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Abstract   This paper is motivated by sustained interest in the capabilities approach to welfare economics combined with the paucity of economic statistics that measure capabilities at the individual level. Specifically, it takes a much discussed account of the normatively desirable capabilities constitutive of a good life, argued to be comprehensive at a high level of abstraction, and uses it to operationalize the capabilities approach by developing a survey instrument to elicit information about capabilities at the individual level. The paper explores the extent to which these capabilities are covariates of a life satisfaction measure of utility and investigates aspects of robustness and subgroup differences using standard socio-demographic variables as well as a relatively novel control for personality. In substantial terms, we find there is some evidence of quantitative, but no qualitative, gender and age differences in the capabilities–life satisfaction relationship. Furthermore, we find that indicators from a wide range of life domains are linked to life satisfaction, a finding that supports multi-dimensional approaches to poverty and the non-materialist view that people do not just value financial income *per se*. Our most important contribution, however, is primarily methodological and derives from the demonstration that, within the conventions of household and social surveys, human capabilities can be measured with the aid of suitably designed statistical indicators.

Key words: Capabilities, Measurement, Advantage, Multi-dimensional welfare indicators, Human development, Welfare, Happiness, Life satisfaction, Personality controls, Gender differences, Age differences

Introduction

How economists conceptualize and measure human welfare is central to both economic theorizing and policy-making. At an axiomatic level, many theorists now accept that generalizations of expected utility are required to model choice behaviour and, together with a growing number of philosophers and psychologists, many accept these generalizations as normative.[1] Moreover these developments have been accompanied by parallel and related changes in the fields of social choice and welfare economics, developments profoundly influenced by the concerns of Sen and others about the inappropriate informational basis of traditional welfare economics, concerns that have led to the capabilities approach to human economic welfare. In short, the approach emphasizes that the things a person could do or be, as opposed to what they actually do, is be an integral part of a person's welfare. This opportunity or freedom aspect of welfare assessment is already reflected in equality and diversity policies, but the capabilities approach encourages us to examine more extensively the implications of freedom and equity for the conception and measurement of human welfare.

This approach[2] has already been highly influential in development, having helped to shape the way in which economic progress is conceived of, and measured by, policy-makers at the international level (for example, United Nations, 2004) — and there is now beginning to emerge a literature that applies capabilities analysis to issues that are also of concern in high-income countries.[3] However, a number of researchers have commented on the lack of data that measure people's capabilities *per se* even though such data seem vital to both policy-makers and academics if the approach is to have the empirical purchase that theory promises, and it is this empirical gap that this paper seeks, mainly, to address.

A secondary theme in the paper relates to the appreciation amongst economists conducting applied welfare research of the value of subjective well-being data. In his writings on human flourishing, Sen (1985a) suggests that evidence on what makes people happy can provide evidence about their true underlying values. And although the use of self-report data on happiness originated in the field of psychology, there are now many mainstream economics articles that use it as a dependent variable, generally as an indicator of 'experienced' utility (Kahneman *et al.*, 1997). This represents something of a methodological departure from the traditional practice in economics of focusing on market measures of utility, but there are many situations where market measures are either infeasible or do not give good proxies of relevant values. Typically, economists using subjective wellbeing (*SWB*) data have tended to work within the utilitarian tradition of conventional welfare economics, but the link need not be exclusive or essential — as we shall see, Sen's account of welfare and capabilities has an explicit role for happiness. Here, we shall use subjective well-being (life satisfaction) data to ask which, if any, of the capabilities measured are its covariates. Strictly speaking, the capabilities

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approach could be defended against apparent counter-evidence on the grounds that normative claims cannot be shown to be true or false. But equally, it would be an odd theory of human well-being that could not be supported by any empirical evidence. In any case, there is a growing recognition, especially amongst behavioural economists, that this work should have implications for the measurement of well-being at national and international level (for example, Kahneman *et al.*, 2004), and yet it is clear that such applications can only develop if researchers construct appropriate datasets of the sort this paper seeks to generate.

The rest of the paper is structured as follows. The second section provides an introduction to aspects of the capability approach, particularly the concept of capability itself, which emphasizes what people are free or able to do, its relation to happiness and a philosophical account of capabilities essential for a good life. The third section describes the methods employed, particularly the questions devised, their relation to Nussbaum's account, and the methods used to implement them. The results of the analysis, in which capabilities are used to explain variations in life satisfaction, are presented in the fifth section, which also includes analysis of robustness and discussion of results. Summary and concluding remarks appear in the final section.

The capabilities approach to welfare

The capabilities approach emerged from concerns about the informational basis of traditional welfare economics. In particular, the approach developed from Sen's analysis of axiomatic social choice theory (Sen, 1970, 1976, 1979), where he concludes that there are good normative reasons for wanting to modify conventional welfare economics. These concerns centre around the informational basis on which social choice and welfare theory operate: in the first instance, there are claims other than utility, like rights and freedoms, which society often wants to acknowledge but which enter neither explicitly, nor directly, into the utilitarian approach to social choice.[4] On the other hand, there may be some preferences, like the desire to discriminate on grounds of skin colour, which we want to exclude from many decision-making processes. So the informational basis of welfare economics is too 'fat' in some ways (includes too may preferences) and too 'thin' in others (ignores non-utility-based claims on social choice). And as has been shown elsewhere, these normative desiderata are supported by evidence concerning how people do, in fact, want social choices to be made — that is, they do not wish to maximize total social welfare for a variety of reasons, not least of which is the fact they are concerned about distributional issues too.[5]

In his monograph *Commodities and Capabilities*, Sen (1985a) outlined a constructive approach that attempted to address at least some of these informational deficiencies in traditional welfare economics. Since then, the approach has been taken up, discussed and

elaborated by many researchers across a range of disciplines from philosophy to development — although a central theme remains the importance of freedom for well-being, and therefore the distinction between what people are free to do (their 'capabilities') and what they do (their 'functionings'). The approach has supported the creation of statistical indicators that add to income measures of educational attainment and longevity, but it is widely recognized that these are limited additions; furthermore, the needs of policy in high-income countries may warrant a rather more detailed approach to capability measurement. Indeed, in her much discussed account of what capabilities are essential for human well-being, Nussbaum (2000) proposes the following 10 items: life expectancy, bodily health, bodily integrity, senses imagination and thought, emotions, practical reason, affiliation, other species, play and control over the environment. We shall say more about what these capabilities are in the following section, but it is sufficient to remark for present that this constitutes a substantive, normative theory that may not, at first sight, be consistent with a completely subjective approach to preference and welfare. Indeed, one of the objections that have attracted much attention is the possibility that different people(s) may place different weights on the capabilities. So from this perspective, if we can derive capability indicators, Nussbaum's claims give rise to two potentially testable hypotheses; namely, whether the capabilities proposed are indeed related to human well-being and, secondly, whether there is any variation between people in the weights they might ascribe to their capabilities — the analysis presented in the fourth section addresses both questions.

There are a number of ways in which the empirical work to come can be linked to capabilities theory but, for our purposes, ideas in Sen (1985a) provide a sufficient basis for the analysis that follows. There, Sen (1985a, p. 11, equation 2.2) defines utility, $u(.)$, as the happiness derived from doing or being a set of things thus:

$$u = h(f(c(x)), \tag{1}$$

where h is a 'happiness' function related to 'functionings achieved', f is a function that maps goods characteristics onto functionings achieved, and c is a function that maps the consumer's bundle of goods, x, onto a vector of characteristics. If one wanted to estimate the happiness specified in Sen (1985a), then this is the function one would examine, although our interest is in a somewhat different relationship.[6]

A key element of the capabilities approach both in Sen's original monograph and as it has developed is the distinction between functionings achieved — what a person is or does — and capabilities in the sense of the functionings that is feasible for a person to achieve. To identify this concept, Sen introduces a set Q that is defined thus (1985a, p. 13):

$$Q = \{f(c(x))\}, \tag{2}$$

where the set of feasible functions is dependent on a person's own features and their entitlements to commodities. As Sen notes, this represents a person's capability set or *freedom* as a set of functionings from which one could be chosen. Our underlying approach is to model life satisfaction as a function of the freedom that a person has, and amounts to estimating:

$$SWB = g(Q), \tag{3}$$

where $g(.)$ can be viewed as just a different 'happiness' function to that described in Equation (1). If there is an intrinsic value to freedom, as Carter (1999, 2003) for instance argues, or if there are process aspects to experienced utility as Frey and Stutzer (2000, 2005) show, then Equation (3) could be taken to be a superior specification to Equation (1). Furthermore, if an expanded capability set enables individuals to select preferred functionings, then Sen's equation (1) combined with that assumption implies our Equation (3). In any case, this is the relationship we shall seek to estimate, although we acknowledge that it will not be possible to separate out variations in *SWB* due to variations in the determinants of Q (i.e. $c(.)$ or x).[7]

There is one further point to make, which ultimately derives from the fact that the behavioural use of the term happiness tends to be more permissive than its use in normative circles. Happiness in philosophical accounts of utilitarianism tends to be associated with hedonism whereas it is used synonymously with a variety of terms like 'life satisfaction' in economic work. In this study, *SWB* is measured by responses to the question: How satisfied or dissatisfied are you with your life as a whole? This is a standard measure of happiness and one used in the British Household Panel Survey (BHPS), but it suggests an evaluative response to an inquiry about something deeper than a person's hedonic state. In Sen's work there is also defined a function (1985a, pp. 13–14), which relates to the *value of well-being v*, a person attaches to his or her functioning state thus:

$$v = b'(f(c(x))). \tag{4}$$

The point of Equation (4), when taken together with Equation (1), is that it allows for the possibility that people might, say, have high levels of functioning, objectively speaking, and yet not place much value on them. The provenance of Sen's ideas is philosophical but the growing evidence supports such distinctions, and we suggest that it would be possible to interpret the analyses to follow as estimate of:

$$v = b''(Q), \tag{5}$$

where $b''(.)$ is the value a person associates with their capabilities. This valuation might be different to the happiness their capabilities bring them, as measured by Equation (3), but that is a distinction we shall not explore here.

Those familiar with the capability approach will have observed that we have not, thus far, made use of the individual differences that Sen (1985a) allows for in his framework. There, both the original happiness function in Equation (1) and the set Q are subscripted to allow for different personal production functions. One method of allowing for this source of heterogeneity would be to use person-specific effects, as indeed Clark *et al.* (2005) suggest, although this option is not open to us as we have only cross-sectional data to work with. However, Ferrer-i-Carbonell and Frijters (2004) have suggested that there is a need for more information on the aspects of persons that influence life satisfaction, and, to that end, we present analyses that both break down the data by subpopulations and that incorporate a measure of personality.[8] Obviously, panel data would be superior but we suggest that where only a cross-section is feasible, personality variables may help to make up for the absence of person specific controls. To sum up, the equations that we estimate are variants of:

$$SWB = a + \sum b_{caps} x_{caps} + \sum b_{pers/socio} x_{pers/socio}$$

where the subscript 'caps' denotes the capabilities indicators and the subscript 'pers/socio' denoted the person-specific variables. This equation relates to the pooled data, and where we estimate models separately by sex and age group this amounts to us allowing the slopes (b values) to vary between people. The null hypothesis — that are all coefficients for capabilities are zero — is implausible, but we have little idea (either *a priori* or from other empirical work) which capabilities will be associated with *SWB* (happiness in Sen, experienced utility in Kahneman): this fact motivates estimation of the function above.

Measuring the capability set, *Q*

Although there have been many studies related to this approach, it is still widely felt that secondary, quantitative data sources provide little evidence about capabilities, *per se*, Brandolini and D'Alessio (1998) and Kuklys and Robeyns (2005).[9] The next step, therefore, is to develop indicators of the capability set Q. To do this, we need an account that will specify, substantively, what those capabilities should be; and in a series of works the political theorist Martha Nussbaum (2000) has offered, defended and refined just such an account. Her view provides a checklist of capabilities that are essential to human flourishing and it has attracted considerable controversy not least because of the universal claims she makes — namely that the list should apply to the political constitutions of all countries. However, these objections are somewhat beside the point for present purposes as our analysis can be interpreted as treating the assertions of Nussbaum as testable claims in need of supporting empirical evidence.

What does matter, from an empirical perspective, is that whatever method is used to generate a set of capability variables has some grounds

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for being viewed as principled. In this case, we are especially concerned with the existence of a normative justification, as well as certain qualities of the taxonomy itself, particularly the diversity and comprehensiveness of its constituent elements — see also Atkinson *et al*. (2002) for a fuller discussion of the properties that social indicators might usefully possess. Nussbaum's work is undoubtedly the most concrete attempt to provide an account of substantive capabilities and it is a natural place to turn. However, and as Robeyns (2005) has cogently argued, different accounts or lists may be appropriate for different purposes so that the idea there should be one single list for all purposes is questionable. For example, the items for inclusion on such a list may vary across cultures. However, if we look both at the headline categories and the more detailed descriptions provided by Nussbaum (see 2000, appendix), it is noticeable that this is intended to be a high-level list — that is, one sufficiently abstracted from empirical sources of variation that it is universal by construction. Furthermore, the claims to comprehensiveness and universality at this level of abstraction may have some merit if they are compared with other such lists. Alkire (2002a) reviews some 40 lists produced by philosophers, psychologists and other social scientists, and, as Qizilbash (2004) has argued, it is difficult to conclude there is not a large degree of similarity between them. Together, these considerations suggest that Nussbaum's account can be taken as a general, high-level account of capabilities that public policy must address.

Given the somewhat abstract nature of this list, we need to construct questions that people can reasonably be expected to ask. Elsewhere, Anand *et al.* (2005) identify sets of questions from the BHPS[10] that are closely, and sometimes directly, related to items on Nussbaum's list. As they note, questions in the BHPS indicate that some secondary data concerning capabilities can be found but that the coverage of items compared against such lists is substantially incomplete. This incompleteness provides a key motive for developing further indicators, and the results of this activity are presented in Table 1. Wherever possible, BHPS questions were used, and these are indicated in the table — although the majority of questions are new: the middle column of the Table 1 indicates how responses were coded for present purposes.[11] Without attempting to discuss each question in turn, we observe that to match the detailed descriptions of capabilities is easier in some cases than in others and that there are, at points, redundancies in the list. That said, it is clear that the 10 headline category titles belie a large and diverse set of capabilities.

Methods

For analysis, we employ the measure of life satisfaction referred to in the second section. This is identical to that used in the BHPS and was chosen to facilitate comparisons with other studies that use life satisfaction. Asked at the end of the survey, and thereby reflecting a 'considered' opinion, was

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Table 1. Capabilities, survey questions and variables.

Nussbaum's capability	Survey questions	Variable
Life		
Being able to live to the end of a human life of normal length; not dying prematurely, or before one's life is so reduced as to be not worth living.	Given your family history, dietary habits, lifestyle and health status until what age do you expect to live?	Life expectancy
Bodily Health		
Being able to have good health,	Does your health in any way limit your daily activities compared with most people of your age? Yes =0, No =1	Health limits activities
including reproductive health;	Are you able to have children? Yes =0, No =1, No because of my age =0, No I have had a vasectomy/hysterectomy =0	Reproductive health
to be adequately nourished;	Do you eat fresh meat, chicken or fish at least twice a week? Yes =1, No, I cannot afford to =0, No I am vegetarian, vegan =1, No I do not like eating fresh meat chicken or fish that often =1, No I do not have time to prepare fresh food =1, No some other reason =1	Adequately nourished
to have adequate shelter.	Is your current accommodation adequate or inadequate for your current needs? More than adequate =1, Adequate =1, Inadequate =0, Very inadequate =0	Adequate shelter
	Are you prevented from moving home for any reason? Yes lack of money/finances prevents me =0, Yes the council would be unlikely to re-house me =1, Yes family responsibilities and/ or schooling =1, Yes for some other reason =1, No =1	
Bodily Integrity		
Being able to move freely from place to place;	Please indicate how safe you feel walking alone in the area near your home DURING THE DAY time Completely safe =7, Very safe =6, Fairly safe =5, Neither safe nor unsafe =4, Fairly unsafe =3, Very unsafe =2, Not at all safe =1	Safe during day
	Please indicate how safe you feel walking alone in the area near your home AFTER DARK Completely safe =7, Very safe =6, Fairly safe =5, Neither safe nor unsafe =4, Fairly unsafe =3, Very unsafe =2, Not at all safe =1	Safe during night
to be secure against violent assault,	Have you ever been the victim of some other form of violent assault or attack — i.e. an assault other than sexual or domestic? Yes =1, No =0, Prefer not to answer	Previous violent assault
	How likely do you think it is that you will be a victim of violent assault or attack in the future? Extremely likely =7, Very likely =6, Fairly likely =5, Neither likely nor unlikely =4, Fairly unlikely =3, Very unlikely =2, Extremely unlikely =1	Future violent assault

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Table 1. Continued.

Nussbaum's capability	Survey questions	Variable
including sexual assault	Have you ever been a victim of sexual assault? Yes =1, No =0, Prefer not to answer	Past sexual assault
	Please indicate how vulnerable you feel to sexual assault or attack — using a scale of 1–7 where 1 means 'not at all vulnerable' and 7 means 'very vulnerable'	Future sexual assault
and domestic violence;	Have you ever been a victim of domestic violence? Yes =1, No =0, Prefer not to answer.	Past domestic assault
	Please indicate how vulnerable you feel to domestic violence in the future — using a scale of 1–7 where 1 means 'not at all vulnerable' and 7 means 'very vulnerable'	Future domestic assault
having opportunities for sexual satisfaction	Do you have sufficient opportunities to satisfy your sexual needs and desires? Yes =1, No =0, Prefer not to answer	Sexual satisfaction
and for choice in matters of reproduction.	Even if you don't need or have never needed any of the following, are you prohibited from using any of the following for any reason (e.g. religious beliefs, family pressure)? Contraception =1, Abortion =1, Infertility treatment =1, I am not prohibited from using any of the above =0	Reproduction choice
Senses, Imagination, and Thought		
Being able to use the senses, to imagine, think, and reason — and to do these things in a 'truly human' way, a way informed and cultivated by an adequate education, including, but by no means limited to, literacy and basic mathematical and scientific training.	Educated to A-level and above =1, Others =0	Education
Being able to use imagination and thought in connection with experiencing and producing works and events of one's own choice, religious, literary, musical, and so forth.	How often do you use your imagination and or reasoning in your day to day life? All the time =7, Very often =6, Fairly often =5, Occasionally =4, Rarely =3, Very Rarely =2, Never =1	Uses imagination
Being able to use one's mind in ways protected by guarantees of freedom of expression with respect to both political and artistic speech,	I am free to express my political views. Agree strongly =7, Agree moderately =6, Agree a little =5, Neither agree nor disagree =4, Disagree a little =3, Disagree moderately =2, Disagree strongly =1	Political expression
and freedom of religious exercise.	I am free to practice my religion as I want to. Agree strongly =7, Agree moderately =6, Agree a little =5, Neither agree nor disagree =4, Disagree a little =3, Disagree moderately =2, Disagree strongly =1	Exercise religion
Being able to have pleasurable experiences and to avoid non-beneficial pain.	Have you recently been able to enjoy your normal day-to-day activities? More so than usual =4, Same as usual =3, Less so than usual =2, Much less than usual =1	Enjoy activities

Table 1. Continued.

Nussbaum's capability	Survey questions	Variable
Emotions		
Being able to have attachments to things and people outside ourselves;	How difficult do you find it to make friendships which last with people outside work? Extremely difficult =1, Very difficult =2, Fairly difficult =3, Neither difficult nor easy =4, Fairly easy =5, Very easy =6, Extremely easy =7	Makes friends
to love those who love and care for us;	At present how easy or difficult do you find it to enjoy the love care and support of your immediate family? Extremely difficult =1, Very difficult =2, Fairly difficult =3, Neither difficult nor easy =4, Fairly easy =5, Very easy =6, Extremely easy =7	Family love
to grieve at their absence; in general, to love, to grieve, to experience longing, gratitude, and justified anger.	Do you find it easy or difficult to express feelings of love, grief, longing, gratitude, and anger compared with most people of your age? Extremely difficult =1, Very difficult =2, Fairly difficult =3, Neither difficult nor easy =4, Fairly easy =5, Very easy =6, Extremely easy =7	Express feelings
Not having one's emotional development blighted by fear and anxiety.	Have you recently lost much sleep over worry? Not at all =1, No more than usual =2, Rather more than usual =3, Much more than usual =4	Lost sleep
(Supporting this capability means supporting forms of human association that can be shown to be crucial in their development.)	Have you recently felt constantly under strain? Not at all =1, No more than usual =2, Rather more than usual =3, Much more than usual =4	Under strain
Practical Reason		
Being able to form a conception of the good;	My idea of a good life is based on my own judgement. Agree strongly =7, Agree moderately =6, Agree a little =5, Neither agree nor disagree =4, Disagree a little =3, Disagree moderately =2, Disagree strongly =1	Concept of good life
and to engage in critical reflection about the planning of one's life. (This entails protection for the liberty of conscience and religious observance.)	Please indicate how strongly you agree or disagree with the following statement; 'I have a clear plan of how I would like my life to be'. Agree strongly =7, Agree moderately =6, Agree a little =5, Neither agree nor disagree =4, Disagree a little =3, Disagree moderately =2, Disagree strongly =1	Plans life
	How often, if at all, do you evaluate how you lead your life and where you are going in life? All the time =7, Very often =6, Fairly often =5, Occasionally =4, Rarely =3, Very rarely =2, Never =1	Evaluates life
	Outside work, have you recently felt that you were playing a useful part in things? More so than usual =4, Same as usual =3, Less so than usual =2, Much less than usual =1	Useful role
Affiliation		
Being able to live with and toward others, to recognize and show concern for other human beings,	I respect, value and appreciate other people. Agree strongly =7, Agree moderately =6, Agree a little =5, Neither agree nor disagree =4, Disagree a little =3, Disagree moderately =2, Disagree strongly =1	Respects others

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Table 1. Continued.

Nussbaum's capability	Survey questions	Variable
to engage in various forms of social interaction;	Do you normally have at least a week's (seven days) annual holiday away from home? Yes =1, No because of lack of money/finances =0, No because of lack of time, =1 No because I did not want to =1, Some other reason =1	Takes holidays
	Do you normally meet up with friends or family for a drink or a meal at least once a month? Yes =1, No because of lack of money/finances =0, No because I do not have the time =1, No because I choose not to =1, No for some other reason =1	Meets friends
to be able to imagine the situation of another.	Do you tend to find it easy or difficult to imagine the situation of other people? (i.e. 'to put yourself in others' shoes'). Extremely easy =7, Very easy =6, Fairly easy =5, Neither easy nor difficult =4, Fairly difficult =3, Very difficult =2, Extremely difficult =1	Thinks of others
Having the social bases of self-respect and non-humiliation;		
being able to be treated as a dignified being whose worth is equal to that of others.	Have you recently been thinking of yourself as a worthless person? Not at all =4, No more than usual =3, Rather more than usual =2, Much more than usual =1	Feels worthless
This entails provisions of non-discrimination on the basis of race, sex, sexual orientation, ethnicity, caste, religion, and national origin.	Outside any employment or work situation, have you ever experienced discrimination because of your; race, sexual orientation, gender, religion, age? Yes =1, No =0	Past discrimination: – racial – sexual – religious – age – sexual orientation
	Outside any work or employment situation how likely do you think it is that in the future you will be discriminated against because of your; race, sexual orientation, gender, religion, age? Extremely likely =1, Very likely =2, Fairly likely =3, Neither likely nor unlikely =4, Fairly unlikely =5, Very unlikely =6, Extremely unlikely =7	Future discrimination : – racial – sexual – religious – age – sexual orientation
Other Species		
Being able to live with concern for and in relation to animals, plants, and the world of nature.	Please indicate to what extent you agree or disagree with the following statement: I appreciate and value plants, animals and the world of nature? Agree Strongly =7, Agree moderately =6, Agree a little =5, Neither agree nor disagree =4, Disagree a little =3, Disagree moderately =2, Disagree strongly =1	Concern for other species
Play		
Being able to laugh, to play, to enjoy recreational activities	Have you recently been enjoying your recreational activities? More so than usual =4, Same as usual =3, Less so than usual =2, Much less than usual =1	Enjoys recreation

Table 1. Continued.

Nussbaum's capability	Survey questions	Variable
Control Over One's Environment		
Political — being able to participate effectively in political choices that govern one's life; having the right of political participation, protection of free speech and association.	I am able to participate in the political activities that affect my life if I want to. Agree strongly =7, Agree moderately =6, Agree a little =5, Neither agree nor disagree =4, Disagree a little =3, Disagree moderately =2, Disagree strongly =1	Participate in politics
Material — being able to hold property (both land and movable goods), and having property rights on an equal basis with others;	For which of the following reasons, if any, have you not bought your home? I cannot afford to buy =0, I cannot obtain a mortgage =0, I think it is a bad time to buy =1, Some other reason =1	Owns home
having the right to seek employment on an equal basis with others,	When seeking employment in the past, have you ever experienced discrimination because of your; race, sexual orientation, gender, religion, age? Yes =1, No =0	Past discrimination (work): – racial – sexual – religious – age – sexual orientation
	Do you intend seeking work in the future? Yes = 1, No =0	Expect to work
	When seeking work in the future how likely do you think it is that you will experience discrimination because of your; race, sexual orientation, gender, religion, age? Extremely likely =7, Very likely =6, Fairly likely =5, Neither likely nor unlikely =4, Fairly unlikely =3, Very unlikely =2, Extremely unlikely =1	Future discrimination: – racial – sexual – religious – age – sexual orientation
having the freedom from unwarranted search and seizure.	How likely do you think it is that within the next 12 months you will be stopped and searched by the police when it is not warranted? Extremely likely =7, Very likely =6, Fairly likely =5, Neither likely nor unlikely =4, Fairly unlikely =3, Very unlikely =2, Extremely unlikely =1	Expect stop and search
In work, being able to work as a human being, exercising practical reason	To what extent does your work make use of your skills and talents? All the time =7, Almost all the time =6, Most of the time =5, Some of the time =4, Rarely =3, Very rarely =2, Never =1	Skills used at work
	At work, have you recently felt that you were playing a useful part in things? More so than usual =4, Same as usual =3, Less so than usual =2, Much less than usual =1	Useful role at work
and entering into meaningful relationships	Do you tend to find it easy or difficult to relate to your colleagues at work? Extremely easy =7, Very easy =6, Fairly easy =5, Neither easy nor difficult =4, Fairly difficult =3, Very difficult =2, Extremely difficult =1	Relate to colleagues

Table 1. Continued.

Nussbaum's capability	Survey questions	Variable
of mutual recognition with other workers.	At work are you treated with respect? All the time, =7 Almost all the time =6, Most of the time =5, Some of the time =4, Rarely =3, Very Rarely =2, Never =1	Respected by colleagues

the opinion that arguably most closely satisfies the concept of reflection consistency (Sen, 1985b).[12] The questions discussed thus far (over 60 indicators of Q, our measure of experienced utility, *SWB*, and the questions relating to personality) together with a small number of socio-demographics comprised the survey instrument that takes approximately 20 minutes to complete.

To deliver the survey and code responses, a professional company (YOUGOV) with a panel of nationally representative citizens was employed.[13] All respondents took part in a self-complete survey in February 2005, which was notified by email and completed through the company's webpages: 1000 responses were commissioned (with 1048 being supplied), although the number of observations used in each analysis varies due to missing observations. The surveying approach taken is one increasingly adopted following recent legislation in the United Kingdom that limits access to the electoral registers and results in a quota sample design that is common, if not standard, in social and economic surveys such as this one (for example, BHPS).

Because of the overlap in questions with the BHPS it was possible to conduct *ex post* checks on our sample, and these are presented in Appendix 2. The *SWB* variable was measured on a standard, seven-point Likert scale. None of the substantive variables checked are significantly different when our survey is compared with the BHPS and, although two socio-demographic variables examined are statistically different at a 5% level, it is not obvious that the differences in average age or sex ratios are that material. Indeed the samples are relatively large, and so even small differences in socio-economic variables can be expected to be statistically significant.

Results

The dataset generated by the survey instrument is rich and there are a number of possible pathways through it. Our emphasis here is on understanding which capabilities can be taken to be covariates of life satisfaction, which we do by analysing first a basic regression model before moving on to report the results of additional analyses that address robustness and subpopulation variations. Throughout the analysis, the dependent variable is a measure of life satisfaction (*SWB*), which is distributed as indicated in Figure 1.

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Table 2. Regression of subjective well-being on capability indicators.

Variable	Coefficient	Standard error	Variable	Coefficient	Standard error
Constant	−0.43	0.80	Affiliation		
Life			Respects others	0.10	0.05
Life Expectancy	0.00	0.00	Takes holidays	0.20	0.11
Bodily Health			Meets friends	0.14	0.09
Health limits activities	0.13	0.10	Thinks of others	0.02	0.04
Reproductive health	−0.03	0.19	Feels worthless	0.34	0.06
Adequately nourished	0.33	0.27	Discrimination — past racial	−0.08	0.18
Adequate shelter	0.23	0.13	– future racial	0.00	0.05
Able to move home	0.12	0.10	– past sexual	0.25	0.16
Bodily Integrity			– future sexual	−0.05	0.04
Safe during day	0.01	0.05	– past sexual orientation	−0.26	0.27
Safe during night	−0.01	0.04	– future sexual orientation	0.07	0.06
Previous violent assault	−0.05	0.10	– past religious	0.12	0.22
Future violent assault	−0.02	0.03	– future religious	0.02	0.06
Past sexual assault	−0.04	0.13	– past age	0.15	0.13
Future sexual assault	−0.04	0.03	– future age	−0.01	0.03
Past domestic violence	−0.19	0.11	Concern for other species		
Future domestic violence	0.03	0.04	Appreciates plants, animals nature	−0.06	0.04
Sexual satisfaction	0.30	0.09	Play		
Reproduction choice	−0.12	0.15	Enjoy recreation	−0.02	0.06
Senses, Imagination and Thought			Control over one's environment		
Education	0.04	0.08	Participate in politics	0.04	0.04
Uses imagination	0.08	0.04	Owns home	0.12	0.12
Political expression	−0.01	0.05	Discrimination (work) — past racial	−0.65	0.22
Exercise religion	−0.05	0.04	– future racial	0.10	0.06
Enjoys activities	0.07	0.08	– past sexual	0.14	0.14
Emotions			– future sexual	0.00	0.05
Makes friends	0.01	0.03	– past sexual orientation	−0.16	0.3
Family Love	0.08	0.03	– future sexual orientation	−0.01	0.08
Expresses feelings	0.13	0.03	– past religious	0.29	0.3
Lost Sleep	−0.03	0.06	– future religious	−0.03	0.07
Under Strain	−0.07	0.07	– past age	−0.04	0.1
Practical Reason			– future age	−0.01	0.03
Concept of good life	0.05	0.04	– expects stop and search	−0.05	0.03
Plan of life	0.16	0.03	At work — skills used	0.04	0.04
Evaluates Life	−0.12	0.04	– useful role	−0.01	0.06
Useful role	0.37	0.07	– relate to colleagues	0	0.05
			– respected by colleagues	0.03	0.06
			Demographics		
			In work	−0.38	0.32

Table 2. Continued.

Variable	Coefficient	Standard error	Variable	Coefficient	Standard error
			Expect to work	−0.13	0.18
R^2	0.61				
Adjusted R^2	0.56				
Log likelihood	−673.90				
Observations	559				

The first model presented, see Table 2, depicts an ordinary least squares model, as given by Equation (3) above, of *SWB* as a function of the 60-plus capability indicators plus two dummy variables, *Expects to work* (one if a person intends to seek work in future, zero otherwise) and *In work* (one if a person is in work, zero otherwise), which are used to reflect current and expected work status. A number of capability indicators have significant coefficients but a larger number do not, and the second model (see column 1 of Table 3) represents the results of a backward elimination exercise.[14] This second model provides a benchmark for subsequent analyses and shows that 17 capability indicators, drawn from a wide range of life domains, had coefficients that were significant at the 5% level — a finding that is consistent both with the economics literature on poverty, which now accepts that welfare is inherently multi-dimensional, as well as the psychological literature on happiness, which indicates that many domains are important for life satisfaction.[15]

To pursue the issue of robustness, we take this second model and ask whether different variables or models make an impact on our results. Table 3 indicates the impact of adding in socio-demographic and personality variables. The introduction of socio-demographic controls causes two of the capability indicators, *Past domestic violence* and *Expects stop and search*, to become insignificant, although only one of these controls, *Household income*, is itself significant. The motivation for exploring the impact of personality has already been described and it is interesting to note that two dimensions, *Extravert* and *Emotionally stable*, are significantly related to life satisfaction, whilst the others are not — even at the 10% level. That said, only the *Evaluates life* capability indicator ceases to be significant as the personality variables are introduced. These findings confirm the view that life satisfaction is related to personality, which underlines the value of using panel data with person-specific effects where such data are available, or the inclusion of at least some personality measures in cross-sectional surveys where this is possible. On the other hand, where measures of personality are not available, these findings suggest that conclusions about significance of variables may be reasonably robust. The last model in Table 2, in which demographics and personality are combined, appears to confirm that the personality and demographic variables do not substantially alter the

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Table 3. Regression of subjective well-being on capabilities, with demographic and personality controls.

Variable	Capabilities		Capabilities and Demographics		Capabilities and Personality		Capabilities, Demographics and Personality	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Bodily Health								
Adequate shelter	0.27	0.09	0.29	0.10	0.22	0.09	0.23	0.09
Bodily Integrity								
Past domestic violence	−0.17	0.08	−0.13	0.09	−0.17	0.08	−0.14	0.09
Sexual satisfaction	0.25	0.07	0.21	0.08	0.25	0.07	0.22	0.07
Emotions								
Family love	0.08	0.03	0.08	0.03	0.08	0.03	0.08	0.03
Expresses feelings	0.11	0.03	0.11	0.03	0.10	0.03	0.10	0.03
Under strain	−0.13	0.04	−0.10	0.04	−0.11	0.04	−0.08	0.04
Practical Reason								
Concept of good life	0.09	0.03	0.10	0.03	0.08	0.03	0.09	0.03
Plan of life	0.12	0.02	0.13	0.02	0.10	0.02	0.11	0.02
Evaluates life	−0.06	0.03	−0.06	0.03	−0.03	0.03	−0.03	0.03
Useful role	0.36	0.05	0.38	0.05	0.35	0.05	0.37	0.05
Affiliation								
Respects others	0.09	0.03	0.12	0.04	0.11	0.04	0.13	0.04
Takes holidays	0.27	0.08	0.21	0.09	0.25	0.08	0.20	0.08
Feels worthless	0.35	0.04	0.37	0.05	0.29	0.05	0.31	0.05
Control over one's environment								
Past racial discrimination (work)	−0.54	0.17	−0.55	0.17	−0.58	0.17	−0.59	0.17
Future racial discrimination (work)	0.08	0.03	0.07	0.03	0.07	0.03	0.07	0.03
Expects stop and search	−0.05	0.02	−0.04	0.02	−0.06	0.02	−0.04	0.02
Skills used at work	0.08	0.03	0.07	0.03	0.07	0.03	0.07	0.03
Demographics								
In work	−0.32	0.16	−0.36	0.17	−0.35	0.16	−0.37	0.16
Expects to work	−0.23	0.09	−0.25	0.10	−0.24	0.09	−0.28	0.10
Gender			−0.04	0.07			−0.08	0.07
Age			−0.02	0.01			−0.02	0.01
Age^2			0.00	0.00			0.00	0.00

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Table 3. Continued.

Variable	Capabilities		Capabilities and Demographics		Capabilities and Personality		Capabilities, Demographics and Personality	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Household income			0.07	0.03			0.06	0.03
South of England			−0.20	0.10			−0.18	0.10
Midlands and Wales			0.00	0.10			0.04	0.10
North of England			−0.17	0.10			−0.14	0.10
Scotland			−0.04	0.13			0.00	0.13
Personality								
Extravert					0.08	0.03	0.07	0.03
Agreeable					−0.04	0.03	−0.04	0.03
Conscientious					−0.04	0.03	−0.03	0.03
Emotionally Stable					0.11	0.03	0.12	0.03
Open to experiences					−0.04	0.03	−0.03	0.03
R^2	0.54		0.55		0.56		0.57	
Adjusted R^2	0.53		0.54		0.55		0.55	
Log likelihood	−999.89		−990.71		−983.08		−974.19	
Observations	778		778		778		778	

Note: Household income is a five-category variable measure of gross annual household income in £10,000 per annum bands from 0 to over £40,000 and over.
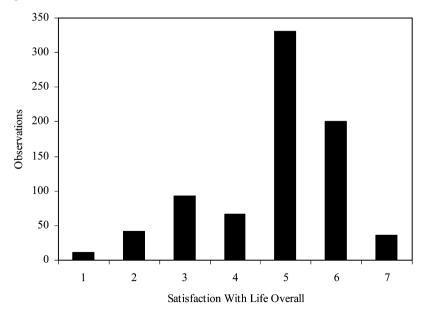

FIGURE 1. Distribution of subjective well-being.

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conclusions one might draw about the relations between capabilities and life satisfaction.

The ordinary least squares (OLS) results lead to coefficients that apply throughout the parameter space and are therefore easier to interpret than they are for other models, but it is nonetheless important to ask whether other model forms are appropriate.[16]

To this point, the analysis indicates a degree of robustness in the relationship between life satisfaction and capability covariates. However, an important element of the capabilities approach is that, as noted in the second section, it recognizes the fact that people convert goods and their characteristics into functionings and happiness at different rates — a point that has implications for economic justice. Personality variables are significant but, apart from income, no control variables are. And whilst the coefficients on *Age* and *Sex* are not significant, one expects some differences both *a priori* as well from the literature, so finally we present two analyses of the model in Table 2 estimated for two sets of population subsamples. Table 4 presents results for a breakdown of respondents by gender, whilst Table 5 summarizes a similar analysis for respondents below and above 45 years of age — the approximate mean age for the overall sample.

At this point, a more heterogeneous picture begins to emerge. Of course some differences are to be expected as the partial de-pooling of the data reduces the sample size for each regression, but the differences are generally consistent with prior expectations about within population variations. The fact that *Adequate shelter* has a significant coefficient for women but not for men could reflect either gender-based differences in attitudes to domestic accommodation or different amounts of time spent in the home. However, the regression does already control for work status, which has been suggested to us as a possible proxy for time in the home so perhaps the sexes do weigh accommodation quality differently. Differences between the sexes in terms of opportunities to seek *Sexual satisfaction* and the ability to enjoy *Family love* are unsurprising. The fact that the ability to *Express feelings* and that being *Under strain* are similarly related to life satisfaction but only significant for men suggests that similar processes might be present in both men and women but that the main consequence of gender differences has to do with the impact of the process. There are a few similarities also: *Plans life*, having a *Useful role* and *Feeling worthless* are significant for both men and women, but they are the only variables of which this is true. Together they might be taken as relating to agency (Nussbaum and Sen, 1993), autonomy (Raz, 1986) or going further back to psychological work on achievement-motivation (McClennen, 1988), and they suggest the shared importance to men and women of life structure. So perhaps this string of concepts related to autonomy is a candidate for being a universal, master value.[17]

Discrimination is important from a capabilities perspective (as it constrains autonomy and redistributes freedom); after controlling for

Table 4. Model estimates for sub samples by gender.

Variable	Females				Males			
	OLS	Standard error	p value	Ordered logit p value	OLS	Standard error	p value	Ordered logit p value
Bodily Health								
Adequate shelter	0.39	0.13	0.00	0.01	0.02	0.15	0.89	0.96
Bodily Integrity								
Past domestic violence	−0.18	0.10	0.08	0.19	−0.18	0.17	0.27	0.36
Sexual satisfaction	0.14	0.11	0.20	0.09	0.29	0.11	0.01	0.00
Emotions								
Family love	0.12	0.03	0.00	0.00	0.02	0.04	0.54	0.20
Expresses feelings	0.04	0.04	0.32	0.38	0.16	0.04	0.00	0.00
Under strain	−0.04	0.05	0.49	0.07	−0.16	0.06	0.02	0.01
Practical Reason								
Concept of good	0.16	0.04	0.00	0.00	0.05	0.04	0.17	0.44
Plans life	0.11	0.04	0.00	0.00	0.09	0.04	0.01	0.03
Evaluates life	−0.03	0.04	0.37	0.48	−0.02	0.04	0.54	0.70
Useful role	0.41	0.07	0.00	0.00	0.30	0.08	0.00	0.00
Affiliation								
Respects others	0.13	0.05	0.01	0.03	0.08	0.06	0.19	0.30
Takes holidays	0.12	0.11	0.28	0.37	0.27	0.14	0.05	0.02
Feels worthless	0.32	0.06	0.00	0.00	0.28	0.07	0.00	0.01
Past racial discrimination	−0.23	0.26	0.38	0.54	−0.73	0.23	0.00	0.00
Future racial discrimination	0.04	0.05	0.39	0.34	0.07	0.05	0.12	0.04
Control over one's environment								
Expect stop and search	−0.03	0.04	0.38	0.11	−0.05	0.03	0.17	0.02
Skills used at work	0.02	0.04	0.66	0.37	0.11	0.04	0.01	0.00
Demographics								
In work	−0.03	0.23	0.90	0.57	−0.75	0.25	0.00	0.00
Expect to work	−0.40	0.14	0.00	0.00	−0.11	0.15	0.47	0.23
Age	−0.03	0.02	0.06	0.06	0.01	0.02	0.42	0.55
Age^2	0.00	0.00	0.24	0.16	0.00	0.00	0.56	0.41
Household income	0.03	0.04	0.37	0.36	0.10	0.04	0.02	0.04
South of England	−0.16	0.14	0.25	0.20	−0.17	0.15	0.26	0.17
Midlands and Wales	0.14	0.14	0.32	0.34	−0.11	0.15	0.48	0.30
North of England	−0.13	0.13	0.32	0.45	−0.12	0.14	0.41	0.23
Scotland	0.13	0.18	0.47	0.74	−0.12	0.18	0.53	0.47
Personality								
Extravert	0.08	0.03	0.02	0.02	0.03	0.04	0.44	0.53
Agreeable	−0.06	0.04	0.18	0.24	0.00	0.05	0.93	0.80
Conscientious	−0.07	0.04	0.07	0.03	0.00	0.04	0.99	0.80
Emotionally stable	0.13	0.04	0.00	0.00	0.14	0.04	0.00	0.00
Open to experiences	−0.01	0.04	0.75	0.90	−0.05	0.05	0.26	0.30
R^2	0.61				0.58			
Adjusted R^2	0.58				0.54			
Log likelihood	−505.9				−445.0			
Observations	418				360			

Note: Table includes p values associated with coefficients from an ordered logit model estimated on the same set of variables as used for the ordinary least squares (OLS) model.

Table 5. Model estimation for subsamples by age group.

Variable	Aged under 45 years				Aged 45 years and over			
	OLS	Standard error	*p* value	Ordered logit *p* value	OLS	Standard error	*p* value	Ordered logit *p* value
Bodily Health								
Adequate shelter	0.22	0.11	0.04	0.02	0.35	0.20	0.09	0.16
Bodily Integrity								
Past domestic violence	−0.02	0.12	0.84	0.83	−0.25	0.12	0.05	0.04
Sexual satisfaction	0.29	0.10	0.00	0.01	0.09	0.11	0.38	0.17
Emotions								
Family love	0.10	0.04	0.01	0.00	0.10	0.04	0.01	0.00
Expresses feelings	0.07	0.04	0.11	0.13	0.13	0.04	0.00	0.00
Under strain	−0.05	0.06	0.41	0.16	−0.13	0.07	0.06	0.03
Practical Reason								
Concept of life	0.11	0.04	0.00	0.01	0.06	0.05	0.22	0.38
Plans life	0.08	0.03	0.01	0.01	0.13	0.04	0.00	0.01
Evaluates life	−0.01	0.04	0.80	0.89	−0.05	0.04	0.17	0.23
Useful role	0.35	0.07	0.00	0.00	0.35	0.08	0.00	0.00
Affiliation								
Respects others	0.12	0.06	0.03	0.04	0.08	0.06	0.16	0.08
Takes holidays	0.29	0.11	0.01	0.01	0.00	0.14	0.97	0.93
Feels worthless	0.31	0.06	0.00	0.00	0.26	0.08	0.00	0.01
Control over one's environment								
Past racial discrimination (work)	−0.28	0.23	0.22	0.74	−0.94	0.26	0.00	0.00
Future racial discrimination (work)	0.06	0.04	0.15	0.13	0.05	0.06	0.40	0.20
Expects stop and search	−0.07	0.03	0.03	0.01	−0.03	0.04	0.34	0.21
Skills used at work	0.09	0.04	0.02	0.01	0.08	0.05	0.09	0.18
Demographics								
In work	−0.27	0.21	0.19	0.09	−0.63	0.28	0.02	0.06
Expect to work	−0.29	0.14	0.04	0.02	−0.26	0.16	0.11	0.05
Age	−0.02	0.03	0.61	0.43	0.01	0.02	0.70	0.75
Age ^{2}	0.00	0.00	0.79	0.51	0.00	0.00	0.99	0.85
Household income	0.00	0.04	0.96	0.95	0.11	0.04	0.01	0.01
South of England	−0.08	0.14	0.55	0.47	−0.26	0.16	0.10	0.09
Midland and Wales	0.18	0.14	0.19	0.23	−0.08	0.16	0.63	0.59
North of England	−0.14	0.13	0.27	0.30	−0.16	0.15	0.30	0.29
Scotland	−0.02	0.17	0.92	0.80	0.05	0.20	0.79	0.88
Personality								
Extravert	0.12	0.03	0.00	0.00	0.01	0.04	0.69	0.83
Agreeable	−0.06	0.04	0.16	0.11	−0.03	0.05	0.56	0.88
Conscientious	−0.05	0.04	0.19	0.20	−0.05	0.04	0.26	0.24
Stable	0.13	0.04	0.00	0.00	0.11	0.04	0.01	0.00
Open to experience	−0.06	0.04	0.19	0.33	−0.03	0.05	0.50	0.85
R^2	0.58				0.60			
Adjusted R^2	0.55				0.56			
Log likelihood	−523.9				−432.0			
Observations	418				360			

Note: Table includes *p* values associated with coefficients from an ordered logit model estimated on the same set of variables as used for the ordinary least squares (OLS) model.

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income, there appears to be an impact on life satisfaction. Specifically, *Past racial discrimination* at work is negatively related to life satisfaction for men, as one would expect. In addition, it has the correct (negative) sign for women but this is not significant — a fact that could simply reflect less time in paid work settings. The finding appears to be strong as it occurs in regressions that control for income, personality and a substantial number of other (mainly capability) variables. But the results are also striking by virtue of what they do not say. The fact that other forms of discrimination are not statistically significant may be due to the paucity of cell observations (e.g. discrimination on grounds of sexual orientation) but could also reflect the nature of such discrimination or the extent to which people adapt to it. A more significant difficulty, however, arises with the related variable indicating that *Future racial discrimination* at work is expected that has a significant coefficient, but in the wrong direction for the pooled data, and is also positively related to life satisfaction (although not significant either for men or women). It may be that the salient comparison is with the person's own past, or the position of their parents or friends and relatives in a different country, and that by those lights most outcomes seem preferable.

If we turn to Table 5, the final analysis concerning age differences suggests a reduction in the number of significant capabilities with age as well as a somewhat changed pattern. *Family love*, *Plans life* and *Useful role* are the only variables significant for both age groups, a finding not dissimilar to that for sex differences, suggesting that agency, in some form, provides a common core of life satisfaction for men and women across the age spectrum. The fact that *Adequate shelter* is significant only for those under 45 years old might indicate that accommodation improves as people accumulate assets over the life course, although combined with the previously noted fact that the variable is only significant for females suggests that concern about adequacy could be heightened by the needs of bringing up young children. The importance of the opportunity to use skills at work and the cost of being in work change with age, although it is impossible to distinguish whether this reflects cohort variations or the effect of ageing. It is certainly plausible that the rising negative impact on life satisfaction of being in work is related to ageing but it is less obvious why opportunities to use skills and talents in work have a greater impact on life satisfaction. A particularly striking difference seems to arise from the fact that the number of capability indicators that have significant coefficients drops by nearly half as one moves from the younger to the older age group. It is well known that life satisfaction exhibits a U-shaped relationship with respect to age (although not why the relation exists), but it has not previously been shown that certain capability covariates decline in importance with age or that there are multiple causes. One possible component of an explanation is that, over the life course, people's aspirations do adapt in a number of areas but that could not be the whole story as age-related adaptation does not explain why, for example, the

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coefficient of *Expresses feelings* is significant for the older group, but not the younger group — a finding that suggests the opposite of adaptation.

In short, to interpret these data, care is warranted and a number of analyses are necessary before any conclusions can, be drawn, even tentatively. Nonetheless, some final comments are warranted. Firstly, although our focus has been on the significance of coefficients, some researchers have commented on the relatively high R^2 values reported throughout (0.5–0.6 compared with 0.4–0.5 in psychology). A number of the items in the Emotions, Practical Reason and Affiliation categories are taken, via the BHPS, from work related to mental health, and so we should not be too surprised if they then turn out to be partly constitutive of life satisfaction. However, this is consistent both with theoretical concerns about materialism in the capabilities approach, as well as empirical evidence from the happiness literature, which shows that income is only weakly related to life satisfaction. The implications depend on the theory of justice one prefers, but where poverty proves stubbornly resistant to attempts at alleviation by conventional economic means, it suggests that a wider range of quality of life issues, if addressed by policy, could have a significant impact on quality of life.

These considerations raise a second point about the relationship between the capabilities approach and the emerging literature on the economics of happiness. Both have origins that include literatures outside economics but, perhaps because of their very different methodological underpinnings, there has been very little constructive engagement between the two traditions to this point. The attitude to utilitarianism, which in turn provided foundations for traditional welfare analysis, is a key issue that has tended to divide these two traditions, but we are not compelled to accept this. For one thing, the substantive content of particular versions of the capabilities approach, as well as the general recognition by all versions of the approach helps provide content that can be used in happiness research: the 60-plus variables used here make that point unambiguously. Whether there is a contribution the other way (i.e. from the research on the economics of happiness to the capabilities approach) has become a more open-ended question because of the implications that are thought to follow from making allowance for the adaptive aspect of preferences. Both camps recognize that such aspects are significant for issues of welfare assessment and we should not ignore the fact that this in itself represents an agreement that goes beyond what is assumed in textbook welfare economics to which most students and policy-makers are exposed. So long as adaptation is not both instantaneous and complete, then changes in valued capabilities can be expected to be reflected by changes in life satisfaction. Layard (2005) suggests the economic policy consequence of adaptation is that we should focus on areas where preferences are resistant to change, and one can think of situations where this might well make sense. For example, there is evidence (Brouwer *et al*., 2005) that people find reduced physical mobility

as they become older acceptable, whereas the same is not true of pain, a fact that suggests pain alleviation be given a relatively high priority. Capabilities researchers are not committed to rejecting such an approach, although they would refine Layard's point by saying that there are some adaptations that need to be discounted — for example, the acceptance of discrimination. And yet it seems difficult to think that anyone trying to operationalize the capabilities approach would not, at some point, want to consult some kind of evidence regarding those capabilities that have a beneficial impact on life satisfaction. There are bridges to be built between the capabilities and life satisfaction camps, and this paper illustrates one way in which they might be constructed.

Conclusions

To summarize briefly, the paper was motivated by a dearth of detailed information about people's capabilities combined with the need for such information that new approaches to welfare economics require. Using an account of what capabilities are valuable that shares many elements with a wide variety of other accounts, a survey instrument was constructed that provides indicators of capability across a wide range of life domains and issues. The research reported here illustrates the feasibility although non-triviality of the task of devising such indicators. It also suggests that lists such as Nussbaum's require further development if they are to generate data that speaks more directly to the interaction between economic activity and human welfare. Nonetheless, the questions developed here provide an illustration of the economic and social statistics that the capabilities approach requires for its operationalization with quantitative empirical work.

For present purposes, we analysed the resulting data on capabilities by asking what evidence there was for relations between capabilities and life satisfaction, a variable now used frequently by labour and other economists. Using backward elimination we developed a short(er) list of capability indicator variables for which there is strongest evidence of a statistical link to subjective well-being. Subsequent analyses suggested that the relations were reasonably robust with respect to the addition of socio-demographic and personality variables. The substantive picture we obtain, then, is one in which life satisfaction is highly multivariate with respect to capabilities, a finding that underlines the value of the vector approach to welfare that Sen advocates as well as the multivariate treatment of poverty that is attracting increasing support. Our evidence also suggests that whilst there may be some gender and age differences, signs — particularly when comparing females and males — are generally the same, suggesting that any gender differences in capability life satisfaction relations are primarily quantitative rather than qualitative.[18]

Much work remains to be done, not least of all in tailoring samples to focus on specific issues, like the impacts of constraints on reproductive

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choice, or the role of ethnicity — see also Schokkaert (2008) for further suggestions for new work. From a practical perspective, it would also be particularly valuable to link some of the capability indicators of the sort developed here to environmental variables that policy-makers can influence. Nonetheless, the paper brings an economics and social statistics approach to bear on a philosophically principled, oriented approach to welfare economics in a way that will be of value to both those interested in the operationalization of this approach and also to those doing applied empirical work in the area of life satisfaction. Focusing on capabilities or opportunities is especially important where preferences are at least partially heterogeneous, an assumption that appears to be confirmed rather starkly by our analyses by gender and to a lesser extent, by those for age. Findings apart, we suggest that the questions developed here illustrate the sorts of data that policy-makers and capability researchers alike could gather both in one-off and in regular surveys. The capabilities approach is undoubtedly a useful complement to conventional analysis but it is one that seems, from this work, to speak particularly explicitly to measurement issues of choice and the multivariate nature of well-being and poverty.

Acknowledgements

Notes

1 See, for instance, surveys by Anand (1987) and Machina (1989).
2 We use the term 'approach' following the literature: This emphasizes the fact that the main contribution of theoretical work has been in the formation of concepts and understanding their relations. In economics (and philosophy of science to a lesser extent), the term theory is often used to refer to a narrower, mathematical formulation of concepts, and for the capabilities approach one such theory can be found in Sen (1985a).

3 Empirical applications can be found in Schokkaert and van Ootegem (1990), Qizilbash (1996, 2004), Chiappero-Martinetti (2000), Layte *et al.* (2000), Laderchi (2001), Alkire (2002a, 2002b), Burchardt and Le Grand (2002), Burchardt and Zaidi (2003), Clark (2003), Kuklys (2005), and Anand *et al.* (2009). The theoretical literature on freedom is perhaps not as closely related to empirical work on capabilities as it might be, although more recent papers suggest modest evidence of conceptual convergence — see, for example, Gaertner and Xu (2005), van Hees (2004), Nehring and Puppe (2002) and Pattanaik and Xu (1998). (The observation is a comment on the recent economic history of development thought and does not imply that high-income countries are more utilitarian, by necessity, than low-income countries.)

4 Rights and freedoms enter into utilitarian calculations to the extent that people value them. However, this contingent approach to valuing so-called de-ontological claims is one of the aspects that causes many to object to utilitarian approaches to welfare.

5 See, for instance, Anand and Wailoo (2000).

6 It is also worth pointing out that most functions, this one included, are specific to the individual. Such functions could be measured with panel data, but as we have only one wave of data on personality and socio-demographics, in effect we estimate an intermediate position in which the functions vary with respect to personality and socio-demographics.

7 Nor is it possible to separate out variations in *SWB* due to variations in *Q* and those due to variations in a person's actual functionings.

8 The instrument used to measure personality is a short form developed for incorporation into research where personality is not the sole focus. Devised by Gosling and Rentfrow (2003), it consists of five pairs of questions that are responded to on a one to seven scale with agreement semantic anchors. The score is summed in each pair, thus giving five dimension scores in the range 2–14. The questions and variable names are given in Appendix 1.

9 In their survey presented to an American Economic Association conference, Kuklys and Robeyns (2005) suggest that only three studies from nearly 50 have concentrated on capabilities. Yet such exercises are vital for operationalization (Comin, 2001).

10 The value of choosing the BHPS is that it is a secondary data source with similar counterpart surveys in many countries around the world. This means that any questions that come from it are likely to be asked regularly and in similar form in other countries, which in turn implies that such questions could, in principle, be used as a basis for international monitoring and comparison.

11 The questions were devised through a process that included a workshop held at Wolfson College, Oxford in September 2004 and piloting with potential respondents. In some cases, responses are recorded in a more detailed manner than indicated in Table 1. Usually categories have been collapsed where cell responses were deemed small, although the original categories may well be of interest to future survey designers and are available from the authors on request.

12 There are a number of discussions in mainstream economics journals about the use of SWB as a measure of well-being, although Oswald (1997) remains one of the best. Manski (2004) provides a useful complement in that he focuses on evidence that indicates the reliability of such data.

13 Respondents are from England, Scotland and Wales and will not be entirely representative of the elderly.

14 Least-significant variables were eliminated sequentially and the model re-run until all remaining capability variables were significant at the 5% level.

15 It has to be said that the psychological literature has tended in the past to concentrate on bivariate analyses — so multivariate analyses make a valuable addition to that literature.

16 We also estimated ordered logit and ordered probit models and find that, as one might expect, they give slightly better fits than ordinary least squares but tell a virtually identical story when it comes to identifying statistically non-zero coefficients. It is perhaps also worth commenting on the practice of treating ordinal scales numerically.

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The justification is merely pragmatic and avoids regression results with hundreds of coefficients that are both difficult to read and interpret and make heavy demands on degrees of information. This amounts to imposing a linearity assumption on the functional form of the partial relations, which is innocent for truly linear relations but is likely to result in conservative estimates of relationship strength for non-linear relations.

17 This is also consistent both with our finding that the quality of a job has a positive impact on life satisfaction, and Winkelmann and Winkelmann (1998) who also control for income and find that the non-pecuniary costs of unemployment are high.

18 We have shown elsewhere how the data can be used to shed light on specific topics such as the experience and consequences of violence (Anand and Santos, 2007) and the association between health and capability poverty (Anand *et al.*, 2008).

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APPENDIX 1. Ten-item personality inventory

Extravert	I see myself as extraverted, enthusiastic
	I see myself as reserved quiet
Agreeable	I see myself as critical quarrelsome
	I see myself as sympathetic, warm
Conscientious	I see myself as dependable, self-disciplined
	I see myself as disorganized, careless
Emotionally stable	I see myself as anxious, easily upset
	I see myself as calm, emotionally stable
Open to experiences	I see myself as open to new experience, complex
	I see myself as conventional, uncreative

Note: Disagree strongly =1, Disagree moderately =2, Disagree a little =3, Neither agree nor disagree =4, Agree a little =5, Agree moderately= 6 Agree strongly =7.

APPENDIX 2. Comparison with BHPS results (pairwise *t*-test)

	Present survey		BHPS (wave 10)		*p* value
	Mean	Standard deviation	Mean	Standard deviation	
Adequately nourished	0.97	0.17	0.98	0.14	0.06
Education	0.60	0.49	0.47	0.49	0.27
Lost sleep	2.06	0.86	1.90	0.78	0.19
Under strain	2.31	0.88	2.13	0.78	0.20
Takes holidays	0.79	0.40	0.83	0.37	0.10
Meets friends	0.63	0.48	0.94	0.23	0.65
Feels worthless	1.72	0.90	1.44	0.69	0.31
Age	44.13	15.08	43.59	15.64	0.04
Sex	0.45	0.50	0.47	0.50	0.04