

Exploratory analysis of Health Index data 2015-21 and subjective wellbeing

By Simona Tenaglia
Senior Analyst

November 2023

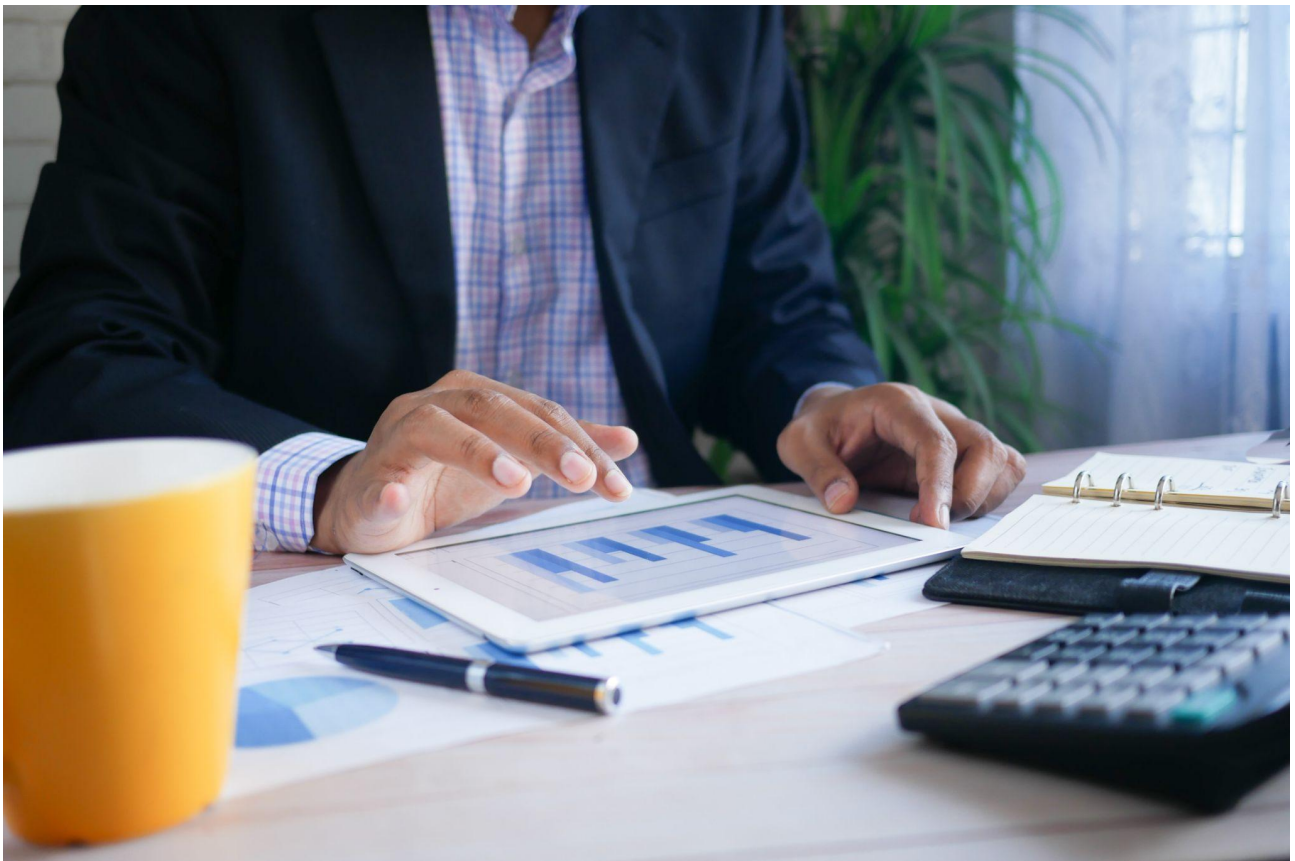


Photo by [Towfiq barbhuiya](#) on [Unsplash](#)

About the author

Simona Tenaglia works on theoretical and empirical aspects of wellbeing at work and financial wellbeing. She also works on the analysis of wellbeing for different age groups. She is a Doctor in Economic Theory with experience in definitions and measures of subjective wellbeing and more than 10 years' experience in labour and social policy analysis.

About the What Works Centre for Wellbeing

We are an independent collaborating centre and the aim of our work is to improve wellbeing and reduce misery in the UK. We believe that this is the ultimate goal of effective policy and community action. By accelerating research and democratising access to wellbeing evidence, we develop and share robust evidence for governments, businesses, communities and people to improve wellbeing across the UK.

-

This analysis has been funded by the Health Foundation, an independent charity committed to bringing about better health and health care for people in the UK. www.health.org.uk

Contents

Introduction	4
Literature review: What we already know	6
The exploratory analysis: methodology	10
The data	10
Our approach	12
The exploratory analysis: Results	12
The Health Index over time	12
Analysis across England regions over 2015-2021	17
Correlation analysis	29
Regression analysis	36
DISCUSSION	41
Difficulties in daily life	41
Mental health	41
Mortality	42
Physical health conditions	42
Behavioural risk factors	43
Children and young people	43
Physiological risk factors	44
Protective measures	45
Overall methodological considerations	45
Conclusion	46
Appendix	47
References	63

Introduction

Mental and physical health is one of the top three drivers of high wellbeing nations, and the biggest driver of individual wellbeing. The relationship is bidirectional, meaning that subjective wellbeing can influence health, and at the same time, health can also impact subjective wellbeing.

Understanding which health factors have the most significant impact on people's subjective wellbeing provides a valuable roadmap for healthcare policymakers and practitioners. There is huge potential for uncovering likely interventions that promote physical and mental health, especially in developing population mental health, rather than just treating illness.

Armed with this knowledge, the Department for Health, and local authorities, can make more informed decisions about healthcare policies and programs, prioritising areas that have the greatest influence on people's lives, and building human capital.

Similarly, healthcare professionals can apply evidence-informed insights to offer more tailored and effective patient care, ultimately improving the health of individuals.

Going 'beyond GDP' - by developing more nuanced understanding through multi-metric approaches to measuring, monitoring, and driving social progress - offers a way to shift from treatment to prevention.

Our goal with this paper is to:

- 1) summarise the main findings of the existing literature on the relationship between some Health index components and subjective wellbeing;
- 2) share insights from exploratory analysis of ONS Health Index data to further investigate the relationships between subjective wellbeing, physical health, and mental health at the local authority level from 2015 to 2021;
- 3) increase access to and use of the Health Index data as a resource within and outside the health sector.

We have made the Stata do code available on the [What Works Centre for Wellbeing GitHub](#) as an open source tool. This is part of our ambition to reduce the cost and improve quality of future analysis, making it easier, cheaper and quicker for ourselves and others.

What is the Health Index?

The Health Index is a tool that measures a broad variety of health outcomes and risk factors over time and for different geographic areas in England at local authority, regional and national levels.

It provides a single value that indicates the health of the nation and can show how health changes over time. It can be broken down to focus on specific topics to show the factors that influence these changes. The Index also enables comparison between geographic areas, health topics and combinations of the two over time.

It uses a broad definition of health, including:

- health outcomes;
- health-related behaviours and personal circumstances;
- wider drivers of health that relate to the places where people live.

It consists of three overarching domains and corresponding subdomains and indicators:

1. *Healthy People*

- Difficulties in daily life (frailty; disability)
- Mental health (children's social, emotional and mental health; mental health conditions; self-harm, suicides)
- Mortality (avoidable mortality; infant mortality; life expectancy; mortality from all causes)
- Personal wellbeing (life satisfaction, worthwhile, happiness, anxiety)
- Physical health conditions (cancer; cardiovascular conditions; dementia; diabetes; kidney and liver disease; musculoskeletal conditions; respiratory conditions)

2. *Healthy Lives*

- Behavioural risk factors (alcohol misuse; drug misuse; healthy eating; physical activity; sedentary behaviour; sexually transmitted infections; smoking)
- Children and young people (early years development; pupil absences; pupil attainment; teenage pregnancy; young people in education, employment and apprenticeships)
- Physiological risk factors (high blood pressure; low birth weight; overweight and obesity in adults; overweight and obesity in children)
- Protective measures (cancer screening attendance; child vaccination coverage)

3. *Healthy Places*

- Access to green spaces (private outdoor space)
- Access to services (distance to GP; distance to pharmacies, distance to sport or leisure facilities; internet access; patients offered acceptable GP practice appointments)

- Crime (low-level crime; personal crime)
- Economic and working conditions (child poverty; job-related training; unemployment; workplace safety)
- Living conditions (air pollution; household overcrowding; noise complaints; road safety; rough sleeping)

The data used for each indicator come from publicly available sources, usually the Office for National Statistics (ONS) or other government departments.¹

While we acknowledge that all three domains are relevant to health, we are focusing on the two domains of Healthy People and Healthy Lives for the purpose of this analysis.

Literature review: What we already know

Table 1 summarises the main findings from the existing literature regarding the relationship between subjective wellbeing and the majority of indicators that make up the two subdomains of Healthy People and Healthy Lives. For a more detailed synthesis of the evidence, see our [extended literature review](#).

Table 1: Summary of the literature

Indicator	Summary of the published literature
Frailty	Frailty is marked by a decline in body functions, leading to increased vulnerability in older adults. Research, including studies by Andrew et al. (2012) and Diener et al. (2018), has demonstrated a consistent inverse relationship between frailty and life contentment.
Disability	Multiple studies, including Sirgy (2021), Van Campen & van Santvoort (2013), and Menhert et al. (1990), find a negative correlation between disability and life satisfaction, though the magnitude of this relationship varies across studies. There are complexities in this relationship, with research, like Riis et al. (2005), indicating only marginal differences in wellbeing between disabled and non-disabled individuals. Other studies delve into factors like personality traits, gender differences, and domain-specific impacts influencing this relationship.

¹ Further detail is available on the data selection and on methods in [Health Index methods and development report](#), and on the data sources in [Health Index datasets](#). The datasets also include details of the weights given to indicators.

Children's social, emotional and mental health and pupil attainments	Research underscores the pivotal role of children's subjective wellbeing in their health, learning, and developmental trajectories (Ben-Arieh, 2008; Park, 2004). Positive correlations exist between subjective wellbeing and school achievements, whereas negative associations are observed with behavioural issues (Amholt et al., 2020; Kaya & Erdem, 2021). Schools significantly influence children's development, with various factors, such as gender, age, and social dynamics, playing critical roles in shaping their wellbeing (Bradshaw et al., 2013; Cho, 2018; Rees & Bradshaw, 2018).
Suicide and self-harm	Suicide is influenced by multiple factors, rendering its sole attribution to mental health issues incomplete. Regions with increased life satisfaction tend to showcase lower suicide rates (Bray, 2006; Zhang, 2017; Liu et al., 2012). Concurrently, Non Suicidal Self-Injury (NSSI) is a prevalent concern, especially during adolescence, and is linked to several psychological disorders and subsequent life outcomes (Barrocas et al., 2012; Swannell et al., 2014; Klonsky, 2007).
Mental health	Multiple studies emphasise that mental health illnesses, including depression, anxiety, schizophrenia, and bipolar disorder, have an inverse relationship with life satisfaction (Bellis et al., 2012; Koivumaa-Honkanen, Honkanen, Antikainen, & Hintikka, 1999; Arnold, Witzeman, Swank, McElroy, & Keck, 2000). Sirgy (2021) indicates a stronger relationship between mental health indicators and subjective wellbeing, compared to physical health.
Chronic illnesses	Multiple studies, including Okely and Gale (2016) and Boehm et al. (2015), found positive correlations between life satisfaction and reduced risk of diabetes onset, especially in women. This relationship is nuanced, as factors like sociodemographics, health behaviours (e.g., physical activity, sedentariness, smoking, and alcohol intake), and existing health complications play roles in diabetes onset and related mortality. Other chronic conditions like respiratory diseases have shown significant impacts on life satisfaction and mental health states such as depression and anxiety (Zhou, 2017; Goodwin, 2014; Monteiro, 2016). Life satisfaction might protect against dementia risk and maintain cognitive functions (Zhu, 2022). Zank (2001) found that individuals with mild dementia exhibited more depressive symptoms and decreased life satisfaction than those with severe forms. Family caregivers' wellbeing, especially those burdened by caregiving demands, significantly affects their life satisfaction (Ju, 2022).

<p>Drug and alcohol misuse</p>	<p>Drugs and alcohol alter brain function, often resulting in feelings of happiness and reduced anxiety due to the release of chemicals like dopamine and norepinephrine (Sirgy, 2021). Multiple studies reveal a nuanced relationship between wellbeing and alcohol consumption: heavy drinking links to reduced wellbeing (Baumberg Geiger & MacKerron, 2016; Dietze et al., 2013), yet moderate drinking relates to higher life satisfaction (Maccagnan et al., 2020). Drug use, particularly early initiation, might increase the risk of depression in later life (Brook et al., 2002). The debate persists over whether the negative effects are directly due to the drugs or the circumstances surrounding drug use, like deteriorating employment, health, and family conditions (Semple et al., 2005).</p>
<p>Healthy eating</p>	<p>Healthy eating is consistently associated with higher life satisfaction and happiness, and reduced anxiety and depression, including for older adults (André 2017). A diet based mostly on plants, natural foods, and low sugar intake can lead to improved mental health outcomes (Sirgy 2021). Veenhoven (2019) found a causal relationship between healthy eating and happiness. Castillo-Mayén (2020) found a correlation between life satisfaction and self-efficacy and motivation to follow a healthy diet in cardiovascular patients. Jackson and DiPlacido (2020) identified subjective vitality as a mediator between diet quality and subjective wellbeing.</p>
<p>Physical Activity and Sedentary Behaviour</p>	<p>Reduced sedentary behaviour and increased physical activity can promote mental wellbeing. Engaging in regular physical activity positively impacts brain structure, function, and mood (Sirgy 2021). Exercise not only offers temporary mood enhancements (Steptoe et al. 1993) but also brings long-term benefits like stress reduction and prevention of depression (Silveira et al., 2013; Schuch et al., 2016). Neurobiological mechanisms, such as the increased production of neurotransmitters, may account for these benefits (Garcia-Segura, 2009; Dishman et al., 2006). Physical activity can increase serotonin synthesis, which has antidepressant effects (Chaouloff, 1997). Conversely, sedentary behaviours correlate negatively with life satisfaction and happiness, and positively with anxiety (Pengpid 2019; Grao-Cruces 2018; Edwards 2017; Allen 2019).</p>
<p>Sexually Transmitted Infections (STIs)</p>	<p>There are mixed findings on the relationship between STIs and subjective wellbeing. Dunne et al. (2018) found negative associations with anxiety and life satisfaction among certain demographics. There's an implied relationship between anxiety, personal resources, STIs, and life satisfaction, but further research is needed for a comprehensive understanding.</p>

Smoking	Smoking is consistently associated with negative mental health outcomes including higher anxiety and depression among smokers (Waal-Manning & de Hame FA, 1978; Patton, 1996). Other research (Davies 1986, Huges et al 1986) highlighted the complex relationship between smoking and emotions, indicating both as causal factors for the other.
Teenage pregnancy	Valois et al. (2002) found negative associations between life satisfaction and sexual risk-taking behaviours. Family dynamics and socioeconomic conditions also influence the occurrence of teenage pregnancies. More specific research identifies family strain, communication dynamics, and physical or sexual abuse as contributing factors (Jaffee et al. 2001).
Young People Not in Education, Employment, or Training (NEET)	Being classified as NEET is associated with lower subjective wellbeing across EU countries (Jongbloed and Giret, 2022). and correlates with increased distress and depression, with some evidence of a bidirectional relationship between mental health issues and being NEET (Bartelink et al., 2019).
High blood pressure	High blood pressure is generally associated with lower life satisfaction, happiness, and worthwhileness and increased anxiety. Several studies, including Mojon-Azzi (2011) and Szabó (2020), found a negative correlation between hypertension and life satisfaction.
Low birth weight	Negative mental health outcomes are associated with low birth weight. Studies have identified factors like stress during pregnancy and linked them to increased risks of very low birth weight (Sable 2000). Young adults with low birth weight also reported more mental health problems (Lund 2012).
Adults & Children Overweight and Obesity	Obesity is negatively associated with subjective wellbeing, especially in females (Katsaiti , 2012, Latif, 2014). The direct impact of obesity on subjective wellbeing might be influenced more by the health complications of obesity rather than obesity itself (Böckerman et al. 2014).
Cancer screening attendance	Cancer screenings are crucial for early detection and treatment but can also cause psychological distress. Davies et al. (2018) underline the benefits of endoscopic screenings in mortality reduction but caution about emotional stress, especially after positive results. The psychological impact varies among individuals, with some feeling increased anxiety and others unaffected. Studies by Essink-bot (1998) and Zhu (2022) highlight this variance, emphasising that reactions depend on the type of screening and individual responses.

<p>Child vaccination coverage</p>	<p>Maternal anxiety is associated with incomplete vaccinations in children under three (Ozkaya et al. 2010). Luthy et al. (2013) also address anxiety around childhood vaccinations, finding it present even among compliant parents, occurring before, during, and after the vaccination. To address such concerns, they recommend customised education, adjustments in practice, and access to credible vaccination information.</p>
-----------------------------------	--

The exploratory analysis: methodology

The data

For this analysis, we used two types of data available from the ONS website, covering 307 local authorities and 9 regions across England for the period 2015 to 2021:

1. **Health Index scores**, both for the overall index and the indices of the three domains, 14 subdomains, and 56 indicators. These data are accessible at both the Lower Tier Local Authorities (LTLA) level, the nine regions level and at the country level, covering all England.
2. **Underlying data** for the 56 indicators, available for the LTLA. Given the 7 years covered, we have a panel of 2,149 observations.

We are interested in exploring the relationship between subjective wellbeing and the indicators of both physical and mental health, covered by variables in the domains of Healthy People and Healthy Lives. It's important to note, as specified above, that all the indicators comprising the Health Index are crucial for individuals' health.²

When utilising the Health Index scores, the values have been adjusted to a baseline of 100 for England, using the year 2015 as the reference point. Values exceeding 100 signify better health compared to England in 2015, while values below 100 indicate worse health.

When utilising the underlying data, each variable has its own unit of measurement, as described by the [ONS](#). For subjective wellbeing variables, average values are considered for each LTLA. These values are calculated based on the four survey questions used by the ONS, focusing on life satisfaction, happiness, worthwhile, and anxiety (ONS4). These questions are incorporated into various [surveys](#) and correspond to the following questions (see Table 2).

² The suggestion for a Health Index was put forward in the 2018 annual report by the former Chief Medical Officer of the government, Dame Sally Davies. He suggested that the Index should be "inclusive of health outcome measures, modifiable risk factors and the social determinants of health"
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/767549/Annual_report_of_the_Chief_Medical_Officer_2018_-_health_2040_-_better_health_within_reach.pdf

Table 2: ONS4 questions

Measure	Question	Scale
Life Satisfaction	Overall, how satisfied are you with your life nowadays?	0 to 10, where 0 indicates 'not at all' and 10 indicates 'completely.'
Worthwhile	Overall, to what extent do you feel that the things you do in your life are worthwhile?	0 to 10, where 0 indicates 'not at all' and 10 indicates 'completely.'
Happiness	Overall, how happy did you feel yesterday?	0 to 10, where 0 indicates 'not at all' and 10 indicates 'completely.'
Anxiety	On a scale where 0 is “not at all anxious” and 10 is “completely anxious”, overall, how anxious did you feel yesterday?	0 to 10, with 0 representing 'not at all anxious' and 10 representing 'completely anxious.'

Source: Office for National Statistics

For ONS4, higher values of life satisfaction, happiness, and worthwhile correlate with greater wellbeing, while elevated levels of anxiety correspond to lower wellbeing.

When we use the Health Index scores calculated by the ONS, the interpretation of anxiety variables will differ: higher values correspond to lower anxiety. This is because, in constructing an index from comparable indicators, the ONS had to ensure uniformity in the direction of change.³ Consequently, adjustments were applied to anxiety and other indicators so that higher values correspond to improved health across all indicators. This adjustment involved multiplying the values of specific indicators by negative ones.

The other variables employed in the analysis are those included in the Healthy People and Healthy Lives domains. See page 5-6 for a full list. Summary statistics related to the 56 indicators, calculated from the underlying data, are presented in Table A1 of the Appendix.

³ See:

<https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandwellbeing/methodologies/healthindexmethodsanddevelopment2015to2019#homogenising-the-data-normalisation-coin-step-5>

Our approach

Our approach involves:

- a description of the role of the Healthy People domain, especially for variables related to subjective wellbeing, as well as those pertaining to physical and mental health, in the variations of the Health Index over the period 2018-2021;
- a **descriptive analysis** of subjective wellbeing variables over time and across different regions, in addition to the variables concerning physical and mental health;
- a **correlation analysis** between the subjective wellbeing variables and the remaining indicators within the Healthy People and Healthy Lives domains, using heatmaps to visualise them;
- a **panel data analysis** over the period 2015-2021 with subjective wellbeing variables as dependent variables and the indicators from the domains of Healthy People and Healthy Life as regressors.

For the descriptive analysis, we will use the indicator scores as calculated by the [Office for National Statistics \(ONS\)](#).

The exploratory analysis: Results

The Health Index over time

The value of the Health Index in England was 100.8 in 2021, an improvement compared to 2020 (100.1) ([ONS 2023](#)). This can be primarily attributed to progress observed in both the Healthy People and Healthy Places domains.

The Healthy People indicator experienced a pronounced decline during the years 2018-2019 (2 points) and 2019-2020 (4.1 points), and a positive shift emerged in 2021, indicating a gradual recovery (figure 1) .

The Healthy Lives indicator displays a declining trend. While the decrease observed during the period of 2019-2020 was less pronounced, it continued into 2021 (figure 2).

The Healthy Places indicator shows an upward trend over the years 2018-2021, with the highest variation in 2019-2020 (3 points) (figure 3).

Fig. 1: Healthy People indicator over time 2015-2021

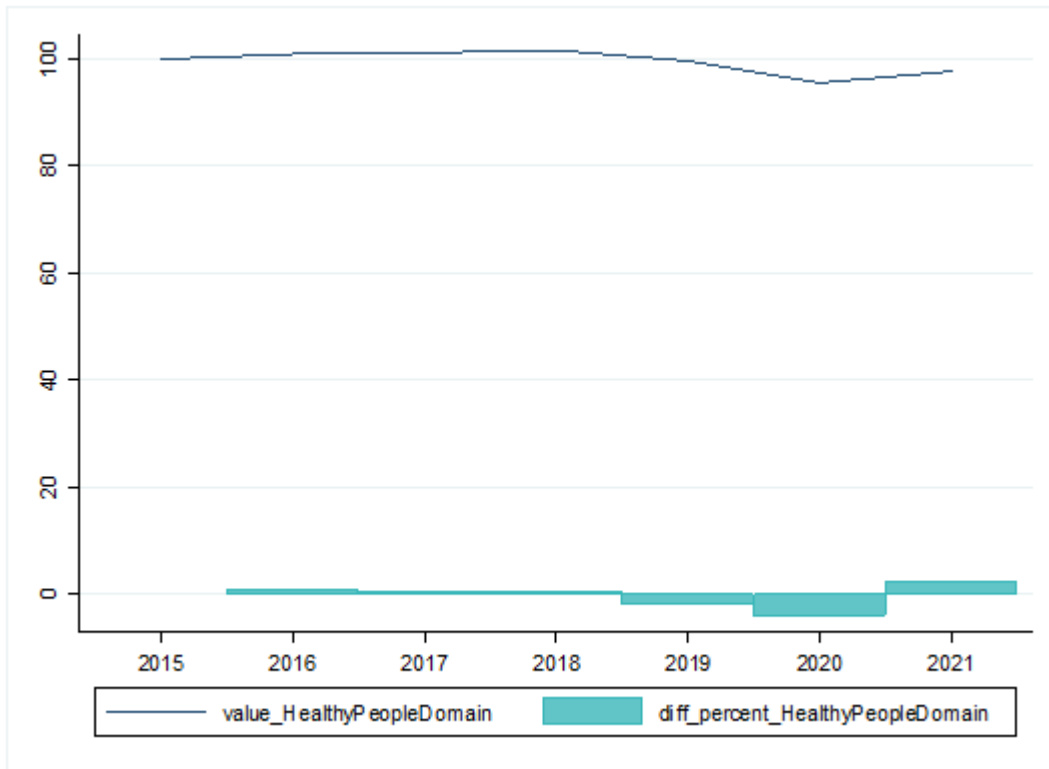


Fig. 2: Healthy lives indicator over time 2015-2021

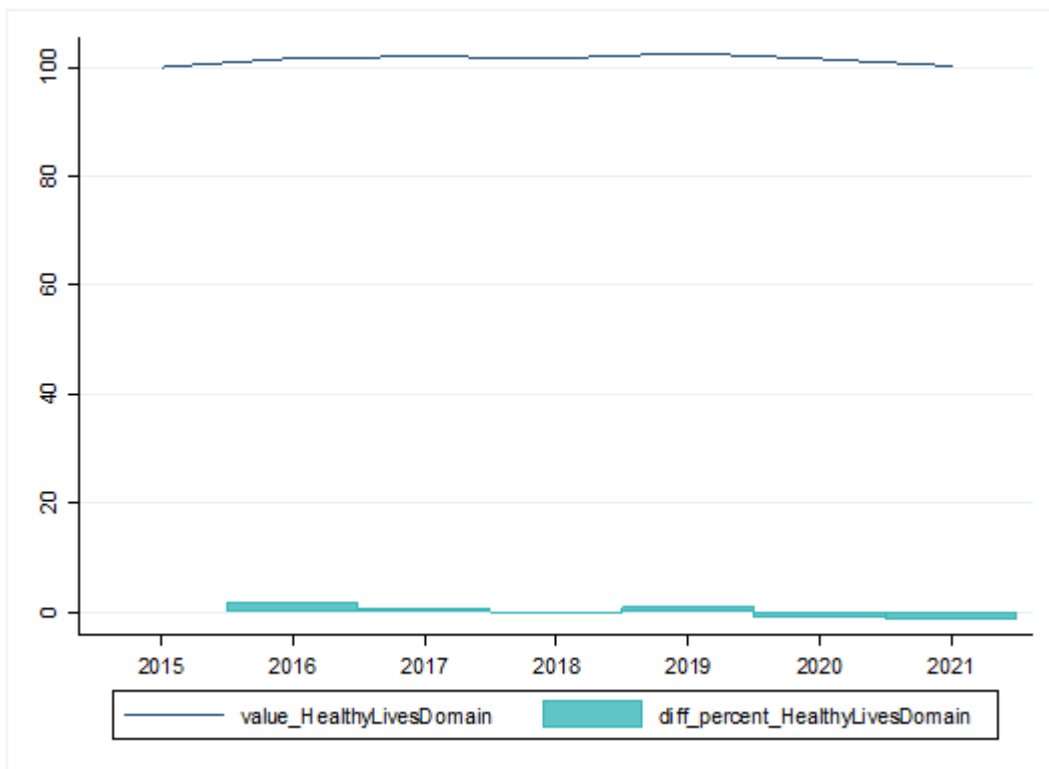
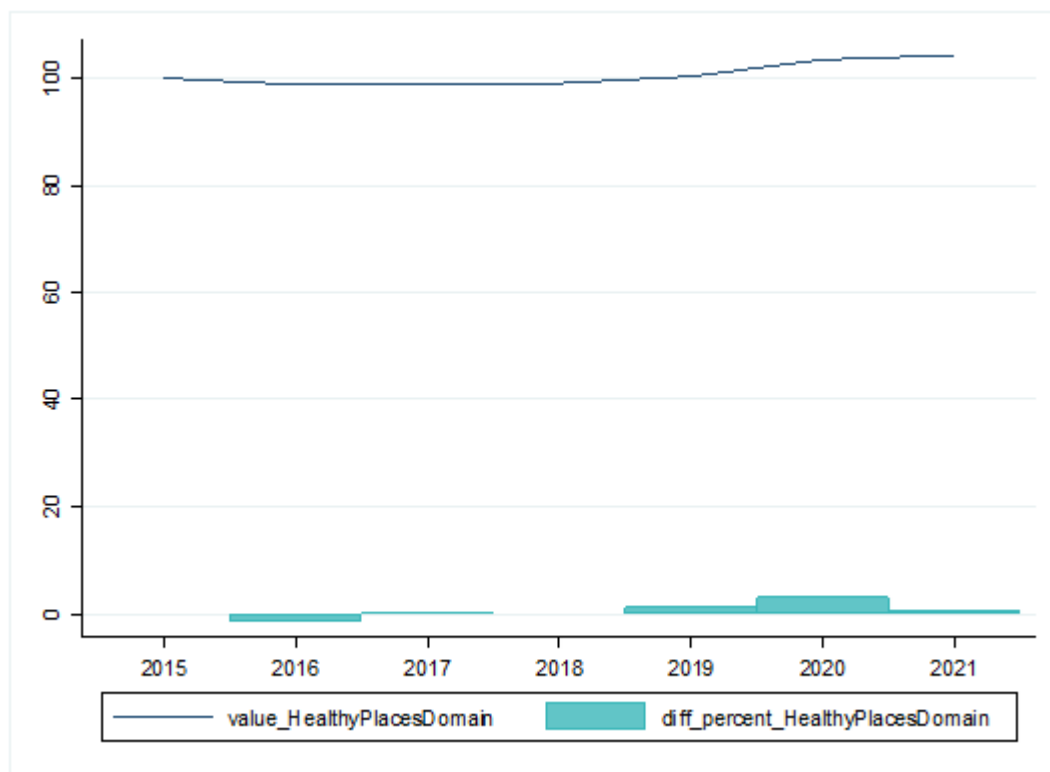


Fig. 3: Healthy Places indicator over time 2015-2021



We are particularly interested in the fluctuations within the Healthy People domain, especially for the variables related to subjective wellbeing, as well as those concerning physical and mental health. As indicated by the [ONS \(2023\)](#), mortality, physical health conditions, and personal wellbeing index improved, while mental health and difficulties in daily life index declined.

In Figures 4 to 6, clearer insight emerges regarding the indicators that experienced fluctuations within the subdomains. These figures depict the yearly changes of all 56 indicators during the periods 2018-2019, 2019-2020, and 2020-2021. Specifically, in Figure 4, which captures the 2020-2021 change, there is a positive shift in life satisfaction, happiness, worthwhileness, and anxiety. Notably, during the preceding two years (2018-2019 and 2019-2020), these same indicators show a decrease.

As for the indicators included in the mental health domain, both suicides and mental health conditions consistently show negative variations across all the period. Within the subdomain mortality, the indicator mortality for all causes experienced a 10-point decrease in 2019-2020, followed by a growth of 1.6 points in 2020-2021. Within the physical health conditions subdomain, the indicators kidney and liver diseases, as well as respiratory conditions, show a decrease starting from 2018 and 2019, respectively. Looking at the difficulty in daily life domain, the disability indicator shows a consistent negative change throughout the years considered.

Fig. 4: Indicators variation in 2020-2021

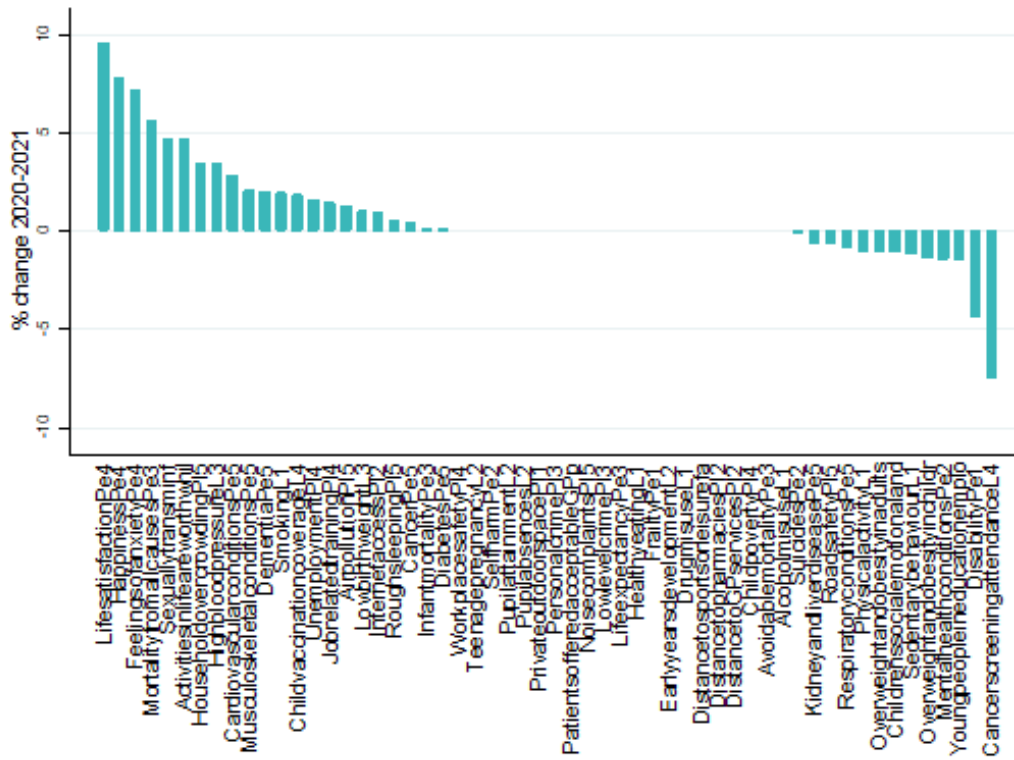


Fig. 5 : Indicators variation in 2019-2020

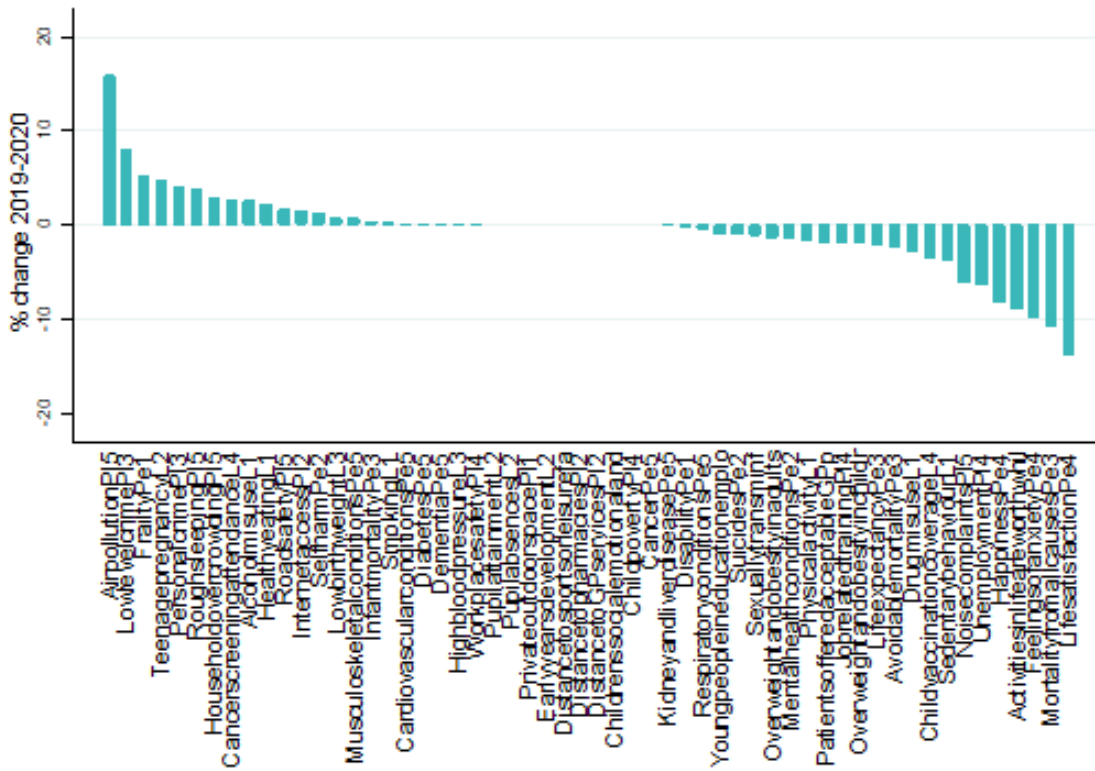
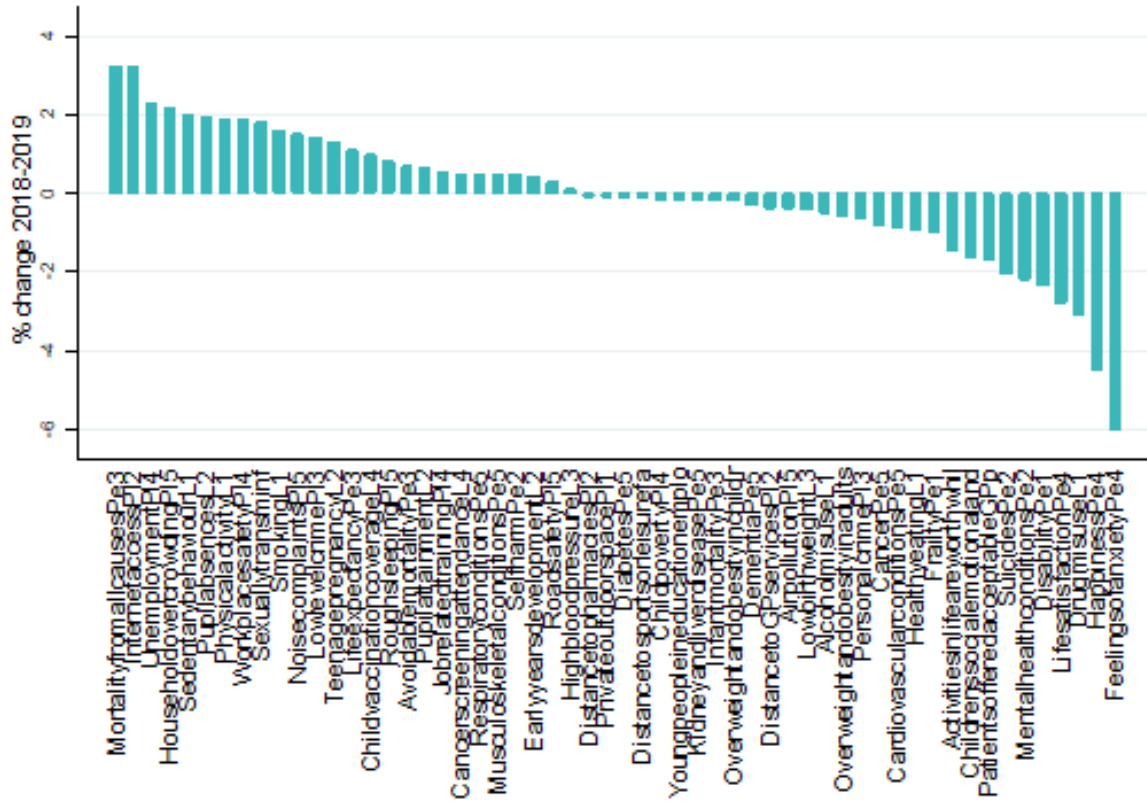


Fig. 6: Indicators variation in 2018-2019

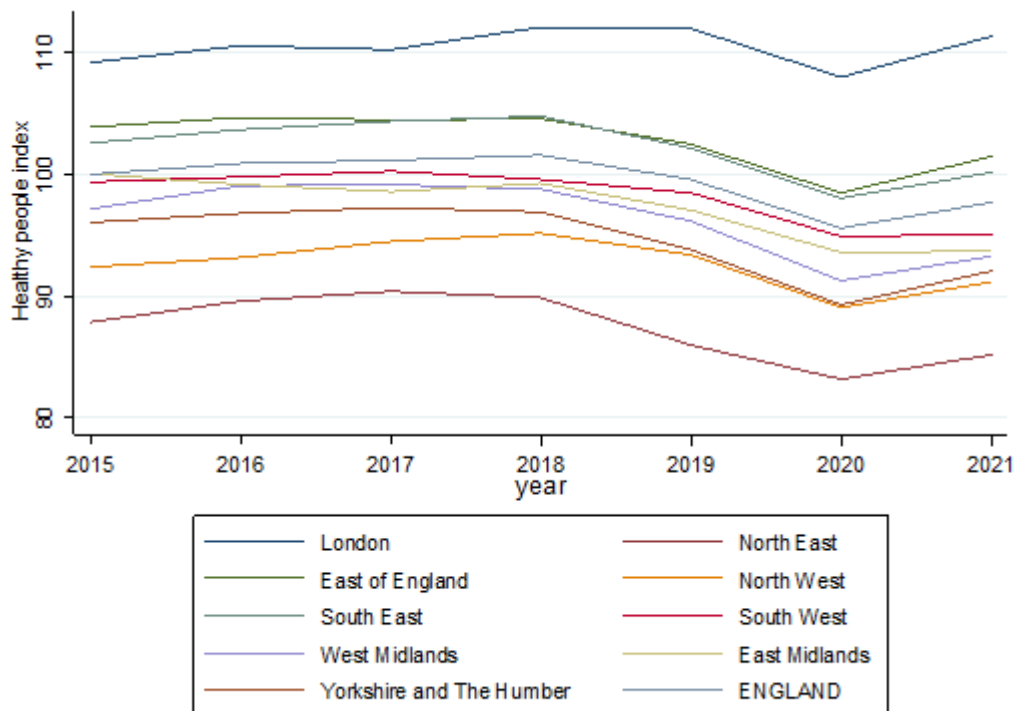


Analysis across England regions over 2015-2021

We now look at trends for the Healthy People Index, and its corresponding subdomain indices and single indicators, across the nine regions of England.

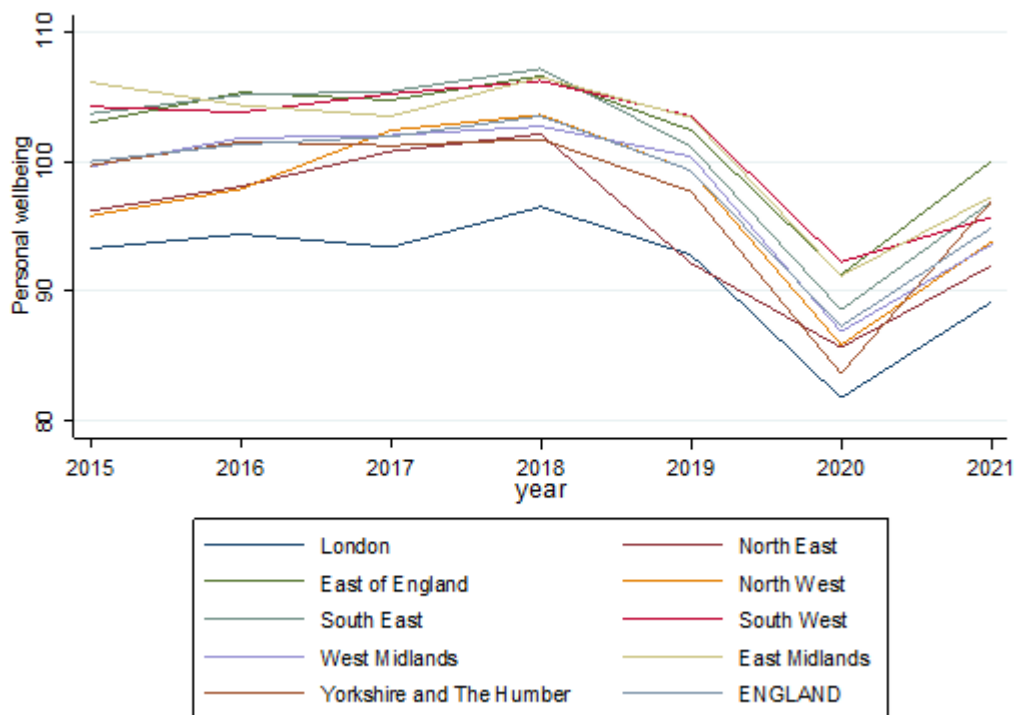
Figure 7 shows the trend of the Healthy People Index over time, broken down by region. London, East of England, and South East show the highest values, while the North East, North West, and Yorkshire and the Humber regions conversely present the lowest values.

Fig. 7: Healthy People index over regions 2015-2021



When we analyse the subdomain index for Personal Wellbeing (figure 8), it becomes evident that every region experienced a decrease in this indicator during the year 2020, followed by an improvement in 2021. Notably, the regions of London, North West, and North East consistently demonstrated the lowest values throughout the entire period.

Fig. 8: Personal wellbeing index over regions 2015-2021



When considering the subjective wellbeing variables within the Personal Wellbeing subdomain (figure 9-12), a similar pattern emerges. In this context, all four variables experienced a decrease in 2020. Notably, as previously mentioned, an adjustment has been applied to the anxiety indicator. This adjustment aligns lower values with higher levels of anxiety, indicating a decline in wellbeing. The region of London exhibits the lowest values for worthwhile and life satisfaction, in addition to showing the worst condition in terms of anxiety throughout the observed period, alongside the North East region.

Fig. 9: life satisfaction over region 2015-2021

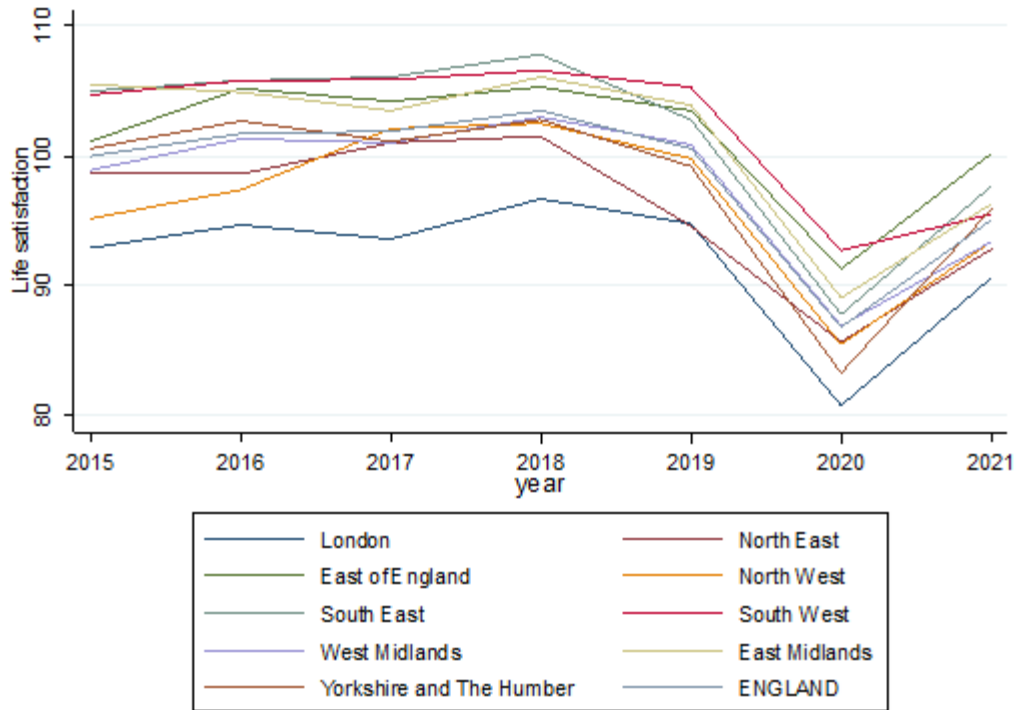


Fig. 10: Happiness over region 2015-2021

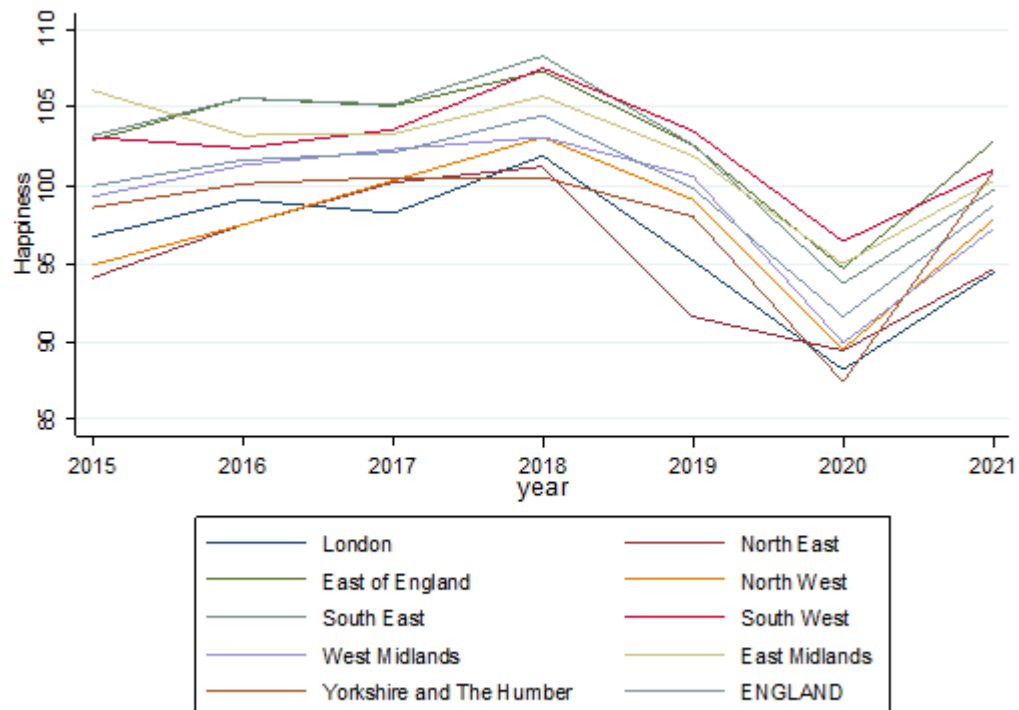


Fig. 11: Worthwhile over region 2015-2021

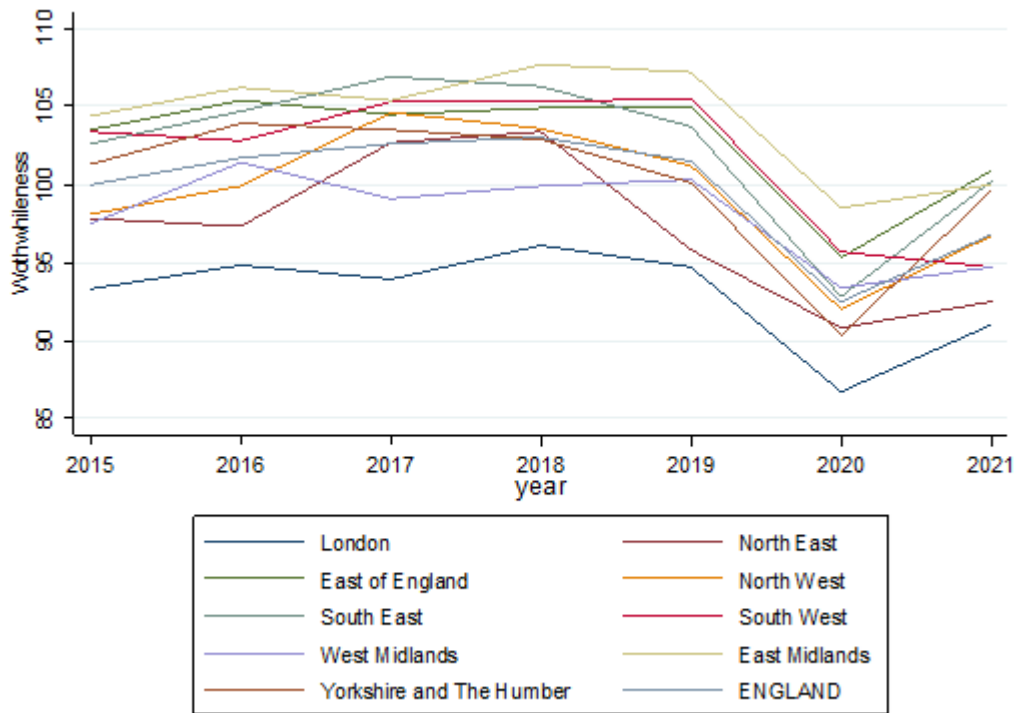
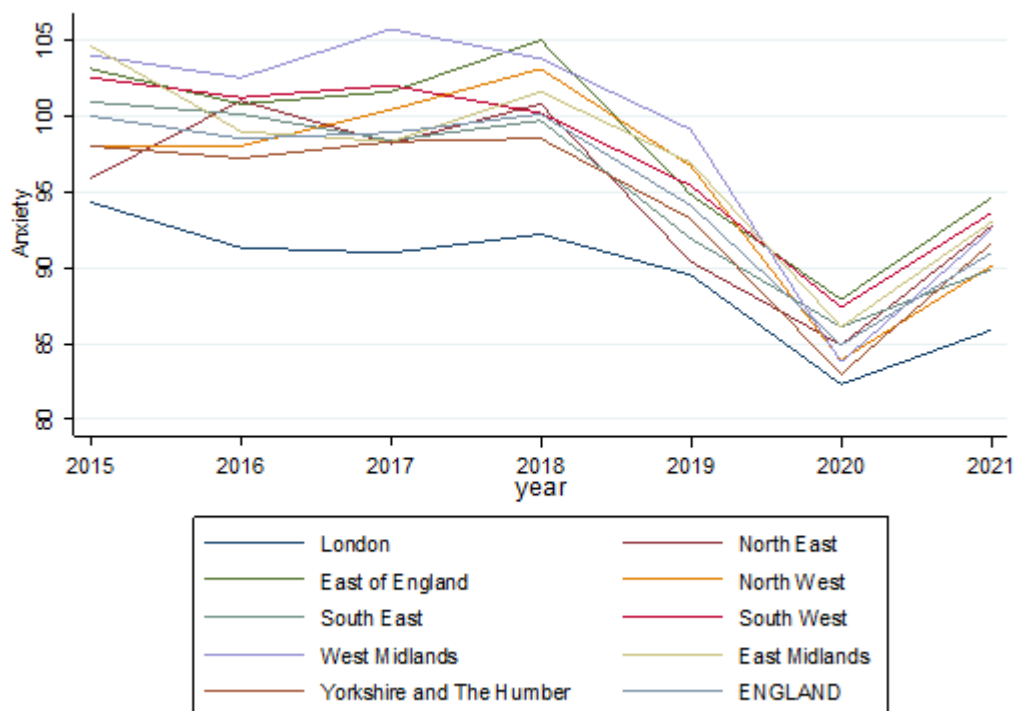


Fig. 12: Anxiety over region 2015-2021



In examining the mortality subdomain index (Figure 13), a clear dichotomy becomes evident among the regions. Specifically, London, South West, South East, and East of England consistently register indicator values above 100 throughout all the examined years. On the other hand, the remaining regions consistently maintain values below 100. Notably, despite these differences, all regions share a common trend: a decline in the indicator during 2020, likely attributable to the impact of the pandemic, followed by a recovery in 2021.

The North East and North West regions face challenging circumstances in relation to three indicators within the mortality subdomain, as depicted in Figures 14 and 15. These indicators encompass mortality for all causes, avoidable mortality, and life expectancy. In 2020, the indices for these metrics experienced a substantial reduction, indicating worsened health outcomes, likely due to the impact of the pandemic. However, 2021 saw a significant rebound in these indicators, showing evident signs of improvement.

Fig. 13 : Mortality index over region 2015-2021

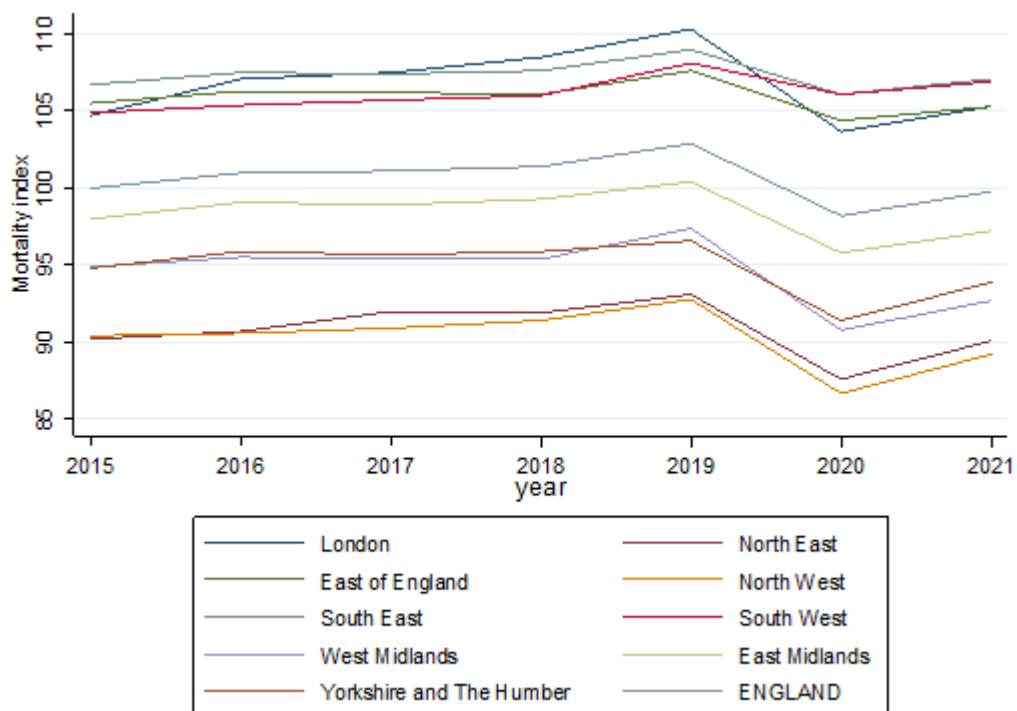


Fig. 14: Subdomain mortality indicators over region 2021

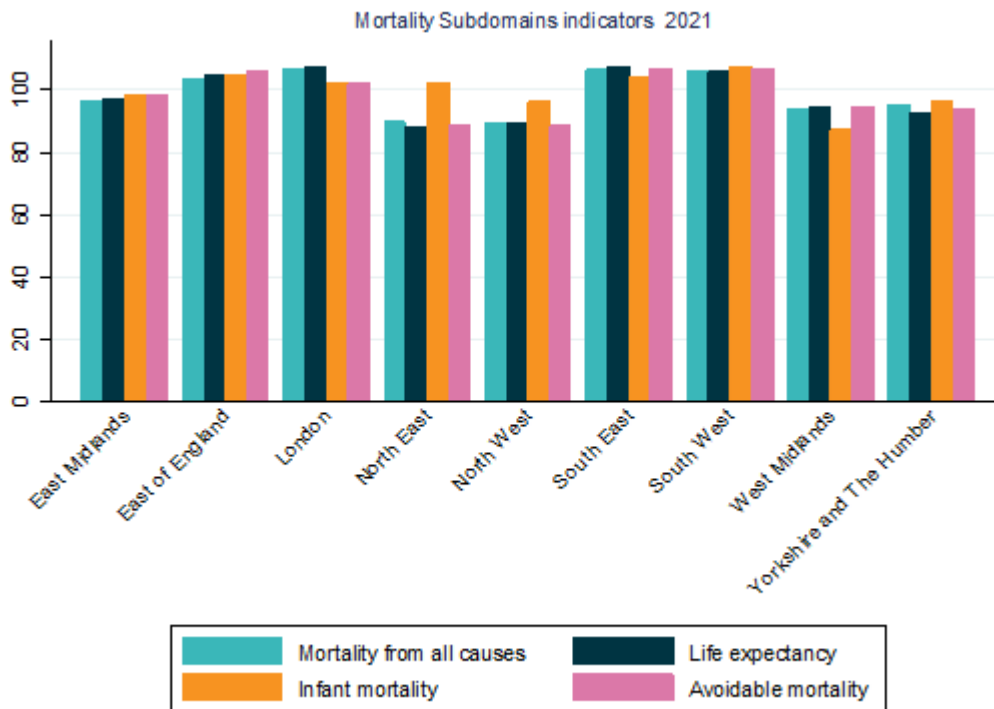
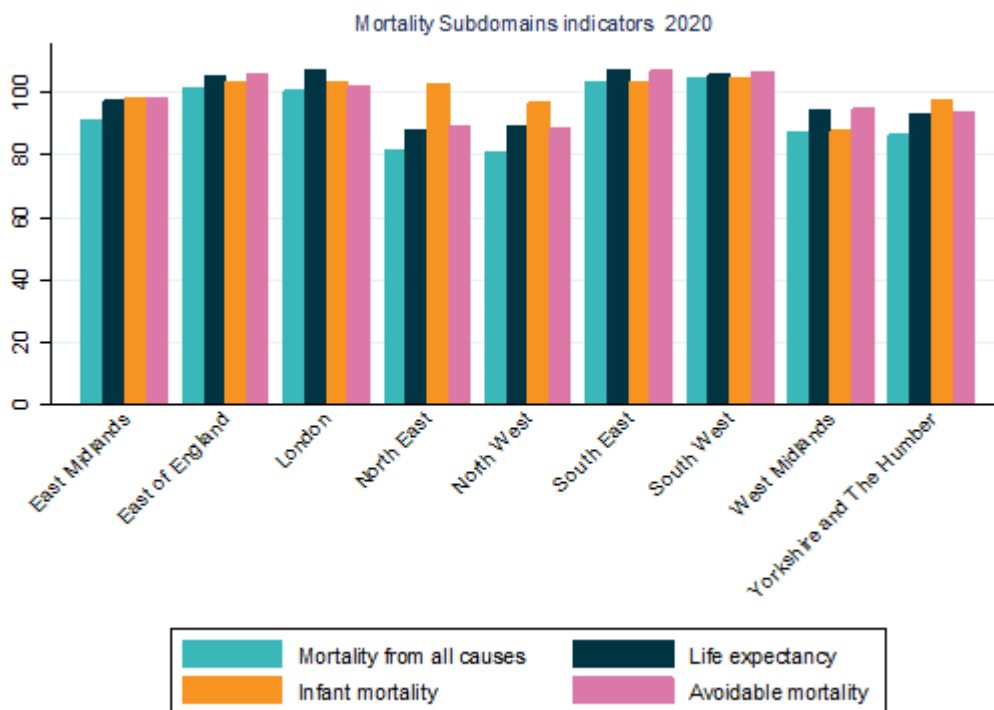


Fig. 15: Subdomain mortality indicators over region 2020



Regarding the indicator for the mental health subdomain (figure 16), London consistently shows significantly higher values compared to all the other regions from 2015 to 2021. This disparity is primarily attributed to the better performance of the Self-harm and Suicide indicators (figure 17-19). Conversely, the North East and the South West regions stand out with the lowest values for all indicators encompassed within the mental health subdomain.

Fig. 16 : Mental health index over region 2015-2021

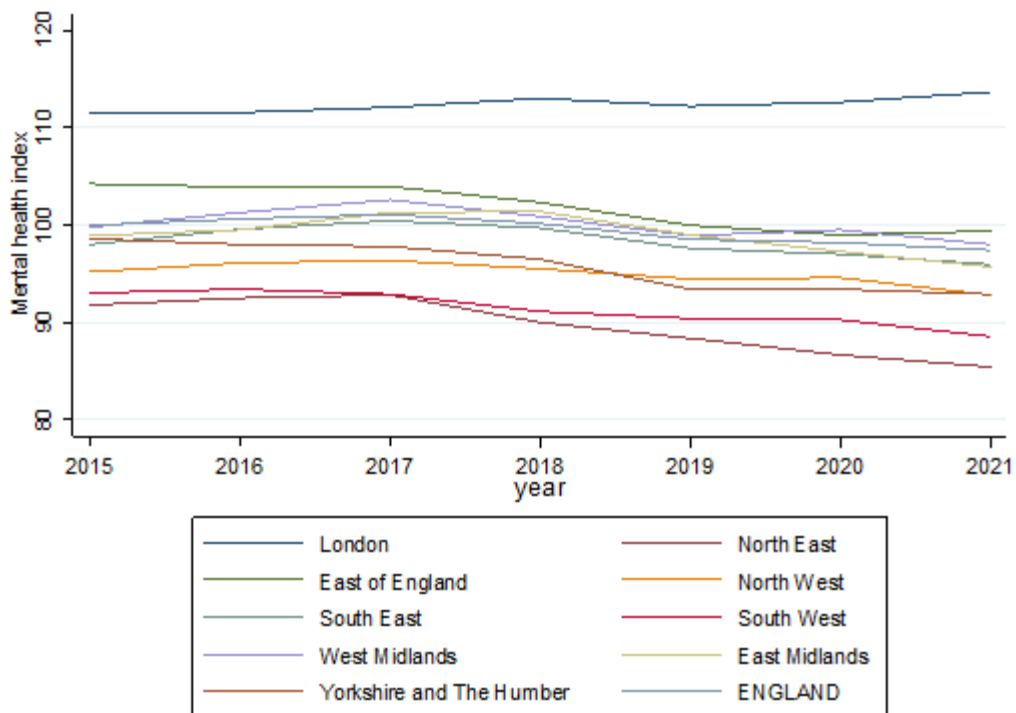


Fig. 17: Mental health subdomain indicators 2021

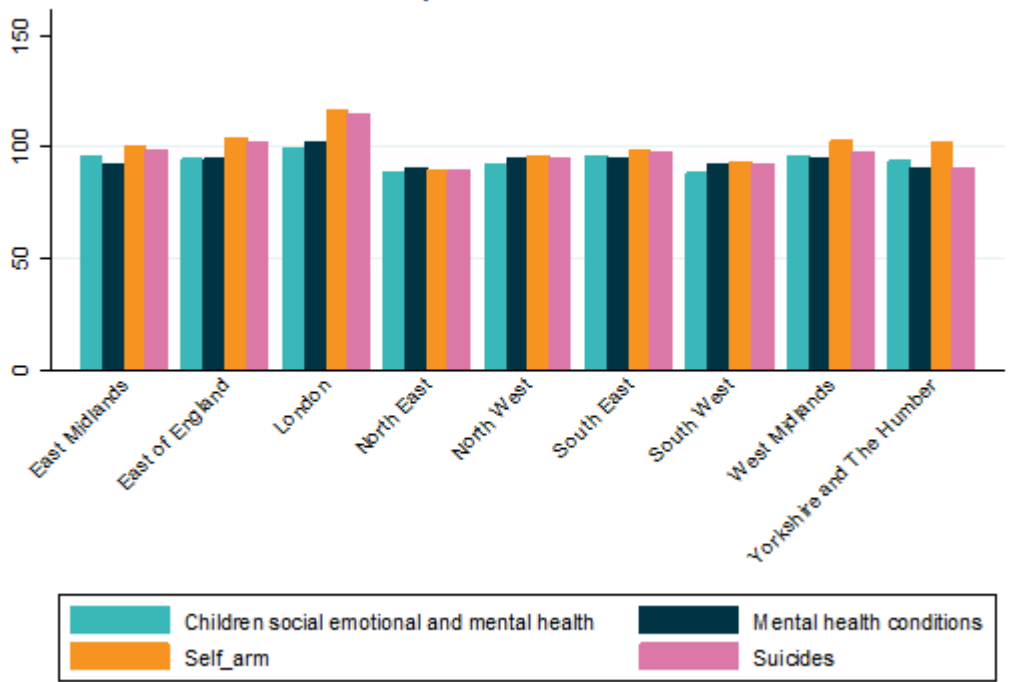


Fig. 18: Mental health subdomain indicators 2020

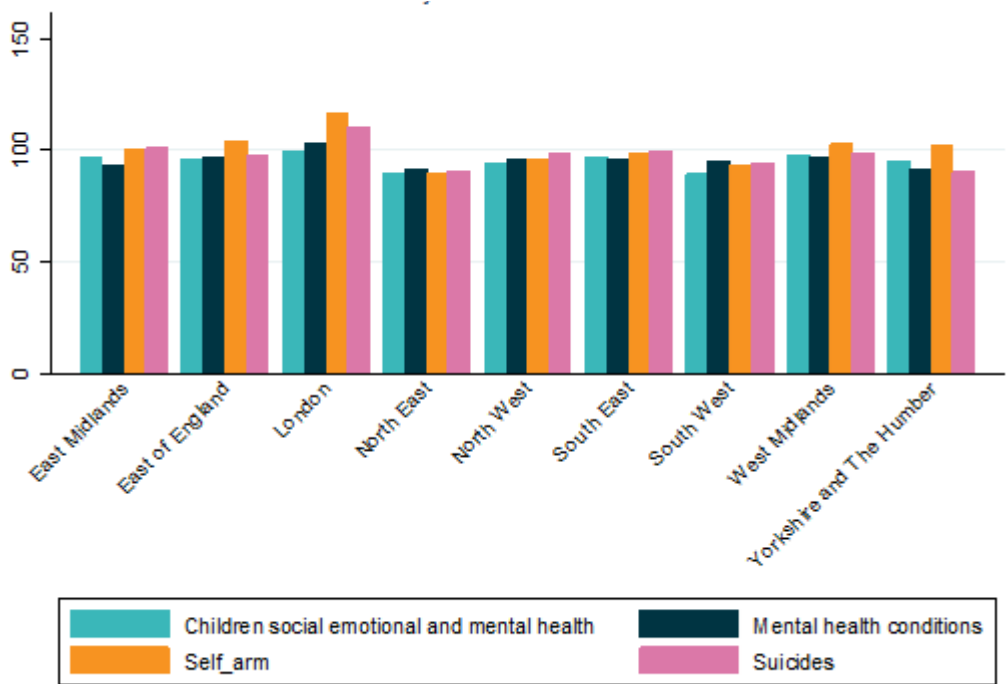
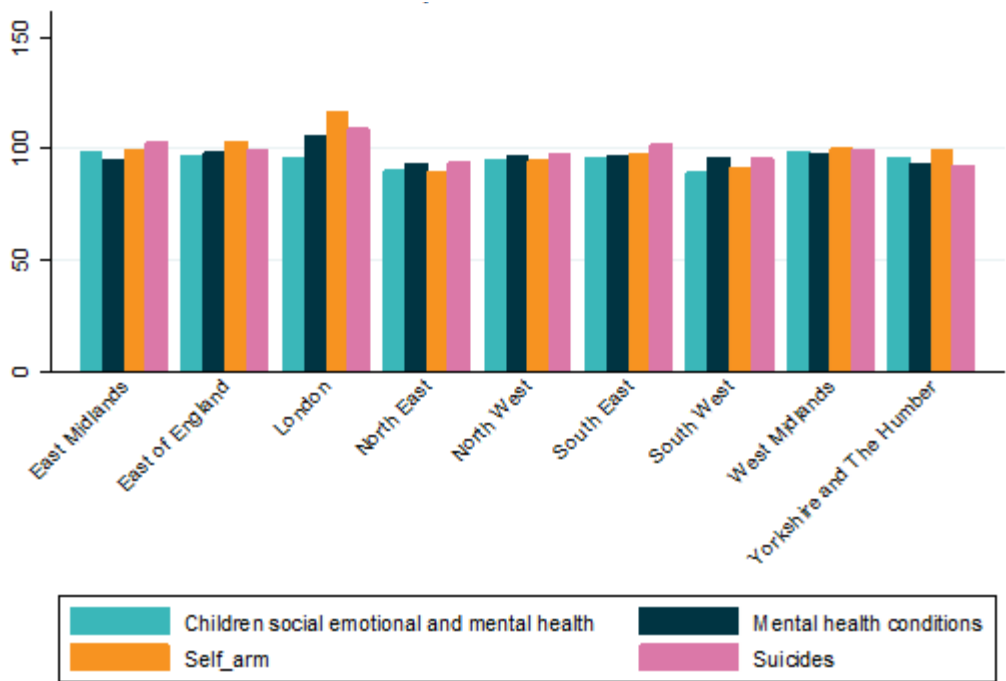


Fig. 19: Mental health subdomain indicators 2019



Regarding the Physical Health subdomain index (Figure 20), London consistently achieves the highest scores 2015-2021. In contrast, the North East and South West regions consistently record the lowest scores. Indicators for musculoskeletal, respiratory, and cardiovascular conditions are particularly pronounced for London in 2021 (Figure 21)

Fig. 20 : Physical health conditions index over region 2015-2021⁴

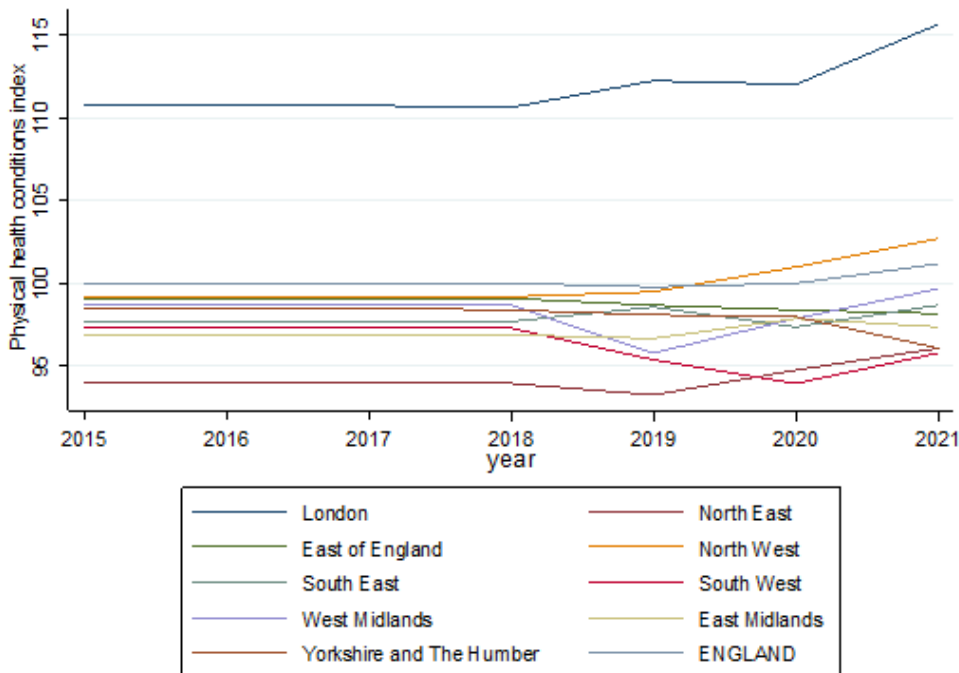
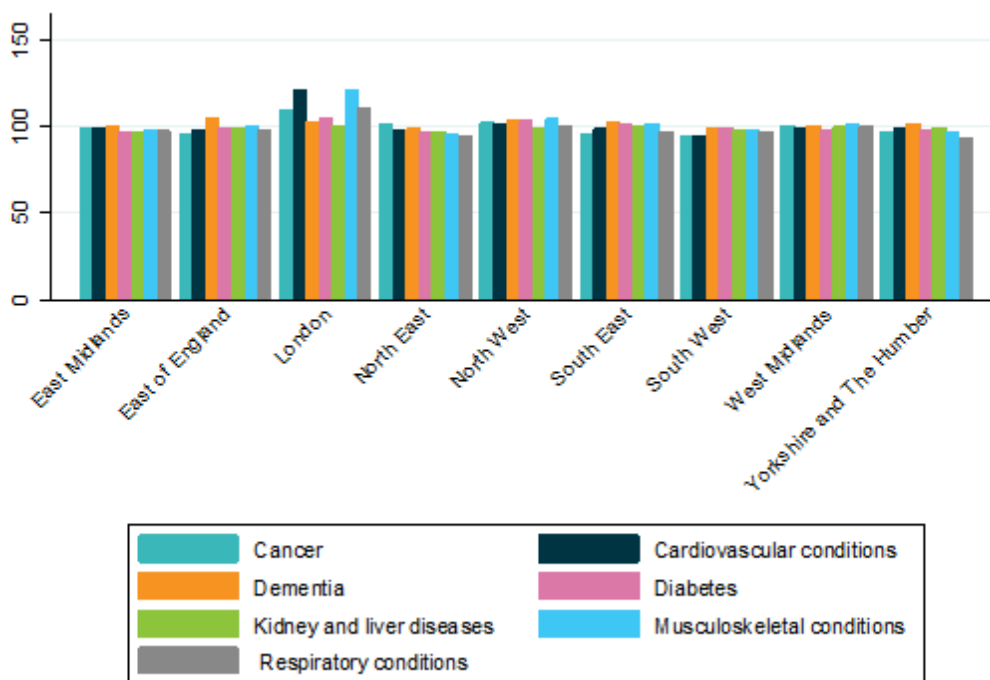


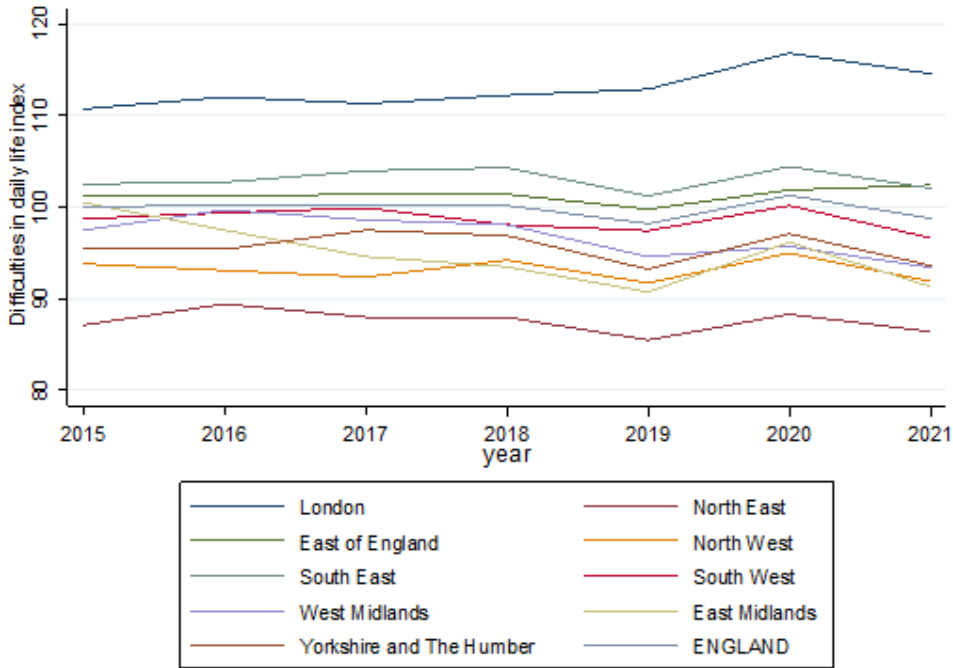
Fig. 21: Physical health conditions indicators 2021



⁴ The values of the indicators related to health conditions are not available for the years 2015-2017. In such cases, the ONS imputes the index value from 2018.

The London region, along with the South East and East of England regions, displays the highest value for the Difficulties in daily life subdomain index (Figure 22). In contrast, the North East and North West regions record the lowest values.

Fig. 22 : Difficulties in daily life index



Within this subdomain, the Disability indicator consistently exhibits lower values than the frailty indicator (figures 23-25).

Fig. 23: Difficulties in daily life indicators 2021

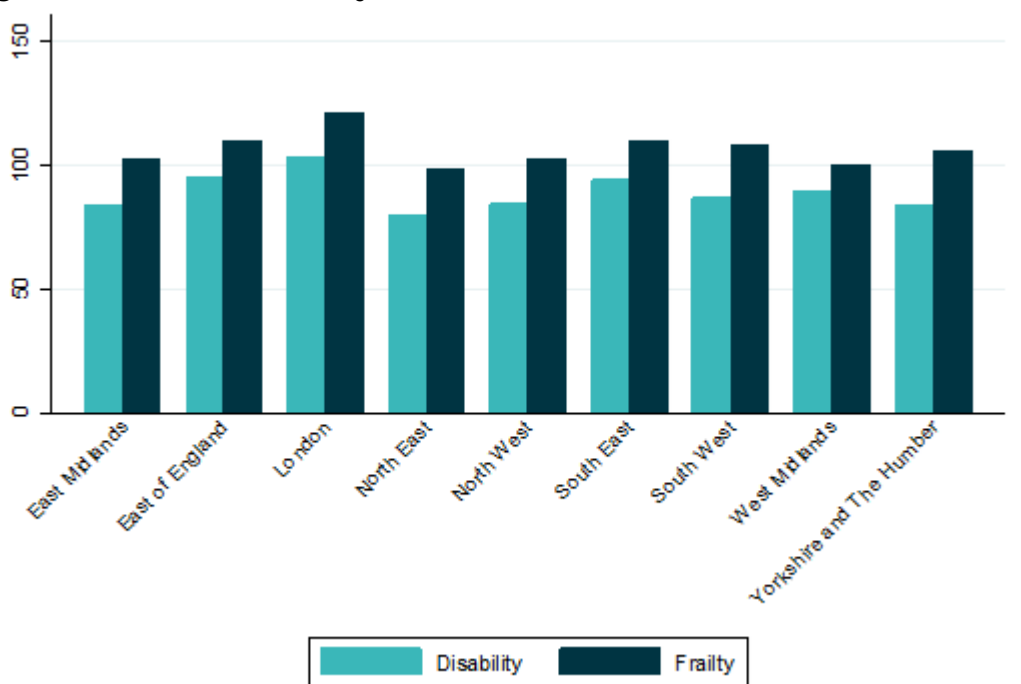


Fig. 24: Difficulties in daily life indicators 2020

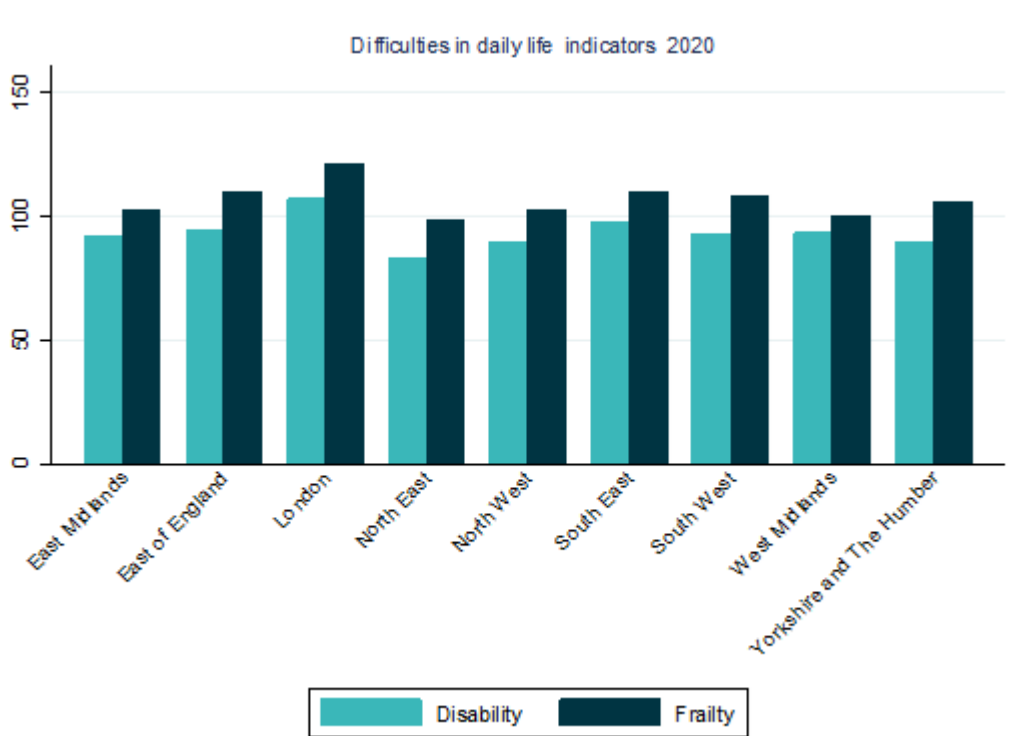
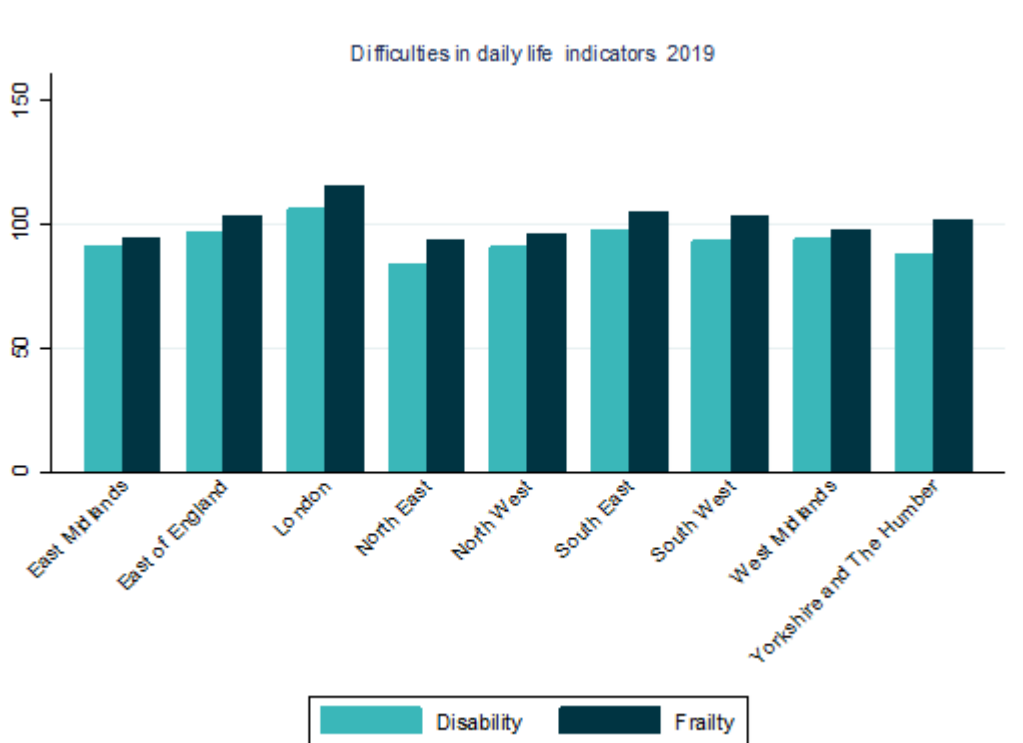


Fig. 25: Difficulties in daily life indicators 2019



Correlation analysis

We examine correlations between the subjective wellbeing variables and the indicators within the Healthy People and Healthy Lives domains, using underlying data released by the ONS where wellbeing variables are represented by mean levels for each local authorities.

The correlation analysis, conducted as an initial exploratory step, provides preliminary insights which will be confirmed, validated or refined by subsequent regression analysis.

For indicators with very high correlations, we conducted a multicollinearity test⁵. In the Healthy People domain, the variables with significant multicollinearity in the mortality subdomain are:

- avoidable mortality
- life expectancy
- mortality from all causes.

In the physical health conditions subdomain, they are:

- cardiovascular conditions
- musculoskeletal conditions
- respiratory conditions

In the Healthy Lives domain, within the behavioural risk factors subdomain, the variables showing multicollinearity are:

- physical activity
- sedentary behaviour

Figure 24 and Table A3 show correlations for the Difficulty in daily life domain and subjective wellbeing indicators. When focusing on subjective wellbeing variables, life satisfaction exhibits a significant and moderately strong positive correlation with happiness and worthwhileness. Anxiety exhibits significant negative correlations with happiness, worthwhileness, and life satisfaction.

The disability indicator displays negative correlations with life satisfaction, happiness, and worthwhileness, while showing a positive correlation with anxiety. This suggests that as levels of disability increase, levels of anxiety also tend to increase.

⁵ A test of multicollinearity is a statistical analysis conducted to assess the degree of correlation between two or more independent variables (predictors) in a model. Multicollinearity occurs when these variables are highly correlated, making it challenging to discern the individual effects of each variable on the dependent variable (outcome). High multicollinearity can lead to unstable coefficient estimates and reduced interpretability of regression results. Addressing multicollinearity can involve various strategies, such as removing one or more correlated variables, transforming variables, or combining them into composite variables.

Fig. 24: Correlations among subjective wellbeing variables and indicators difficulty in daily life subdomain

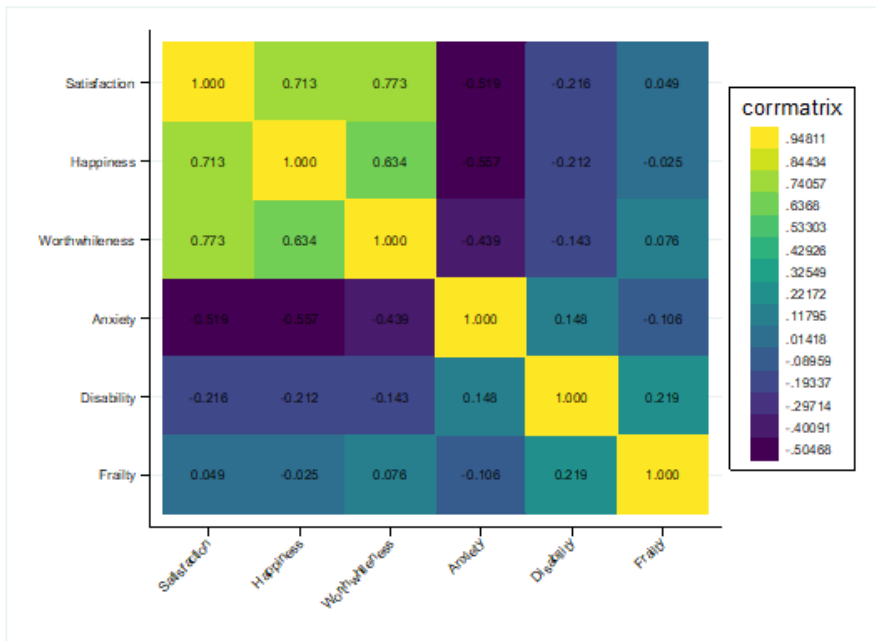
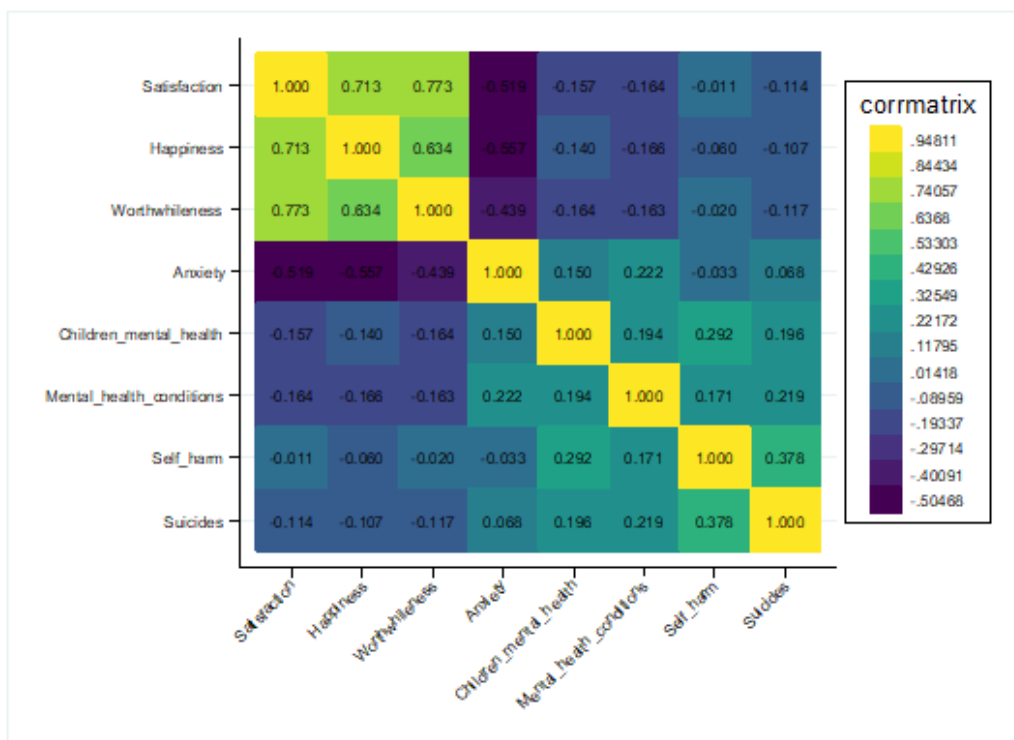


Figure 25 and Table A4 show the correlations between self-harm, suicides, and mental health conditions with life satisfaction, happiness, worthwhileness and anxiety.

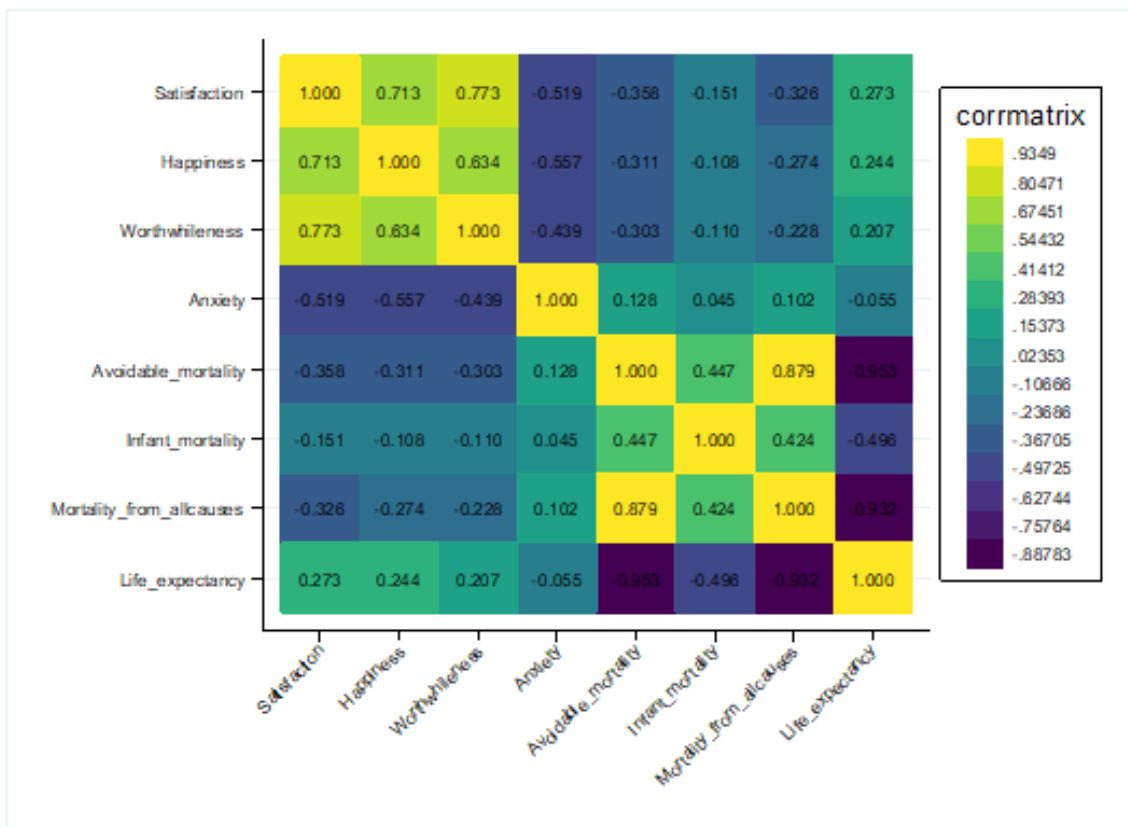
Fig. 25: Correlations among subjective wellbeing variables and indicators and mental health subdomain



The analysis reveals that mental health conditions and suicides are negatively correlated with life satisfaction, happiness, and feelings of worthwhilenes, and positively correlated with anxiety. Children's social, emotional and mental health⁶ has a negative correlation with life satisfaction, happiness, and feelings of worthwhilenes, and a positive correlation with anxiety.

Notably, there are negative correlations between mortality indicators (avoidable mortality, infant mortality, mortality for all causes) and subjective wellbeing variables, whereas there is a significant positive correlation between life expectancy and subjective wellbeing (figure 26, table A5). It is important to note, however, that the indicators of mortality from all causes, life expectancy, and avoidable mortality are highly correlated. This highlights a possible problem of multicollinearity, as will be described in the regression analysis.

Fig. 26: Correlations among subjective wellbeing variables and indicators and mortality subdomain



When examining variables related to Physical health conditions (Figure 27, Table A6), the indicator for dementia lacks a significant correlation with subjective wellbeing variables. Additionally, there are relatively small negative correlations observed between diabetes and subjective wellbeing measures.

⁶ Children's social, emotional, and mental health is measured by the ratio of the total number of pupils with social, emotional, and mental health listed as their primary special educational need (SEN) requirement to the total number of pupils.

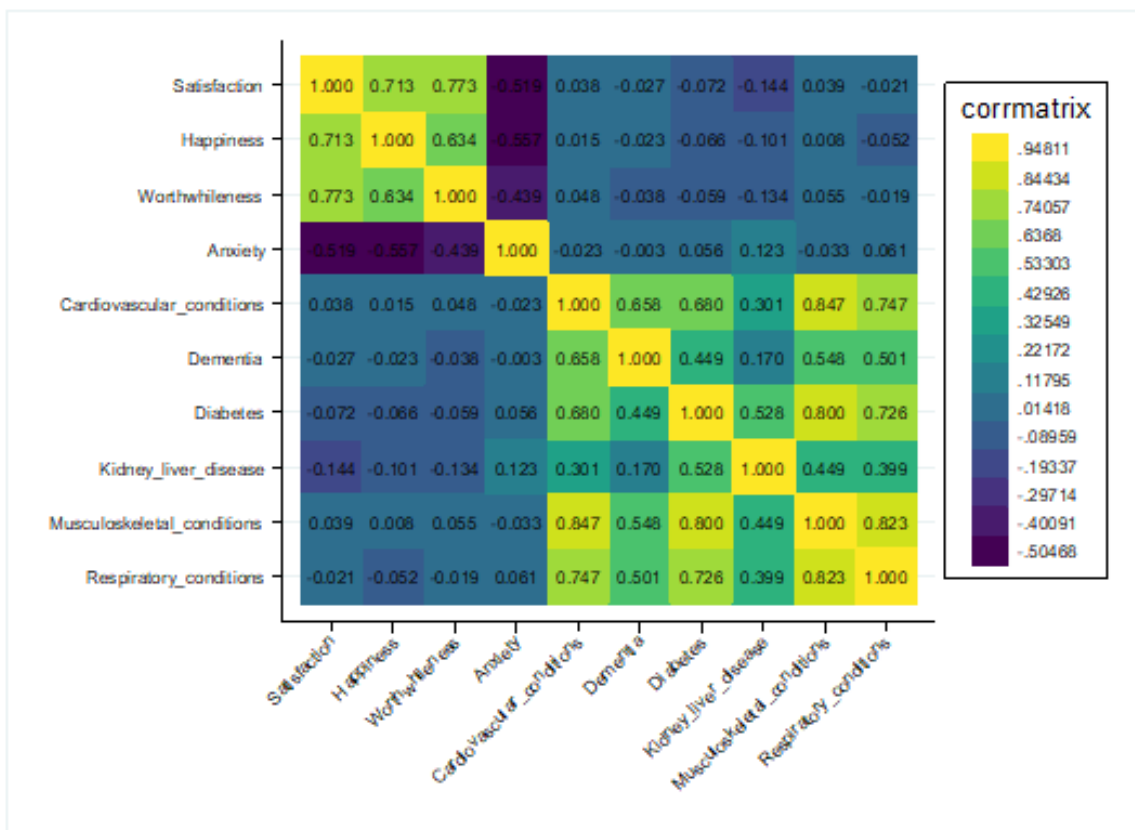
In regard to the correlation between kidney and liver conditions and subjective wellbeing, the coefficients do suggest a degree of significant negative correlation.

Respiratory conditions exhibit a negative correlation with happiness and a positive correlation with anxiety, although the values are small.

Cardiovascular conditions demonstrate only a slight positive correlation with worthwhileness.

It is important to note the high correlation among cardiovascular conditions, musculoskeletal conditions, and respiratory conditions. We accounted for this by conducting a multicollinearity test in the regression analysis.

Fig. 27: Correlations among subjective wellbeing variables and indicators of Physical health conditions domain

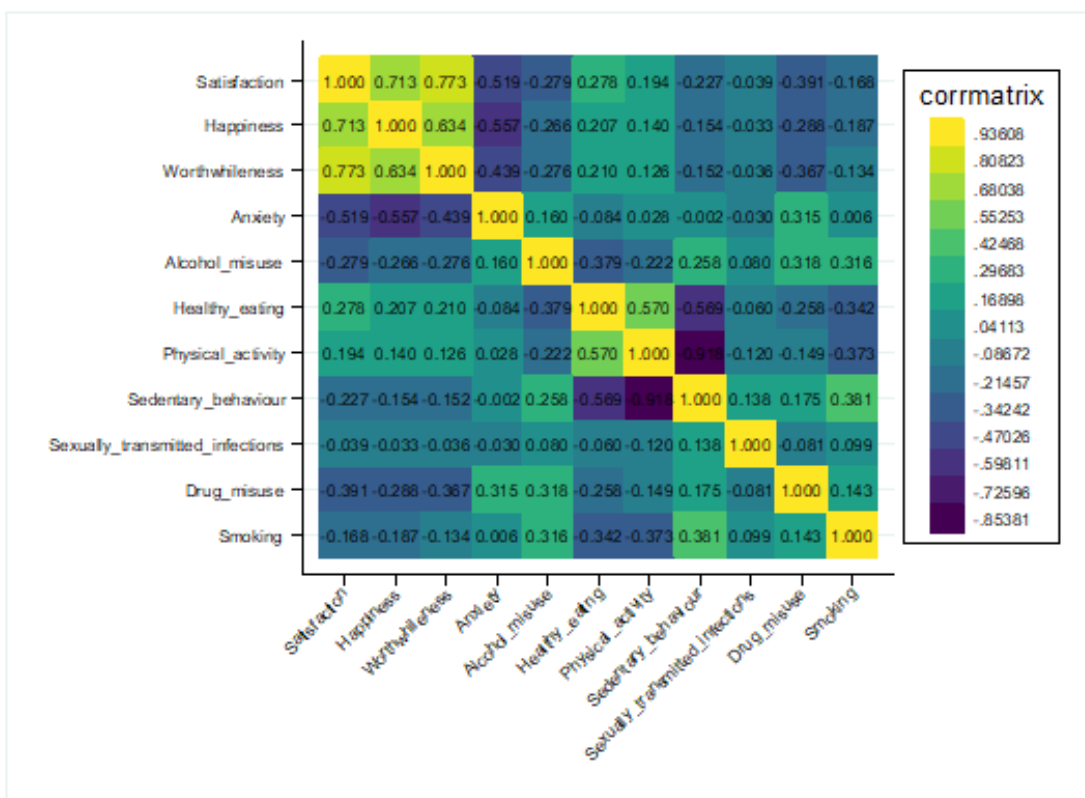


Alcohol misuse, drug misuse, and smoking display significant negative correlations with life satisfaction, happiness, and worthwhileness. Additionally, alcohol and drug misuse demonstrate a positive correlation with anxiety (Figure 28, Table A7).

Healthy eating and physical activity exhibit positive correlations with life satisfaction, happiness, and worthwhileness. Conversely, sedentary behaviour presents a negative correlation with life satisfaction, happiness, and worthwhileness. It is important to note that the correlation between sedentary behaviour and physical activity is very high, giving rise to a problem of multicollinearity that will be addressed in the regression analysis.

Generally, the correlations between sexually transmitted infections and subjective wellbeing are weak and not significant

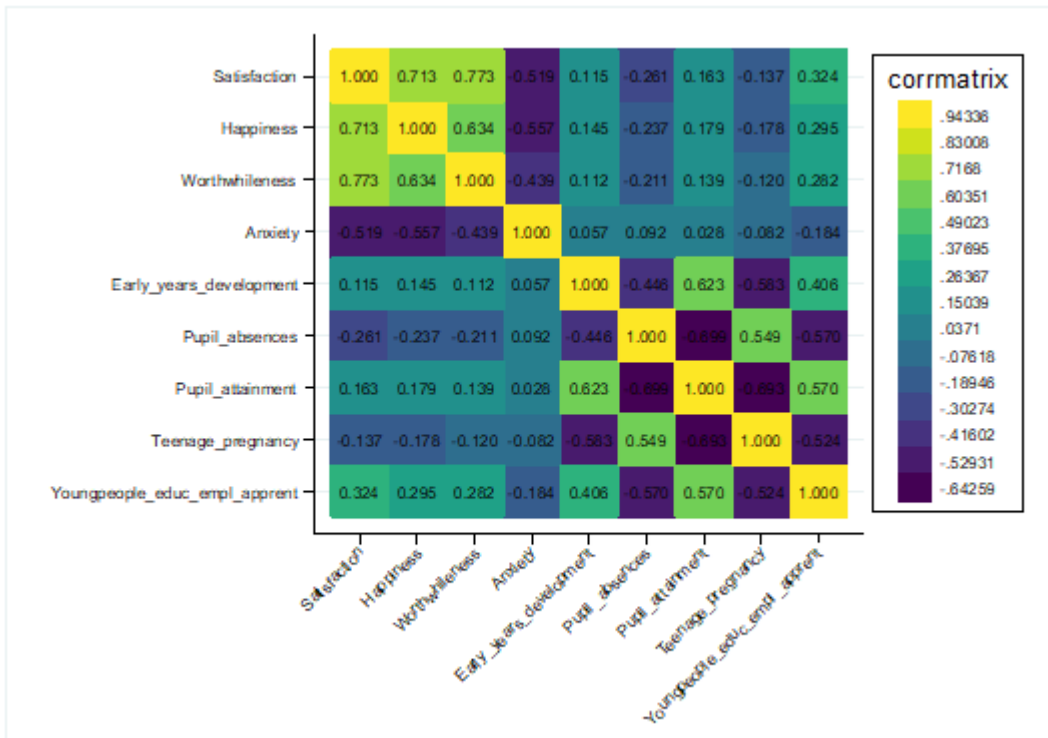
Fig. 28: Correlations among subjective wellbeing variables and indicators of behavioural risks factor domain



When we consider children and young people behavioural variables (figure 29, table A8) we can see that pupil absence shows negative correlations with subjective wellbeing variables. On the contrary, higher pupil attainments⁷ are positively correlated with higher levels of life satisfaction, happiness, and worthwhileness. Teenage pregnancy shows negative correlations with subjective wellbeing variables.

There is a positive correlations between young individuals enrolled in education, engaged in employment, or participating in traineeship programs⁸ and subjective wellbeing. This provides support to the idea that targeted initiatives aimed at enhancing the educational and occupational opportunities for young people are associated with heightened levels of life satisfaction, happiness and a perception of meaningful existence.

Fig. 29: Correlations among subjective wellbeing variables and indicators of children and young people domain

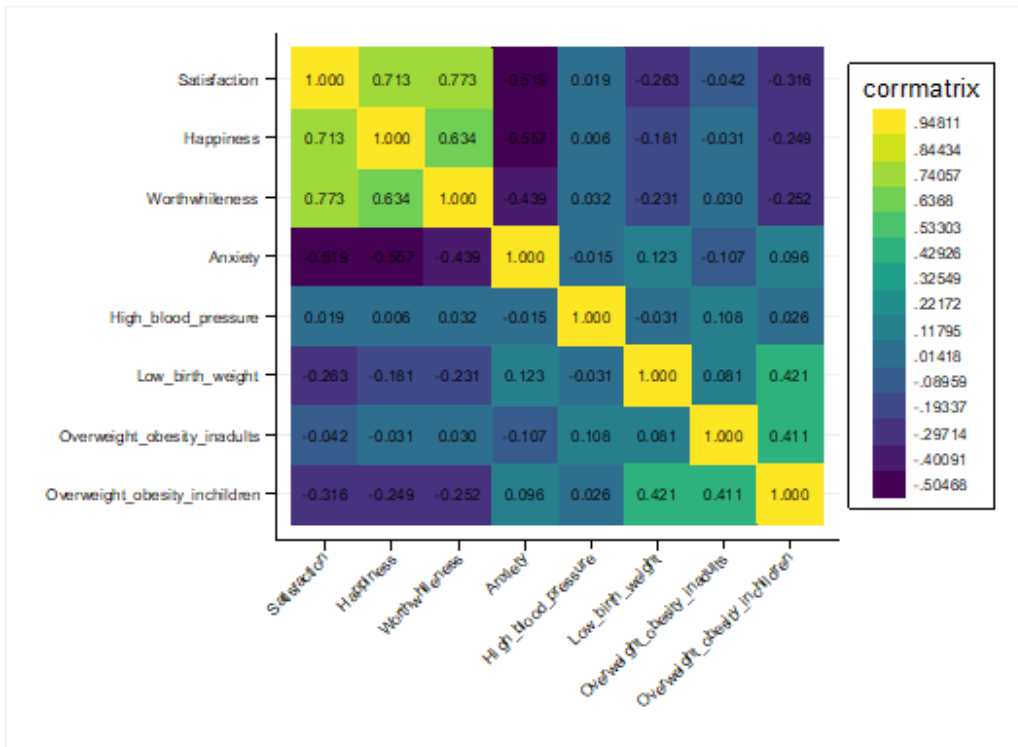


The indicators of Overweight and obesity in children, as well as low birth weight, are negatively correlated with subjective wellbeing indicators (figure 30).

⁷ The indicators pupil attainment represent the number of state school pupils achieving the required GCSE grade (C or 4 and above) in both English and Mathematics

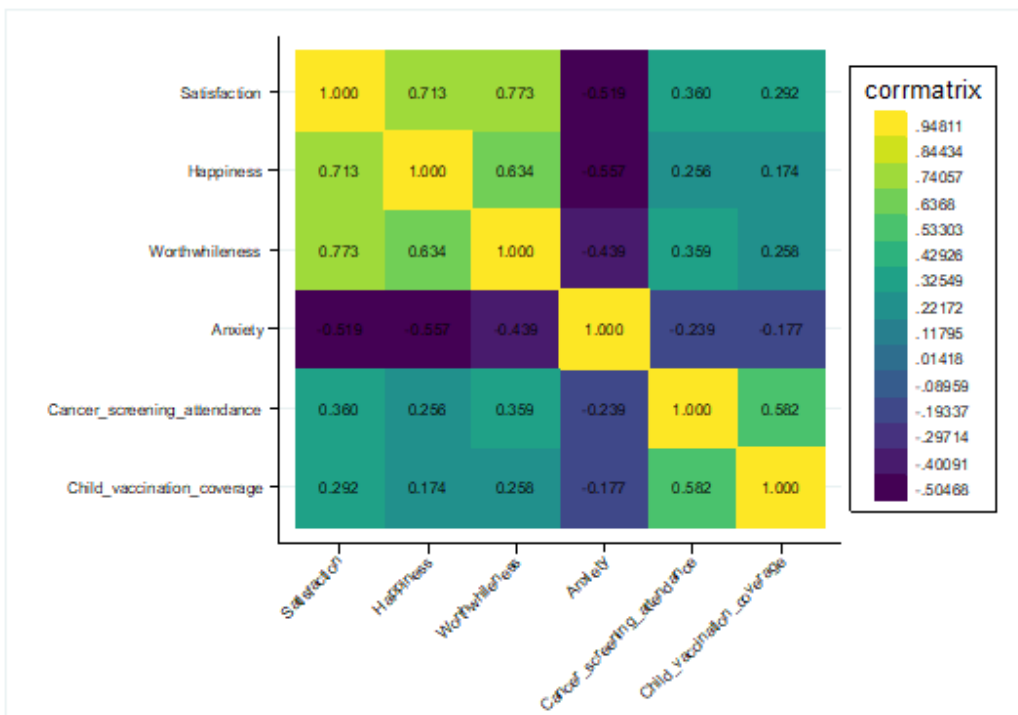
⁸ Number of pupils in the cohort in sustained education, employment and apprenticeships

Fig. 30: Correlations among subjective wellbeing variables and indicators of physiological risk factors domain (see also table A9)



Lastly, we observe positive correlations between cancer screening rates and child vaccination coverage with subjective wellbeing variables (figure 31).

Fig. 31: Correlations among subjective wellbeing variables and indicators of protective measures domain



Regression analysis

After conducting a correlation analysis, we proceeded with a regression analysis using the underlying data provided by the ONS. Our approach involved a panel data analysis, encompassing a total of 2149 observations, derived from 307 Lower Tier Local Authorities (LTLA) over a period of 7 years.

We conducted two regressions, one for the Healthy People domain and one for the Healthy Lives domain, taking the four subjective wellbeing variables as dependent variables and using the indicators from the respective subdomains as explanatory variables (30 indicators in total).

Before the analysis we checked for normality, multicollinearity, and heteroskedasticity. As we detected the presence of multicollinearity and heteroskedasticity, and we found that the 3 wellbeing variables⁹ and the residuals are not normally distributed, we used three regression models:

1. a first regression where we only specified the fixed effect options
2. a second regression where we run a robust regression to correct for heteroskedasticity
3. a third regression where we used a log-linear model. In this case the dependent variables were expressed in natural logarithm¹⁰.

The regressions' coefficients will represent the average effect of the independent variables on the dependent variable. In the log-linear model, the coefficients represent the percentage change in the dependent variable for a one-unit change in the independent variable. We also conducted the Hausman test, after which we selected the fixed effects model¹¹.

After assessing for multicollinearity, we identified that almost all variables exhibiting high correlation also demonstrate issues of multicollinearity. Specifically, within the mortality subdomain, the variables of avoidable mortality, life expectancy, and mortality from all causes were found to be affected. In the subdomain of physical health conditions, the variables of musculoskeletal conditions and respiratory conditions were similarly multicollinear. Finally, in the subdomain of behavioural risk factors, the variables of physical activity and sedentary activity exhibited multicollinearity problems.

We present the results of the regressions for the three models. We conducted the analysis both considering all the variables (Table A11 and A13) and dropping some of the variables that exhibited multicollinearity (Table A12 and A14).

⁹ Only anxiety is normally distributed.

¹⁰ The logarithmic transformation can normalise the distribution of the data, making it closer to a normal distribution. This can be especially useful if the original dependent variable is skewed or exhibits other departures from normality.

¹¹ In a fixed-effects panel analysis, we are accounting for the unobserved heterogeneity across the local authorities by including fixed effects for each local authority. This means that we are controlling for any time-invariant characteristics that may affect both the dependent and independent variables.

Healthy People domain indicators

Disability and frailty

The coefficient estimates for disability, although relatively small, show a clear trend across the subjective wellbeing variables. Specifically, we find negative and statistically significant coefficients for life satisfaction, happiness, and worthwhileness. Additionally, there is a significant negative coefficient for anxiety. These findings align with the correlations observed above and emphasise that individuals with disabilities tend to report lower levels of subjective wellbeing. Importantly, these results hold true across all three models, demonstrating their robustness.

Frailty appears to have a more nuanced relationship, showing some positive association with life satisfaction and worthwhileness, although the significance of these associations is limited. Further exploration is required to shed light on the meaning of these relationships.

It's worth noting that we obtained consistent results for both variables even in the regressions where we corrected for multicollinearity (see table A12), with only minimal differences in the magnitude of the coefficients.

Mental health

In the context of mental health subdomain indicators, the coefficient of the variable children mental health¹² is statistically significant in relation to life satisfaction and anxiety. For the regressor mental health conditions the coefficient for life satisfaction is statistically significant and negative, indicating that higher levels of mental health conditions are associated with decreased life satisfaction. The coefficient for anxiety is also statistically significant and positive, suggesting a positive relationship between mental health conditions and anxiety.

Self-harm is found to have a statistically significant negative impact on life satisfaction. However, the coefficient for happiness, worthwhileness, and anxiety are not statistically significant. As for suicides, there is a statistically significant negative relationship between suicides and life satisfaction, happiness, and worthwhileness. Suicides are also significantly associated with anxiety.

These results hold true for all three regressions, even though the coefficients are relatively small, and for suicides they align with what was found in the correlation analysis.

¹² Children's social, emotional and mental health is given by the ratio between total pupils with social, emotional and mental health listed as their primary special educational need (SEN) requirement and total pupils.

We obtained the same results for both variables even in the regressions where we corrected for multicollinearity (table A12), with minimal differences in the magnitude of the coefficients.

Mortality

Within the mortality subdomain, despite evident multicollinearity among avoidable mortality, life expectancy, and mortality from all causes, we opted to retain mortality from all causes¹³. In every regression — whether encompassing all mortality indicators or focusing solely on mortality from all causes — this variable consistently exhibited a significant negative correlation with subjective wellbeing measures like life satisfaction, happiness, and feelings of worthwhileness, and a positive association with anxiety, as shown in table A12. However the magnitudes of the coefficients, across all regression models, remain relatively small.

Physical health conditions

In the subdomain of physical health conditions, three variables, namely cardiovascular conditions, musculoskeletal conditions and respiratory conditions, exhibit problems of multicollinearity. We decided to drop respiratory conditions¹⁴ even if we are aware that all three variables significantly impact the quality of life of individuals¹⁵. In both analyses, with all the variables for physical condition and in the one where respiratory conditions were removed, the results do not change significantly.

As for cancer, it is not significant in both analyses, while cardiovascular conditions demonstrate statistically significant negative relationships with life satisfaction and happiness and a significant positive relationship with anxiety.

Diabetes shows a statistically significant negative relationship with happiness and a statistically significant positive relationship with anxiety in both regressions.

The coefficients for kidney and liver diseases indicate significant negative relationships with life satisfaction, while no statistically significant relationships are observed for happiness, feelings of worthwhileness, or anxiety in both the analyses.

¹³ After comparing models that retained only one or two of the three variables, the best-performing model was the one that included both mortality from all causes and life expectancy. However, since these two variables are inversely related, we chose to retain only the variable mortality from all causes.

¹⁴ The model with only the other two variables (cardiovascular and musculoskeletal conditions) exhibits better goodness-of-fit measures.

¹⁵ For leading cause of death see

https://fingertips.phe.org.uk/static-reports/health-profile-for-england/hpfe_report.html#summary-7---leading-causes-of-death.

Healthy Lives domain indicators

Behavioural risk factors

Regarding the indicators smoking, alcohol misuse, and healthy eating, there appears to be no statistically significant impact on any of the wellbeing indicators—such as life satisfaction, happiness, feelings of worthiness, and anxiety—either across the three models or when excluding sedentary behaviour to account for multicollinearity (table A14).

Drug misuse shows a significant negative impact across all wellbeing dimensions, in all the models and after accounting for multicollinearity, even if coefficients are relatively small. An increase in drug misuse is associated with decreases in life satisfaction, happiness, and feelings of worthiness, while anxiety experiences a notable increase. These effects are statistically significant, highlighting the importance of addressing drug misuse in the context of subjective wellbeing. These results are in line with the correlations analysis and what has been already found in the literature.

As for the indicator sexually transmitted infections, the coefficients indicate a statistically significant negative relationship with life satisfaction in all the models after taking into account multicollinearity, even if the coefficients are quite small.

The variables physical activity and sedentary activity are multicollinear and necessitate further analysis. We decided to keep the variable physical activity¹⁶. This variable, which in the regression with all the variables showed a significant negative relationship with life satisfaction, happiness, and worthwhileness, and a positive one with anxiety, retained only a significant positive relationship with anxiety after removing the sedentary behaviour variable (table A14). The direction of this relationship is not what we expected and need for further investigation.

Children and young people

In this subdomain, the only indicators displaying a statistically significant relationship with the four subjective wellbeing variables are teenage pregnancy and young people's education, employment, and apprenticeships. These results holds across the three models and after accounting for multicollinearity. The analysis reveals significant positive associations between teenage pregnancy and all well-being indicators, with a change in direction compared to the correlation. The effect size is however small.

¹⁶ We decided to focus on physical activity due to the best goodness of fit and the observed inverse relationship between sedentary and physical activity.

Furthermore, the coefficients for young people's education, employment, and apprenticeships demonstrate statistically significant positive relationships with all wellbeing indicators, confirming correlations' analysis. This suggests that a rise in the number of young people enrolled in education and employment apprenticeships is associated with higher levels of wellbeing.

It's important to note that the indicator for pupil attainment shows a significant positive correlation with anxiety levels, despite having relatively small coefficients.

Physiological risk factors

The coefficients for high blood pressure, low birth weight and overweight and obesity in children suggest that their impact on wellbeing indicators are generally small and statistically non-significant.

As for the indicator overweight and obesity in adults, it shows statistically significant negative relationships with life satisfaction and worthwhileness. The coefficients for happiness and anxiety, however, are relatively small and not statistically significant for all the models and after accounting for multicollinearity.

Protective measures

The coefficients for cancer screening attendance reveal statistically significant negative relationships with life satisfaction, happiness, and worthwhileness. Conversely, there is a statistically significant positive association with anxiety. However, the coefficients are quite small.

Child vaccination coverage exhibits statistically significant positive relationships with life satisfaction and a significant negative association with anxiety. Coefficients are quite small and in line with the correlations analysis.

DISCUSSION

This discussion aims to provide a comprehensive overview and interpretation of the results obtained from the literature review and exploratory data analysis, shedding light on the key findings and their implications.

Difficulties in daily life

In line with previous literature, both correlation and regression analyses support the finding that the presence of a disability is associated with lower levels of subjective wellbeing. Specifically, disability exhibits a negative relationship with measures of life satisfaction, happiness, and worthwhileness, confirming its adverse impact on overall wellbeing. However, the relationship between frailty and subjective wellbeing is less defined and requires further investigation.

These findings provide valuable insights for developing policies to enhance the wellbeing of individuals with disabilities and their families. Personalised support programs that offer tailored mental health services, counselling, and therapy can positively influence subjective wellbeing. Additionally, establishing and maintaining accessible public spaces can overcome physical challenges and simultaneously enhance life satisfaction and self-worth for those with disabilities. Engaging the community through various initiatives is vital to promote inclusivity and diminish feelings of isolation among these individuals.

It's essential to further delve into the relationship between frailty and wellbeing and to consistently assess the effectiveness and appropriateness of related policies.

Mental health

The importance of children's subjective wellbeing in their overall health, school's attainments, and development has been consistently highlighted in academic research. In line with these findings, our data further highlight the strong relationship between mental health challenges and subjective wellbeing. Specifically, we've identified more vulnerabilities among students with special educational needs (SEN) and observed significant effects of mental health conditions on life satisfaction and anxiety levels. Furthermore, the negative impacts of self-harm on life satisfaction, as revealed in our analysis, emphasize the intricate relationship between subjective wellbeing, self-harm, and suicidal tendencies.

From a policy perspective, educational institutions and policymakers could prioritise [mental health support within schools](#). This is especially crucial for at-risk groups like SEN students. Given the evident connection between mental health and subjective wellbeing, comprehensive mental health programs, early intervention strategies, and consistent support mechanisms tailored for the needs of the student population can promote their wellbeing.

Mortality

Drawing on the insights of previous research, our study confirms the link between subjective wellbeing and mortality rates. Earlier works have already suggested that individuals with higher subjective wellbeing often display lower mortality risks, possibly due to healthier behaviours, strong social networks, and potentially enhanced immune responses. These individuals might also be more able to handle stress, thereby increasing their longevity. The regression analysis confirms the negative relationships between mortality from all causes and life satisfaction, happiness, and feelings of worthwhileness, and a positive relationship with anxiety.

From a policy perspective, if individuals with enhanced wellbeing truly have a propensity for healthier behaviours and more resilient coping strategies, then fostering environments and programs that enhance life satisfaction and happiness have promising potential to not just improve individual health but also to significantly reduce broader societal mortality rates and extend average life expectancies.

Physical health conditions

Building upon existing literature, our research reaffirms the complex relationship between health conditions, particularly diabetes, and subjective wellbeing. Previous studies show that enhanced wellbeing correlates with a reduced risk of various chronic ailments. Furthermore, it's essential to recognize the influence of sociodemographic factors, such as wealth and employment status, that intertwine with both diabetes onset and related mortality. The role of lifestyle choices and physical activity, which have been previously identified as critical determinants in diabetes risk, is also intricately linked with subjective wellbeing levels.

Our analysis confirms these results. While conditions like cardiovascular diseases and dementia might not always exhibit strong correlations with subjective wellbeing variables, diabetes results negatively correlated to happiness. Our regression findings confirm these results, showcasing significant interplays between various health conditions like cardiovascular diseases, diabetes, and kidney and liver disorders with key indicators of subjective wellbeing.

The research findings suggest several intertwined policy actions. Policymakers could enhance integrated health approaches that combine medical care with mental health support. This can be achieved by making psychological support readily accessible and fostering collaboration among medical practitioners and mental health experts, ensuring an integrated care pathway for patients.

Additionally, the establishment of support groups and community engagement initiatives can offer mutual emotional backing and coping mechanisms for patients.

Behavioural risk factors

The link between drug misuse and a decrease in subjective wellbeing, as confirmed by our correlation and regression analyses, confirms previous findings emphasising the adverse impacts of drugs on the brain. Such drugs, by influencing neurotransmitters, can induce transient feelings of euphoria but ultimately lead to reduced life satisfaction, happiness, and increased anxiety over prolonged use.

The observed negative association between sedentary behaviour and wellbeing parameters echoes earlier studies, suggesting a decline in life satisfaction with increased sedentary activity. However, the high correlation between physical activity and sedentary behaviour needed to be addressed. After refining our models to avoid multicollinearity, physical activity surprisingly showed a positive relationship with anxiety, deviating from our initial expectations. This requires deeper analysis.

Our analysis indicates that sexually transmitted infections (STIs) marginally affect life satisfaction. Although the correlations are generally weak, the regressions show a negative relationship between STIs and life satisfaction. While the coefficients are small, this finding is significant.

The significant negative effects of drug and alcohol misuse on subjective wellbeing necessitate comprehensive drug prevention and rehabilitation programs that prioritise initiatives both deterring drug misuse and supporting individuals in recovery. The findings related to sexually transmitted infections underline the importance of an inclusive health service for STI patients that combines medical treatment with psychological counselling. Furthermore, given the relationship between smoking and reduced life satisfaction, preventive policies could be important. These policies should not just focus on the physical detriments of smoking but also tackle its emotional triggers, offering alternative coping strategies.

Children and young people

Our correlation analysis shows a negative association between adolescent risk-taking sexual behaviour and subjective wellbeing. The regression results, introduce a nuanced layer of understanding, showing a positive relationship between teenage pregnancy and subjective wellbeing. This result, somewhat counter-intuitive, requires further exploration through analysing different data sets to investigate the relationships in more depth.

As for the indicator young people in education, employment and apprenticeship, our regression results confirm prior research, emphasising the beneficial impact of participation in education, employment, or apprenticeships on the well-being of young individuals.

Interpreting these outcomes in light of existing literature, it's evident that broader social environment, family dynamics, and opportunities in education and employment significantly shape adolescent choices and their subsequent wellbeing. While some risky behaviours might be associated with short-term subjective wellbeing gains, the longer-term implications need comprehensive consideration.

From a policy standpoint, attention to multifaceted interventions is relevant. Having a high emphasis on educational and vocational opportunities for young individuals, could help improve young wellbeing. Secondly, there's undeniable value in offering comprehensive sexual education and dedicated support for both teenagers and their parents. By tackling these areas, it is possible not only to reduce potential risks but also boosts the future wellbeing of youth.

Physiological risk factors

The topic of low birth weight presents concerns in the context of life satisfaction and mental wellbeing. Previous research has pointed out the long-term consequences of low birth weight, not just in terms of physical health but also in its relation to mental health challenges, diminished quality of life, and reduced self-esteem. The relationship between perceived stress during pregnancy and the incidence of low birth weight, in particular, suggests the need to ensure mothers' mental and emotional wellbeing. However, while we found an inverse correlation between low birth weight and subjective wellbeing, the regression analysis does not confirm this result, requiring deeper understanding.

When considering overweight and obesity, particularly in adults, the narrative remains consistent. The detrimental effects of obesity on life satisfaction have been extensively documented. Our study expands on this by indicating that overweight and obesity in children show a negative correlation with wellbeing indicators. However this relationship becomes statistically insignificant in the regression analysis. This means that, when accounting for other variables, the direct link between children's weight status and their wellbeing indicators becomes less clear-cut or definitive. Conversely, for adults, obesity continues to have a significant negative relationship with indicators such as life satisfaction and worthwhileness.

Given the findings, there's a strong case for policies to take a proactive approach, especially regarding nutritional education. It goes beyond simply instructing individuals on what to eat; it's about to make people understand the link between dietary choices and overall health.

For the younger generation, this might involve embedding nutritional education within school curricula to ensure they develop with a robust foundation in dietary knowledge.

Protective measures

Drawing from both our research and prior studies, several insights emerge. First, when it comes to cancer screening attendance, the literature consistently indicates its dual nature: while crucial for early detection and potentially reducing mortality, it can introduce considerable psychological stress. Our results mirror this sentiment, as we find a negative relationship of cancer screening with life satisfaction, happiness, and worthwhileness, alongside its positive relationship with anxiety. These findings potentially underline the psychological toll that such screenings can exact.

Given the importance of bolstering early detection efforts, it is crucial to consider the potential psychological impact on individuals. Integrating psychological support and counselling services alongside cancer screening programs could help mitigate the associated mental and emotional strains. By addressing these aspects, we can ensure a more holistic approach to cancer prevention and care, taking into account both physical and psychological well-being.

In relation to child vaccination coverage our findings suggest that, beyond the evident medical advantages, there's a tangible positive impact on overall wellbeing when children are adequately vaccinated. This likely stems from the relief parents feel knowing their children are protected, but it also underscores the importance of educating parents, not just about the health benefits, but also the emotional peace that accompanies vaccination.

Beyond just advocating for preventive healthcare measures like screenings and vaccinations, it could be important to incorporate extensive psychological support and educational outreach. Ensuring the public is not only medically informed but emotionally prepared and supported can significantly improve the overall wellbeing outcomes linked to these health interventions.

Overall methodological considerations

To address the discrepancy in results between correlations and regression analysis, it is important to explore potential interaction effects or non-linear relationships between variables to capture more nuanced dynamics that may not be captured by simple correlations or linear regressions. Additionally, it is crucial to assess whether omitted variable bias, measurement error, or confounding factors could be influencing the unexpected direction of some regressors. Considering alternative measures for the regressors could help in capturing their true relationship with subjective wellbeing.

Collecting data on additional variables that could potentially influence subjective wellbeing but were not included in the original analysis would further enhance the understanding of the determinants of subjective wellbeing.

Conclusion

Our analysis has produced results that are consistent with previous literature. For certain variables such as: disability; young people in education, employment, or training; drug misuse; suicides; child vaccination coverage; and mortality from all causes. Our results were also coherent and consistent between the correlation and regression analyses for these variables, demonstrating robust associations with subjective wellbeing, indicating their significance as determinants.

However, for other regressors, there are discrepancies. Potential explanations may include omitted variable bias, measurement error, or the influence of confounding factors. Exploring potential interaction effects or non-linear relationships may provide a more nuanced understanding of these variables' impact on subjective wellbeing.

While our analysis has provided valuable insights into the relationship between certain variables and subjective wellbeing, the presence of discrepancies in other regressors highlights the need for continued research and investigation. By exploring potential interaction effects and examining non-linear relationships, we can enhance our understanding of these variables' impact on subjective wellbeing, paving the way for more comprehensive and informed interventions in healthcare and wellbeing policies.

Appendix

Table A1: Descriptives statistics

	N	Mean	Std. Dev.	min	max	kurtosis	skewness
Worthwhile	2149	7.86	0.21	6.81	8.7	4.01	0
Air pollution	2149	8.84	1.77	3.96	13.49	2.4	0.08
Alcohol misuse	2149	566.12	231.11	197.23	2590.17	10.09	1.79
Avoidable mortality	2149	226.47	51.16	138	425.5	3.13	0.7
Cancer	2149	4.07	1.9	1.34	28.72	55.36	5.27
Cancer screening attendance	2149	70.6	4.34	47.86	80.27	4.77	-1.13
Cardiovascular conditions	2149	7.45	4.23	2.24	71.23	113.67	8.45
Child poverty	2149	13.62	5.35	4.6	34.2	4.3	1.09
Child vaccination coverage	2149	91.41	4.31	65.04	97.87	6.13	-1.57
Children emotional mental and social wellbeing	2149	2.53	0.72	0.64	5.5	3.77	0.58
Dementia	2149	0.77	0.62	0.02	10.66	122.35	8.45
Diabetes	2149	9.08	3.86	3.1	53.34	29.83	3.99
Disability	2149	20.7	5.02	5.33	41.3	3.25	0.33
Distance GP services	2149	1.42	0.7	0.45	4.36	4.86	1.36
Distance pharmacies	2149	1.2	0.79	0.34	6.06	12.28	2.73
Distance sport leisure facilities	2149	0.69	0.16	0.34	1.24	4	0.94
Drug misuse	2149	2.49	1.62	0.3	14.34	11.12	2.31
Early years development	2149	71.16	4.26	51.43	82.23	3.29	-0.38
Anxiety	2149	2.97	0.36	1.7	4.29	3.09	0.04
Frailty	2149	560.6	81.2	305.96	981.3	3.88	0.19
Happiness	2149	7.5	0.23	6.52	8.34	3.64	-0.01
Healthy eating	2149	56.54	5.5	35.8	70.98	2.72	-0.14
High blood pressure	2149	20.75	7.76	7.49	109.83	45.32	4.83
Household overcrowding	2149	4.87	4.14	0.93	29.55	9.32	2.4
Infant mortality	2149	3.65	1.27	0	8.31	3.33	0.51
Internet access	2149	1.68	2.12	0	12.22	8.83	2.29
Job related	2149	26.63	6.57	3.76	57.24	3.29	0.17

training							
Kidney liver disease	2149	2.21	1.39	0.18	21.77	81.83	6.73
Life expectancy	2149	81.54	1.5	76.53	86.05	2.8	-0.28
Life Satisfaction	2149	7.65	0.24	6.61	8.59	3.49	-0.13
Low birth weight	2149	2.6	0.72	0.69	5.3	3.38	0.4
Low level crime	2149	6.54	3.79	0.99	34.39	9.51	1.93
Mental health conditions	2149	12.66	7.83	3.69	132.57	50.93	5.04
Mortality from all causes	2149	965.89	131.82	583.1	1509.2	3.44	0.53
Musculoskeletal conditions	2149	22.97	8.65	7.01	115.86	30.55	3.85
Noise complaints	2149	7.31	23.61	0.58	731.34	824.7	27.09
Overweight obesity in adult	2149	62.36	5.73	40.69	77.67	3.23	-0.42
Overweight obesity in children	2149	27.71	3.59	17.36	41.75	2.92	-0.08
Patients acceptable appointment	2149	7.91	4.29	1.04	44.68	12.71	2.26
Personal crime	2149	46.19	16.88	13.28	156.3	4.83	0.96
Physical activity	2149	66.77	5.21	46.66	80.17	2.71	-0.17
Private outdoor space	2149	89.31	5.07	60.3	96.52	13.2	-2.63
Pupil absences	2149	10.5	1.73	4.11	16.43	3.32	0.15
Pupil attainment	2149	64.62	6.73	43.5	85.83	2.73	0.05
Respiratory conditions	2149	13.94	6.05	5.31	77.12	32.5	4.19
Road safety	2149	4.25	8.92	0.05	78.44	24.54	4.33
Rough sleeping	2149	6.43	8.77	0	127.43	63.19	5.98
Sedentary behaviour	2149	21.97	4.49	10.49	42.98	2.97	0.36
Self harm	2149	192.91	76.86	41.45	631.21	4.17	0.77
Sexually transmitted infections	2149	2.19	3.68	0.09	88.05	171.46	9.85
Smoking	2149	14.29	4	2.2	29.7	2.92	0.17
Suicides	2149	10.33	2.61	4.4	20.7	3.51	0.65
Teenage pregnancy	2149	15.95	6.84	2.06	43.81	3.26	0.7
Unemployment	2149	4.18	1.35	1.51	11.01	4.09	0.96
Workplace safety	2149	286.45	103.59	63	1065	9.48	1.66
Young people education employment and training	2149	94.26	1.7	84.96	98.4	5.24	-0.98

year	2149	2018	2	2015	2021	1.75	0
id	2149	154	88.64	1	307	1.8	0

Table A3: Correlations between subjective wellbeing variables and difficulty in daily life subdomain indicators

	Satisfaction	Happiness	Worthwhile	Anxiety	Disability	Frailty
Satisfaction	1					
Happiness	0.7134*	1				
Worthwhile	0.7725*	0.6337*	1			
Anxiety	-0.5190*	-0.5566*	-0.4394*	1		
Disability	-0.2158*	-0.2122*	-0.1425*	0.1478*	1	
Frailty	0.0493*	-0.0253	0.0763*	-0.1057*	0.2188*	1

Table A4: Correlations between subjective wellbeing variables and mental health subdomain indicators

	Satisfaction	Happiness	Worthwhile	Anxiety	Children mental health	Mental health conditions	Self harm	Suicides
Satisfaction	1							
Happiness	0.7134*	1						
Worthwhile	0.7725*	0.6337*	1					
Anxiety	-0.5190*	-0.5566*	-0.4394*	1				
Children mental health	-0.1565*	-0.1395*	-0.1640*	0.1497*	1			
Mental health conditions	-0.1638*	-0.1661*	-0.1633*	0.2217*	0.1935*	1		
Self_harm	-0.0105	-0.0600*	-0.0203	-0.0332	0.2924*	0.1706*	1	
Suicides	-0.1138*	-0.1071*	-0.1168*	0.0684*	0.1955*	0.2189*	0.3780*	1

Table A5: Correlations between subjective wellbeing and mortality subdomain indicators

	Satisfaction	Happiness	Worthwhile	Anxiety	Avoidable mortality	Infant mortality	Mortality for all causes	Life expectancy
Satisfaction	1							
Happiness	0.7134*	1						
Worthwhile	0.7725*	0.6337*	1					
Anxiety	-0.5190*	-0.5566*	-0.4394*	1				
Avoidable mortality	-0.3580*	-0.3112*	-0.3026*	0.1283*	1			
Infant mortality	-0.1510*	-0.1080*	-0.1097*	0.0453*	0.4471*	1		
Mortality for all causes	-0.3265*	-0.2743*	-0.2284*	0.1018*	0.8793*	0.4236*	1	
Life expectancy	0.2726*	0.2435*	0.2069*	-0.0548*	-0.9529*	-0.4963*	-0.9322*	1

Table A6: Correlations between subjective wellbeing and physical health conditions subdomain indicators

	Satisfaction	Happiness	Worth	Anxiety	Cancer	Cardiovascular conditions	Dementia	Diabetes	Kidney liver diseases	Musculoskeletal conditions	Respiratory conditions
Satisfaction	1										
Happiness	0.7134*	1									
Worthwhile	0.7725*	0.6337*	1								
Anxiety	-0.5190*	-0.5566*	-0.4394*	1							
Cancer	0.0660*	0.0430*	0.0693*	-0.0127	1						
Cardiovascular conditions	0.0377	0.0147	0.0479*	-0.0226	0.7520*	1					
Dementia	-0.0269	-0.0229	-0.0382	-0.0029	0.5981*	0.6584*	1				
Diabetes	-0.0724*	-0.0664*	-0.0587*	0.0557*	0.6088*	0.6803*	0.4486*	1			

Kidney liver diseases	-0.1443*	-0.1015*	-0.1339*	0.1230*	0.3839*	0.3006*	0.1697*	0.5282*	1		
Musculoskeletal conditions	0.0387	0.0081	0.0555*	-0.0333	0.7557*	0.8465*	0.5477*	0.8001*	0.4492*	1	
Respiratory conditions	-0.0212	-0.0515*	-0.0193	0.0611*	0.6800*	0.7466*	0.5015*	0.7262*	0.3993*	0.8231*	1

Table A7: Correlations between subjective wellbeing and behavioural risk factors subdomain indicators

	Satisfaction	Happiness	Worthwhile	Anxiety	Alcohol misuse	Healthy eating behaviour	Physical activity	Sedentary behaviour	STIs	Drug misuse	Smoking
Satisfaction	1										
Happiness	0.7134*	1									
Worthwhile	0.7725*	0.6337*	1								
Anxiety	-0.5190*	-0.5566*	-0.4394*	1							
Alcohol misuse	-0.2789*	-0.2660*	-0.2755*	0.1598*	1						
Healthy eating behaviour	0.2782*	0.2071*	0.2104*	-0.0844*	-0.3786*	1					
Physical activity	0.1944*	0.1396*	0.1262*	0.0281	-0.2222*	0.5703*	1				
Sedentary behaviour	-0.2270*	-0.1542*	-0.1520*	-0.002	0.2575*	-0.5690*	-0.9177*	1			
Sexually transmitted infections	-0.039	-0.0332	-0.0357	-0.0297	0.0803*	-0.0600*	-0.1200*	0.1381*	1		
Drug misuse	-0.3912*	-0.2883*	-0.3667*	0.3154*	0.3179*	-0.2583*	-0.1494*	0.1749*	-0.0806*	1	
Smoking	-0.1681*	-0.1866*	-0.1339*	0.0061	0.3162*	-0.3423*	-0.3734*	0.3812*	0.0990*	0.1432*	1

Table A8: Correlations between subjective wellbeing and children and young people subdomain indicators

	Satisfaction	Happiness	Worth	Anxiety	Early year development	Pupil absences	Pupil attain.	Teenage pregnancy	Young people not NEET
Satisfaction	1								
Happiness	0.7134*	1							
Worth	0.7725*	0.6337*	1						
Anxiety	-0.5190*	-0.5566*	-0.4394*	1					
Early year development	0.1146*	0.1447*	0.1123*	0.0572*	1				
Pupil absences	-0.2607*	-0.2371*	-0.2111*	0.0923*	-0.4457*	1			
Pupil attainment	0.1629*	0.1791*	0.1394*	0.028	0.6230*	-0.6992*	1		
Teenage pregnancy	-0.1371*	-0.1781*	-0.1200*	-0.0817*	-0.5830*	0.5492*	-0.6928*	1	
Young people not NEET	0.3235*	0.2949*	0.2816*	-0.1842*	0.4064*	-0.5696*	0.5701*	-0.5245*	1

Table A9 :Correlations between subjective wellbeing and physiological risk factors subdomain indicators

	Satisfaction	Happiness	Worth	Anxiety	High blood pressure	Low birth weight	Overweight adults	Overweight children
Satisfaction	1							
Happiness	0.7134*	1						
Worth	0.7725*	0.6337*	1					
Anxiety	-0.5190*	-0.5566*	-0.4394*	1				
High blood pressure	0.0187	0.0064	0.0321	-0.0146	1			
Low birth weight	-0.2627*	-0.1813*	-0.2308*	0.1229*	-0.0308	1		
Overweight adults	-0.0419	-0.0314	0.0297	-0.1075*	0.1084*	0.0810*	1	
Overweight children	-0.3161*	-0.2488*	-0.2520*	0.0957*	0.0262	0.4207*	0.4111*	1

Table A10: Correlations between subjective wellbeing and protective measures subdomain indicators

	Satisfaction	Happiness	Worth	Anxiety	Cancer screening attendance	Child vaccination coverage
Satisfaction	1					
Happiness	0.7134*	1				
Worthwhile~s	0.7725*	0.6337*	1			
Anxiety	-0.5190*	-0.5566*	-0.4394*	1		
Cancer screening attendance	0.3605*	0.2560*	0.3594*	-0.2387*	1	
Child vaccination coverage	0.2925*	0.1742*	0.2575*	-0.1773*	0.5819*	1

Table A11: Regressions' results

	First regressions				Second regressions				Third regressions			
	Satisfaction	Happiness	Worthwhile	Anxiety	Satisfaction	Happiness	Worthwhile	Anxiety	In_Satisfaction	In_Happiness	In_Worthwhile	In_Anxiety
Disability	-0.0107***	-0.00914***	-0.00763***	0.0188** *	-0.0107***	-0.00914***	-0.00763** *	0.0188***	-0.00140***	-0.00122***	-0.000979***	0.00642***
	(0.00124)	(0.00133)	(0.00113)	(0.00202)	(0.00146)	(0.00146)	(0.00128)	(0.00237)	(0.000192)	(0.000196)	(0.000163)	(0.000831)
Frailty	0.000157**	-1.35e-05	0.000136**	-0.000373** *	0.000157*	-0.00013	0.000136*	-0.000373**	0.00021**	-0.000012	0.000017*	-0.000123***
	(0.000075)	(0.000081)	(0.00007)	(0.000124)	(0.00008)	(0.00008)	(0.00008)	(0.000136)	(0.000011)	(0.000011)	(0.00001)	(0.00005)
Children_mental_health	-0.0284**	-0.0100	-0.0186	0.0985** *	-0.0284**	-0.0100	-0.0186	0.0985***	-0.00379**	-0.00147	-0.00243	0.0335** *
	(0.0134)	(0.0144)	(0.0123)	(0.00219)	(0.0131)	(0.0143)	(0.0121)	(0.00227)	(0.00174)	(0.00192)	(0.00155)	(0.00766)
Mental_health_conditions	-0.00432***	-0.000696	-0.00220*	0.00977**	-0.00432**	-0.000696	-0.00220*	0.00977***	-0.000566*	-0.00009	-0.000280*	0.00329***
	(0.00133)	(0.00143)	(0.0012)	(0.00216)	(0.00185)	(0.00123)	(0.00122)	(0.000373)	(0.000244)	(0.000166)	(0.000156)	(0.00119)
Self_harm	-0.000272*	-0.000138	-0.000158	-0.000001	-0.000272*	-0.000138	-0.000158	-0.000001	-0.00003*	-0.00002	-0.00002	0.00005760.00005
	(0.000139)	(0.000150)	(0.000128)	(0.0000227)	(0.000154)	(0.000158)	(0.000128)	(0.000199)	(0.00002)	(0.00002)	(0.0000165)	(0.00007)
Suicides	-0.0144***	-0.00981***	-0.0117***	0.0162** *	-0.0144***	-0.00981***	-0.0117***	0.0162***	-0.00190***	-0.00132***	-0.00151***	0.00578***
	(0.00267)	(0.00287)	(0.00245)	(0.000436)	(0.00315)	(0.00313)	(0.00283)	(0.00467)	(0.000414)	(0.000421)	(0.000361)	(0.00158)
Avoidable_mortality	-0.00315***	-0.00253***	-0.00206***	0.00151	-0.00315***	-0.00253***	-0.00206** *	0.00151	-0.000415** *	-0.000339**	-0.000261***	0.000517

	(0.000781)	(0.000840)	(0.000717)	(0.00128)	(0.000926)	(0.000932)	(0.000753)	(0.00126)	(0.000122)	(0.000125)	(9.61e-05)	(0.000431)
Infant_mortality	-0.0143**	-0.00690	-0.00576	0.0238**	-0.0143**	-0.00690	-0.00576	0.0238**	-0.00185**	-0.000929	-0.000686	0.00800**
	(0.00567)	(0.00610)	(0.00520)	(0.00926)	(0.00706)	(0.00743)	(0.00647)	(0.0112)	(0.000923)	(0.000986)	(0.000820)	(0.00388)
Life_expectancy	-0.202**	-0.195**	-0.112**	0.261***	-0.202**	-0.195**	-0.112**	0.261**	-0.0267***	-0.0263***	-0.0143**	0.0872**
	(0.0287)	(0.0308)	(0.0263)	(0.0468)	(0.0330)	(0.0334)	(0.0258)	(0.0450)	(0.00435)	(0.00446)	(0.00326)	(0.0156)
Mortality_from_all causes	-0.00129***	-0.000890**	-0.000656***	0.00128**	-0.00129***	-0.000890***	-0.000656**	0.00128***	-0.000172**	-0.000121**	-8.49e-05***	0.000404***
	(0.00015)	(0.000104)	(0.00089)	(0.000158)	(0.000108)	(0.000109)	(0.0009)	(0.000167)	(0.00014)	(0.00015)	(0.00012)	(0.00056)
Cancer	-0.00197	0.000630	-0.000405	-0.00427	-0.00197	0.000630	-0.000405	-0.00427	-0.000265	0.0000908	-0.000063	-0.00114
	(0.00486)	(0.00523)	(0.00446)	(0.00794)	(0.00533)	(0.00499)	(0.00430)	(0.0109)	(0.000701)	(0.000670)	(0.000548)	(0.00371)
Cardiovascular_conditions	-0.0101**	-0.00769***	-0.00766***	0.0104**	-0.0101**	-0.00769**	-0.00766**	0.0104**	-0.00132***	-0.00103**	-0.000971***	0.00332**
	(0.00251)	(0.00270)	(0.00230)	(0.00409)	(0.00241)	(0.00304)	(0.00295)	(0.00499)	(0.000318)	(0.000411)	(0.000250)	(0.00166)
Diabetes	0.00133	-0.00689**	-0.00159	0.00993*	0.00133	-0.00689**	-0.00159	0.00993	0.000190	-0.000916*	-0.000206	0.00384
	(0.00301)	(0.00323)	(0.00276)	(0.00491)	(0.00383)	(0.00345)	(0.00285)	(0.00887)	(0.000512)	(0.000465)	(0.000368)	(0.00305)
Kidney_liver_disease	-0.0151**	-0.00474	-0.00507	0.000451	-0.0151**	-0.00474	-0.00507	0.000451	-0.00199**	-0.000628	-0.000644	-7.89e-05
	(0.00510)	(0.00547)	(0.00467)	(0.00831)	(0.00632)	(0.00603)	(0.00396)	(0.00928)	(0.000838)	(0.000813)	(0.000508)	(0.00326)
Musculoskeletal_conditions	0.00489**	0.00654***	0.00568***	-0.0115**	0.00489**	0.00654***	0.00568***	-0.0115**	0.000636**	0.000879**	0.00077***	-0.00382***

	(0.00191)	(0.00206)	(0.00175)	(0.00312)	(0.00223)	(0.00230)	(0.00175)	(0.00396)	(0.000294)	(0.000308)	(0.000225)	(0.00130)
Respiratory_conditions	0.00402*	0.00217	0.00374**	-0.00576*	0.00402	0.00217	0.00374**	-0.00576	0.000515	0.000268	0.000470**	-0.00219
	(0.00207)	(0.00223)	(0.00190)	(0.00338)	(0.00249)	(0.00227)	(0.00183)	(0.00452)	(0.000328)	(0.000303)	(0.000233)	(0.00148)
Constant	26.51***	25.17**	18.33**	-20.48**	26.51**	25.17**	18.33**	-20.48***	4.527**	4.396***	3.399***	-6.749**
	(2.508)	(2.695)	(2.300)	(4.092)	(2.891)	(2.948)	(2.261)	(3.941)	(0.381)	(0.393)	(0.287)	(1.367)
R-squared	0.209	0.098	0.111	0.164	0.209	0.098	0.111	0.164	0.213	0.100	0.113	0.157

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table A12: Regressions' results with multicollinearity correction.

VARIABLES	First regressions				Second regressions				Third regressions			
	Satis	Happiness	Worth	Anxiety	Satis	Happiness	Worth	Anxiety	In_Satis	In_Happiness	In_Worth	In_Anxiety
Disability	-0.0111***	-0.00953***	-0.00788***	0.0196***	-0.0117***	-0.00953***	-0.00788***	0.0196**	-0.00145***	-0.00127***	-0.00101**	0.00669***
	(0.00125)	(0.00134)	(0.00114)	(0.00204)	(0.00144)	(0.00150)	(0.00127)	(0.00238)	(0.000190)	(0.000202)	(0.000162)	(0.000834)
Frailty	0.000204***	3.27e-05	0.000162**	-0.000432**	0.000204**	0.000032	0.000162**	-0.000432***	0.000274**	0.000042	0.000020**	-0.000143***
	(0.000076)	(0.000087)	(0.000076)	(0.000125)	(0.000083)	(0.000084)	(0.000076)	(0.000136)	(0.000010)	(0.000011)	(0.0000097)	(0.000047)
Children mental health	-0.0278**	-0.00865	-0.0187	0.0955***	-0.0278**	-0.00865	-0.0187	0.0955**	-0.00370**	-0.00128	-0.00244	0.0326**
	(0.0136)	(0.0146)	(0.0124)	(0.0222)	(0.0139)	(0.0143)	(0.0122)	(0.0238)	(0.00185)	(0.00193)	(0.00156)	(0.00800)
Mental health conditions	-0.00389***	-0.000714	-0.00155	0.00870***	-0.00389**	-0.000714	-0.00155	0.00870**	-0.000513**	-9.68e-05	-0.000199	0.00286**

	(0.00118)	(0.00126)	(0.00107)	(0.00192)	(0.00193)	(0.00126)	(0.00118)	(0.00395)	(0.000255)	(0.000170)	(0.000152)	(0.00125)
Self_harm	-0.000257*	-0.000137	-0.000141	0.000029	-0.000257*	-0.000137	-0.000141	0.000021	-0.000033	-0.000018	-0.000017	0.000015
	(0.000141)	(0.000151)	(0.000128)	(0.000229)	(0.000155)	(0.000157)	(0.000126)	(0.000206)	(0.00020)	(0.00021)	(0.00016)	(0.000069)
Suicides	-0.0127**	-0.00773***	-0.0110***	0.0121***	-0.0127***	-0.00773**	-0.0110***	0.0121**	-0.00168***	-0.00104**	-0.00142**	0.00444***
	(0.00266)	(0.00285)	(0.00242)	(0.002434)	(0.002311)	(0.00309)	(0.00284)	(0.00482)	(0.000409)	(0.000415)	(0.000363)	(0.00164)
Infant mortality	-0.000984	0.00583	0.00171	0.00750	-0.000984	0.00583	0.00171	0.00750	-0.00096	0.000786	0.000267	0.00254
	(0.00541)	(0.00579)	(0.00491)	(0.004880)	(0.004685)	(0.00749)	(0.00629)	(0.0112)	(0.000898)	(0.000995)	(0.000798)	(0.00388)
Mortality from all causes	-0.00103***	-0.000605***	-0.000537***	0.000766***	-0.00103**	-0.000605**	-0.000537***	0.000766***	-0.000139***	-0.00008***	-0.0007**	0.000232***
	(0.00008)	(0.00008)	(0.00007)	(0.000135)	(0.00009)	(0.00009)	(0.00007)	(0.000137)	(0.00001)	(0.00001)	(0.00001)	(0.00004)
Cancer	-0.00173	0.000850	-0.000297	-0.000389	-0.000173	0.000850	-0.000297	-0.000389	-0.000232	0.000122	-0.00004	-0.000995
	(0.00493)	(0.00528)	(0.00448)	(0.004803)	(0.004541)	(0.00501)	(0.00451)	(0.0110)	(0.000710)	(0.000675)	(0.000576)	(0.00372)
Cardio-vascular conditions	-0.00910***	-0.00708***	-0.00675***	0.00872**	-0.00910**	-0.00708**	-0.00675***	0.00872*	-0.000119***	-0.0000951**	-0.0000856***	0.00270
	(0.00249)	(0.00267)	(0.00227)	(0.002406)	(0.002256)	(0.00340)	(0.00201)	(0.00510)	(0.000338)	(0.000458)	(0.000257)	(0.00170)
Diabetes	0.00209	-0.00656**	-0.000810	0.00894*	0.00209	-0.00656*	-0.000810	0.00894	0.000288	-0.00077*	-0.000107	0.00345
	(0.00302)	(0.00323)	(0.00274)	(0.002491)	(0.002393)	(0.00346)	(0.00298)	(0.00878)	(0.000525)	(0.000467)	(0.000385)	(0.00301)
Kidney liver disease	-0.0140**	-0.00321	-0.00483	-0.00189	-0.0140**	-0.00321	-0.00483	-0.00189	-0.00185**	-0.000417	-0.000612	-0.000814

	(0.00515)	(0.00551)	(0.00468)	(0.00838)	(0.00607)	(0.00590)	(0.00371)	(0.00929)	(0.000807)	(0.000798)	(0.000477)	(0.00326)
Musculoskeletal conditions	0.00550**	0.00676***	0.00632***	-0.0120***	0.00550**	0.00676***	0.00632***	-0.0120**	0.000714**	0.000905***	0.000807***	-0.00406***
	(0.00190)	(0.00204)	(0.00173)	(0.00310)	(0.00229)	(0.00234)	(0.00182)	(0.00402)	(0.000301)	(0.000314)	(0.000234)	(0.00132)
Constant	9.025***	8.341***	8.579**	1.711***	9.025***	8.341**	8.579**	1.711***	2.218**	2.129***	2.154***	0.670***
	(0.120)	(0.129)	(0.109)	(0.196)	(0.139)	(0.143)	(0.122)	(0.222)	(0.0184)	(0.0191)	(0.0156)	(0.0741)
R-squared	0.184	0.076	0.100	0.142	0.184	0.076	0.100	0.142	0.188	0.077	0.102	0.136

Table A13: Regression results

	First regression				Second regression				Third regression			
	Satis	Happiness	Worth	Anxiety	Satis	Happiness	Worth	Anxiety	In_Satis	In_Happiness	In_Worth	In_Anxiety
Alcohol misuse	-0.000017	-0.000032	-0.000045	0.000008	-0.000017	-0.000032	-0.000045	0.000008	-0.000018	-0.000016	-0.000003	0.0328
	(0.0000057)	(0.0000058)	(0.000005)	(0.000009)	(0.000005)	(0.000005)	(0.000004)	(0.000007)	(0.000007)	(0.000006)	(0.000006)	(0.000002)
Drug misuse	-0.0583***	-0.0415**	-0.0327***	0.0664***	-0.0583***	-0.0415***	-0.0327***	0.0664***	-0.00779***	-0.00561***	-0.00422***	0.0207***
	(0.00716)	(0.00755)	(0.00646)	(0.0114)	(0.00953)	(0.00877)	(0.00709)	(0.0138)	(0.00126)	(0.00118)	(0.000908)	(0.00464)
Healthy eating	-0.000480	-0.000803	0.00102	0.00229	-0.000480	-0.000803	0.00102	0.00229	-6.76e-05	-0.000112	0.000123	0.000727
	(0.00151)	(0.00159)	(0.00136)	(0.00241)	(0.00163)	(0.0017)	(0.00146)	(0.00259)	(0.000213)	(0.000235)	(0.000187)	(0.000881)
Physical activity	-0.00795**	-0.00197	-0.00397*	0.00842**	-0.00795***	-0.00197	-0.00397*	0.00842**	-0.00105***	-0.000247	-0.000512*	0.00267**
	(0.00247)	(0.00261)	(0.00223)	(0.00394)	(0.00268)	(0.00267)	(0.00227)	(0.00375)	(0.000354)	(0.000357)	(0.000287)	(0.00129)
Sedentary	-0.00805*	-0.00120	-0.005	0.0045	-0.00805	-0.0012	-0.005	0.0045	-0.001	-0.000	-0.0006	0.00129

behaviour	**		27**	2	805** *	0	527**	52	07***	148	79**	
	(0.00285)	(0.00300)	(0.00257)	(0.00454)	(0.00292)	(0.00287)	(0.00259)	(0.00411)	(0.00387)	(0.000384)	(0.000331)	(0.00141)
STIs	-0.00154	0.000495	-0.000867	0.00106	-0.00154**	0.000495	-0.000867	0.00106	-0.000203*	0.00006	-0.000113	0.000353
	(0.00151)	(0.00159)	(0.00136)	(0.00241)	(0.000774)	(0.000751)	(0.000778)	(0.00125)	(0.00102)	(0.00001)	(9.98e-05)	(0.000422)
Smoking	-0.00128	-0.00225	-0.000731	-0.000318	-0.00128	-0.00125	-0.000731	-0.000318	-0.000170	-0.000296	-0.00009	-0.00001
	(0.00169)	(0.00178)	(0.00153)	(0.00270)	(0.00182)	(0.00207)	(0.00177)	(0.00305)	(0.000238)	(0.000275)	(0.000223)	(0.00107)
Early years development	-0.00144	0.00137	0.00117	0.00176	-0.00144	0.00137	0.00117	0.00176	-0.000196	0.000184	0.000153	0.000719
	(0.00243)	(0.00256)	(0.00219)	(0.00386)	(0.00297)	(0.00288)	(0.00228)	(0.00429)	(0.000392)	(0.000384)	(0.000290)	(0.00151)
Pupil absences	-0.0104	0.00633	-0.00357	-0.00439	-0.0104	0.00633	-0.00357	-0.00439	-0.00138	0.000795	-0.000492	-0.00220
	(0.00814)	(0.00858)	(0.00734)	(0.0130)	(0.00904)	(0.0103)	(0.00782)	(0.0134)	(0.00118)	(0.00137)	(0.00092)	(0.00470)
Pupil attainment	-0.000168	-0.00360	0.000550	0.000739**	-0.000168	-0.000360	0.000550	0.000739**	-0.00003	-0.000491	0.000005	0.00239*
	(0.00213)	(0.00225)	(0.00192)	(0.00340)	(0.00242)	(0.00262)	(0.00204)	(0.00372)	(0.000315)	(0.000346)	(0.000257)	(0.00133)
Teenage pregnancy	0.00877** *	0.00496***	0.00493***	-0.0179***	0.00877***	0.00496***	0.00493***	-0.0179***	0.00116***	0.000678***	0.000636***	-0.00594**
	(0.00147)	(0.00155)	(0.00133)	(0.00234)	(0.00173)	(0.00187)	(0.00164)	(0.00287)	(0.000229)	(0.000250)	(0.000210)	(0.000969)
Young people not NEET	0.0252***	0.0192***	0.0205***	-0.0252***	0.0252***	0.0192**	0.0205***	-0.0252**	0.00330***	0.00255***	0.00263**	-0.00886***
	(0.00587)	(0.00618)	(0.00529)	(0.00935)	(0.00622)	(0.00652)	(0.00547)	(0.00984)	(0.000818)	(0.000873)	(0.000698)	(0.00330)
High blood pressure	-0.000832	0.000800	0.00126	-0.00325	-0.000832	0.000800	0.00126	-0.00325	-0.000124	0.000103	0.000153	-0.00122
	(0.00155)	(0.00164)	(0.00140)	(0.00247)	(0.00169)	(0.00187)	(0.00140)	(0.00328)	(0.000223)	(0.000251)	(0.000177)	(0.00113)
Low birth weight	0.00514	0.0117	0.00213	0.00425	0.00514	0.0117	0.00213	0.00425	0.000651	0.00161	0.000254	0.00136
	(0.00944)	(0.00994)	(0.00851)	(0.0150)	(0.0112)	(0.0123)	(0.0101)	(0.0174)	(0.00146)	(0.00163)	(0.00128)	(0.00599)

Overweight obesity adults	-0.00342* *	-0.000577	-0.00378***	0.00324	-0.00342**	-0.000577	-0.00378** *	0.00324	-0.000457* *	-0.00008	-0.000485***	0.000985
	(0.00145)	(0.00153)	(0.00131)	(0.00231)	(0.00157)	(0.00159)	(0.00143)	(0.00236)	(0.00206)	(0.000212)	(0.000183)	(0.000813)
Overweight obesity children	-0.00310	0.00378	-0.00153	0.00644	-0.00310	0.00378	-0.00153	0.00644	-0.000405	0.000517	-0.000188	0.00226
	(0.00328)	(0.00345)	(0.00295)	(0.00522)	(0.00385)	(0.00421)	(0.00333)	(0.00532)	(0.000507)	(0.000562)	(0.000425)	(0.00185)
Cancer screening attendance	-0.0157***	-0.0165** *	-0.00972***	0.0133* **	-0.0157***	-0.0165***	-0.00972** *	0.0133***	-0.00210***	-0.00223***	-0.00124***	0.00423**
	(0.00279)	(0.00294)	(0.00251)	(0.00444)	(0.00287)	(0.00324)	(0.00284)	(0.00485)	(0.000377)	(0.000435)	(0.000362)	(0.00169)
Child vaccination coverage	0.00682** *	0.00443* *	0.00243	-0.0102***	0.00682***	0.00443	0.00243	-0.0102**	0.000914***	0.000606	0.000306	-0.00331* *
	(0.00220)	(0.00231)	(0.00198)	(0.00350)	(0.00263)	(0.00279)	(0.00214)	(0.00425)	(0.000343)	(0.000372)	(0.000272)	(0.00152)
Constant	7.059***	6.668***	6.897**	3.747***	7.059**	6.668** *	6.897***	3.747**	1.961** *	1.905** *	1.939***	1.412***
	(0.686)	(0.723)	(0.619)	(1.093)	(0.681)	(0.703)	(0.629)	(1.124)	(0.0896)	(0.0941)	(0.0804)	(0.385)
R-squared	0.138	0.056	0.064	0.133	0.138	0.056	0.064	0.133	0.141	0.057	0.066	0.121

Table A14: Regressions' results with multicollinearity correction

VARIABLES	First regression				Second regression				Third regression			
	Satis	Happiness	Worthwhile	Anxiety	Satis	Happiness	Worthwhile	Anxiety	In_Satis	In_Happiness	In_Worthwhile	In_Anxiety
Alcohol misuse	-0.000014	-0.000026	0.00002	0.000079	-0.000014	-0.00002	0.0000189	0.0000797	-0.00001	-0.00009	0.00002	0.0000322
	(-0.000056)	(-0.000059)	(-0.000050)	(-0.000089)	(-0.000055)	(-0.000048)	(-0.000045)	(-0.00007)	(-0.000072)	(-0.000065)	(-0.000058)	(-0.000026)
Drug misuse	-0.0599***	-0.0417***	-0.0337***	0.0673***	-0.0599***	-0.0417***	-0.0337***	0.0673***	-0.00800***	-0.00563***	-0.00435***	0.0209***

	(0.00716)	(0.00752)	(0.00645)	(0.0114)	(0.00958)	(0.00869)	(0.00706)	(0.0138)	(0.00127)	(0.00117)	(0.000905)	(0.00464)
Healthy eating	-0.000497	-0.000806	0.0001	0.00230	-0.000497	-0.000806	0.0001	0.00230	-7.00E-07	-0.000112	0.000122	0.000730
	(0.00152)	(0.00159)	(0.00136)	(0.00241)	(0.00163)	(0.00177)	(0.00147)	(0.00259)	(0.000214)	(0.000235)	(0.000187)	(0.000883)
Physical activity	-0.00257	-0.00117	-0.000454	0.00540*	-0.00257	-0.00117	-0.000454	0.00540*	-0.000332	-0.000148	-5.78e-05	0.00081**
	(0.00158)	(0.00166)	(0.00143)	(0.00252)	(0.00182)	(0.00184)	(0.00150)	(0.00260)	(0.000238)	(0.000245)	(0.000190)	(0.000913)
STIs	-0.00177	0.000460	-0.00102	0.00119	-0.00177**	0.000460	-0.00102	0.00119	-0.000234**	0.00006	-0.000133	0.000391
	(0.00151)	(0.00159)	(0.00136)	(0.00241)	(0.000760)	(0.000749)	(0.000785)	(0.00121)	-0.00009	(0.000101)	(0.000101)	(0.000411)
Smoking	-0.00113	-0.00223	-0.000634	-0.000401	-0.00113	-0.00223	-0.000634	-0.000401	-0.000151	-0.000293	-0.00007	-0.00003
	(0.00170)	(0.00178)	(0.00153)	(0.00269)	(0.00183)	(0.00207)	(0.00177)	(0.00306)	(0.000239)	(0.000275)	(0.000223)	(0.000107)
Early years_ development	-0.00144	0.00037	0.00017	0.00177	-0.00144	0.00037	0.00017	0.00177	-0.000197	0.000184	0.000152	0.000721
	(0.00243)	(0.00255)	(0.00219)	(0.00386)	(0.00298)	(0.00288)	(0.00228)	(0.00429)	(0.000392)	(0.000384)	(0.000290)	(0.000151)
Pupil absences	-0.00955	0.000645	-0.000301	-0.000486	-0.00955	0.000645	-0.000301	-0.000486	-0.000127	0.0000811	-0.0000420	-0.0000234
	(0.00815)	(0.00857)	(0.00735)	(0.0130)	(0.00906)	(0.0102)	(0.00781)	(0.0134)	(0.00118)	(0.00137)	(0.000991)	(0.000468)
Pupil attainment	-0.00009	-0.000359	0.000601	0.000734*	-0.00009	-0.000359	0.000601	0.000734*	-0.00002	-0.0000489	0.00006	0.000038*
	(0.00214)	(0.00225)	(0.00192)	(0.00340)	(0.00243)	(0.00262)	(0.00205)	(0.00372)	(0.000316)	(0.000346)	(0.000257)	(0.000134)
Teenage pregnancy	0.00912***	0.00502**	0.0016***	-0.0181***	0.00912**	0.00502**	0.0016***	-0.0181***	0.00121***	0.000685***	0.000665***	-0.000600**
	(0.00147)	(0.00155)	(0.00132)	(0.00234)	(0.00171)	(0.00187)	(0.00163)	(0.00284)	(0.000225)	(0.000250)	(0.000208)	(0.000960)
Young people not NEET	0.0248***	0.0191***	0.0203***	-0.0250***	0.0248***	0.0191***	0.0203***	-0.0250**	0.00325***	0.00254***	0.00261***	-0.000881**

												*
	(0.00588)	(0.00618)	(0.00530)	(0.00935)	(0.00622)	(0.00651)	(0.00546)	(0.00983)	(0.000818)	(0.000872)	(0.000697)	(0.00330)
High blood pressure	-0.000786	0.000807	0.00129	-0.00328	-0.000786	0.000807	0.00129	-0.00328	-0.00117	0.000104	0.000157	-0.00122
	(0.00156)	(0.00164)	(0.00140)	(0.00247)	(0.00174)	(0.00188)	(0.00142)	(0.00332)	(0.000229)	(0.000252)	(0.000181)	(0.00114)
Low birth weight	0.00601	0.0119	0.00271	0.00376	0.00601	0.0119	0.00271	0.00376	0.000766	0.00163	0.000328	0.00122
	(0.00945)	(0.00994)	(0.00851)	(0.0150)	(0.011)	(0.0123)	(0.0101)	(0.0174)	(0.00145)	(0.00163)	(0.00128)	(0.00599)
Overweight obesity adults	-0.00375***	-0.000627	-0.00400**	0.00342	-0.00375**	-0.000627	-0.00400**	0.00342	-0.000501**	-8.96e-05	-0.000513***	0.00104
	(0.00145)	(0.00152)	(0.00131)	(0.00231)	(0.00158)	(0.00159)	(0.00144)	(0.00237)	(0.000208)	(0.000212)	(0.000185)	(0.000816)
Overweight obesity children	-0.00359	0.00370	-0.00186	0.00672	-0.00359	0.00370	-0.00186	0.00672	-0.000471	0.000508	-0.000230	0.00234
	(0.00328)	(0.00344)	(0.00295)	(0.00521)	(0.00385)	(0.00421)	(0.00333)	(0.00531)	(0.000506)	(0.000561)	(0.000425)	(0.00184)
Cancer screening attendance	-0.0152***	-0.0164***	-0.00940**	0.0130***	-0.0152***	-0.0164***	-0.00940**	0.0130***	-0.00204***	-0.00222***	-0.0020***	0.00415**
	(0.00279)	(0.00293)	(0.00251)	(0.00443)	(0.00287)	(0.00324)	(0.00281)	(0.00479)	(0.000377)	(0.000435)	(0.000359)	(0.00167)
Child vaccination coverage	0.00716***	0.00449*	0.00265	-0.0104***	0.00716**	0.00449	0.00265	-0.0104**	0.000959***	0.000612	0.000334	-0.00336**
	(0.00220)	(0.00231)	(0.00198)	(0.00349)	(0.00263)	(0.00279)	(0.00214)	(0.00423)	(0.000343)	(0.000371)	(0.000271)	(0.00151)
Constant	6.504***	6.585***	6.533***	4.059***	6.504***	6.585***	6.533***	4.059***	1.887**	1.895**	1.892**	1.501**
					(0.649)	(0.681)	(0.591)	(1.034)	(0.0852)	(0.0911)	(0.0754)	(0.353)
R-squared	0.134	0.056	0.062	0.132	0.134	0.056	0.062	0.132	0.138	0.057	0.063	0.121

References

Allen, J., & Holder, M. D. (2014). Marijuana use and wellbeing in university students. *Journal of Happiness Studies*, 15, 301–321. <https://doi.org/10.1007/s10902-013-9423-1>.

Amholt, T. T., Dammeyer, J., Carter, R., & Niclasen, J. (2020). Psychological wellbeing and academic achievement among school-aged children. A systematic review. *Child Indicators Research*, 13(5), 1523–1548. <https://doi.org/10.1007/s12187-020-09725-9>

Anderson, D. M., Rees, D. I., & Sabia, J. J. (2014). Medical marijuana laws and suicides by gender and age. *American Journal of Public Health*, 104(12), 2369–2376. <https://doi.org/10.2105/AJPH.2013.301612>.

Andrew, M., Fisk, J., & Rockwood, K. (2012). Psychological wellbeing in relation to frailty: A frailty identity crisis? *International Psychogeriatrics*, 24(8), 1347-1353. <https://doi.org/10.1017/s1041610212000269>

André B., H. Canhão, Geir A. Espnes, Ana Maria Ferreira Rodrigues, Maria João Gregorio, Camilla Nguyen, Rute Sousa, Kjersti Grønning, Is there an association between food patterns and life satisfaction among Norway's inhabitants ages 65 years and older?, *Appetite*, Volume 110, 2017, Pages 108-115, ISSN 0195-6663, <https://doi.org/10.1016/j.appet.2016.12.016>.

Arishi, L., Boyle, C., & Lauchlan, F. (2017). Inclusive education and the politics of difference. Considering the effectiveness of labelling in special education. *Educational and Child Psychology*, 34(4), 9–19.

Barrocas AL, Hankin BL, Young JF, Abela JRZ (2012) Rates of Nonsuicidal Self-Injury in Youth: Age, Sex, and Behavioral Methods in a Community Sample. *Pediatrics* 130:39-45.

Bartelink, Vicky H. M., Kyaw Zay Ya, Karin Guldbbrandsson, and Sven Bremberg. 2019. Unemployment among young people and mental health: A systematic review. *Scandinavian Journal of Public Health* 48: 1–15.

Baumberg Geiger, B., & MacKerron, G. (2016). Can alcohol make you happy? A subjective wellbeing approach. *Social Science and Medicine*, 156, 184–191. <https://doi.org/10.1016/j.socscimed.2016.03.034>.

Bellis MA, Lowey H, Hughes K, Deacon L, Stansfield J & Perkins C (2012). Variations in risk and protective factors for life satisfaction and mental wellbeing with deprivation: A cross-sectional study. *BMC Public Health* 12, 492.

Ben-Arieh, A. (2008). The child indicators movement. Past, present, and future. *Child Indicators Research*, 1(1), 3–16. <https://doi.org/10.1007/s12187-007-9003-1>

Blanchflower, D.G., & Oswald, A.J. (2008). Is wellbeing U-shaped over the life cycle?. *Social Science and Medicine*, 66(8): 1733-1749

Böckerman, P.; Johansson, E.; Saarni, S.I.; Saarni, S.E. The negative association of obesity with subjective well-being: Is it all about health? *J. Happiness Stud.* 2014, 15, 857–867.

Boyce, C.J., & Wood, A.M. (2011). Personality Prior to Disability Determines Adaptation: Agreeable Individuals Recover Lost Life Satisfaction Faster and More Completely. *Psychological Science*, 22(11): 1397– 140

Borschmann R., D. Becker, C. Coffey, E. Spry, M. Moreno-Betancur, P. Moran, G.C. Patton (2017) 20-year outcomes in adolescents who self-harm: a population-based cohort study *Lancet Child Adolesc. Health.*, 1 (3) , pp. 195-202

Bradshaw, J., & Richardson, D. (2009). An index of child well-being in Europe. *Child Indicators Research*, 2(3), 319–351. <https://doi.org/10.1007/s12187-009-9037-7>

Bradshaw, J., Martorano, B., Natali, L., & Neubourg, C. (2013). Children's subjective wellbeing in rich countries. *Child Indicators Research*, 6(4), 619–635. <https://doi.org/10.1007/s12187-013-9196-4>

Bray I, Gunnell D (2006). Suicide rates, life satisfaction and happiness as markers for population mental health. *Social Psychiatry and Psychiatric Epidemiology* 41, 333–337.

Casas, F., Bello, A., Gonzalez, M., & Aligue, M. (2013). Children's subjective wellbeing measured using a composite index. What impacts spanish first-year secondary education students' subjective wellbeing? *Child Indicators Research*, 6(3), 433–460. <https://doi.org/10.1007/s12187-013-9182-x>

Castillo-Mayén, Rosario et al. "Influence of Self-Efficacy and Motivation to Follow a Healthy Diet on Life Satisfaction of Patients with Cardiovascular Disease: A Longitudinal Study." *Nutrients* 12 (2020).

Chida Y, Steptoe A. (2008). Positive psychological wellbeing and mortality: a quantitative review of prospective observational studies. *Psychosom. Med.* 70: 741–56

Cho, E. Y.-N. (2018). Links between poverty and children's subjective wellbeing. Examining the mediating and moderating role of relationships. *Child Indicators Research*, 11(2), 585–607. <https://doi.org/10.1007/s12187-017-9453-z>

Cohen R, Bavishi C, Rozanski A. 2016. Purpose in life and its relationship to all-cause mortality and cardiovascular events: a meta-analysis. *Psychosom. Med.* 78: 122–33

Collins AL, Gleib DA, Goldman N. 2009. The role of life satisfaction and depressive symptoms in all-cause mortality. *Psychol. Aging* 24: 696–702

Czepiel D. and Paul F. Nowak. "Sedentary behaviour and life satisfaction in high school students." *British journal of medicine and medical research* 10 (2015): 1-8.

Grao-Cruces, Alberto & Nuviala, Román & Aznar, Mónica & Nuviala, Alberto. (2018). DO ALL SEDENTARY BEHAVIORS AFFECT LIFE SATISFACTION EQUALLY IN STUDENTS AGED 12-16 YEARS?. *Egitania Scientia*. 183-193. 10.46691/es.v0i0.189.

Daly MC, Oswald AJ, Wilson D, Wu S (2011). Dark contrasts: the paradox of high rates of suicide in happy places. *Journal of Economic Behavior & Organization* 80, 435–442.

Davies L, Petitti DB, Martin L, Woo M, Lin JS. Defining, Estimating, and Communicating Overdiagnosis in Cancer Screening. *Ann Intern Med.* 2018 Jul 3;169(1):36-43. doi: 10.7326/M18-0694. Epub 2018 Jun 26. PMID: 29946705.

Desousa C, Murphy S, Roberts C & Anderson L (2008). School policies and binge drinking behaviours of school-aged children in Wales: A multilevel analysis. *Health Education Research* 23, 259-71.

Dietze, P., Jenkinson, R., Aitken, C., Stoové, M., Jolley, D., Hickman, M., et al. (2013). The relationship between alcohol use and injecting drug use: Impacts on health, crime and wellbeing. *Drug and Alcohol Dependence*, 128, 111–115. <https://doi.org/10.1016/j.drugalcdep.2012.08.013>.

Dunne E.M., Theresa E. Senn, Kate B. Carey & Michael P. Carey (2018) Factors related to life satisfaction among urban African American adults receiving care at a publicly-funded sexual health clinic, *Psychology, Health & Medicine*, 23:3, 360-368, DOI: [10.1080/13548506.2017.1362109](https://doi.org/10.1080/13548506.2017.1362109)

Easterlin, R. (2006). Life cycle happiness and its sources. Intersection of psychology, economics and demography. *Journal of Economic Psychology*, 27(4): 35-47.

Edwards M. K. and Paul Dinneen Loprinzi. "Experimentally increasing sedentary behavior results in decreased life satisfaction." *Health Promotion Perspectives* 7 (2017): 88 - 94.

Essink-bot, M., Harry, Koning, J., Nijs, H.G., Kirkels, W.J., der, P.J., Maas, & Schröder, F. (1998). Short-term effects of population-based screening for prostate cancer on health-related quality of life. *Journal of the National Cancer Institute*, 90 12, 925-31 .

Flèche S & Layard R (2013). How mental health affects life-satisfaction. Centre for Economic Performance: London.

Forste R., Erin Moore, Adolescent obesity and life satisfaction: Perceptions of self, peers, family, and school, *Economics & Human Biology*, Volume 10, Issue 4, 2012, Pages 385-394, ISSN 1570-677X, <https://doi.org/10.1016/j.ehb.2012.04.008>.

Gariépy, Geneviève, Sofia M. Danna, Lisa Hawke, Johanna Henderson, and Srividya N. Iyer. 2021. The mental health of young people who are not in education, employment, or training: A systematic review and meta-analysis. *Social Psychiatry and Psychiatric Epidemiology* 57: 1–15

Gebhardt, M., Sälzer, C., Mang, J., Müller, K., & Prenzel, M. (2015). Performance of students with special educational needs in Germany: Findings from Programme for International Student Assessment 2012. *Journal of Cognitive Education and Psychology*, 14(3). <https://doi.org/10.1891/1945-8959.14.3.343>

Goldan, J., Nusser, L. & Gebel, M. (2022), School-related Subjective wellbeing of Children with and without Special Educational Needs in Inclusive Classrooms. *Child Ind Res* 15, 1313–1337 <https://doi.org/10.1007/s12187-022-09914-8>

Goodwin, R.D., Scheckner, B., Pena, L., Feldman, J.M., Taha, F., & Lipsitz, J.D. (2014). A 10-year prospective study of respiratory disease and depression and anxiety in adulthood. *Annals of allergy, asthma & immunology : official publication of the American College of Allergy, Asthma, & Immunology*, 113 5, 565-70 .

Graham C. and Felton A, (2005) Variance in Obesity Across Cohorts and Countries: A Norms-Based Explanation Using Happiness Surveys (September 2005). CSED Working Paper No. 42, Available at SSRN: <https://ssrn.com/abstract=1024823> or <http://dx.doi.org/10.2139/ssrn.1024823>

- Gram, I.T., & Slenker, S.E. (1992). Cancer anxiety and attitudes toward mammography among screening attenders, nonattenders, and women never invited. *American journal of public health*, 82 2, 249-51 .
- Guijarro, S., Naranjo, J., Padilla, M., Gutierrez, R., Lammers, C., & Blum, R. W. (1999). Family risk factors associated with adolescent pregnancy: Study of a group of adolescent girls and their families in Ecuador. *Journal of Adolescent Health*, 25, 166–172.
- Gutierrez-Garcia, Raúl A., Corina Benjet, Guilherme Borges, Enrique Méndez Rios, and Maria Elena Medina-Mora. 2017. NEETadolescents grown up: Eight-year longitudinal follow-up of education, employment and mental health from adolescence to early adulthood in Mexico City. *European Child & Adolescent Psychiatry* 26: 1459–69
- Helliwell J (2007). wellbeing and social capital: does suicide pose a puzzle? *Social Indicators Research* 81, 455–496
- Hill PL, Turiano NA. 2014. Purpose in life as a predictor of mortality across adulthood. *Psychol. Sci.* 25: 1482–86
- Hubbard, R., Goodwin, V., Llewellyn, D., Warmoth, K., & Lang, I. (2014). Frailty, financial resources and subjective wellbeing in later life. *Archives of Gerontology and Geriatrics* 58(3), 364-369. <https://doi.org/10.1016/j.archger.2013.12.008>
- Jackson, C.E., DiPlacido, J. Vitality as a Mediator Between Diet Quality and Subjective Wellbeing Among College Students. *J Happiness Stud* **21**, 1617–1639 (2020). <https://doi.org/10.1007/s10902-019-00150-6>
- Ju, Y.J., Kim, W., Kim, E., & Lee, S.Y. (2022). What types of burden experienced by family caregivers of dementia patients are related to their life satisfaction? *The journals of gerontology. Series A, Biological sciences and medical sciences*.
- Hughes JR, Hatsukami DK, Mitchell JE, Dahlgren LA. Prevalence of smoking among psychiatric outpatients. *Am J Psychiatry*. 1986;143:993-997.
- Jackson, C. E., & DiPlacido, J. (2020). Vitality as a mediator between diet quality and subjective wellbeing among college students. *Journal of Happiness Studies*, 21, 1617–1639.
- Jaffee, S., Caspi, A., Moffitt, T. E., Belsky, J., & Silva, P. (2001). Why are children born to teen mothers at risk for adverse outcomes in young adulthood? Results from a 20-yr longitudinal study. *Development and Psychopathology*, 12, 377–397

Jongbloed, Janine, and Jean-François Giret. 2022. Quality of life of NEET youth in comparative perspective: Subjective wellbeing during the transition to adulthood. *Journal of Youth Studies* 25: 321–43

Kandel DB, Davies M. Adult sequelae of adolescent depressive symptoms. *Arch Gen Psychiatry*. 1986;43:255-262.

Katsaiti, M. S. (2012). Obesity and happiness. *Applied Economics*, 44(31), 4101–4114.

Kaya, M., & Erdem, C. (2021). Students' wellbeing and academic achievement. *Child Indicators Research*. <https://doi.org/10.1007/s12187-021-09821-4>

Kiekens G., P. Hasking, R. Bruffaerts, L. Claes, I. Baetens, M. Boyes, J. Whitlock (2017), What predicts ongoing nonsuicidal self-injury?: a comparison between persistent and ceased self-injury in emerging adults *J. Nerv. Ment. Dis.*, 205 (10) , pp. 762-770

Klonsky E., (2007) The functions of deliberate self-injury: a review of the evidence *Clin. Psychol. Rev.*, 27 (2) , pp. 226-239, 10.1016/j.cpr.2006.08.002

Koivumaa-Honkanen, H. T., Honkanen, R., Antikainen, R., & Hintikka, J. (1999). Self-reported life satisfaction and treatment factors in patients with schizophrenia, major depression and anxiety disorder. *Acta Psychologica Scandinavia*, 95, 377–384.

Kress, V. E., Newgent, R. A., Whitlock, J., & Mease, L. (2015). Spirituality/religiosity, life satisfaction, and life meaning as protective factors for nonsuicidal self-injury in college students. *Journal of College Counseling*, 18(2), 160–174. <https://doi.org/10.1002/jocc.12012>

Lader, D. (2007). *Smoking-related Behaviour and Attitudes, 2006*. London: Office for National Statistics.

Lanier, C. A., Nicholson, T., & Duncan, D. (2001). Drug use and mental wellbeing among a sample of undergraduate and graduate college students. *Journal of Drug Education*, 31(3), 239–248. <https://doi.org/10.2190/r7t3-t266-jn9e-ux3w>.
Pei-Shan Li Chia-Jung Hsieh , Ya-Ling Shih³, Ya-Ting Lin and Chieh-Yu Liu et al. *BMC Geriatrics* (2023) 23:176 <https://doi.org/10.1186/s12877-023-03873-7>

Latif, E. Obesity and happiness: Does gender matter? *Econ. Bus. Lett.* 2014, 3, 59–67.

Lieshout R.J.V, Michael H. Boyle, Lindsay Favotto, John E. Krzeczkowski, Calan Savoy, Saroj Saigal, Louis A. Schmidt, (2018) Impact of extremely

low-birth-weight status on risk and resilience for depression and anxiety in adulthood *Journal of Child Psychology and Psychiatry*, Volume 59, Issue 5, May

Liu Y-X, Huang W-Q, Zhu W-E (2012). Suicidal ideation to satisfaction with life and happiness in college freshmen (in Chinese). *Chinese Mental Health Journal* 26, 235–238.

López-López, José A., Alex S. F. Kwong, Elizabeth Washbrook, Rebecca M. Pearson, Kate Tilling, Mina S. Fazel, Judy Kidger, and Gemma Hammerton. 2019. Trajectories of depressive symptoms and adult educational and employment outcomes. *BJPsych Open* 6: e6.

Lucas, R., & Salvador-Carulla, L. (2012). Life satisfaction in persons with intellectual disabilities. *Research in Developmental Disabilities*, 33(4):1103-9

Lund, Line Knutsen et al. "Mental health, quality of life and social relations in young adults born with low birth weight." *Health and Quality of Life Outcomes* 10 (2012): 146 - 146.

Luthy, Karlen E. ; Beckstrand, Renea L.; Asay, Whitney; Hewett, Carly(2013). Vaccinating parents experience vaccine anxiety too. *Journal of the American Association of Nurse Practitioners* 25(12):p 667-673, December

Maccagnan, A., Taylor, T., & White, M. P. (2020). Valuing the relationship between drug and alcohol use and life satisfaction: Findings from the Crime Survey for England and Wales. *Journal of Happiness Studies: An Interdisciplinary Forum on Subjective Wellbeing*, 21(3), 877–898.

<https://doi.org/10.1007/s10902-019-00110-0>

Martín-María, Natalia MS; Miret, Marta ; Caballero, Francisco Félix ; Rico-Urbe, Laura Alejandra MS; Steptoe, Andrew ; Chatterji, Somnath ; Ayuso-Mateos, José Luis PhD, (2017). The Impact of Subjective wellbeing on Mortality: A Meta-Analysis of Longitudinal Studies in the General Population. *Psychosomatic Medicine* 79(5):p 565-575. | DOI: 10.1097/PSY.0000000000000444

Meggiolaro S., & Ongaro F. (2014). Life satisfaction among older people in Italy in a gender approach. *Ageing & Society*, Published on-line 01 August 2014.

Menhert, T., Krauss, H.H., Nadler, R. & Boyd, M. (1990). Correlates of life satisfaction in those with disabling conditions. *Rehabilitation Psychology*, 35: 3-17.

Migliorini, L., Tassara, T., & Rania, N. (2019). A study of subjective wellbeing and life satisfaction in Italy. How are children doing at 8 years of age? *Child Indicators Research*, 12(5), 49–69 <https://link.springer.com/article/10.1007/s12187-017-9514-3>

Monteiro, B., & Belo, A.P. (2016). Avaliação do nível de ansiedade, depressão e autoestima dos idosos com patologia respiratória. *International Journal of Developmental and Educational Psychology. Revista INFAD de psicología*, 1, 283-292.

Murray, C., & Lopez, A. (1997). Alternative projections of mortality and disability by cause 1999–2020: Global burden of disease study. *Lancet*, 349, 1498–1504.

Mujcic, Redzo and Andrew J Oswald. “Evolution of Well-Being and Happiness After Increases in Consumption of Fruit and Vegetables.” *American journal of public health* 106 8 (2016): 1504-10 .

Newton R. and L P Hunt. “Psychosocial stress in pregnancy and its relation to low birth weight.” *British Medical Journal (Clinical research ed.)* 288 (1984): 1191 - 1194.

Nosek M.A. et al (1995). Life satisfaction of people with physical disabilities: Relationship to personal assistance, disability status, and handicap. *Rehabilitation Psychology*, 40 (3): 191-202

Odermatt R. & A, Stutzer, (2015) Smoking bans, cigarette prices and life satisfaction, *J. Health Econ.*, [Volume 44](#), December, Pages 176-194

Okun, M., Stock, W., Haring, M., & Witter, R. (1984). Health and subjective wellbeing: A meta-analysis. *International Journal of Aging and Human Development*, 19(2), 111-132. <https://doi.org/10.2190/ggjn-0n81-5957-haqd>

Oswald, A. J., & Powdthavee, N. (2007). Obesity, unhappiness, and the challenge of affluence: Theory and evidence. *Economic Journal*, 117(6), 441-454. <http://dx.doi.org/10.1111/j.1468-0297.2007.02077.1.x>

Ozkaya, E., Eker, H.H., Aycan, N., & Samancı, N. (2010). Impact of maternal anxiety level on the childhood vaccination coverage. *European Journal of Pediatrics*, 169, 1397-1401.

Padhiar BB, Karia UK (2020). A study on satisfaction level among patients attending sexually transmitted infections clinic. *Indian J Sex Transm Dis AIDS*. Jan-Jun;41(1):63-67. doi: 10.4103/ijstd.IJSTD_44_17. Epub 2018 Apr 11. PMID: 33062985; PMCID: PMC7529166.

Pagán, R., & Malo, M. (2009). Job satisfaction and disability: lower expectations about jobs or a matter of health?. *Spanish Economic Review*, 11(1): 51-74

Palomo-Vélez G, García F, Arauna D, Muñoz-Mendoza CL, Fuentes E, Palomol. Effects of frailty status on happiness and life satisfaction: the mediating role of self-perceived health. *Revista Latinoam de Psicología*. 2020;52:95

Patton G.C., M Hibbert, M J Rosier, J B Carlin, J Caust, and G Bowes, 1996: Is smoking associated with depression and anxiety in teenagers? *American Journal of Public Health* 86, 225-230, <https://doi.org/10.2105/AJPH.86.2.225>

Pengpid, Supa and Karl Peltzer. "Sedentary Behaviour, Physical Activity and Life Satisfaction, Happiness and Perceived Health Status in University Students from 24 Countries." *International Journal of Environmental Research and Public Health* 16 (2019).

Pomerleau OF, Adkins D, Pertschuk M. Predictors of outcome and recidivism in smoking cessation treatment. *Addict Behav.* 1978;3:65-70.

Rees, G., & Bradshaw, J. (2018). Exploring low subjective wellbeing among children aged 11 in the UK. An analysis using data reported by parents and by children. *Child Indicators Research*, 11(1), 27–56. <https://doi.org/10.1007/s12187-016-9421-z>

Riis, J., Loewenstein, G., Baron, J., & Jepson, C. (2005). Ignorance of hedonic adaptation to hemodialysis: A study using ecological momentary assessment. *Journal of Experimental Psychology: General*, 134 (1), 3-9.

Robertson, S.; Davies, M.; Winefield, H. Why weight for happiness? Correlates of BMI and SWB in Australia. *Obes. Res. Clin. Pract.* 2015, 9, 609–612.

Sable MR, Wilkinson DS. Impact of perceived stress, major life events and pregnancy attitudes on low birth weight. *Fam Plann Perspect.* 2000 Nov-Dec;32(6):288-94. PMID: 11138865.

Schilmoeller, G. L., Baranowski, M. D., & Higgins, B. S. (1991). Long-term support and personal adjustment of adolescent and older mothers. *Adolescence*, 26, 787–797.

Shiffman S. Relapse following smoking cessation: a situational analysis. *J Clin Psychol.* 1982;50:71-86

Stea, Tonje H., Eirik Abildsnes, Arve Strandheim, and Siri H. Haugland. 2019. Do young people who are not in education, employment or training (NEET) have more health problems than their peers? A cross-sectional study among Norwegian adolescents. *Norsk Epidemiologi* 28: 89–95.

Stevenson, W., Maton, K. I., & Teti, D. M. (1999). Social support, relationship quality, and wellbeing among pregnant adolescents. *Journal of Adolescence*, 22, 109–121.

Sirgy M.J. (2021), *The Psychology of Quality of Life*, 2021, Volume 83, ISBN : 978-3-030-71887-9

Steptoe A, (2019) *Happiness and Health*, *me Annual Review of Public Health* Volume 40, 2019, pp 339-359.

<https://www.annualreviews.org/doi/full/10.1146/annurev-publhealth-040218-044150>

Stevenson, W., Maton, K. I., & Teti, D. M. (1999). Social support, relationship quality, and wellbeing among pregnant adolescents. *Journal of Adolescence*, 22, 109–121.

Stoiber, K. C., & McIntyre, H. (2006). Adolescent pregnancy and parenting. In G. G. Bear & K. M. Minke (Eds.), *Children's needs III: Development, prevention, and intervention* (pp. 705–719). Bethesda, MD: National Association of School Psychologists.

Swannell SV, Martin GE, Page A, Hasking P, St John NJ (2014). Prevalence of nonsuicidal self-injury in nonclinical samples: Systematic review, meta-analysis and meta-regression *Suicide Life Threat Behav* 44: 273-303.

Tartaglia, S., Gattino, S., & Fedi, A. (2017a). Life satisfaction and alcohol consumption among young adults at social gatherings. *Journal of Happiness Studies*. <https://doi.org/10.1007/s10902-017-9907-5>

Tian, L., Liu, B., Huang, S., & Huebner, E. S. (2013). Perceived social support and school wellbeing among chinese early and middle adolescents. The mediational role of self-esteem. *Social Indicators Research*, 113(3), 991–1008. <https://doi.org/10.1007/s11205-012-0123-8>

Tobia, V., Greco, A., & Steca, P. (2019). & Marzocchi, G. M. (2019). Children's wellbeing at school: A multi-dimensional and multi-informant approach. *Journal of Happiness Studies*, 20, 841–861. <https://doi.org/10.1007/s10902-018-9974-2>

Tomás, J. M., Gutiérrez, M., Pastor, A. M., & Sancho, P. (2020). Perceived Social Support, School Adaptation and Adolescents' Subjective wellbeing. *Child Indicators Research*, 13(5), 1597–1617. <https://doi.org/10.1007/s12187-020-09717-9>

Trask, P.C., Paterson, A.G., Wang, C., Hayasaka, S., Milliron, K.J., Blumberg, L., Gonzalez, R., Murray, S., & Merajver, S.D. (2001). Cancer-specific worry interference in women attending a breast and ovarian cancer risk evaluation program: impact on emotional distress and health functioning. *Psycho-Oncology*, 10.

Unutzer, J., Patrick, D., Diehr, P., Simon, G., Grembowski, D., & Katon, W. (2000). Quality adjusted life years in older adults with depressive symptoms and chronic medical disorders. *International Psychogeriatrics*, 12, 15–33.

United Nations. (2006). Convention on the Rights of Persons with Disabilities and Optional Protocol. United Nations

Uppal, S., (2005). Disability, workplace characteristics and job satisfaction. *International Journal of Manpower*, 26(4): 336 - 349.

Valois, R. F., Zullig, K. J., Huebner, E. S., Kammermann, S. K., & Drane, J. W. (2002). Association between life satisfaction and sexual risk-taking behaviors among adolescents. *Journal of Child & Family Studies*, 11, 427–440.

van Campen, C., & van Santvoort, M. (2013). Explaining Low Subjective wellbeing of Persons with Disabilities in Europe: The Impact of Disability, Personal Resources, Participation and Socio-economic Status, *Social Indicators Research*, 111 (3): 839-854.

Veenhoven, Ruut. "Will Healthy Eating Make You Happier? A Research Synthesis Using an Online Findings Archive." *Applied Research in Quality of Life* 16 (2019): 221-240.

Waal-Manning HJ, de Hamel FA. Smoking habit and psychometric scores: a community study. *N Z Med J*. 1978;88:188-191

Whitlock J., K. Prussien, C. Pietrusza, (2015), Predictors of self-injury cessation and subsequent psychological growth: results of a probability sample survey of students in eight universities and colleges *Child Adolesc. Psychiatr. Ment. Health.*, 9 , p. 19

Ying, L. (2012). Suicidal ideation to satisfaction with life and happiness in college freshmen. *Chinese mental health journal*.

You Z, Song J, Wu C, Qin P, Zhou Z (2014). Effects of life satisfaction and psychache on risk for suicidal behaviour: a cross-sectional study based on data from Chinese undergraduates. *BMJ Open* 4, e004096.

Zank, S., & Leipold, B. (2001). The relationship between severity of dementia and subjective well-being. *Aging & Mental Health*, 5, 191 - 196.

Zhang, J., Liu, Y., & Sun, L. (2017). Life satisfaction and degree of suicide intent: A test of the strain theory of suicide. *Comprehensive psychiatry*, 74, 1-8 .

Zhu, J., Ma, S., Chen, R., Liu, Z., Liu, Z., & Wei, W. (2022). The psychological impact of esophageal cancer screening on anxiety and depression in China. *Frontiers in Psychiatry*, 13.

Zhu, X., Luchetti, M., Aschwanden, D., Sesker, A.A., Stephan, Y., Sutin, A.R., & Terracciano, A. (2022). Satisfaction with life and risk of dementia: Findings from the Korean Longitudinal Study of Aging. *The journals of gerontology. Series B, Psychological sciences and social sciences*.

Zhou, X., Li, J., Gu, W., Wang, J., Zhu, Y., Zhang, G., Ding, Y., & Tang, Y. (2017). Prevalence and associated factors of anxiety and depression among patients with chronic respiratory diseases in eight general hospitals in Jiangsu Province of China: A cross-sectional study. *Psychiatry Research, 251*, 48-53.

Zullig KJ, Valois RF, Hobbs GR, Romer D, Brown LK, DiClemente RJ, Venable PA. Does Initiating Vaginal Sexual Intercourse During a Safer Sex Media Campaign Influence Life Satisfaction Among African American Adolescents? *J Adolesc Health*. 2020 Jul;67(1):40-45. doi: 10.1016/j.jadohealth.2019.09.001. Epub 2019 Nov 23. PMID: 31771924.