UNITED NATIONS
UNIVERSITY
UNU-WIDER

This paper is a draft submission to

Inequality—Measurement, trends, impacts, and policies

5–6 September 2014 Helsinki, Finland

Measuring Progress

Paul Anand[1,2] Laurence Roope[2,*] and Alastair Gray[2]

Date: 30th April 2014

Abstract

There is a growing international consensus that progress should be monitored directly in terms of human wellbeing though less agreement, given the data available, about how this should be done. In this paper, we contribute to this latter question by constructing a unique dataset comprising variables derived from a variety of human wellbeing concepts now increasingly used by economists. With responses from 2,752 individuals from the USA and UK we compare wellbeing in both countries, drawing on stochastic dominance techniques applied to a range of capability indicators and regression models of happiness. The main empirical findings are (i) that with the exception of those on the lowest incomes, the USA dominates the UK with respect to human wellbeing and (ii) that the new indicators developed capture a large amount of variance previously unexplained in happiness regressions. We conclude that our findings and approach illustrate that with suitable data, direct assessment of progress based on human wellbeing is likely to be feasible and informative.

Keywords: Wellbeing, freedoms, capability approach, happiness, welfare economics, Stiglitz-Sen-Fitoussi Commission, stochastic dominance

JEL Classifications: D60, I31

1: The Open University 2: University of Oxford

Acknowledgements and Contact Details

For comments on the paper and related analytical issues, the authors wish to thank Gaston Yalonetsky, Ian Crawford, Ron Smith and various conference and seminar participants in Oxford, the OECD, Austin, Sheffield, Utrecht, and Buenos Aires. We are also grateful to colleagues from a number of other disciplines and government departments, who commented on the methods of the paper, and to the Leverhulme Trust for funding the project of which this paper is part. Any remaining errors are the responsibility of the authors alone.

*Corresponding author

Anand: Economics, Faculty of Social Sciences, The Open University, Walton Hall, Milton Keynes MK7 6AA, UK (Email: Paul.Anand@open.ac.uk); Gray and Roope: Health Economics Research Centre, Nuffield Department of Population Health, University of Oxford, Oxford OX3 7LF, UK (Email: Alastair.gray@dph.ox.ac.uk and Laurence.roope@dph.ox.ac.uk)

Measuring Progress

1. Introduction

How best to measure progress and wellbeing is a topic of growing interest within economics and has been the subject of practical concern in national and international organisations around the world for some time. The reasons why GDP is not a good measure of human wellbeing have been much rehearsed by economists who, for the most part, have nevertheless resorted to using GDP, with suitable purchasing power parity adjustments where possible, as the best proxy available. Within development circles, however, the UN's Human Development Index (HDI) has become a focus for international and public discourse on the goals and achievements of economic activity. Though its simple variable structure and weighting system have been much criticised, the approach has helped to raise the question of how we *should* in fact monitor human wellbeing, and what policies might follow.

The Stiglitz-Sen-Fitoussi Commission (2009) provides a good example of how the influence of Sen's (1979, 1985) approach to welfare economics, based on freedoms, multiple dimensions (including happiness) and an emphasis on the view that income should be regarded as an input into the production of human wellbeing, continues to spread in policy as well as academic circles.[1] This, in turn, has encouraged renewed interest in what a broadened version of the HDI might look like. The original HDI focused exclusively on income, health and literacy. Although recent variants of the HDI have been developed that reflect additional issues such as gender equity, even the latest incarnation of the core HDI (see Klugman, Rodriguez and Choi (2011)) produces considerable bunching of higher income countries. It also fails to include a number of variables that economic theory, and many ordinary people, would consider matter for development.

[1] This policy interest is distinct from but, in various ways, underpinned by a significant body of research – from economics, see, for instance: Anderson and Ray (2010), Basu and Kanbur (2009), Desai and Shah (1988), Gaertner and Xu (1999), Krishnakumar and Ballon (2008), Nehring and Puppe (2002), Ramos and Silber (2005) and Schokkaert (2009), to mention a few.

However, policy-makers and economists often feel that it is difficult to extend such measures as the relevant data are not widely collected. In this paper, building on work by Anand et al. (2011), we develop datasets for the USA and the UK that provide direct indicators of the key variables theory identifies as being important in the assessment of a person's wellbeing. We then offer a framework which demonstrates how such multi-dimensional indicators might be compared and report evidence from happiness regression models in which they are used.

Even if one adopts a utilitarian stance. Benjamin, Heffetz, Kimball and Rees-Jones (2012), for example, have shown that after controlling for anticipated subjective wellbeing (SWB) levels, now widely used as proxies for utility, a number of additional factors also explain individuals' choices; people do not necessarily make the choices that they think would maximise life satisfaction alone.[2] They found this to be especially true in scenarios constructed to resemble important decisions in respondents' lives. One of these additional factors is 'control over one's life,' which might be regarded as the essence of capability or 'freedom.'[3][4] In a later study, Benjamin, Heffetz, Kimball and Szembrot (2014) used a stated preference approach to estimate marginal utilities of a variety of "fundamental aspects" of wellbeing, as measured via surveys. They found high relative marginal utilities not only for happiness, life satisfaction and aspects related to family, health, security and values but also for freedoms. These findings suggest that multi-dimensional capability measures may be complementary empirically to SWB measures such as life satisfaction, even in a utilitarian framework.

---

[2] This builds on the findings of earlier related papers which found discrepancies between choice and predicted affective reactions using hypothetical scenarios designed to test theories as to why the two may differ. Tversky and Griffin (2000), for example, argued that levels of payoff have a bigger effect on choice than on happiness while gaps between payoffs and a reference point play a bigger role in happiness judgements. See also Hsee (1999) and Hsee et al. (2003). Many further papers have observed that factors other than individual life satisfaction matter for choice; recent examples from the economic literature include Loewenstein and Ubel (2008) and Fleurbaey (2009).

[3] The others are predicted sense of purpose, family happiness and social status.

[4] Nevertheless, the predictive power of expected SWB is by far the single best predictor of choice of those factors analysed and "…SWB is a uniquely important argument of the utility function." (p. 2107) This lends some justification to the popular practice of using SWB measures as proxies for utility, as used in this paper.

There is evidence then to suggest that capabilities may act as additional determinants of utility, alongside anticipated life satisfaction and other factors. In the context of actual reported overall life satisfaction, where no hypothetical choices exist, there is also a growing body of evidence that an individual's capabilities may be at least partially factored into their response. In conjunction with a list of capabilities proposed by Nussbaum (2000), Anand, Krishnakumar and Tran (2011) developed data on the capabilities of adults in Argentina. Using a generalized linear latent and mixed model, they found that empathy, self-worth, goal autonomy, discrimination, safety and stress are statistically significant determinants of life satisfaction. Notwithstanding these recent findings, in the extensive literature on happiness, capabilities have only very rarely been included as explanatory variables.

In this paper, we investigate both the distribution of multi-dimensional capability variables and their role in life satisfaction (happiness) regressions. Our results suggest that including capabilities, and also soft skills and personality traits, in happiness regressions has a dramatic effect. The explanatory power of the regressions is more than doubled and variables that have consistently been found in the literature to be significant become insignificant. Moreover, consistent with recent studies using panel data techniques (e.g. Kassenboehmera and Haisken-DeNew (2012), Frijters and Beatton (2012)), our results cast further doubt on the long established U-shaped relationship between happiness and age by showing that it can become only marginally significant, even in a cross-sectional study, after controlling for a wide range of capabilities, soft skills and personality traits.

The rest of the paper is organised as follows. In Section 2 we introduce our theoretical framework and provide an outline and justification of the types of variables that we subsequently focus on in our empirical application. In Section 3 we provide a short discussion of the empirical methods used to generate our data and summary statistics for a selection of key variables. In Section 4 we compare the distribution of wellbeing outcomes in the USA and the UK using recently developed stochastic dominance techniques for ordinal variables. In Section 5 we analyse the production of capabilities, both from resources and from a variety of person-specific variables. In Section 6 we analyse the production of life satisfaction, or happiness, and find that capabilities play an important, and hitherto neglected, role. Concluding remarks are offered in Section 7.

2. A Framework for Measuring Wellbeing

Economic theory (Sen (1979, 1985), Deaton (2008)) clearly distinguishes between an individual's capabilities and their utility and emphasises the importance of each, so there is a good *prima facie* reason to evaluate them both in any attempt to capture overall wellbeing. Our theoretical framework is as follows.

We begin by introducing some notation. We assume that there is a finite number $k \in \mathbb{N}$ of types of resources to which an individual might have access. Individual *i* has a vector of resources given by $\mathbf{r}_i^T = (r_{i1}, \dots, r_{ik}) \in \mathbb{R}^k$. We suppose also that there is a finite number $m \in \mathbb{N}$ of types of personal characteristics, for example 'soft skills' or personality traits, that any individual might have and be able to use to transform resources into activities and states. Individual *i* has a vector of personal characteristics given by $\boldsymbol{c}_i^T = (c_{i1}, \dots, c_{im}) \in \mathbb{R}^m$.

Note that this notation does not rule out the possibility that some of the resource and personal characteristic variables may be discrete, and even binary. Note also that the notation is consistent with the realistic situation in which individuals have neither all possible types of resources nor all possible types of personal characteristics, as the elements of these vectors are allowed to take zero values.

Via various combinations of resources and personal characteristics, individuals may produce a variety of activities and states, which we refer to as functionings. We assume that there exists some finite number $n \in \mathbb{N}$ of types of possible functionings. Individual *i* has a vector of functionings given by $\boldsymbol{f}_i^T = (f_{i1}, \dots, f_{in}) \in \{0,1\}^n$ where $f_{ij} = 1$ if the individual produces functioning *j* and $f_{ij} = 0$ otherwise.

The value of f_{ij} is determined by the production function:

$$f_{ij} = \theta_j(r_{i1}, \dots, r_{ik}, c_{i1}, \dots, c_{im}). \qquad (1)^5$$

---

[5] Note that f_{ij} is the realised outcome of the *j*'th functioning for individual *i* so we are assuming that the production function encompasses not only the individual's ability to produce functioning *j*, given his/her resources and personal characteristics, but also, where appropriate, his/her decision whether to do so. Note also that θ_j may be of a sufficiently complex functional form to take the value '1' with different combinations of resources and

Individual *i* is assumed to derive utility dependent on the various activities and states they engage in and also, as before, some traits specific to the person. This is given by:

$$u_i = \lambda_i(f_{i1}, \dots, f_{in}, c_{i1}, \dots, c_{im}). \quad (2)$$

We also suppose that there is a finite number $s \in \mathbb{N}$ of types of freedoms, or capabilities, that any individual might have. Individual *i* has a vector of capabilities given by $\boldsymbol{q}_i^T = (q_{i1}, \dots, q_{is}) \in \mathbb{R}^s$, where the value of q_{ij} is determined by the following production function:

$$q_{ij} = \varphi_j(r_{i1}, \dots, r_{ik}, c_{i1}, \dots, c_{im}). \quad (3)$$

The vector $\boldsymbol{q}_i^T$ describes what person *i* is free, or able, to do. It therefore determines the collection of situations and states a person could be involved in, given their resources and personal traits. The greater the value of q_{ij}, the greater is individual *i*'s degree of freedom, or capability, in dimension *j*.

Equation (3) describes the relationship between capability, a wellbeing outcome, and resources and personal characteristics. By combining (1) and (2), it follows immediately that utility, our experiential measure of wellbeing, can be expressed as follows:

$$u_i = \rho_i(f_{i1}, \dots, f_{in}, r_{i1}, \dots, r_{ik}, c_{i1}, \dots, c_{im}). \quad (4)$$

Equations (3) and (4) can be interpreted as production functions, analogous to those central to the neo-classical analysis of production by firms, but they concern the production of human wellbeing.[6] Finally, note that since the variables in (3) which produce q_{ij} are the same for all *j*, any simple summary index of individual *i*'s capability based on $\boldsymbol{q}_i^T$, can be expressed in a similar manner.

To illustrate this approach, in our empirical application we create an overall summary capability index and five separate summary capability indices

---

personal characteristics. Different individuals may therefore achieve the same functionings as one another using different methods.

[6] Note that while in (3) we impose the same functional form φ_j for all individuals, as discussed in Footnote 5, in (4) we allow for the possibility that different individuals may have different utility production functions. However, in order to analyse the production of utility econometrically, we will later make the simplifying assumption that $\rho_i = \rho$ for all individuals.

corresponding to individual *i*'s capabilities in five domains - Home, Work, Community, Environment and Access to Services. These indices are denoted as Q_{iH}, Q_{iW}, Q_{iC}, Q_{iE} and Q_{iS} and each can be expressed in a similar form to (3).

We obtain each of our summary indicators by employing a 'threshold plus counting' method, as has become popular in the literature on multi-dimensional poverty measurement (see, for instance, Alkire and Foster (2011)).[7] For example, for capabilities related to the Home domain, we have seven sub-domain indicators, each of which takes a response on an 11-point scale from '0' to '10' ranging from 'disagree' to 'strongly agree.' Typically, the responses in our dataset can be conveniently divided into groupings from 0-5 and from 6-10. Binary indices based on these two categories were then created, $q_{ij} \in \{0,1\}$, where i denotes the individual and $j \in \{1, \cdots, 7\}$ denotes the *j*-th sub-domain. A summary index of capabilities in the Home domain, for the *i*-th individual, Q_{iH}, was then created by summing over the seven sub-domains, i.e. $Q_{iH}=\sum_{j=1}^{7} q_{ij}$. A maximum score of seven therefore indicates that the individual has a certain degree of capability in all seven kinds of capability related to the Home domain, whilst a minimum score of zero indicates that the individual has relatively poor capabilities in all seven sub-domains. Counting sub-domains in this way is consistent with the view that either each sub-domain is equally indicative of capability in that domain or, simply, that there is not sufficient justification for attaching different weights to different sub-domains.

The overall summary capability index, Q_i, is simply, for the purposes of this paper, the sum of the capability indices for each of the five domains.[8]

[7] Although not widely recognised in the literature, the approach can also be justified in an analogous manner to Nehring and Puppe (2002)'s axiomatic work on measuring the diversity of a set of species by summing the values of all attributes possessed by some species in the set.

[8] In ongoing work, the data are applied to an index that allows for substitution and complementarity between domain components (Anderson et al. (2014)).

3. Data and Descriptive Statistics

Our objective is to illustrate how the framework described in the previous section might be applied empirically to gain insights into levels and determinants of wellbeing. In 2012, we designed and implemented population surveys in the USA and the UK. Since our aim was to profile overall wellbeing at a national level, we sought to ensure that our sample populations in each country were as close to being nationally representative as possible. In each country, the respective panels of respondents were drawn equally from several geographic regions and are representative of working age adults in terms of age, gender and social class.[9] As a pilot study, samples of 1,061 and 1,691 were targeted in the USA and the UK, respectively.

Consistent with our framework, the surveys captured all three aspects of the capabilities approach (Sen (1979, 1985)) – life satisfaction (utility), capabilities and functioning participation. The surveys asked four questions (questions 1(a), (b), (c) and (d)) designed to measure variants of the first aspect.[10] These related to overall life satisfaction, the level of happiness experienced yesterday, the level of anxiety experienced yesterday and the extent to which individuals feel the things they do in life are worthwhile. Our main focus is on the life satisfaction question which was phrased as, "Please rate on a scale of 0 to 10, where 0 indicates the lowest rating you can give and 10 the highest, overall, how satisfied are you with your life nowadays?" The responses to this question for each country are presented in Table OA1 of our online Appendix A.[11]

The most innovative component of our surveys involves the measurement of capabilities. There has been much debate in the literature as to which capabilities should be included. For example, Nussbaum (2000) and Nussbaum and Sen (1993) advocate including 10 categories (life; bodily health; bodily integrity; senses, imagination and thought; emotion; practical reason; affiliation; other species; play and control over one's environment). As mentioned, in this study we develop a survey instrument that contains variables relating to all the

[9] In the USA, the sample contains an approximately equal number of respondents from the Mideast, Midwest, South and West; in the UK, there are approximately equal numbers of respondents from England, Scotland and Wales.
[10] The survey instruments are available from the authors upon request.
[11] A link to our extensive online appendices is available from the authors upon request.

concepts of Sen's framework. All the variables used are presented verbatim in the text or appendices. The design and rationale for questions is similar to that in Anand et al. (2011).[12] In particular, we assess the opportunities and constraints individuals face across five domains (questions 2-6) – Home (i.e. domestic and family life), Work, Community, the Environment in which one lives and Access to services. In each of these domains, sets of four to seven 'sub-domain' questions were asked, regarding various specific capabilities that people are able to do or to achieve. In total, we captured 29 capabilities across the 5 domains. Whilst all individuals were asked the questions on Home life, Community, Environment and Access to services, only those who reported currently being employed or self-employed were asked the Work domain questions. Means, for each country, for each of the 29 capabilities estimated, are presented in Table OA2 of our online Appendix A.

To obtain a measure of activity participation, or functionings, we collected binary indicators of 30 activities individuals may or may not have been involved in "yesterday." The choice of activities was largely influenced by work by Kahneman et al. (2004). Question 21 provides the list of activities individuals reported on.[13]

We also collected data on a wide range of resources and personal characteristics. For the former, we asked questions about income, education, health and a number of other socio-demographic attributes. The latter consisted of data on 'soft skills' and personality traits. Heckman and Kautz (2012) have discussed the importance of the early development of soft skills and their role in achieving success in later years. They argue that success in life requires more than

[12] The main modifications include the grouping of questions into subfields and the reorientation of question content marginally towards variables of potential practical interest. Given the high level of dimensionality being evidenced in recent wellbeing research, the use of subfields provides a useful, heuristic way of understanding the topics covered, is hopefully meaningful from a personal wellbeing perspective and suggestive of relevant areas in government and business. In another modification to previous work, our current list is also informed by the contents of the OECD Better Life Index, to which our work has contributed and which bears some similarities in domain coverage to our earlier work. We have, for example, in this case included a question about work-life balance which is also included in the OECD index.

[13] Summary statistics of the proportion of individuals reporting participation in each of these activities are displayed in Tables OA3 (a) and (b) in our online Appendix A. These results are split according to whether or not individuals considered yesterday to be 'a normal working day.'

academic achievement alone and that education policy should focus on developing soft skills from an early age.[14] From a capabilities perspective, having good levels of soft skills would improve an individual's ability to convert resources and activities into higher levels of wellbeing. We included eleven questions on soft skills in our survey. The responses on soft skills for each country are summarized in Table OA4 in Online Appendix A. For each question, individuals were asked to rate their responses on a scale of 0 (strongly disagree) to 10 (strongly agree).

We also included a range of personality questions (see Table OA5 in Online Appendix A). This was partly to help control for any personality related bias in our analysis, since all our measures are self-reported, and partly because personality traits themselves might have an impact on happiness or capabilities.[15]

Before turning to our detailed analysis of the distribution and determinants of capabilities, and their role in life satisfaction, we conclude this section with a top-line summary of the capability and life satisfaction estimates generated from our datasets. We compare our indices with those obtained by the most recent version of the Human Development Index. Sample means and standard deviations for our measures are presented in Table 1, together with the HDI.

Table 1: Wellbeing Index Scores Versus HDI

Country	HDI	Total Capability Score			Life Satisfaction Score		
	Score	Mean	Std Dev	Obs	Mean	Std Dev	Obs
USA	0.937	22.322	6.800	723	6.324	2.301	1059
UK	0.875	20.378	7.356	1243	5.899	2.311	1689

NOTE: All estimates are based on data for 2012. The HDI score is sourced from Malik (2013).

The capability score is the total capability score, derived as described in the previous section.[16] Our second measure, life satisfaction, is a response to the question, "Overall how satisfied are you with your life nowadays?" (as displayed

[14] See also Cunha and Heckman (2008), Cunha, Heckman and Schennach (2010) and Heckman, Pinto and Savelyev (2014).
[15] It is well documented, for example, that extraversion is generally associated with higher reported levels of SWB. For evidence that personality traits can predict a variety of social and economic outcomes see, for example, Borghans, Duckworth, Heckman, and ter Weel (2008).
[16] Note, however, that the total capability score excludes those individuals who are neither employed nor self-employed, since they were not asked any questions regarding work related capabilities.

in Table OA1 in online Appendix A). The HDI captures progress in a country through three dimensions of development – life expectancy at birth, education and income. The rankings of the two countries using capabilities and life satisfaction can be seen to mirror that of the HDI. The USA is ranked first by all three measures. It also displays a notably lower standard deviation in capability score.

4. The distribution of wellbeing outcomes

In this section we compare the distributions of wellbeing outcomes (capabilities, life satisfaction and also, by way of comparison, income) in the USA with those in the UK. We also compare the distributions of these variables within each country for whites versus non-whites and males versus females. We begin by outlining our methodology.

4.1 Stochastic dominance results with ordinal variables

A natural question to ask is how we might compare wellbeing outcomes in these two countries when the measures are based on ordinal data and so lack any cardinal meaning. Fortunately, we are able to draw on recent work by Yalonetzky (2013), which provides stochastic dominance conditions for ordinal variables.[17] When these conditions hold, we are able to make unambiguous judgements about the relative wellbeing (e.g. with wellbeing variables such as capabilities as arguments) in two groups (e.g. countries, regions, genders) for a broad range of wellbeing functions, without the need to impose any specific functional form or cardinal scale.

Suppose that there are N_g individuals in group $g \in \{A, B\}$. Each individual has an attainment in some common wellbeing domain which lies in one of $S \in \mathbb{N}$ ordinal categories. Let $\boldsymbol{\omega}_g \in \mathbb{N}_{\uparrow}^{N_g}$ for $g \in \{A, B\}$ be a vector of wellbeing scores, where the subscript $\uparrow$ indicates that wellbeing attainments are weakly ordered from lowest to highest. The i'th element of $\boldsymbol{\omega}_g$ is given by $\omega_{ig} \in \{1, \cdots, S\}$.

[17] Yalonetzky (2013) provides analogous results to those in a seminal paper by Atkinson and Bourguignon (1982) in the context of continuous variables.

Following Yalonetzky (2013), we focus on the class of social wellbeing functions that are additively separable and symmetric with respect to individuals.[18] The class of all such social wellbeing functions Ω, unique up to positive affine transformations, can be defined as

$$\Omega = \left\{ W(\boldsymbol{\omega}_g) : W(\boldsymbol{\omega}_g) = \sum_{i=1}^{N_g} \alpha_i u(\omega_{ig}) \right\},$$

where $\alpha_i \geq 0$ for all $i \in \{1, \cdots, N_g\}$, $\sum_{i=1}^{N_g} \alpha_i = 1$ and the function $u: \mathbb{N} \to \mathbb{R}$ can be interpreted either as an individual-level wellbeing evaluation function (of which a utility function is a special case) or simply as a cardinal scale.

For $k \in \{1, \cdots, S\}$, let us denote the cumulative probability function by $F_g(k) \equiv \Pr(\omega_{ig} \leq k)$. In what follows it will also be convenient to define the differences in wellbeing and cumulative probability functions, respectively, between the two groups as

$\Delta W \equiv W(\boldsymbol{\omega}_A) - W(\boldsymbol{\omega}_B)$ and $\Delta F(\cdot) \equiv F_A(\cdot) - F_B(\cdot)$.

Applying Yalonetzky (2013)'s results, we can write the following stochastic dominance conditions:

(D1) First Order Stochastic Dominance (FOSD):

$\Delta W \geq 0 \Leftrightarrow \Delta F(k) \leq 0 \; \forall \; k \in \{1, \cdots, S-1\}$ and all $u(\cdot) \in U^1$, where the class U^1 is defined as:

$U^1 = \{u(\cdot) : u(k+1) - u(k) \geq 0 \; \forall \; k \in \{1, \cdots, S-1\}\}$.

[18] We use the term 'social wellbeing function' rather than 'social welfare function' simply to emphasise that the function's arguments are variables not typically used in welfare economics. The simplifying assumption of additive separability, though quite restrictive, is a widely made one and such social welfare functions are well known to have a number of attractive properties, most obviously subgroup consistency. There are more fundamental concerns also. For example, Sen (1977, pp. 1568-1569) warns of the dangers of "…treating social welfare to be functions only of the individual welfare vectors (without admitting any non-welfare description of social states)…" and of using such an approach to make social decision rules. Just to be clear, we are certainly not interpreting the univariate social wellbeing function here in this way; it is merely a tool for facilitating comparison of some wellbeing outcome of interest between two groups.

The only restriction then on the function $u(\cdot)$ is a very mild one of weak monotonicity; ordinal categories are assigned weakly higher cardinal values according to their relative desirability. If group A is found to have FOSD over group B then we can conclude that A is ranked as being preferable to B, with respect to social wellbeing based on our wellbeing domain, by any such function $u(\cdot) \in U^1$.

(D2) Second Order Stochastic Dominance (SOSD):

$\Delta W \geq 0 \Leftrightarrow \Delta H(k) \equiv \sum_{j=1}^{k} \Delta F(j) \leq 0 \; \forall \; k \in \{1, \cdots, S-1\}$ and all $u(\cdot) \in U^2$, where the class U^2 is defined as:

$$U^2 = \Big\{u(\cdot) : u(\cdot) \in U^1 \text{ and } \big[\big(u(k+2) - u(k+1)\big) - \big(u(k+1) - u(k)\big)\big] \leq 0 \; \forall \; k \in \{1, \cdots, S-2\}\Big\}.$$

Here the form of the function $u(\cdot)$ is further constrained by imposing a concavity restriction.

As usual, clearly FOSD implies SOSD and is the first condition to check. If FOSD does not hold, the two groups may still be ranked for a broad class of social wellbeing functions if SOSD holds.

Yalonetzky (2013) also provides an ordinal variable extension of Anderson (1996)'s non-parametric statistical tests for stochastic dominance in empirical applications. The univariate versions of these tests for FOSD and SOSD in the present setting are as follows.[19]

Let p_{kg} be the probability that a randomly selected individual from $G = \{1, \cdots, N_g\}$ has a capability attainment in category $k \in \{1, \cdots S\}$ and let $\boldsymbol{p}_g \in [0,1]^S$ be the corresponding vector of probabilities. The empirical estimate of p_{kg} from a random sample of $n_g \leq N_g$ is given by

$$\hat{p}_{kg} = \frac{1}{n_g} \sum_{i=1}^{n_g} I(k_i),$$

[19] Strictly speaking, Yalonetzky (2013) provides only multivariate results, for two or more variables. The univariate results provided here are very closely related and more easily derived.

where $(k_i) \equiv \begin{cases} 1 \; if \; k_i = k \\ 0 \; otherwise \end{cases}$.

Let $\widehat{\boldsymbol{p}}_g$ be the corresponding vector of empirical estimates and let $\mathbf{0}$ denote an S-vector of zeros. Using results by Formby, Smith and Zheng (2004), we can then write the asymptotic result:

$$\sqrt{n_g}\left(\widehat{\boldsymbol{p}}_g - \boldsymbol{p}_g\right) \xrightarrow{d} N\left(\mathbf{0}, \boldsymbol{\Omega}_g\right)$$

where the S-dimensional covariance matrix $\boldsymbol{\Omega}_g$ is such that its (k,l)'th element is equal to $p_{kg}\left(1 - p_{kg}\right)$ whenever $k = l$ and $-p_{kg}p_{lg}$ otherwise. Now denote $\boldsymbol{v} = (\widehat{\boldsymbol{p}}_{A-}\widehat{\boldsymbol{p}}_B)$. Under the null hypothesis that groups A and B are identically distributed,

$$\boldsymbol{v} \xrightarrow{d} N\left(\mathbf{0}, \frac{n_A + n_B}{n_A n_B}\boldsymbol{\Omega}\right).$$

where $\boldsymbol{\Omega} = \boldsymbol{\Omega}_g$ for any $g \in \{A, B\}$.

It will be convenient in what follows to introduce some further notion. Let $\Delta\mathbf{F}$ and $\Delta\mathbf{H}$ denote the S-vectors with k'th elements $\Delta F(k)$ and $\Delta H(k)$, respectively, and let the corresponding test statistic vectors be denoted by $\widehat{\Delta\mathbf{F}}$ and $\widehat{\Delta\mathbf{H}}$.

Let $\widehat{\boldsymbol{\Omega}}_g$ be the estimate of the covariance matrix $\boldsymbol{\Omega}_g$, with (k,l)'th element equal to $\hat{p}_{kg}\left(1 - \hat{p}_{kg}\right)$ whenever $k = l$ and $-\hat{p}_{kg}\hat{p}_{lg}$ otherwise. It will also be useful to define $\mathbf{L}$ as an S-dimensional lower triangular matrix of ones.

We can now write the statistical tests for FOSD and SOSD.

(S1) The k'th element of the test statistic for $\Delta\mathbf{F}$ is given by
$\widehat{\Delta F}(k) = \sum_{j=1}^{k} v_j = \sum_{j=1}^{k}\left(\hat{p}_{jA} - \hat{p}_{jB}\right)$.

Now, under the assumption that the samples from A and B are independent,

$$var\left(\widehat{\Delta\mathbf{F}}\right) = \mathbf{L}\left(\frac{\mathbf{1}}{n_A}\widehat{\boldsymbol{\Omega}}_A + \frac{\mathbf{1}}{n_B}\widehat{\boldsymbol{\Omega}}_B\right)\mathbf{L'}.$$

For each $k \in \{1, \cdots, S\}$, the corresponding z-statistic Z_k^I is obtained by dividing $\widehat{\Delta F}(k)$ by its standard error (S.E), which is given by the square root of the k'th diagonal element of $var\left(\widehat{\Delta\mathbf{F}}\right)$. Thus,

$$Z_k^I = \frac{\sum_{j=1}^{k}\left(\hat{p}_{jA} - \hat{p}_{jB}\right)}{S.E.\left(\widehat{\Delta F}(k)\right)}$$

where $S.E.\left(\widehat{\Delta F}(k)\right)$

$$= \sqrt{\sum_{j=1}^{k}\left(\frac{\hat{p}_{jA}\left(1-\hat{p}_{jA}\right)}{n_A} + \frac{\hat{p}_{jB}\left(1-\hat{p}_{jB}\right)}{n_B} - \frac{\hat{p}_{jA}}{n_A}\sum_{\substack{l=1 \\ l\neq j}}^{k}\hat{p}_{lA} - \frac{\hat{p}_{jB}}{n_B}\sum_{\substack{l=1 \\ l\neq j}}^{k}\hat{p}_{lB}\right)}$$

$$= \sqrt{\sum_{j=1}^{k}\left(\frac{\hat{p}_{jA}}{n_A}\left(1-\hat{p}_{jA}-\sum_{\substack{l=1 \\ l\neq j}}^{k}\hat{p}_{lA}\right) + \frac{\hat{p}_{jB}}{n_B}\left(1-\hat{p}_{jB}-\sum_{\substack{l=1 \\ l\neq j}}^{k}\hat{p}_{lB}\right)\right)}$$

$$= \sqrt{\sum_{j=1}^{k}\left(\frac{\hat{p}_{jA}}{n_A}\left(1-\hat{p}_{jA}-2\sum_{l=j+1}^{k}\hat{p}_{lA}\right) + \frac{\hat{p}_{jB}}{n_B}\left(1-\hat{p}_{jB}-2\sum_{l=j+1}^{k}\hat{p}_{lB}\right)\right)}$$

We now consider the null hypothesis that A does not FOSD B.

H_0: $\Delta F(k) > 0$ for some $k \in \{1, \cdots, S-1\}$.
H_1: $\Delta F(k) \leq 0$ for all $k \in \{1, \cdots, S-1\}$.

H_0 is rejected if and only if $Z_k^I \leq -Z^* < 0$ for all $k \in \{1, \cdots, S-1\}$, where $-Z^*$ is the left-tail critical value for a desired level of statistical significance.[20]

(S2)The k'th element of the test statistic for **ΔH** is given by $\widehat{\Delta H}(k) = \sum_{j=1}^{k}\widehat{\Delta F}(j)$.

Similarly to above, under the assumption that the samples from A and B are independent,

[20] Other rejection rules are possible. Following Yalonetzky (2013), we too follow the rejection rule of Howes (1996).

$$var\left(\widehat{\Delta \mathbf{H}}\right) = \mathbf{L^2}\left(\frac{\mathbf{1}}{n_A}\widehat{\mathbf{\Omega}}_A + \frac{\mathbf{1}}{n_B}\widehat{\mathbf{\Omega}}_B\right)\mathbf{L'^2}.$$

For each $k \in \{1, \cdots, S-1\}$, the corresponding z-statistic Z_k^{II} is obtained by dividing $\widehat{\Delta H}(k)$ by its standard error, which is given by the square root of the k'th diagonal element of $var\left(\widehat{\Delta \mathbf{H}}\right)$. Thus,

$$Z_k^{II} = \frac{\sum_{j=1}^{k} \widehat{\Delta F}(j)}{S.E.\left(\widehat{\Delta H}(k)\right)}$$

where $S.E.\left(\widehat{\Delta H}(k)\right)$

$$= \sqrt{\begin{matrix} \frac{1}{n_A}\left(\sum_{j=1}^{k}(k-j+1)^2\,\hat{p}_{jA}\left(1-\hat{p}_{jA}\right) - 2\sum_{j=1}^{k-1}(k-j+1)\,\hat{p}_{jA}\sum_{l=j+1}^{k}(k-l+1)\hat{p}_{lA}\right) + \\ \frac{1}{n_B}\left(\sum_{j=1}^{k}(k-j+1)^2\,\hat{p}_{jB}\left(1-\hat{p}_{jB}\right) - 2\sum_{j=1}^{k-1}(k-j+1)\,\hat{p}_{jB}\sum_{l=j+1}^{k}(k-l+1)\hat{p}_{lB}\right) \end{matrix}}$$

$$= \sqrt{\sum_{g\in G}\frac{1}{n_g}\begin{pmatrix} \sum_{j=1}^{k}(k-j+1)^2\,\hat{p}_{jg}\left(1-\hat{p}_{jg}\right) - \\ 2\sum_{j=1}^{k-1}(k-j+1)\,\hat{p}_{jg}\sum_{l=j+1}^{k}(k-l+1)\hat{p}_{lg} \end{pmatrix}}$$

We now consider the null hypothesis that A does not SOSD B. The test is very similar to the first-order test.

H_0: $\Delta H(k) > 0$ for some $k \in \{1, \cdots, S-1\}$.
H_1: $\Delta H(k) \leq 0$ for all $k \in \{1, \cdots, S-1\}$.

H_0 is rejected if and only if $Z_k^{II} \leq -Z^* < 0$ for all $k \in \{1, \cdots, S-1\}$, where $-Z^*$ is the left-tail critical value for a desired level of statistical significance. In the remainder of this section we use these results both to compare wellbeing outcomes in the USA with those in the UK and to make country specific comparisons between males and females and between whites and non-whites.

4.2 Wellbeing in the USA v UK

We begin by comparing the distribution of overall capabilities in the USA with those in the UK and then consider a number of sub-domains. Overall capabilities in each country are summarised in Appendix A, Table A1. It can be seen from the uniformly negative values of $\widehat{\Delta F}(k)$ in Table A1 that, in our sample, the USA FOSD the UK with respect to total capabilities. However, it is clear from the values of Z_k^I that this result is not statistically significant. Moreover, it can be inferred from the values of Z_k^{II} that even SOSD is not statistically significant.

As noted earlier, in generating the 'total capabilities' scores, an important group of individuals, namely those for whom we have no data on Work capabilities was omitted. Since most of these individuals were not in work, it is reasonable to hypothesise that they might be a group with relatively low capabilities overall. This in itself underlines the desirability of also analysing each of our capability domains, to which we now turn.

First we consider the distribution of capabilities within the Home domain in the two countries. These are summarised in Appendix A, Table A2. It can be seen from the uniformly negative values of $\widehat{\Delta F}(k)$ in Table A2 that, in our sample, the USA FOSD the UK with respect to capabilities in the Home domain. In contrast to the case with total capabilities, the values of Z_k^I indicate that FOSD is statistically significant, but only at the 10% level. However, the values of Z_k^{II} indicate that statistical significance for SOSD is achieved at the 5% level.

Turning to capabilities within the Work domain, it can be inferred from Table A3 in Appendix A that, in our sample, the USA again FOSD the UK and this time the results are highly statistically significant (at the 1% level).

It can be seen from Table A4 in Appendix A that, in our sample, the USA also FOSD the UK at the 1% level of significance in the Community domain.

Tables A5 through to A7 in Appendix A indicate that the USA also FOSD the UK in our sample in the domains of Environment, Access to services and life satisfaction. However, none of these results are statistically significant at conventional levels.

Finally, in Table A8 of Appendix A we compare the distributions of household income in the two countries.[21] It is clear that, in our sample, neither country either FOSD or SOSD the other with respect to household income distribution. There is a greater proportion of individuals in the lowest income band of £0-£10k in the USA than in the UK, but a smaller proportion in each of the subsequent lower income bands. It is only in the income bands from £50,000 to £74,999 and upwards that the USA has a higher proportion of individuals than the UK. Determining which country has a higher level of wellbeing with income as the argument therefore requires imposing further restrictions on the form of $u(\cdot)$.[22]

Next we investigate whether this broadly consistent picture of higher levels of wellbeing in the USA versus the UK remains intact when we repeat the analysis at the level of various subgroups. We repeated the analysis above restricting the focus to, in turn, whites, non-whites, those in the lowest income band, those with relatively poor health, those who are unemployed and females.[23] In what follows, we present some of the key findings from these analyses.[24]

Among white individuals in our sample, the USA FOSD the UK in all the domains analysed. However, the results are only statistically significant in the Work and Community domains (at the 1% level) and in the Environment domain (at the 10% level). No statistically significant results were obtained in our sample of non-white individuals. This is likely to be partially due to the fact that our non-white sample size in the UK is very small. However, it is of interest that in several

[21] Note that this particular comparison is largely for illustrative purposes. In a scaled up application of our approach, using national survey data, it would be important to use household income equivalence scales to account for household composition, and to adjust for purchasing power parity.

[22] Adopting a Rawlsian wellbeing function $u(\cdot)$, for example, would imply that the UK FOSD the USA.

[23] Our dataset contains self-reported categorical responses to questions regarding mobility, self-care, ability to perform daily activities, pain and mental health. The wording of these questions is displayed in Table OA6 of our online Appendix A. From these we construct the 'EQ5D' measure, which is the most widely used summary measure of health related quality of life. In our empirical analysis, we regard those with an EQ5D score below 0.8 as being in 'relatively poor health.' This corresponds to the bottom 21% of our sample in the UK and the bottom 25% of our sample in the USA. (Strictly speaking, EQ5D is evaluated slightly differently in different countries. For consistency, we use the UK EQ5D evaluation methodology for both the USA and the UK).

[24] To conserve space, all tables corresponding to results in the remainder of this section are deferred to online Appendix B.

domains (Home, Environment and Access to services) there is a higher proportion of individuals in the very lowest category of attainment in the USA than in the UK, yet lower numbers in immediately subsequent categories. This turns out to be a recurring theme in our comparisons of the USA and the UK. As can be verified from the tables in our online Appendix B, a similar effect is apparent in at least one wellbeing domain in all of the subgroups we consider.

Notwithstanding some similar effects to those just described at the very lowest levels of attainment in some domains, overall the grouping with the poorest health in our sample displays higher wellbeing levels in the USA. The USA dominates the UK in both the Home and Work domains for this grouping in our sample. In the former case, the USA FOSD the UK, though not statistically significantly, and SOSD the UK at the 10% level of significance. In the latter, the USA FOSD and SOSD the UK at the 5% and 1% levels, respectively. In our sample, the USA also FOSD and SOSD dominates the UK in the life satisfaction sphere at the 10% and 1% significance levels, respectively. In fact, higher reported levels of life satisfaction in the USA than in the UK in our sample is another recurring theme; in all subgroups considered apart from females, the USA FOSD the UK, though not always with statistical significance.

Comparing females in the two countries in our sample yields mostly non-significant results, though in most domains the USA either FOSD the UK or would do if it were not for having a higher proportion than the UK in the very lowest category of attainment.

In summary, the between country comparison results above seem to suggest that wellbeing is higher in the USA than in the UK for a number of subgroups in society, in a number of dimensions and for a broad range of wellbeing functions. However, across a number of groups and domains, wellbeing at the very bottom of the distribution is higher in the UK than it is in the USA and in many cases this greatly restricts the class of wellbeing functions for which the USA could be judged to have higher wellbeing levels than does the UK.

4.3 Wellbeing of Whites v Others and Males v Females

We now compare the wellbeing within each of the two countries internally for two important subgroups. Firstly, we compare the wellbeing of whites with that of non-whites in our USA sample. Whites are found to dominate non-whites at second order, at least, in all domains analysed, and to FOSD non-

whites in the Environment domain, at the 1% significance level. Overall, our small sample results suggest that there are significant racial disparities across a broad range of indicators of wellbeing in the USA.

As in the USA, our results suggest that whites in the UK have higher levels of wellbeing, across multiple dimensions, than non-whites. In contrast to the results for the USA, these results are lacking in statistical significance. It is not clear whether the lack of statistical significance is due to lower racial disparities in the UK or whether it is merely a result of the small number of non-whites in our UK sample.

We now compare the wellbeing of males with that of females. In our USA sample, males are found to FOSD dominate females in most domains, though the results are not statistically significant, except in the Environment domain, where they are significant at the 10% level. Males SOSD females in the Home and income domains at the 5% and 1% level of statistical significance, respectively. Overall, these results indicate significant gender disparities in a number of dimensions of wellbeing in the USA, where the results are consistently in the favour of males.

Our analysis of gender disparities in the UK provides more mixed results than in the USA. Females in our sample appear to dominate males in more cases than males dominate females, but these results are non-significant, with the exception of the income domain, where males FOSD females in our sample at the 10% level and SOSD females at the 5% level.

5. Analysing the production of capabilities

Thus far we have analysed the distributions of various dimensions of wellbeing. We now turn our attention to the determinants of some of these dimensions, focusing in particular on capabilities.

We consider a range of resources an individual may possess and use to help develop capabilities. These include income, education, ethnicity and health. For income, we use dummy variables corresponding to various bands of income. As in the previous section, to facilitate comparison among countries, all income is quoted in GBP and the base category is less than £10,000 per annum. For education, we use a dummy variable, indicating whether an individual has been educated beyond high-school. The samples do not possess a large number of

different ethnicities, particularly in the UK, and so we collapse ethnicity to a binary measure of white and non-white. For health, we use the EQ5D measure, as described in footnote 23.

We also include a range of variables corresponding to different types of soft skills and personality traits. It is very plausible that some of these personal characteristics may have an important role to play in determining capabilities. However, attempting to attribute causality in a cross-section such as this is fraught with concerns over endogeneity, which are difficult to adequately address. In the specifications in which these variables are included, we therefore regard them mainly as controls.[25]

For each country $g \in \{USA, UK\}$, for individual $i \in \{1, \dots, n_g\}$, we have an observation corresponding to each of five capability domains $d \in \{H, W, C, E, S\}$.[26] These are denoted as $\hat{Q}_{id}$. These capability variables are regressed by ordinary least squares on respective k_d-dimensional vectors of explanatory variables $\mathbf{x}_{di}$, where each element of $\mathbf{x}_{di}$ is a member of either $\mathbf{r}_i^T$ or $\mathbf{c}_i^T$.[27] The results of these regressions for the USA are presented in Table 2 (a) and (b). The analogous regression results for the UK are presented in Table 3 (a) and (b).[28]

For each country and each domain, a baseline regression is first run with the various resources described above as explanatory variables. Expanded regressions are then performed which include, as controls, a range of soft skills and personality traits. In all cases, the expanded regressions are preferred by both the AIC and BIC criteria and we focus mainly on these. A number of interesting patterns are apparent from Tables 2 and 3.

---

[25] Note that, even aside from their possible role in determining capabilities, including variables for self-reported soft skills and, especially, personality traits, might also be desirable to help control for biases arising from the self-reported nature of the capability variables.
[26] This is a slight abuse of notation; as noted above, in country g there are fewer than n_g individuals with observations corresponding to the Work domain.
[27] Ordered probit regressions were also run for all regressions in both this section and the following section. The results were found to be qualitatively very similar, as is often the case.
[28] As noted above, we regard the soft skills and personality traits in the regressions in Tables 12 and 13 primarily as controls. However, a discussion of their coefficients and possible impact is provided in our online Appendix C.

Table 2(a): Production of Home, Work and Community Capabilities in USA

	Home		Work		Community	
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES						
Age	-0.010	0.011	0.065	0.055	-0.018	-0.017
	(0.051)	(0.044)	(0.060)	(0.055)	(0.029)	(0.027)
Age Squared	0.000	-0.000	-0.001	-0.001	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Health (EQ5D)	2.870***	1.427***	2.708***	1.459***	0.993***	0.361**
	(0.322)	(0.296)	(0.451)	(0.407)	(0.181)	(0.180)
HH Inc. £10-20k	-0.308	-0.334	-0.367	-0.388	0.049	-0.032
	(0.294)	(0.255)	(0.413)	(0.354)	(0.166)	(0.142)
HH Inc. £20-30k	0.394	0.146	-0.210	-0.345	0.137	-0.016
	(0.294)	(0.251)	(0.401)	(0.346)	(0.161)	(0.140)
HH Inc. £30-40k	0.301	0.106	-0.168	-0.233	0.176	0.065
	(0.300)	(0.261)	(0.395)	(0.346)	(0.165)	(0.143)
HH Inc. £40-50k	0.118	-0.061	-0.225	-0.233	0.196	0.098
	(0.337)	(0.289)	(0.424)	(0.364)	(0.189)	(0.159)
HH Inc. £50-75k	0.644**	0.551**	-0.196	-0.187	0.122	0.065
	(0.311)	(0.266)	(0.402)	(0.354)	(0.171)	(0.149)
HH Inc. £75-100k	0.760**	0.370	0.246	-0.022	0.234	0.074
	(0.335)	(0.315)	(0.426)	(0.384)	(0.177)	(0.166)
HH Inc. £100k+	1.148***	0.771**	0.219	-0.048	0.233	0.090
	(0.323)	(0.304)	(0.443)	(0.405)	(0.203)	(0.192)
Male	0.134	0.266**	0.179	0.318**	0.024	0.132*
	(0.133)	(0.121)	(0.146)	(0.137)	(0.075)	(0.071)
Higher Education	0.289*	0.196	0.224	0.302*	0.364***	0.293***
	(0.173)	(0.153)	(0.197)	(0.180)	(0.099)	(0.087)
White	-0.108	-0.049	-0.068	-0.085	0.217**	0.232**
	(0.184)	(0.152)	(0.199)	(0.178)	(0.107)	(0.091)
Unemployed	-1.118***	-0.843***			-0.491***	-0.334***
	(0.224)	(0.204)			(0.136)	(0.122)
Married / live with	0.779***	0.595***	0.221	0.135	0.109	0.043
partner	(0.163)	(0.138)	(0.181)	(0.166)	(0.091)	(0.080)
Have dependent	-0.372**	-0.441***	-0.035	-0.075	-0.058	-0.106
children	(0.149)	(0.125)	(0.165)	(0.152)	(0.087)	(0.075)
Controls for soft skills & personality	N	Y	N	Y	N	Y
Constant	1.944*	-3.685***	0.374	-4.058***	1.758***	-1.688***
	(1.079)	(1.057)	(1.248)	(1.242)	(0.600)	(0.617)
Observations	1059	1059	723	723	1059	1059
R-squared	0.233	0.436	0.093	0.283	0.124	0.331
AIC	4620.403	4336.722	3002.596	2874.595	3421.694	3177.601
BIC	4704.809	4525.395	3075.93	3044.182	3506.1	3366.274

NOTE: Here and throughout the remainder of the paper, *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. All standard errors are White adjusted for heteroscedasticity.

Table 2(b): Production of Environment and Access to Services Capabilities in USA

	Environment		Access to Services	
	(1)	(2)	(3)	(4)
VARIABLES				
Age	0.001	-0.006	-0.041	-0.037
	(0.034)	(0.031)	(0.046)	(0.041)
Age Squared	0.000	0.000	0.001	0.001
	(0.000)	(0.000)	(0.001)	(0.000)
Health (EQ5D)	1.325***	0.726***	1.768***	0.853***
	(0.203)	(0.210)	(0.266)	(0.252)
HH Inc. £10-20k	0.078	-0.055	-0.144	-0.284
	(0.210)	(0.186)	(0.276)	(0.239)
HH Inc. £20-30k	0.270	0.053	0.427	0.152
	(0.206)	(0.182)	(0.269)	(0.233)
HH Inc. £30-40k	0.412**	0.254	0.626**	0.432*
	(0.201)	(0.180)	(0.267)	(0.232)
HH Inc. £40-50k	0.541**	0.372*	0.489	0.303
	(0.223)	(0.195)	(0.311)	(0.266)
HH Inc. £50-75k	0.588***	0.463**	0.653**	0.515**
	(0.212)	(0.189)	(0.279)	(0.245)
HH Inc. £75-100k	0.571***	0.332	0.944***	0.658**
	(0.222)	(0.212)	(0.294)	(0.268)
HH Inc. £100k+	0.707***	0.475**	0.812***	0.557*
	(0.234)	(0.223)	(0.310)	(0.290)
Male	0.150*	0.265***	0.165	0.363***
	(0.089)	(0.088)	(0.118)	(0.113)
Higher Education	0.411***	0.312***	0.305*	0.223
	(0.122)	(0.110)	(0.156)	(0.137)
White	0.365***	0.367***	0.234	0.243*
	(0.126)	(0.109)	(0.166)	(0.142)
Unemployed	-0.555***	-0.383***	-0.971***	-0.725***
	(0.166)	(0.143)	(0.220)	(0.192)
Married / live with partner	0.133	0.084	0.317**	0.236*
	(0.112)	(0.098)	(0.151)	(0.128)
Have dependent children	-0.045	-0.080	-0.053	-0.107
	(0.102)	(0.091)	(0.136)	(0.115)
Controls inc. for soft skills & personality traits	N	Y	N	Y
Constant	1.289*	-2.289***	3.531***	-1.911**
	(0.683)	(0.711)	(0.946)	(0.953)
Observations	1059	1059	1059	1059
R-squared	0.193	0.356	0.186	0.378
AIC	3758.955	3561.319	4368.644	4125.544
BIC	3843.361	3749.992	4453.05	4314.217

Table 3(a): Production of Home, Work and Community Capabilities in UK

	Home		Work		Community	
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES						
Age	-0.093**	-0.079**	0.046	0.038	-0.034	-0.034
	(0.042)	(0.038)	(0.047)	(0.044)	(0.025)	(0.024)
Age Squared	0.001***	0.001**	-0.001	-0.001	0.001**	0.000*
	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
Health (EQ5D)	3.229***	1.429***	2.751***	1.117***	1.052***	0.395***
	(0.219)	(0.242)	(0.343)	(0.370)	(0.138)	(0.152)
HH Inc. £10-20k	0.029	-0.002	-0.030	0.071	-0.049	-0.095
	(0.215)	(0.200)	(0.300)	(0.294)	(0.134)	(0.120)
HH Inc. £20-30k	0.102	0.005	0.151	0.229	0.164	0.083
	(0.214)	(0.199)	(0.297)	(0.286)	(0.134)	(0.124)
HH Inc. £30-40k	0.445**	0.285	0.383	0.286	0.160	0.031
	(0.225)	(0.208)	(0.301)	(0.291)	(0.135)	(0.126)
HH Inc. £40-50k	0.922***	0.527**	0.984***	0.759***	0.394***	0.205
	(0.238)	(0.218)	(0.309)	(0.293)	(0.148)	(0.137)
HH Inc. £50-75k	0.929***	0.610***	1.080***	0.825***	0.405***	0.189
	(0.234)	(0.218)	(0.300)	(0.294)	(0.141)	(0.135)
HH Inc. £75-100k	0.542*	0.368	0.933***	0.754**	0.294	0.181
	(0.282)	(0.265)	(0.345)	(0.336)	(0.181)	(0.174)
HH Inc. £100k+	-0.078	-0.617*	0.476	0.294	0.007	-0.140
	(0.425)	(0.367)	(0.446)	(0.424)	(0.258)	(0.245)
Male	-0.104	0.137	-0.187	0.016	-0.121*	0.001
	(0.107)	(0.104)	(0.114)	(0.114)	(0.066)	(0.066)
Higher Education	0.418***	0.189*	0.185	0.065	0.341***	0.201***
	(0.116)	(0.106)	(0.123)	(0.117)	(0.071)	(0.068)
White	0.384	0.356	0.488*	0.694**	0.238	0.181
	(0.276)	(0.275)	(0.289)	(0.278)	(0.194)	(0.181)
Unemployed	-1.001***	-0.884***			-0.160	-0.159
	(0.229)	(0.217)			(0.146)	(0.132)
Married / live with partner	0.823***	0.647***	0.015	-0.148	0.062	0.009
	(0.134)	(0.120)	(0.141)	(0.130)	(0.083)	(0.077)
Have dependent children	-0.528***	-0.453***	-0.094	-0.008	-0.037	0.005
	(0.124)	(0.113)	(0.128)	(0.120)	(0.078)	(0.073)
Controls for soft skills and personality	N	Y	N	Y	N	Y
Constant	2.036**	-1.376	-0.705	-4.176***	1.550***	-0.751
	(0.890)	(0.874)	(0.978)	(1.033)	(0.542)	(0.555)
Observations	1651	1591	1218	1173	1651	1591
R-squared	0.242	0.415	0.115	0.281	0.104	0.252
AIC	7260.446	6633.375	5119.391	4730.779	5647.096	5200.109
BIC	7352.401	6837.516	5201.071	4918.27	5739.052	5404.249

Table 3(b): Production of Environment and Access to Services Capabilities in UK

	Environment		Access to Services	
	(1)	(2)	(3)	(4)
VARIABLES				
Age	0.009	0.007	-0.024	-0.025
	(0.028)	(0.026)	(0.038)	(0.036)
Age Squared	0.000	0.000	0.001	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Health (EQ5D)	1.533***	0.713***	1.699***	0.477*
	(0.152)	(0.172)	(0.231)	(0.261)
HH Inc. £10-20k	0.192	0.187	0.092	0.005
	(0.161)	(0.149)	(0.217)	(0.199)
HH Inc. £20-30k	0.418***	0.342**	0.246	0.025
	(0.157)	(0.148)	(0.210)	(0.196)
HH Inc. £30-40k	0.580***	0.453***	0.249	-0.013
	(0.156)	(0.149)	(0.217)	(0.207)
HH Inc. £40-50k	0.925***	0.714***	0.735***	0.362*
	(0.164)	(0.158)	(0.224)	(0.210)
HH Inc. £50-75k	0.932***	0.754***	0.848***	0.444**
	(0.162)	(0.156)	(0.219)	(0.207)
HH Inc. £75-100k	0.849***	0.760***	0.808***	0.607**
	(0.194)	(0.189)	(0.254)	(0.242)
HH Inc. £100k+	0.374	0.316	0.198	-0.070
	(0.325)	(0.293)	(0.424)	(0.388)
Male	-0.070	0.028	-0.124	0.084
	(0.072)	(0.071)	(0.103)	(0.099)
Higher Education	0.232***	0.094	0.267**	0.025
	(0.077)	(0.071)	(0.111)	(0.102)
White	0.492***	0.503***	0.431	0.310
	(0.182)	(0.169)	(0.269)	(0.259)
Unemployed	-0.347*	-0.305*	-0.487**	-0.487**
	(0.182)	(0.160)	(0.241)	(0.209)
Married / live with partner	0.111	0.042	0.108	0.020
	(0.090)	(0.084)	(0.127)	(0.116)
Have dependent children	0.065	0.112	-0.092	-0.026
	(0.082)	(0.076)	(0.119)	(0.108)
Controls inc. for soft skills & personality	N	Y	N	Y
Constant	0.487	-2.606***	3.052***	-1.379
	(0.589)	(0.581)	(0.826)	(0.861)
Observations	1651	1591	1651	1591
R-squared	0.187	0.334	0.107	0.302
AIC	5923.331	5447.913	7047.991	6460.046
BIC	6015.287	5652.053	7139.946	6664.187

Health is found to be an important resource in the production of each of the capabilities analysed (while recognising the endogeneity issue noted above). It

is statistically significant in all regressions for both countries and, with just one exception, the significance holds at the 1% level.

Household income is also found to be an important resource in the production of a range of capabilities. In the USA, mid to high levels of income tend to have a positive and statistically significant impact on capabilities in the Home, Environment and Access to Services domains. An income gradient is also apparent. In the UK, mid to high levels of income tend to have a positive and statistically significant impact on capabilities in the Home, Work, Environment and Access to Services domains. Unexpectedly, however, the very highest bands of income in the UK are generally not statistically significant and, in the Home domain, the top band is even significantly negative at the 10% significance level.[29]

Interestingly, and perhaps consistent with our gender results in the previous section, being male in the USA has a positive and statistically significant impact on all five capability domains, whilst in the UK being male is not found to have a statistically significant positive impact in any domain.

In the USA, an above school level education has a positive and statistically significant impact in the production of capabilities in the Work, Community, Environment and Access to Services domains. In the UK, a similar effect is observed in the Home and Community domains.

Being white in the USA is found to be positively and statistically significantly associated with greater capabilities in the Community, Environment and Access to Services domains. In the UK, being white has a similar impact on capabilities in the Work and Environment domains.

Even after controlling for income and quite a wide range of other resources and personal attributes, the serious negative impact of unemployment in our results is striking. Being unemployed appears to be particularly debilitating in the USA, where it is found to have a negative impact, significant at the 1% level, on all four domains considered.[30] In the UK, the negative impact is statistically

---

[29] With regard to the lack of statistical significance of the highest income bands in a number of domains, it should be borne in mind that the sample sizes are quite small and statistical power is therefore limited.

[30] Recall that unemployed individuals were not asked any questions about capabilities in the Work domain.

significant in the Home, Access to Services and Environment domains, at the 1%, 5% and 10% levels respectively.

In both countries, there appear to be benefits, with respect to capabilities, of being married or living with a partner. In the USA, this variable has a positive and statistically significant impact on capabilities in the Home and Access to Services domains, at the 1% and 10% levels, respectively. In the UK, being married or living with a partner has a statistically significant positive impact only on capabilities in the Home domain, again at the 1% level. In both countries, having dependent children is negatively associated, at the 1% level, with capabilities in the Home domain. It is not, however, found to have a discernible impact in any other capability domains.

6. Production of Life Satisfaction

In this section we report a number of 'happiness' regressions, variations of equations (2) and (4). In all specifications, the samples are divided into two sub-samples according to whether or not yesterday was a normal working day. This is done in order to allow for the possibility that the effects on happiness of the daily activities in which someone is involved may depend on whether or not they were working that day. (For example, whilst going to the park or countryside might be a pleasant experience for someone who is taking a day off work, it could also be an indication that they do not have a job).

Results are provided for the USA and the UK in Table 4 (a) and (b) respectively. For each country and each of the two sub-samples, a baseline regression is performed. The variables in the baseline regressions are quite typical of those in the extensive literature on happiness, but for the addition of the various 'functionings' variables available in our dataset. In each country the results are broadly similar for the two sub-samples. The sample sizes are much larger and give more statistically significant results for those who reported that yesterday was a working day, and so we focus mainly on them. We first note in passing, however, that certain specific issues do stand out, at least in the UK, for those who reported that yesterday was not a normal working day. In particular, there is a negative and highly statistically significant impact on life satisfaction of caring for someone who is ill, and there are significant positive impacts of playing a musical instrument (at the10% level) and visiting a park or the countryside (at the

5% level). The latter two findings seem to suggest that how a person uses their leisure time has an impact on their life satisfaction. The former finding is open to interpretation. It may be indicative of market failures in the UK with respect to caring services. Alternatively, it may simply be that many of those who engage in such caring are doing so for loved ones in need of care, and that their relatives' poor state of health has in turn lowered the respondents' happiness levels.

Focusing on those for whom yesterday was a normal working day, in both the USA and the UK income is found to have a positive and statistically significant impact on life satisfaction. This effect is especially evident in the UK, each income band from £20k upwards being significant at the 5% level or lower. There is also some evidence of an income gradient, and again this is particularly clear in the results for the UK. However, somewhat similarly to the capabilities regressions in the previous section, the marginal benefit of being in the very highest income band (with respect to the omitted category of less than £10k) is lower than that of the two preceding categories.

Unsurprisingly, being unemployed has a negative and highly statistically significant impact on life satisfaction in both countries. Being married or living with a partner is found to have a positive effect on life satisfaction, statistically significant at the 1% level in the USA and at the 5% level in the UK. Being white and having an above school level education are also both positively related to life satisfaction in the UK, but only at the 10% level; these patterns are not observed in the USA.

The much observed and recently contested U-shaped relationship between happiness and age is observed in both countries. However, the effect is only statistically significant in the UK – where it is significant at the 1% level.

Table 4(a): Production of 'Overall Life Satisfaction' in USA

	Yesterday normal working day			Yesterday not normal working day		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES						
Age	-0.051	-0.047	-0.014	-0.137	-0.135*	-0.082
	(0.063)	(0.047)	(0.048)	(0.099)	(0.074)	(0.072)
Age Squared	0.000	0.000	0.000	0.002	0.002*	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Health (EQ5D)		0.991***	0.531		1.188**	0.787*
		(0.369)	(0.360)		(0.483)	(0.473)
HH Inc. £10-20k	-0.261	-0.519*	-0.400	-0.191	-0.250	-0.526
	(0.365)	(0.278)	(0.284)	(0.542)	(0.431)	(0.411)
HH Inc. £20-30k	0.169	-0.527*	-0.468*	0.415	-0.091	-0.376
	(0.357)	(0.270)	(0.278)	(0.491)	(0.384)	(0.380)
HH Inc. £30-40k	-0.010	-0.501*	-0.419	0.564	0.079	-0.097
	(0.359)	(0.278)	(0.274)	(0.459)	(0.365)	(0.341)
HH Inc. £40-50k	-0.067	-0.541*	-0.501*	0.767	-0.208	-0.545
	(0.407)	(0.303)	(0.302)	(0.555)	(0.488)	(0.443)
HH Inc. £50-75k	0.794**	-0.110	0.044	0.539	-0.237	-0.268
	(0.359)	(0.265)	(0.267)	(0.506)	(0.394)	(0.399)
HH Inc. £75-100k	0.443	-0.518	-0.550*	0.972*	0.398	0.272
	(0.422)	(0.321)	(0.327)	(0.583)	(0.463)	(0.467)
HH Inc. £100k+	0.954**	-0.304	-0.275	1.643***	0.214	-0.078
	(0.436)	(0.333)	(0.344)	(0.555)	(0.473)	(0.447)
Male	-0.171	-0.294**	-0.166	-0.023	-0.231	-0.222
	(0.175)	(0.147)	(0.154)	(0.282)	(0.230)	(0.222)
Higher Educ.	-0.130	-0.250	-0.300*	-0.519	-0.710**	-0.612**
	(0.223)	(0.170)	(0.167)	(0.332)	(0.277)	(0.269)
White	-0.145	0.168	0.245	-0.193	-0.105	-0.078
	(0.214)	(0.167)	(0.167)	(0.342)	(0.266)	(0.245)
Unemployed	-1.215***	-0.343	-0.405	-1.067**	-0.485	-0.611*
	(0.316)	(0.286)	(0.296)	(0.418)	(0.341)	(0.325)
Married / live with partner	0.674***	0.176	0.120	0.701**	0.217	0.316
	(0.216)	(0.167)	(0.168)	(0.290)	(0.247)	(0.241)
Have dep. children	0.005	0.333*	0.261	-0.180	-0.256	-0.468
	(0.226)	(0.174)	(0.167)	(0.363)	(0.307)	(0.289)
Caring (unpaid)	-0.128	-0.003	0.189	0.351	0.245	0.071
	(0.323)	(0.236)	(0.220)	(0.442)	(0.365)	(0.361)
Commuting	0.588***	0.326**	0.281**	0.207	0.014	-0.065
	(0.179)	(0.138)	(0.138)	(0.301)	(0.217)	(0.227)
Drinking Alcohol	-0.017	0.009	0.061	0.307	0.132	0.200
	(0.187)	(0.142)	(0.138)	(0.272)	(0.226)	(0.226)
Exercising	0.202	-0.018	-0.150	0.433	0.064	0.053
	(0.174)	(0.133)	(0.134)	(0.310)	(0.235)	(0.222)
Internet (for paid employment)	-0.067	-0.159	-0.125	-0.059	-0.209	-0.240
	(0.197)	(0.146)	(0.143)	(0.361)	(0.286)	(0.302)
Intimate relations	0.061	0.203	0.240	0.240	0.213	0.192
	(0.200)	(0.168)	(0.163)	(0.319)	(0.245)	(0.229)
Listening to music	0.046	0.009	0.033	0.410	0.076	-0.134
	(0.186)	(0.144)	(0.141)	(0.292)	(0.241)	(0.238)
Other outdoor activities	0.045	0.141	0.103	0.192	0.273	0.320
	(0.244)	(0.181)	(0.172)	(0.375)	(0.269)	(0.255)

Paid employment	-0.008	-0.519***	-0.454***	-0.233	-0.214	-0.202
	(0.200)	(0.178)	(0.175)	(0.330)	(0.268)	(0.255)
Playing musical instrument	-0.079	0.219	0.370*	0.530	0.181	0.116
	(0.298)	(0.186)	(0.200)	(0.558)	(0.409)	(0.432)
Praying or meditating	0.530***	0.307**	0.240*	-0.004	0.170	0.056
	(0.182)	(0.134)	(0.132)	(0.313)	(0.249)	(0.258)
Reading for pleasure	0.012	-0.015	-0.056	0.126	0.206	0.342
	(0.171)	(0.129)	(0.131)	(0.305)	(0.233)	(0.228)
Smoking	-0.454**	-0.237	-0.195	-0.511	-0.053	0.144
	(0.202)	(0.161)	(0.155)	(0.363)	(0.315)	(0.294)
Socialising	0.854***	0.364***	0.349***	0.725**	0.158	0.013
	(0.170)	(0.132)	(0.131)	(0.285)	(0.232)	(0.230)
Shopping	0.150	0.209	0.252*	0.367	0.525**	0.501**
	(0.202)	(0.157)	(0.151)	(0.276)	(0.227)	(0.220)
Visiting park / countryside	0.085	0.121	0.102	-0.309	-0.457	-0.592**
	(0.312)	(0.224)	(0.219)	(0.387)	(0.289)	(0.294)
Other Activities	0.609	-0.001	-0.034	0.054	-0.105	-0.278
	(0.648)	(0.554)	(0.564)	(0.715)	(0.554)	(0.521)
Home Cap.		0.436***	0.395***		0.561***	0.448***
		(0.044)	(0.044)		(0.061)	(0.066)
Work Cap.		0.152***	0.136***		0.091*	0.069
		(0.037)	(0.036)		(0.053)	(0.053)
Comm. Cap.		0.122*	0.107		0.095	0.091
		(0.071)	(0.072)		(0.120)	(0.124)
Env. Cap.		-0.063	-0.076		0.027	-0.008
		(0.071)	(0.070)		(0.102)	(0.099)
Access to Services		0.054	0.044		-0.057	-0.083
		(0.051)	(0.050)		(0.077)	(0.075)
Constant	7.812***	5.096***	4.439***	9.617***	6.769***	4.551**
	(1.344)	(1.017)	(1.112)	(1.973)	(1.535)	(1.783)
Controls for personality & soft skills	N	N	Y	N	N	Y
Observations	678	678	678	381	381	381
R-squared	0.231	0.548	0.587	0.210	0.517	0.603
AIC	2934.729	2586.301	2567.991	1741.492	1565.579	1533.715
BIC	3138.09	2816.777	2893.369	1918.918	1766.662	1817.597

NOTE: Additional functionings are also included. Only those functionings which are statistically significant at the 5% level or lower, in at least one specification, for either our USA or UK regressions, are reported here. The full results are available in Online Appendix D, Table OD1(a).

Table 4(b): Production of 'Overall Life Satisfaction' in the UK

	Yesterday normal working day			Yesterday not a normal working day		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES						
Age	-0.149***	-0.090**	-0.066*	-0.154**	-0.096	-0.084
	(0.055)	(0.042)	(0.039)	(0.073)	(0.061)	(0.059)
Age Squared	0.002***	0.001**	0.001*	0.002**	0.001**	0.001*
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
Health (EQ5D)		2.505***	1.740***		2.269***	1.792***
		(0.247)	(0.264)		(0.422)	(0.425)
HH Inc. £10-20k	0.238	0.048	0.044	0.906**	0.540*	0.628**
	(0.294)	(0.222)	(0.213)	(0.370)	(0.291)	(0.285)
HH Inc. £20-30k	0.586**	-0.011	0.075	1.132***	0.247	0.251
	(0.299)	(0.218)	(0.210)	(0.362)	(0.311)	(0.299)
HH Inc. £30-40k	0.984***	0.075	0.084	1.315***	0.460	0.477*
	(0.306)	(0.223)	(0.215)	(0.372)	(0.296)	(0.280)
HH Inc. £40-50k	1.189***	0.063	0.079	1.717***	0.504	0.409
	(0.331)	(0.259)	(0.249)	(0.384)	(0.317)	(0.307)
HH Inc. £50-75k	1.332***	0.103	0.153	1.571***	0.509	0.413
	(0.319)	(0.239)	(0.229)	(0.394)	(0.323)	(0.313)
HH Inc. £75-100k	1.435***	0.241	0.161	1.794***	0.837**	0.777**
	(0.373)	(0.281)	(0.263)	(0.486)	(0.379)	(0.375)
HH Inc. £100k+	1.262**	0.375	0.047	1.331*	0.571	0.449
	(0.536)	(0.365)	(0.360)	(0.684)	(0.611)	(0.592)
Male	-0.198	-0.215**	-0.194*	-0.280	-0.336**	-0.271
	(0.147)	(0.106)	(0.103)	(0.198)	(0.157)	(0.182)
Higher Educ.	0.288*	0.117	0.098	0.211	-0.123	-0.120
	(0.151)	(0.109)	(0.106)	(0.199)	(0.165)	(0.166)
White	0.770*	0.382	0.385	-0.478	-0.245	-0.055
	(0.462)	(0.304)	(0.269)	(0.499)	(0.404)	(0.387)
Unemployed	-1.273***	-0.836***	-0.715***	-0.220	0.198	0.109
	(0.346)	(0.250)	(0.247)	(0.368)	(0.308)	(0.317)
Married / live with partner	0.384**	-0.104	-0.166	0.442*	0.068	0.098
	(0.173)	(0.122)	(0.115)	(0.229)	(0.180)	(0.173)
Have dep. children	-0.154	-0.045	0.003	0.025	0.195	0.158
	(0.201)	(0.146)	(0.142)	(0.276)	(0.213)	(0.207)
Caring (unpaid)	-0.384	0.084	-0.070	-1.098***	-0.645*	-0.699**
	(0.319)	(0.213)	(0.213)	(0.384)	(0.349)	(0.350)
Commuting	-0.015	-0.123	-0.142	-0.257	-0.218	-0.255
	(0.151)	(0.112)	(0.109)	(0.253)	(0.217)	(0.218)
Drinking Alcohol	-0.365**	-0.219*	-0.147	0.342*	0.237	0.268
	(0.169)	(0.116)	(0.113)	(0.202)	(0.165)	(0.172)
Exercising	0.328**	0.028	0.079	0.032	0.048	0.014
	(0.156)	(0.116)	(0.108)	(0.238)	(0.189)	(0.194)
Internet (for paid employment)	-0.234	-0.315***	-0.205*	-0.064	0.041	0.119
	(0.156)	(0.119)	(0.112)	(0.297)	(0.220)	(0.231)
Intimate relations	0.142	0.090	0.011	0.805***	0.627***	0.558***
	(0.224)	(0.166)	(0.156)	(0.270)	(0.211)	(0.212)
Listening to music	0.150	0.208*	0.219**	0.258	0.087	0.110
	(0.148)	(0.108)	(0.102)	(0.203)	(0.164)	(0.166)
Other outdoor activities	0.533**	0.085	0.013	0.249	0.276	0.164
	(0.241)	(0.184)	(0.171)	(0.284)	(0.238)	(0.242)

Paid employment	0.365**	-0.283	-0.272**	-0.045	-0.167	-0.122
	(0.167)	(0.133)	(0.120)	(0.261)	(0.213)	(0.217)
Playing a musical instrument	0.074	-0.208	-0.092	0.693*	0.816**	0.593
	(0.261)	(0.177)	(0.178)	(0.418)	(0.405)	(0.377)
Praying or meditating	0.016	0.11	0.081	0.353	0.121	0.165
	(0.296)	(0.197)	(0.187)	(0.367)	(0.249)	(0.247)
Reading for pleasure	0.340**	0.083	0.059	-0.194	-0.132	-0.080
	(0.149)	(0.110)	(0.103)	(0.185)	(0.153)	(0.156)
Smoking	-0.268	-0.103	-0.203	-0.302	0.049	0.049
	(0.199)	(0.151)	(0.147)	(0.330)	(0.249)	(0.263)
Socialising	0.605***	0.026	-0.001	0.244	0.157	0.104
	(0.171)	(0.128)	(0.123)	(0.200)	(0.166)	(0.170)
Shopping	-0.125	-0.120	-0.129	-0.104	-0.170	-0.193
	(0.159)	(0.115)	(0.107)	(0.208)	(0.174)	(0.173)
Visiting park / countryside	-0.095	-0.220	-0.205	0.570**	0.336	0.209
	(0.260)	(0.184)	(0.171)	(0.274)	(0.205)	(0.192)
Other Activities	0.153	0.193	0.175	0.613	0.845**	0.501
	(0.527)	(0.411)	(0.391)	(0.491)	(0.382)	(0.352)
Home Cap.		0.448***	0.355***		0.399***	0.367***
		(0.029)	(0.030)		(0.045)	(0.045)
Work Cap.		0.080***	0.047		0.050	0.025
		(0.030)	(0.029)		(0.041)	(0.042)
Comm. Cap.		0.110**	0.054		0.029	0.027
		(0.048)	(0.046)		(0.067)	(0.069)
Env. Cap.		0.051	0.049		-0.070	-0.086
		(0.044)	(0.040)		(0.074)	(0.074)
Access to Services		0.004	-0.025		0.050	0.019
		(0.035)	(0.032)		(0.053)	(0.054)
Constant	7.472***	3.453***	2.650***	7.635***	4.041***	3.428**
	(1.203)	(0.911)	(0.925)	(1.514)	(1.282)	(1.360)
Controls inc. for personality & soft skills	N	N	Y	N	N	Y
Observations	1072	1072	1072	519	519	519
R-squared	0.171	0.571	0.633	0.232	0.516	0.567
AIC	4767.654	4074.317	3949.071	2239.246	2010.947	1995.071
BIC	4991.632	4328.158	4307.435	2430.582	2227.794	2301.208

NOTE: Additional functionings are also included. Only those functionings which are statistically significant at the 5% level or lower, in at least one specification, for either our USA or UK regressions, are reported here. The full results are available in Online Appendix D, Table OD1(b).

A number of functionings are also observed to have an impact on life satisfaction, though the variables which are significant are largely different in the two countries. A notable exception is socialising, which is found to have a positive impact on life satisfaction, statistically significant at the 1% level, in both the USA and the UK. Commuting and praying or meditating are positively related to life satisfaction at the 1% significance level in our USA sample, while smoking tobacco and relaxing or napping are negatively associated with happiness, at the 5% and 10% levels respectively. In the UK, reading for pleasure, paid employment, exercising and other outdoor activities are all positively associated with life satisfaction at the 5% significance level. In contrast, drinking alcohol is negatively related to life satisfaction in the UK at the 5% significance level. Leaving aside our unique functionings variables, overall the variables which are significant in the baseline regressions are broadly consistent with the results reported in the literature on happiness, as are the R-squared values of 0.231 in the USA and 0.171 in the UK.

In column (2) of Tables 4(a) and (b) we add, as additional explanatory variables, both our summary measure of health and our summary capability variables for the Home, Work, Community, Environment and Access to Services domains. These are novel in the happiness literature and their inclusion leads to some striking observations. In each country, both health and capabilities in the Home and Work domains are positively and statistically significantly related to life satisfaction at the 1% level. Community domain capabilities are also positively related to life satisfaction in both countries, at the 5% level in the UK and the 10% level in the USA.

Inclusion of these variables has a pronounced effect on a number of the other explanatory variables. After controlling for capabilities, the positive effect of household income, for example, becomes insignificant in both the USA and the UK and, somewhat surprisingly, even marginally significantly negative in certain income bands in the USA. This suggests that the development of capabilities may be an important mechanism via which higher levels of income can boost life satisfaction.[31] Similarly, the significance of being married or living with a partner

[31] It should also be noted here that, as can be seen in Table 2, one of the questions in the Home domain relates to "being able to make ends meet." Being able to make ends meet has both a material aspect and a capability aspect; for example, someone with a mental disability might be well off financially but unable to manage their money well. In Table OD2 of our online

disappears after controlling for capabilities. Again, this seems to suggest that development of good health and certain capabilities, particularly in the Home and Work spheres, may be important transmission mechanisms via which living in stable relationships can help boost life satisfaction.

The marginally significant beneficial impacts of being white and having a higher education on life satisfaction in the UK are also found to become non-significant after controlling for health and capabilities. Similarly, most of the functionings that were significant in the baseline regressions either lose their significance or become less so when health and capabilities are included. This applies to commuting and praying or meditating in the USA and to exercising, other outdoor activities, paid employment, reading for pleasure and even socialising in the UK.

The negative effects on life satisfaction of smoking in the USA and drinking alcohol in the UK are also found to diminish after controlling for health and capabilities. This seems to suggest that the damage these activities cause to one's happiness may be transmitted via detriment to health or capabilities, the former of which seems particularly likely.

Also eye-catching are the dramatic increases in R-squared values after including health and capabilities - to 0.548 in the USA and 0.571 in the UK. In the happiness literature, it is rare to see R-squared values above around 0.25. Our results suggest that capabilities have been important missing dimensions in that literature and this is further corroborated by the large reductions in AIC and BIC.

It should be recognised that the relationships between life satisfaction and capabilities or health may be endogenous. Firstly, there is, as is commonplace in economic analysis, an issue of unobserved heterogeneity. This has long been a concern in the happiness literature generally. Unobserved characteristics that make people happier may also make it more likely that they will have higher incomes, be in stable relationships and, of particular concern here, have better health and greater capabilities. In one of the few previous studies that have used capabilities as regressors in happiness regressions, Anand et al. (2005) addressed

---

Appendix D, we report variations of the regressions discussed here in which the full range of capability sub-domains are used as explanatory variables. We find that "being able to make ends meet" is a highly statistically significant variable in these regressions for both countries. This suggests that it is not just one's financial resources, but how one is able to manage them that impact upon their happiness.

this problem indirectly, proxying unobserved personality traits by individuals' measures of satisfaction with particular areas of life. Here, we address the problem directly by developing and including data on a wide range of variables for soft skills and personality traits as controls. A second potential source of endogeneity is simply that there may be reverse causality; happiness might have a causal impact on capabilities. In a cross-sectional study, without good instruments, it is rather difficult to adequately address this concern. We remain cautious therefore in how we interpret the causal relationships. That said, the inclusion of capability variables in multiple domains substantially improves the regressions and there is good reason to think that they might.

As alluded to above, in column (3) of Tables 4(a) and (b) we include as additional controls our variables for soft skills and personality traits. The R-squared values increase further, as expected. Specifications (3) are slightly preferable according to the AIC criteria and (in most cases) slightly less preferred by the BIC criteria. Some, but not all, of the key findings from column (2) discussed above remain intact. Capabilities in the Home domain remain highly statistically significant determinants of life satisfaction in both countries, though the coefficients are slightly smaller. The same holds for Work capabilities in the USA but they lose their significance in the UK. Health remains highly significant in the UK but loses its significance in the USA. The significance of capabilities in the Community domain disappears in both countries. The association of praying or meditating with life satisfaction in the USA falls to the 10% level, perhaps suggesting that the relationship between the two is not constant across personality types. Playing a musical instrument and going shopping are now found to have a marginally significant positive relationship with life satisfaction in the USA. Similarly, listening to music is found to have an increasingly significant positive impact on life satisfaction in the UK going from columns (1) through to (3). The negative effect of drinking alcohol in the UK loses its statistical significance when soft skills and personality traits are added alongside capabilities.

Another striking finding is that evidence for a U-shaped relationship between age and happiness in the UK becomes increasingly tentative moving from column (1) through to (3). The age and age squared variables are each significant at the 1% significance level in (1), the 5% level in (2) and only the 10% level in (3). The U-shaped relationship between age and happiness has been a very consistent finding in the happiness literature and has even been detected in

great apes (Weiss et al. (2012)). However, as mentioned above, a number of studies have recently called the effect into question, finding that the U-shape in middle age disappears completely after taking account of selection effects using fixed-effects models. The interpretation provided by these studies is that the U-shape apparent in cross-sectional work is an artefact arising from unobserved heterogeneity.

An argument that has been made is that unobserved characteristics that make people happier also make it more likely that they will have higher incomes, be in stable relationships, better health and so on.[32] The omission of these unobserved characteristics results in upward biases in the coefficients of variables such as income and marriage. This in turn leads to biases in the coefficients of 'age' and 'age-squared,' since these are typically correlated with variables such as income and marriage. In particular, such variables tend to be highest in middle age and the direction of the biases on the 'age' and 'age-squared' variables are therefore such that they force the conditional age profile to become U-shaped. Our results from the UK are consistent with that argument. We have included a wide range of capabilities, soft skills and personality traits that might be expected to pick up a good deal of the unobserved heterogeneity typical in cross-sectional regressions in the happiness literature. Consistent with the psychology literature, their inclusion reduces the significance of the effects of variables such as income and marriage on happiness and, in line with recent panel data studies, the evidence of the U-shaped relationship weakens as a result.

7. Concluding Remarks

There is a growing consensus within a range of international economics organisations that human wellbeing outcomes produced by economic growth should be directly monitored. Various initiatives and commissions have drawn on recent developments in economics but implementation has been limited by the availability of data. In this paper, we developed a unique dataset comprising variables on capabilities in multiple dimensions, happiness, daily activities, resources and potential sources of (often unobserved) individual heterogeneity.

[32] Similar arguments have been made in the psychology literature – see for example Lyubomirsky, King, & Diener (2005).

We conducted a number of analyses to explore wellbeing differences between the USA and UK.

Our first main empirical finding was that for most of the income range, the USA stochastically dominates the UK in terms of wellbeing measures related to all five areas explored: home, work, community, environment and access to services. The only exception concerns those in the lowest income group. These results raise a question as to whether there is a cultural response factor at play. Researchers are often not able to control for such factors and any attempt to do so would almost certainly impose a burden of questions on respondents that would be not be acceptable. The result of our comparison is favourable to the US and consistent with other findings using different methods not susceptible to this issue but still it would be interesting to see more methodological work relating to multi-dimensional indicators in multi-country studies.

Our second main empirical finding was that with the addition of data on multi-dimensional capabilities and soft skills with personality controls, the explained variance in the now essentially standard happiness equation, is nearly doubled. Whilst we believe these new variables are warranted by theory, and would also argue that more work is needed empirically, either through panels or possibly experiments, to determine the causal mechanisms at work. In addition, we believe that the measures of soft-skills merit further work. Economists have identified this as an area in need of further work but we found less in either the management or psychology literatures that we had hoped.

Notwithstanding these limitations, we hope that this paper will contribute to thinking about the measurement of progress and the modelling of happiness.

References

Alkire, S. and Foster, J. (2011), "Counting and Multidimensional Poverty Measurement," *Journal of Public Economics* 95, 476-487.

Anand, P., Krishnakumar, J. and Tran, N-B. (2011), "Measuring welfare: Latent variable models for happiness and capabilities in the presence of unobservable heterogeneity" *Journal of Public Economics* 95, 205-215.

Anderson, G. (1996), "Nonparametric tests of stochastic dominance in income distributions," *Econometrica* 64, 1183–1193.

Anderson, G., Leo, T. and Anand, P. (2014), "Dealing with Increasing Dimensionality in Wellbeing and Poverty Measurement, Some Problems and Solutions," mimeo

Anderson, S. and Ray, D. (2010), "Missing Women: Age and Disease," *Review of Economic Studies* 77, 1262-1300.

Atkinson, A. and Bourguignon, F. (1982), "The comparison of multi-dimensioned distributions of economic status," *Review of Economic Studies* 49, 183–201.

Basu, K. and Kanbur, R. (2009), "Arguments for a Better World," Oxford, Oxford University Press.

Benjamin, D., Heffetz, O., Kimball, M. and Rees-Jones, A. (2012), "What Do You Think Would Make You Happier? What Do You Think You Would Choose?" *American Economic Review* 102, 2083–2110.

Benjamin, D., Heffetz, O., Kimball, M. and Szembrot, N. (2014), "Beyond Happiness and Satisfaction: Toward Well-Being Indices Based on Stated Preference," forthcoming, *American Economic Review*.

Borghans, L., Duckworth, A., Heckman, J. and ter Weel, B. (2008), "The Economics and Psychology of Personality Traits," *Journal of Human Resources* 43, 972-1059.

Cunha, F. and Heckman, J. (2008), "Formulating, Identifying and Estimating the Technology of Cognitive and Noncognitive Skill Formation," *Journal of Human Resources* 43, 738-782.

Cunha, F., Heckman, J. and Schennach, S. (2010), "Estimating the technology of cognitive and noncognitive skill formation," *Econometrica* 78, 883-931.

Deaton, A. (2008), "Income, Health and Wellbeing around the World," *Journal of Economic Perspectives* 22, 53-72.

Desai, M. and Shah, A. (1988), "An Econometric Approach to the Measurement of Poverty," *Oxford Economic Papers*, 40, 505-522.

Diener, E. and Seligman, M. (2002), "Very Happy People," *Psychological Science* 13, 81-84.

Fleurbaey, M. (2009), "Beyond GDP: The Quest for a Measure of Social Welfare." *Journal of Economic Literature*, 47, 1029–1075.

Formby, J., Smith, J., Zheng, B. (2004), "Mobility measurement, transition matrices and statistical inference," *Journal of Econometrics* 120, 181–205.

Frijters, P. and Beatton, T. (2012), "The mystery of the U-shaped relationship between happiness and age," *Journal of Economic Behavior and Organization* 82, 525-542.

Gaertner, W. and Xu, Y (1999), "On the Structure of Choice under different External References," *Economic Theory*, 14, 609-620.

Heckman, J. and Kautz, T. (2012), "Hard Evidence on Soft Skills," *Labour Economics* 19, 451-464.

Heckman, J, Pinto, R. and Savelyev, P. (2014), "Understanding the Mechanisms Through Which an Influential Early Childhood Program Boosted Adult Outcomes," forthcoming, *American Economic Review*.

Howes, S. (1996), "A new test for inferring dominance from sample data," Discussion Paper, STICERD, London School of Economics.

Hsee, C. (1999), "Value-Seeking and Prediction-Decision Inconsistency: Why Don't People Take What They Predict They'll Like the Most?" *Psychonomic Bulletin and Review* 6, 555–561.

Hsee, C., Zhang, J., Yu, F. and Xi, Y. (2003), "Lay Rationalism and Inconsistency Between Predicted Experience and Decision." *Journal of Behavioral Decision Making* 16, 257–72.

Jones, D. and Peters, T. (1992), "Caring for Elderly Dependants: Effects on the Carers' Quality of Life*," Age and Ageing* 21, 421-428.
Kahneman, D., Krueger, A., Schkade, D., Schwarz, N. and Stone, A. (2004), "Toward National Well-being Accounts," *American Economic Review* 94, 429-434.
Kassenboehmer, S. and Haisken-DeNew, J. (2012), "Heresy or enlightenment? The well-being age U-shape effect is flat," *Economics Letters* 117, 235-238.
Krishnkumar, J. and Ballon, P. (2008), "Estimating basic capabilities: a structural equation model applied to Bolivian data," *World Development* 36, 992-1010.
Klugman, J., F. Rodriguez and Choi (2011), "The HDI 2010: new controversies, old critiques," *Journal of Economic Inequality* 9, 249-288.
Loewenstein, G. and Ubel, P. (2008), "Hedonic Adaptation and the Role of Decision and Experience Utility in Public Policy," *Journal of Public Economics* 92, 1795–1810.
Lyubomirsky, S., King, L., & Diener, E. (2005), "The Benefits of Frequent Positive Affect: Does Happiness Lead to Success?" *Psychological Bulletin, 131*(6), 803-855.
Malik, K. (2013), "Human Development Report 2013. The rise of the South: Human progress in a diverse world."
Nehring, K. and Puppe, C. (2002), "A Theory of Diversity*," Econometrica* 70, 1155–1198.
Nussbaum, M. (2000), *Women and Human Development: The Capabilities Approach* (Cambridge University Press, Cambridge).
Nussbaum, M. and Sen, A. (eds.) (1993), *The Quality of Life*: OUP.
Ramos, X. and Silber, J. (2005), "On the application of efficiency analysis to the study of the dimensions of human development," *Review of Income and Wealth* 51, 285-309.
Schokkaert, E. (2009), "The Capabilities Approach," in *Handbook of Rational and Social Choice*, (eds) Anand, P., Pattanaik, P. and Puppe, C.: Oxford, Oxford University Press.
Sen, A. (1977), "On Weights and Measures: Informational Constraints in Social Welfare Analysis," *Econometrica* 45, 1539-1572.
Sen, A. (1979). 'Personal Utilities and Public Judgements: Or What's Wrong With Welfare Economics', *The Economic Journal* 89, 537-558.
Sen, A. (1985). *Commodities and Capabilities*, Amsterdam, North-Holland.
Sen, A. (1999). *Development as a Freedom*, Oxford: OUP Oxford.
Stiglitz, J., Sen, A. and Fitoussi J-P. (2009), Report by the Commission on the Measurement of Economic Performance and Social Progress.
Tversky, A. and Griffin, D. (2000), "Endowments and Contrast in Judgments of Well-Being." In *Choices, Values, and Frames*, edited by D. Kahneman and A. Tversky, 709–725. New York: Cambridge University Press.
Weinberg, A. and Huxley, P. (2000), "An evaluation of the impact of voluntary sector family support workers on the quality of life of carers of schizophrenia sufferers," *Journal of Mental Health* 9, 495-503.
Weiss, A., King, J., Inoue-Murayama, M., Matsuzawa and Oswald, A. (2012), "Evidence for a midlife crisis in great apes consistent with the U-shape in human well-being," PNAS 109, 19949-19952.
Yalonetzky, G. (2013), "Stochastic dominance with ordinal variables: Conditions and a test," *Econometric Reviews* 32, 126-163.

Appendix A

Table A1: Total Capability Distribution in the USA Versus the UK

	USA		UK					
$\hat{Q}_i$ (k)	Freq	Cum %	Freq	Cum %	$\widehat{\Delta F}(k)$	$\widehat{\Delta H}(k)$	Z_k^I	Z_k^{II}
0	15	2.07	26	2.09	-0.000	-0.000	-0.030	-0.030
1	2	2.35	6	2.57	-0.002	-0.002	-0.305	-0.176
2	6	3.18	10	3.38	-0.002	-0.004	-0.229	-0.204
3	2	3.46	10	4.18	-0.007	-0.011	-0.802	-0.391
4	3	3.87	7	4.75	-0.009	-0.02	-0.918	-0.531
5	4	4.43	10	5.55	-0.011	-0.031	-1.107	-0.667
6	2	4.7	15	6.76	-0.020	-0.052	-1.923	-0.920
7	6	5.53	8	7.4	-0.019	-0.07	-1.640	-1.065
8	5	6.22	18	8.85	-0.026	-0.096	-2.164	-1.265
9	4	6.78	21	10.54	-0.038	-0.134	-2.937	-1.542
10	4	7.33	20	12.15	-0.048	-0.182	-3.589	-1.857
11	6	8.16	20	13.76	-0.056	-0.238	-3.964	-2.170
12	10	9.54	20	15.37	-0.058	-0.296	-3.891	-2.434
13	3	9.96	29	17.7	-0.077	-0.373	-4.987	-2.783
14	6	10.79	23	19.55	-0.088	-0.461	-5.439	-3.132
15	20	13.55	31	22.04	-0.085	-0.546	-4.895	-3.365
16	21	16.46	37	25.02	-0.086	-0.631	-4.637	-3.587
17	12	18.12	35	27.84	-0.097	-0.728	-5.077	-3.833
18	26	21.72	56	32.34	-0.106	-0.835	-5.243	-4.085
19	22	24.76	59	37.09	-0.123	-0.958	-5.848	-4.379
20	28	28.63	58	41.75	-0.131	-1.090	-6.009	-4.667
21	26	32.23	55	46.18	-0.140	-1.229	-6.231	-4.961
22	43	38.17	74	52.13	-0.140	-1.369	-6.080	-5.235
23	57	46.06	64	57.28	-0.112	-1.481	-4.830	-5.397
24	43	52.01	79	63.64	-0.116	-1.597	-5.049	-5.578
25	55	59.61	71	69.35	-0.097	-1.695	-4.338	-5.711
26	50	66.53	96	77.07	-0.105	-1.800	-4.967	-5.907
27	66	75.66	93	84.55	-0.089	-1.889	-4.686	-6.104
28	74	85.89	84	91.31	-0.054	-1.943	-3.555	-6.297
29	102	100	108	100				
Total	723		1,243					

Table A2: Home Domain Capability Distribution in the USA Versus the UK

	USA		UK					
$\hat{Q}_{iH}$ (k)	Freq	Cum %	Freq	Cum %	$\widehat{\Delta F}(k)$	$\widehat{\Delta H}(k)$	Z_k^I	Z_k^{II}
0	99	9.4	200	11.8	-0.025	-0.025	-2.091	-2.091
1	78	16.7	117	18.8	-0.021	-0.045	-1.377	-1.817
2	70	23.3	131	26.5	-0.032	-0.077	-1.898	-1.964
3	75	30.4	141	34.9	-0.045	-0.122	-2.445	-2.238
4	94	39.3	147	43.6	-0.043	-0.165	-2.228	-2.363
5	127	51.3	202	55.5	-0.043	-0.208	-2.179	-2.469
6	171	67.4	242	69.9	-0.024	-0.232	-1.339	-2.428
7	345	100	509	100				
Total	1,059		1,689					

Table A3: Work Domain Capability Distribution in the USA Versus the UK

	USA		UK					
$\hat{Q}_{iW}$ (k)	Freq	Cum %	Freq	Cum %	$\widehat{\Delta F}(k)$	$\widehat{\Delta H}(k)$	Z_k^I	Z_k^{II}
0	52	7.2	148	11.9	-0.047	-0.047	-3.551	-3.551
1	44	13.3	100	20.0	-0.067	-0.114	-3.937	-4.055
2	67	22.5	139	31.1	-0.086	-0.200	-4.221	-4.474
3	70	32.2	152	43.4	-0.111	-0.311	-4.983	-5.000
4	91	44.8	177	57.6	-0.128	-0.439	-5.511	-5.538
5	95	58.0	181	72.2	-0.142	-0.581	-6.364	-6.155
6	304	100	346	100				
Total	723		1,243					

Table A4: Community Domain Capability Distribution in the USA Versus the UK

	USA		UK					
$\hat{Q}_{iC}$ (k)	Freq	Cum %	Freq	Cum %	$\widehat{\Delta F}(k)$	$\widehat{\Delta H}(k)$	Z_k^I	Z_k^{II}
0	101	9.5	225	13.3	-0.038	-0.038	-3.088	-3.088
1	45	13.8	152	22.3	-0.085	-0.123	-5.819	-4.856
2	131	26.2	210	34.8	-0.086	-0.209	-4.827	-5.292
3	268	51.5	464	62.2	-0.108	-0.317	-5.551	-6.087
4	514	100	638	100				
Total	1,059		1,689					

Table A5: Environment Domain Capability Distribution in the USA Versus the UK

	USA		UK					
$\hat{Q}_{iE}$ (k)	Freq	Cum %	Freq	Cum %	$\widehat{\Delta F}(k)$	$\widehat{\Delta H}(k)$	Z_k^I	Z_k^{II}
0	81	7.7	141	8.4	-0.007	-0.007	-0.661	-0.661
1	42	11.6	102	14.4	-0.028	-0.035	-2.125	-1.561
2	87	19.8	156	23.6	-0.038	-0.073	-2.364	-2.055
3	123	31.4	255	38.7	-0.073	-0.145	-3.925	-2.946
4	225	52.7	379	61.2	-0.007	-0.007	-0.661	-0.661
5	501	100	656	100				
Total	1,059		1,689					

Table A6: Access to Services Domain Capability Distribution in the USA Versus the UK

	USA		UK					
$\hat{Q}_{iS}$ (k)	Freq	Cum %	Freq	Cum %	$\widehat{\Delta F}(k)$	$\widehat{\Delta H}(k)$	Z_k^I	Z_k^{II}
0	57	5.4	98	5.8	-0.004	-0.004	-0.468	-0.468
1	29	8.1	57	9.2	-0.011	-0.015	-0.959	-0.779
2	42	12.1	75	13.6	-0.015	-0.030	-1.166	-0.995
3	58	17.6	105	19.8	-0.023	-0.053	-1.487	-1.236
4	83	25.4	146	28.5	-0.031	-0.083	-1.768	-1.487
5	114	36.2	156	37.7	-0.015	-0.099	-0.815	-1.411
6	178	53.0	268	53.6	-0.006	-0.105	-0.307	-1.266
7	498	100	784	100				
Total	1,059		1,689					

Table A7: Life Satisfaction Distribution in the USA Versus the UK

	USA		UK					
Life Sat. Score (k)	Freq	Cum. %	Freq	Cum. %	$\widehat{\Delta F}(k)$	$\widehat{\Delta H}(k)$	Z_k^I	Z_k^{II}
0	23	2.2	49	2.9	-0.007	-0.007	-1.205	-1.205
1	12	3.3	35	5.0	-0.017	-0.024	-2.191	-1.857
2	33	6.4	80	9.7	-0.033	-0.057	-3.156	-2.663
3	76	13.6	133	17.6	-0.040	-0.097	-2.837	-3.029
4	71	20.3	115	24.4	-0.041	-0.138	-2.527	-3.093
5	134	33.0	212	36.9	-0.040	-0.178	-2.143	-3.067
6	127	45.0	240	51.2	-0.062	-0.240	-3.179	-3.352
7	219	65.6	392	74.4	-0.087	-0.327	-4.841	-3.999
8	199	84.4	285	91.2	-0.068	-0.395	-5.206	-4.520
9	100	93.9	94	96.8	-0.030	-0.425	-3.456	-4.703
10	65	100	54	100				
Total	1,059		1,689					

Table A8: Household Income Distribution in the USA Versus the UK

	USA		UK					
HH Inc. (k)	Freq	Cum. %	Freq	Cum. %	$\widehat{\Delta F}(k)$	$\widehat{\Delta H}(k)$	Z_k^I	Z_k^{II}
1 (£0-10k)	131	12.4	188	11.2	0.012	0.012	0.912	0.912
2 (£10-20k)	167	28.1	295	28.9	-0.007	0.005	-0.373	0.184
3 (£20-30k)	163	43.5	331	48.5	-0.050	-0.045	-2.566	-1.064
4 (£30-40k)	167	59.3	286	65.6	-0.063	-0.108	-3.304	-1.919
5 (£40-50k)	110	69.7	206	77.9	-0.082	-0.190	-4.705	-2.769
6 (£50-75k)	167	85.5	231	91.7	-0.062	-0.252	-4.840	-3.339
7 (£75- 100k)	89	93.9	96	97.4	-0.035	-0.287	-4.191	-3.641
8 (£100k +)	65	100	44	100				
Total	1,059		1,677					

From Online Appendix A

Table OA1: "Overall how satisfied are you with your life nowadays"

		USA	UK
Lowest score		2.17%	2.90%
	1	1.13%	2.07%
	2	3.12%	4.74%
	3	7.18%	7.87%
	4	6.70%	6.81%
	5	12.65%	12.55%
	6	11.99%	14.21%
	7	20.68%	23.21%
	8	18.79%	16.87%
	9	9.44%	5.57%
Highest score		6.14%	3.20%
Number of responses		1,059	1,689

Table OA2: Capabilities Questions - Mean Scores

	USA	UK
Home		
I am able to share domestic tasks within the household fairly	6.64	6.11
I am able to socialise with others in the family as I would wish	6.96	6.40
I am able to make ends meet	6.36	6.28
I am able to achieve a good work-life balance	5.98	5.81
I am able to find a home suitable for my needs	6.96	6.52
I am able to enjoy the kinds of personal relationships that I want	6.40	6.16
I have good opportunities to feel valued and loved	6.92	6.26
Work		
I am able to find work when I need to	6.97	6.50
I am able to use my talents and skills at work	7.07	6.51
I am able to work under a good manager at the moment	6.79	6.10
I am always treated as an equal (and not discriminated against) by people at work	7.39	6.78
I have good opportunities for promotion or recognition at work	5.90	4.77
I have good opportunities to socialise at work	6.72	5.58
Community		
I have good opportunities to take part in local social events	5.94	4.95
I am treated by people where I live as an equal (and not discriminated against)	7.60	7.09
I am able to practice my religious beliefs (including atheism/agnosticism)	8.12	7.59
I am able to express my political views when I wish	7.56	7.23
Environment		
I am able to walk in my local neighbourhood safely at night	7.47	6.78
I am able visit parks or countryside whenever I want	7.55	7.42
I am able to work in an environment that has little pollution from cars or other	6.36	5.87
I am able to keep a pet or animals at home with ease if I so wish	7.77	7.11
I am able to get to places I need to without difficulty	7.56	6.97
Access to services		
I find it easy to make use of banking and personal finance services	7.92	7.62
I find it easy to get my rubbish cleared away	8.25	7.45
I find it easy to get trades people or the landlord to help fix problems in the house	7.15	6.69
I find it easy to be treated by a doctor or nurse	7.52	7.27
I find it easy to get help from the police	7.67	6.81
I find it easy to get help from a solicitor	6.36	6.78
I find it easy to get to a range of shops	7.76	7.60