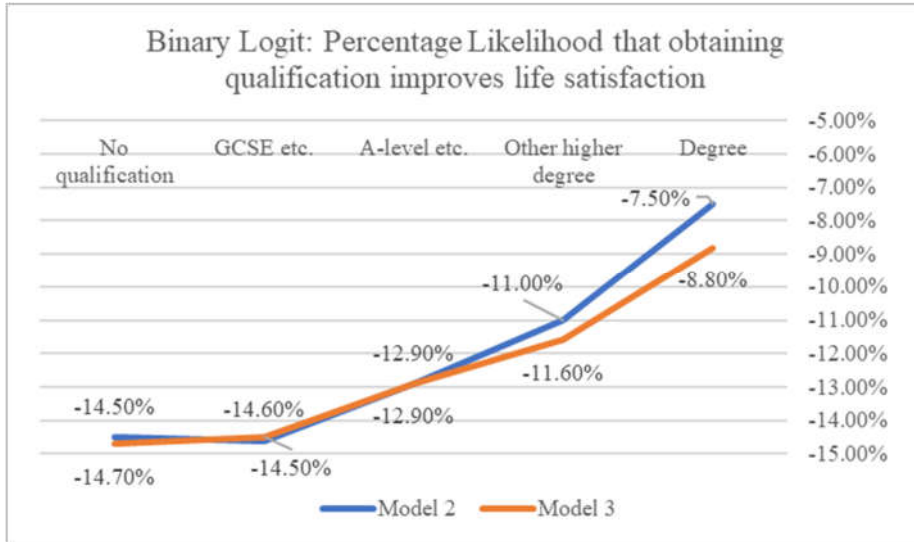


Figure 3: Binary logit model marginal effect comparison (%)

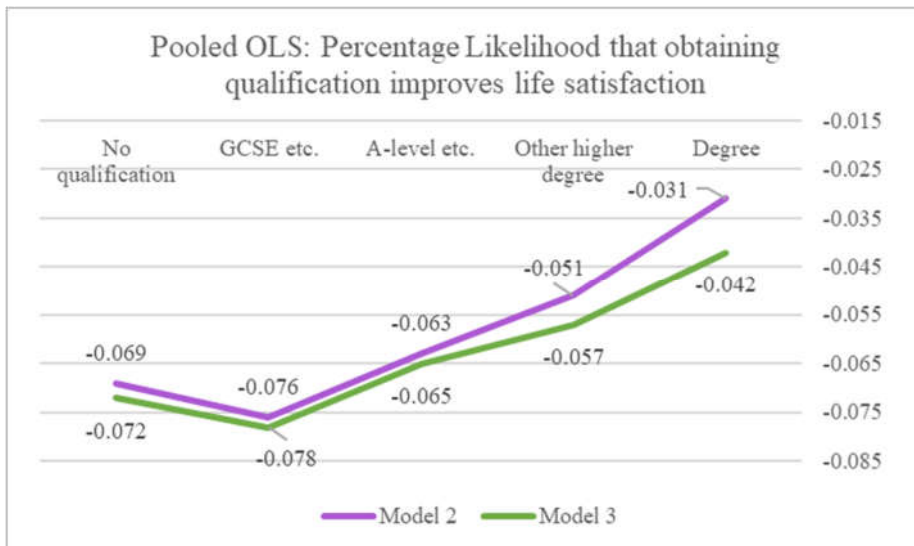


Figure 4: Pooled OLS model coefficient comparison

Secondly, changes in life satisfaction for both the logit and pooled OLS models share similar patterns as education rises. GCSE level qualifications possess the highest likelihood of leading to dissatisfaction, but as the qualification level rises this likelihood decreases across both models. In model (2) the slope is steeper than model (3) where income and job classification variables are included – similar to what is seen in the fixed-effects model. The logit model shows that each education variable has a lower negative impact on life satisfaction than achieving no qualifications. Hence, for this model, it can be said that achieving each subsequent higher educational qualification does lead to improved life satisfaction directly with minimal indirect effects through income and job classification. Similar is seen for the pooled OLS model although this is only true for other higher degrees and qualifications beyond degree level.

Thirdly, whilst the gross monthly income variable remains insignificant in both regressions of model (3), for the OLS model the coefficient is negative. It suggests that for every additional pound of gross monthly income, a person is 0.1% less satisfied with their life (table 3). Whilst this opposes evidence and economic theory, this result may arise due to social comparisons regarding one's income, thus lending that a person's income 'rank' affects their life satisfaction (Boyce, et al., 2010).

Due to the insignificance of the majority of education variables in the pooled OLS and logit models, there must be an element of doubt exercised in concluding that there is a positive, significant, and increasing impact of education on life satisfaction. However, from the alternative models it can be concluded that whilst there is always a negative impact on life satisfaction from education, this impact reduces as the level of educational attainment rises. Whilst this does not lead to the full acceptance of the first hypothesis, there still remains an element of improvement in life satisfaction scores for achieving higher education.

5.2 IMPLICATIONS

Measuring life satisfaction, or more broadly subjective wellbeing, has been a key indicator of how an economy is progressing. In 2010, the Office for National Statistics (ONS) launched the Measuring National Wellbeing programme aiming to summarise "how we are doing" (Office for National Statistics, 2024). From this, they found that wellbeing at an individual and national level is a multi-dimensional and complex issue. They also discovered common contributing factors to wellbeing. Most notably, through the "quality and availability of Government provided services" like education, as well as having adequate income (Evans, 2011) This is furthered by Sen (1999) who advocated that "public policy to foster human capabilities and substantive freedoms" can help to ensure individuals have the potential to maximise their utility in the form of life satisfaction.

The findings from this analysis imply that policies improving the availability and quality of education could aid in improving wellbeing in the UK. Traditional economic theory cites that with increased choices comes the possibility to satisfy personal preferences and therefore improve wellbeing. Hence, GDP is often used as a proxy for the measurement of wellbeing in a nation (Dolan, et al., 2011). More specifically, within policy appraisal surrounding the provision of education, this analysis highlights the need to consider wellbeing factors when conducting cost-benefit analysis (CBA). Within basic educational policy CBA, welfare might be considered

as the sum of earnings benefits achieved by pupils in their lifetimes less the policy costs (Hodge, et al., 2021). However, this assumes that welfare is determined exclusively by changes in

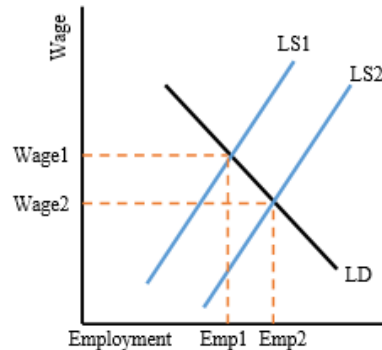


Figure 4: supply and demand diagram of skilled labour

income, to which this analysis opposes.

A key element that this analysis, as well as main literature, neglects is success in education. Whilst the achievement of a qualification, as seen, contributes to life satisfaction – is there a divide in which those that perform better at each level achieve more satisfaction gain? Applicants and accepted applications to university through UCAS have almost doubled since 1995 (Bolton, 2024). This yields an increase in the saturation of highly skilled workers in the labour force, consequently the substitution of labour is more costly for firms and creates a more inelastic demand for labour. Illustrated in figure 4, the increase in the supply of skilled workers shifts labour supply (LS1) outwards, causing an increase in employment (emp1 to emp2) but also a fall in wages (wage1 to wage2). This increase is only possible if the labour market is able to take on these highly skilled workers. Between 1992 and 2022, the number of graduates in medium/low skilled jobs doubled (CIPD, 2022). Thus, the employment increases would not be realised and the fall in wage rate would be the prevailing effect. Future developments of artificial intelligence may displace high-skilled work, reducing labour demand for graduates (Frank, et al., 2019) (Webb, 2020). Further instances of this research would be intriguing as university attainment continues to rise. In future, vast changes in the value-added from education could occur, specifically regarding life satisfaction.

6 CONCLUSION

Given that the theory of economic utility has shortcomings in its assumptions and that arguments against the use of GDP as a proxy for wellbeing are growing, research into components of human happiness is vital. This analysis has contributed to a valuable bank of evidence assessing whether educational attainment is a factor leading to the improvement of life satisfaction.

Fixed-effects regression models were conducted upon individuals in the United Kingdom surveyed between 2009 and 2023. Results from this show that, compared to those without academic qualification, those that achieve educational qualifications tend to be more satisfied with their life. Despite this, the satisfaction gain is decreasing with the level of education with

the exception of vocational qualifications (other higher degrees). It also concluded that the indirect impact of education on life satisfaction (see figure 1) is weaker than its direct impact. Thus, it can be concluded that educational attainment does have a positive influence on life satisfaction in the United Kingdom.

However, when conducting robustness checks of the models against alternative strategies, the results were almost entirely different. Pooled OLS and binary logit models produced results implying that education is weakly or not at all correlated with life satisfaction, further it displayed a negative impact on the dependent variable. The inconsistency of results across models might enforce a sense of doubt upon the results of the main models. Although, pooled OLS is best suited to data in which different samples are given for each period, otherwise it is inconsistent (Wooldridge, 2010).

The UK is ranked 19th globally for average life evaluation scores (Helliwell, et al., 2023). It must be considered that the analysis provided is conducted upon a relatively happy population in comparison with other countries. To validate the results and provide a more general outlook, the same study should be carried out with a focus on countries with lower life evaluation scores. It is also acknowledged that quality education is more accessible within the UK than it is in some African and South American countries (World Population Review, 2024). Further research should be conducted to compare the influence of education on life satisfaction amongst these countries. Whilst education in the UK is a key life-stage for most of the population, the same cannot be said for the rest of the world. Its impact explored in this analysis is limited to life satisfaction, although the payoffs from having access to quality education are far more vast.

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ANNEX 1: VARIABLE DESCRIPTIONS

Variable name	Description	Understanding Society code
Life satisfaction	How dissatisfied or satisfied are you with your life overall, from 1 (completely dissatisfied) to 7 (completely satisfied).	scfssato
Life satisfaction (binary)	Life satisfaction variable separated into binary dummy variables, in which 0 is equal to a score below 4 and 1 is equal to a score equal to or above 4.	NA
Highest qualification	Variable derived within the Understanding Society data to include the highest educational or vocational qualification achieved by the respondent.	hiqual_dv
Degree	Including higher university degrees (e.g., MSc, PhD) and first-degree level qualifications (including foundation degrees, graduate membership of a professional institute and PGCE).	
Other higher degree	Including diploma in higher education, teaching qualifications (excluding PGCE), nursing or other medical qualification and HNC/HND.	
A-Level etc.	Including A-Level, Welsh Baccalaureate, International Baccalaureate, AS-Level, Scottish highers, certificate of sixth year studies, NVQ/SVQ level 3-5, ONC/OND and BTEC variations. Also inclusive of modern apprenticeship/trade apprenticeship.	
GCSE etc.	Including GCSE, O-level, GNVQ/GSVQ and NVQ/SVQ level 1-2.	
Other qualification	Including CSE and other vocational, technical, or professional qualification.	
No qualification	No qualification achieved by respondent	
Male	Dummy variable denoting 0 when a respondent is female and 1 when a respondent is male.	sex
Age	Variable derived within Understanding Society data calculating the age of the respondent at the time of interview from the respondent's date of birth and date of interview.	age_dv
Health/satisfaction with health	How dissatisfied or satisfied are you with your health, from 1 (completely dissatisfied) to 7 (completely satisfied).	scfssat1
Labour force status	"Which of these best describes your current employment situation?"	jbstat
Gross monthly income	Variable derived within Understanding Society data calculating the following: monthly income from savings and investments + total monthly gross labour income + total income from benefits and other sources.	fimngrs_dv
Current job classification	Registrar General's Social Class (SC) of current job. With current job referring to paid employment within the last week.	jbrgsc_dv

(Understanding Society: The UK Household Longitudinal Study, n.d.)

ANNEX 2: ALTERNATIVE EMPIRICAL STRATEGIES

Table 3: Alternative empirical strategies, coefficient estimates (standard errors)	Dependent variable: Life satisfaction (binary)			
	Pooled OLS		Binary logit (marginal effects)	
	Model 2	Model 3	Model 2	Model 3
*Highest qualification (= degree)	-0.031 (0.062)	-0.042 (0.062)	-0.075 (0.461)	-0.088 (0.465)
(= other higher degree)	-0.051 (0.062)	-0.057 (0.062)	-0.110 (0.461)	-0.116 (0.465)
(= a-level etc.)	-0.063 (0.062)	-0.065 (0.062)	-0.129 (0.461)	-0.129 (0.465)
(= gcse etc.)	-0.076 (0.062)	-0.078 (0.062)	-0.146* (0.461)	-0.145* (0.465)
(= other qualification)	-0.073 (0.062)	-0.075 (0.062)	-0.149* (0.461)	-0.148* (0.465)
(= no qualification)	-0.069 (0.062)	-0.072 (0.062)	-0.145 (0.461)	-0.147* (0.465)
Male	-0.009** (0.004)	-0.008** (0.003)	-0.011*** (0.016)	-0.010*** (0.017)
Square of age	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
*Health (= completely dissatisfied)	0.328*** (0.009)	0.332*** (0.009)	0.223*** (0.149)	0.219*** (0.151)
(= mostly dissatisfied)	0.408*** (0.007)	0.410*** (0.007)	0.259*** (0.147)	0.255*** (0.148)
(= somewhat dissatisfied)	0.553*** (0.006)	0.554*** (0.006)	0.336*** (0.146)	0.331*** (0.148)
(= neither satisfied nor dissatisfied)	0.521*** (0.007)	0.525*** (0.007)	0.273*** (0.147)	0.268*** (0.148)
(= somewhat satisfied)	0.799*** (0.004)	0.801*** (0.004)	0.381*** (0.147)	0.375*** (0.148)
(= mostly satisfied)	0.899*** (0.003)	0.899*** (0.003)	0.829*** (0.146)	0.828*** (0.148)
(= completely satisfied)	0.926*** (0.003)	0.926*** (0.003)	0.334*** (0.152)	0.329*** (0.154)
*Labour force status (= employed)	0.062*** (0.007)	0.039*** (0.008)	0.057*** (0.026)	0.029*** (0.043)
(= unemployed)	-0.102*** (0.010)	-0.098*** (0.011)	-0.119*** (0.049)	-0.111*** (0.053)
(= self-employed)	0.059*** (0.008)	0.040*** (0.009)	0.049*** (0.037)	0.028*** (0.051)
(= retired)	0.125*** (0.008)	0.137*** (0.008)	0.128*** (0.034)	0.134*** (0.035)
Log of gross monthly income		-0.001 (0.002)		0.000 (0.009)
*Current job classification (= professional)		0.059*** (0.10)		0.060*** (0.059)

(= managerial & technical)		0.053*** (0.007)		0.054*** (0.043)
(= skilled non-manual)		0.031*** (0.008)		0.030*** (0.045)
(= skilled manual)		0.026*** (0.008)		0.024*** (0.047)
(= part-skilled)		0.025*** (0.009)		0.025*** (0.048)
(= unskilled)		-0.011 (0.002)		-0.012 (0.071)
Observations	127,812 (9,992 individuals)	124,891 (9,990 individuals)	127,812	124,891
R-Squared	0.343	0.344	0.311	0.312
F-stat / LR test	9167.5	6512.1	45754.1	44621.3

*Represents a group of dummy variables

P-value *<0.10, **<0.05,
***<0.01