Measuring wellbeing
inequalities

A HOW-TO GUIDE

Measuring Wellbeing Series

This practical guide is aimed at analysts who want to look at different ways to measure wellbeing inequality.

It reflects our current thinking, which is evolving with academic research and feedback from those carrying out the measuring. These guides will be continually updated with emerging best practice and knowledge.

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what works
wellbeing

contents

About the What Works Centre for Wellbeing

What Works Centre for Wellbeing is an independent organisation set up to produce robust, relevant and accessible evidence on wellbeing. We work with individuals, communities, businesses and government, to enable them to use this evidence to make decisions and take action to improve wellbeing. The Centre is supported by the ESRC and partners to produce evidence on wellbeing in four areas: work and learning; culture and sport; community; and cross-cutting capabilities in definitions, evaluation, determinants.

About the Measuring Wellbeing Series

As a collaborating centre on wellbeing in the UK, we bring together leading thinking and practice on current and potential uses of wellbeing in policy and decision-making. This extends across different disciplines, sectors and jurisdictions of the UK. With our work we aim to allow meaningful comparison across sectors and to move towards consensus on what the outcomes of interest are and what to measure to understand value. We want to make wellbeing evaluation more robust and easier to use, and do, by learning from practice and integrating the best research principles. The Centre's approach is independent, evidence based, collaborative, practical, open and iterative.

You can find other publications in this series on our website: **whatworkswellbeing.org**

background

We have made huge strides over the last six years in defining and measuring wellbeing. Personal wellbeing, people's own ratings about their lives and experiences, is now being routinely captured through a wide range of surveys and there is a growing archive of data to analyse. Furthermore, organisations are increasingly asking personal wellbeing questions in evaluations of their programmes and services to try to capture the impact they are having on people's lives.

The focus of analysis of this new survey data is often on 'average' levels of wellbeing but there is increasing recognition of the importance of measuring and reporting inequalities between and within different groups in society. Measures of inequality help us to explore differences in wellbeing and where there is the greatest gap between those who are doing well and those who are struggling.

There is a strong argument that policy makers should be most focussed on improving the lives of the worst off and measures of inequality can help to target those in most need and indicate whether the gap is closing.

This is a short and accessible guide for analysts and practitioners on why you should be interested in wellbeing inequalities, how to analyse data, and how to assess whether inequalities are changing for the better or worse

Introduction

The political events of 2016 shone a bright spotlight on people who have struggled since the global financial crisis of 2008. It's also highlighted the gap between those who have, and haven't, benefitted from the subsequent recovery. Objective measures, such as income, may paint only part of the picture of what inequality means for people's lives. Using a personal wellbeing lens allows us to fully understand people's ratings of their own lives and experiences. This may include personal circumstances such as income, as well as social settings, including having someone to rely on. On top of this, services, organisations and country-wide conditions may help, or in some cases make things worse. Personal wellbeing is an individual's own view about what matters and how their lives are progressing, taking all the relevant factors into consideration.

Focussing on averages can hide important underlying variation within and between population groups, places or regions. Inequalities in wellbeing show the gap between those who feel their lives are progressing well and those who feel they are languishing. They can show differences *between* groups, e.g. between females and males; those in and out of work; or between areas. They can also show differences in wellbeing *within* a certain group. For example, within a local authority what is the difference between those who feel they are doing well compared to those who are struggling? Why is this of interest? How do you go about measuring wellbeing inequalities? That is the main subject of this short guide.

What is personal wellbeing and how do we measure it?

Personal wellbeing measures are an important component of the Office for National Statistics (ONS) approach to measuring national wellbeing [1]. They are designed to capture how people rate their lives and therefore support a better understanding of those served by public policies and services. They are also important because there is so much research that shows the multiple benefits of improving people's personal wellbeing on other outcomes such as health, work and education. Personal wellbeing also provides a common cause and shared goal for organisations to rally around. This is especially important given the extent to which public and private sector organisations and charities affect people's lives and experiences.

There is now a range of standard survey questions to capture personal wellbeing. Most notable in the UK are the ONS4 harmonised national statistics [2]. The ONS4 are measured on a scale of 0-10.

Next I would like to ask you four questions about your feelings on aspects of your life. There are no right or wrong answers. For each of these questions I'd like you to give an answer on a scale of nought to 10, where nought is 'not at all' and 10 is 'completely.

Overall, how satisfied are you with your life nowadays?

Overall, to what extent do you feel that the things you do in your life are worthwhile?

Overall, how happy did you feel yesterday?

On a scale where nought is 'not at all anxious' and 10 is 'completely anxious', overall, how anxious did you feel yesterday?

Why are inequalities in personal wellbeing important?

As we've explored above, focussing on averages can hide important underlying variation within and between groups. In addition, when comparisons are made over time, increases in averages may be entirely due to improvements among those with higher levels of wellbeing. An average could increase while those at the low end of the distribution are unaffected or even become worse off. It is important therefore to understand the full distribution of responses to personal wellbeing questions and to present measures that describe features of the distribution.

There is also a strong argument that policy makers should be most interested in improvements for the worst-off. In order to do this, we need to understand who has the lowest levels of wellbeing. Policy is often set against a backdrop of resource constraints, so strategic targeting of funding is necessary to achieve maximum impact.

Lastly, wellbeing and inequalities in wellbeing are associated with other outcomes which are important for communities, policy and local authorities, as outlined in the box below.

> **Wellbeing inequalities: what do we already know?**
>
> - Differences in **social trust** between people can be explained through wellbeing inequalities – and is a stronger factor than income inequalities [3]
>
> - Wellbeing inequality was a predictor of an **area voting to leave in the European Referendum in the UK** and a stronger predictor than conventional economic measures [4]
>
> - **Unemployment rates** are a strong predictor of wellbeing inequality in a country [5]. **Higher GDP** and **better governance** have been found to be associated with lower wellbeing inequalities among richer nations [6].
>
> - Lower wellbeing can be caused by poorer health, but lower wellbeing has also been shown to **cause worsening health**, through the impacts of stress hormones on chronic inflammation. Higher wellbeing leads to better health, faster recovery, higher productivity, better social relations and pro-social behaviours [7]. **Improving the wellbeing of those at the bottom levels can lead to benefits** in health, social care and other Local Authority and policy priorities.
>
> - Analysis of the drivers of wellbeing inequality in Britain [8] has highlighted:
>
>   - **Deprivation, median income and unemployment** are all associated with higher wellbeing inequality at the local authority level.
>
>   - Although more **rural areas** have higher average wellbeing, this does not translate into lower wellbeing inequality as might be expected. Analysis indicates that this might be due to higher impacts of unemployment in rural areas.
>
>   - Higher levels of engagement in **heritage activities** and the **use of**

The distribution of wellbeing is also important and reveals additional information for policy makers that is hidden in headline averages.

> **green space for health or exercise** is associated with lower wellbeing inequality in local authorities, even though increased engagement in these activities is not associated with improved average wellbeing.
>
> - Analysis has highlighted the most equal and unequal Local Authorities in Britain [9]. When focusing on the differences between groups, the majority of Local Authorities show a wellbeing 'deficit' for those with lower educational levels. However, this is not inevitable and in many Local Authorities there is no difference for those with different levels of education, or the reverse is true.

The New Economics Foundation explore some of the key reasons why policy-makers care about wellbeing inequalities in their recent report, Measuring Wellbeing Inequality: Working paper on the selection of a Headline Indicator [10].

How does this guide help, and who is it for?

The purpose of this guide is primarily intended as a guide for analysts interested in understanding how wellbeing inequalities relate to a policy, programme or research. The guide sets out a few common measures of inequality, and highlights how to test whether they are getting better or worse. While we focus on the ONS4 in each example provided, we also discuss the equivalent approaches for other common measures of personal wellbeing. Above all, we have written this guide to encourage readers to have a go.

headline measures of wellbeing inequality

Measures of inequality in personal wellbeing between populations and groups

It is common to report the wellbeing of the population or of sub-groups of the population. For example, women and men; different religious groups; those living in different areas of the UK. This is an important test to understand differences for different groups and whether programmes or policies may not be reaching all in the desired way.

Whether there is a significant difference between groups can be tested using standard statistical tests.

Measures of inequality in personal wellbeing within populations and groups

In addition, it is important to understand differences *within* groups. For those using the ONS4, attention is often drawn to average levels of personal wellbeing within a group such as a Local Authority or entire nation. The main issue with this is that it provides little insight into the underlying distribution of responses. While average wellbeing is going up, this could mask an increase in the numbers with low wellbeing.

There are a range of approaches which can be taken for measuring inequalities, discussed in the New Economics Foundation report [10].

To ensure we understand those who are at the bottom of the distribution, one important measure is the proportion of people within a group answering below a certain threshold The ONS currently reports on the proportion of people within a group answering with different categories of score (high, medium and low, see below)and proposes that a headline measure alongside average wellbeing should be the proportion of people answering with low wellbeing. The rationale behind this choice as a headline indicator was explored in

ONS4 Score Categories

For Life Satisfaction, Happiness and Worthwhile:
- Low = 0 – 4 out of 10
- Medium = 5 – 6 out of 10
- High = 7 – 8 out of 10
- Very High = 9 – 10 out of 10

For Anxiety:
- Very Low = 0 – 1 out of 10
- Low = 2 – 3 out of 10
- Medium = 4 – 5 out of 10
- High = 6 – 10 out of 10

the [New Economics Foundation report](#) [10] and associated Roundtable discussion.

Headline measures within populations and groups

- **Average wellbeing**, alongside

- **Percentage below a threshold** - Low well-being is defined as a rating of 0-4 on an 11-point scale for measures of personal well-being (i.e. Life Satisfaction). This is proposed as a key headline indicator of well-being inequalities. The ONS are carrying out analysis to test whether the threshold should stay with the current 4 (category of low wellbeing), or should be extended to below 5.

- Note the different score categories for the three positive ONS4 questions compared to anxiety. So someone scoring 4 for life satisfaction would fall into the low category, but a score of 4 for anxiety would fall into the medium category.

There are other measures of personal wellbeing besides the ONS4. But, for the most part, the same fundamental approaches to reporting results can be used.

- *Warwick and Edinburgh Mental Wellbeing Scale (WEMWBS)*; WEMWBS [10] is a well validated popular measure of mental wellbeing. It provides an index score based on the sum of responses from 14 questions (or 7 questions for the shorter form survey) each on a scale of 1 to 5. So total scores range from 14 to 70 (7 to 35 for short form). Similar to the ONS4, the average score can be taken across groups and comparisons made between groups. Proportions answering with high, medium and low scores can be reported (see box) and the standard deviation from the mean can be used as a measure of the spread of responses.

- *Personal wellbeing measures on 5, 7 or x point scales*; the averages and standard deviations can be calculated in the same way as recommended for the ONS4 and comparisons can be made within groups using this same 7 or 5 point scale. However, to be able to compare with the population level means and sds of the ONS4 as in Annex A, the scales have to be translated to the 0-10 scale. See forthcoming guidance on scale translation.

- *Cantril Scale*; this is a measure of wellbeing on an 11 point scale based on the question "*Please imagine a ladder with steps numbered from zero at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?*" (see [11]) The mean score can be reported along with high, medium and low scores (see box). The standard deviation from the mean can be used as a measure of the spread of responses

- *Euro-Barometer Life Satisfaction*; a long time series is available from the European Commission dating back to 1973 based on the question "*On the whole are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with the life you lead?*" – i.e. a 4 point scale. The proportion in each category can be reported and this is inherently a measure of the distribution of wellbeing across the population and of inequalities [12].

Proportions of a population with low wellbeing is the proposed headline measure.... however, other measures exist, including looking at the spread of wellbing inequality.

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Cantril Ladder Categories

Answer on a scale from 0 to10:
- Low/ Suffering = 0 – 4 out of 10
- Medium/ Struggling = 5 – 6 out of 10
- High/ Thriving = 7 – 10 out of 10

These thresholds are based on Gallup recommendations [11].

Other measures of wellbeing inequality

We recommend measuring wellbeing inequality alongside averages in wellbeing, to allow for a broader comparison. While the approach of using thresholds is the current recommended headline measure for wellbeing inequalities, there are also other ways of reporting wellbeing inequality:

- **Standard deviation** – represents how much the scores for individual members of a group differ from the mean value for the group. A large standard deviation of personal wellbeing implies a greater spread of responses within the group - a less equal distribution. Calculated as the square root of the average square difference between individual scores within a group and the mean score across the group.

- *Mean Paired Distance (MPD)*; is also known as mean absolute difference and is a statistical measure of dispersion. Within the context of personal wellbeing MPD is equal to the average absolute difference in wellbeing scores between two people drawn at random from the sample. In practice we can calculate it by taking the average absolute differences in scores between all survey participants (see Annex B). It is more complicated to measure than the standard deviation, and also more difficult to test for meaningful differences between groups or changes over time. However, the principle is easy to understand and in contrast to the standard deviation it is independent of the mean.

- *Mean wellbeing of the bottom 40%*; the average wellbeing of the bottom 40% can provide a useful focus on those with the lowest wellbeing and those who are struggling the most. The calculation is straight forward - the scores are listed in ascending order and then the set of scores are partitioned into five equal parts. The mean is calculated for the lowest two parts combined. A t-test can be used to compare the difference between groups or change over time. Ordinary Least Squares regression on the bottom 40% can be used to test whether differences between groups are significant while controlling for other factors.

- *80:20 difference*; another measure that can be used is the difference between the mean of the top 20% to the mean of the bottom 20% of scores. To calculate, the scores are listed in ascending order and partitioned into 5 equal parts. The means of the top 20% and bottom 20% are calculated. The mean of the bottom 20% is subtracted from the mean of the top 20%.

The table below presents the measures for smokers using the life satisfaction questions in the Annual Population Survey for 2015-16. Using these measures, inequalities among smokers appears to be higher than for non-smokers, consistent with the tables presented earlier in this guide. However, it is less straightforward to confirm the differences are statistically significant for MPD and the ratio of means.

Mean Paired Distance (MPD): The MPD for smokers was 2.3 compared to the MPD of non-smokers which was 1.8.

Mean of the bottom 40%: was 5.6 compared to 7.0 for non-smokers.

80: 20 difference: is 6.1 for smokers compared to 4.0 for non-smokers.

Inequalities of life satisfaction for smokers (2015-16)

Average: The mean life satisfaction of smokers was 7.2 out of 10

Proportions: The percentage of smokers in each score category was:
 - Low [0-4]: 5%
 - Medium [5-6]: 14%
 - High [7-8]: 52%
 - Very High [9-10]: 29%

Standard Deviation: The standard deviation from the mean was 2.1

Life satisfaction and inequalities of life satisfaction for smokers (2015-16)

There are standard tests which you can use to determine whether wellbeing and wellbeing inequalities are different between groups, or have changed significantly over time.

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Comparing wellbeing inequalities between groups or changes over time

Reporting wellbeing and wellbeing inequalities within a group raises the question: what does good look like? All things being equal, a distribution with a higher average, a smaller spread of scores and a greater proportion with high and very high wellbeing is desirable. Benchmarks for the population are in annex A for broad comparision. For the most part, however, we want to compare a group's wellbeing against:

- another group
- the same group at a different point in time.

 We also want to test whether the differences in personal wellbeing and inequalities are statistically significantly better or worse. A list of tests with example results comparing the wellbeing of smokers to non-smokers are shown in the table below. These tests can be conducted using standard spreadsheet packages as well as specialised statistical software. In the table, the tests show that, based on the Annual Population Survey data in 2015-16, smokers had higher levels of anxiety and a more unequal distribution of anxiety than non-smokers. These same tests can be used to compare differences over time.

Ordinary Least Squares Regression – what to control for?

Differences in wellbeing between groups can sometimes be due to the different characteristics of people within the groups – age, gender etc. We often want to test whether, all other things being equal, wellbeing is different. Ordinary Least Squares Regression allows for this. But what else should you control for?
Where possible try to control for:
- Health and Disability*
- Relationship Status
- Economic Activity/ Employment
- Income
- Age and Age Squared
- Gender
- Ethnicity
- Religion
- Highest Qualification level
- Dependent children
- Occupational Grouping/ Status
- Housing Tenure
- Interview type
- Region/ location
See Reports [11, 12]
*Objective measures where possible
Interpreting the results of a regression does require some care. For example, if one finds that ethnicity no longer predicts wellbeing when controlling for income, there is no direct effect of ethnicity on wellbeing. However it may still be the case that ethnicity plays a role in determining income which in turn determines wellbeing.

Comparisons	Significance Test [available in excel or stats software]
Differences in average wellbeing (basic) The average anxiety of smokers was: 3.2 The average anxiety of non-smokers was: 2.8 The difference is 0.4 and is significant at the 1% level i.e. there is less than 1% chance that the averages are the same.	t-test
Differences in average wellbeing (advanced) Differences between averages can often be fully, or partially explained by other factors. For example, if anxiety is higher in middle aged people and the middle aged also smoke more, then some of the difference in anxiety between smokers and non-smokers could be explained by age. You can control for other factors using ordinary least squares regression (see box). After controlling for a range of other factors the difference in anxiety between smokers and non-smokers falls from 0.4 to 0.2 but remains significant at the 1% level.	Ordinary Least Squares Regression
Differences in Proportions A standard test of proportions can be used to determine if the proportion of people with high anxiety is higher among smokers than non-smokers. 24% of smokers answered high for anxiety compared to 19% of non-smokers. The difference of 5 percentage points is significant at the 1% level.	Test of Proportions
Differences in Standard Deviations A variance ratio test can be used to determine whether the standard deviation or spread of responses to the anxiety question is wider for smokers than non-smokers. The Standard Deviation from the mean anxiety for smokers was 3.1 and for non-smokers 2.8. The difference is significant at the 1% level.	Variance Ratio Test (F test)

Testing the differences in anxiety between smokers and non-smokers (2015-16)

Next steps, information and resources

Contribute your feedback

This is part of ongoing work on wellbeing inequalities carried out by the Office for National Statistics, New Economics Foundation and the evidence programmes at the What Works Centre for Wellbeing. We will update this guide periodically to reflect all of this ongoing work.

Your feedback on the questions below will help us understand needs and shape these recommendations.

- For what reason are you measuring or aiming to measure inequalities in wellbeing?
- How easy were these measures to understand and use?
- Are there other measures of inequality that you commonly use?

Please get in touch with evidence@whatworkswellbeing.org

Start measuring and reporting inequalities

In the meantime we would encourage you to present inequality data alongside averages. If you have questions on how to implement any of these measures in practice in spreadsheet packages such as Excel, or specialist statistical packages like STATA, SPSS or R – then please do get in touch with the What Works Centre for Wellbeing. In addition, the following organisations have expertise in this area and have participated in the development of this guide and would be able to help provide advice:

- Office for National Statistics Quality of Life branch QualityofLife@ONS.Gov.UK
- New Economics Foundation: Inequality and Wellbeing
- Warwick University [WEMWEBS]

The ONS are proposing using 'percentage below a certain threshold' as one of the headline measures.

Give these measures a try and contribute your feedback to this ongoing work.

Annex A: Wellbeing estimates UK Annual Population Survey

Population estimates for the UK	Life satisfaction	Worthwhile	Happiness
Mean	7.65	7.84	7.48
Proportion - Very High	29.2%	34.4%	34.2%
Proportion - High	52.1%	49.2%	40.5%
Proportion - Medium	14.2%	12.8%	16.5%
Proportion - Low	4.6%	3.6%	8.8%
Standard Deviation	1.74	1.69	2.11
Mean Paired Distance	1.89	1.81	2.29
Mean of bottom 40%	6.90	6.97	5.48
80:20 difference	4.09	4.00	5.48

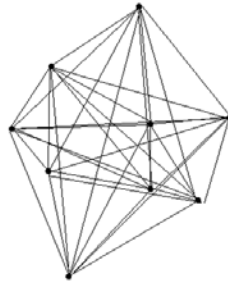| Population estimates for the UK	Anxiety
Mean	2.87
Proportion - Very Low	40.8%
Proportion - Low	23.1%
Proportion - Medium	16.6%
Proportion - High	19.5%
Standard Deviation	2.82
Mean Paired Distance	3.16
Mean of bottom 40%	6.15
80:20 difference	-8.01

13

Annex B – mean paired distance

Mean Paired Distance (MPD) is a statistical measure of dispersion that can be used to understand inequalities in personal wellbeing within the population or within sub-groups of the population. It is different from the Standard Deviation as illustrated in the diagrams below. The standard deviation is calculated with reference to the mean and is measured by taking the square root of the average squared difference of each observation from the mean of all observations. In contrast the MPD is calculated as the averaged absolute difference between every observation and every other observation. The equation for the MPD is also shown. It is more complicated than the Standard Deviation to implement but can be calculated using spreadsheet packages such as Excel.

Mean Paired Distance is an alternative measure of inequality.

It can be calculated using spreadsheet packages such as Excel.
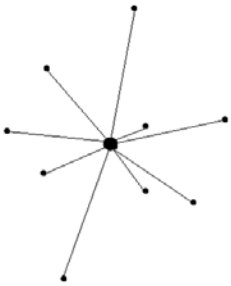
Standard Deviation

Mean Paired-Distance

Where for the ONS4 personal wellbeing questions:

$$k, j = \text{ range of scores from 0 to 10 on the wellbeing scale}$$

$$n_j, n_i = \text{ frequency count of observations scoring } j \text{ and } i \text{ respectively}$$

$$N = \text{ overall number of observations of personal wellbeing in survey}$$

$$|j - i| = \text{ absolute difference between scores } j \text{ and } i$$

Survey weights can be handled by computing weighted frequency counts (n_j, n_i). While it is more complicated to calculate, the principle underlying MPD is easy to understand and in contrast to standard deviation it can be reported independent of the mean.

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12. Measuring National Well-being – What matters most to Personal Well-being? – Regression Results, Office for National Statistics (2013)

13. Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS)

14. Understanding How Gallup Uses the Cantril Scale

15. Eurobarometer Life Satisfaction Time Series