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Valuing Health: A Brief Report on Subjective Well-Being versus Preferences

Paul Dolan, DPhil, and Robert Metcalfe, PhD

Health care can improve people's quality of life, and it can help them live longer. The quality-adjusted-life-years (QALYs) approach has been developed to express these twin components of benefit (quality and quantity of life) in a single number. It expresses different health states on a scale between 0 for death and 1 for full health and then multiplies these values by how long the states last. One QALY is equivalent to 1 year of life in full health.¹ By comparing how many QALYs different interventions are expected to generate with how much those interventions are expected to cost, it is possible to show the cost-effectiveness of different uses of resources.

In the United Kingdom, the National Institute for Health and Clinical Excellence (NICE) recommends that "the value of changes in patients' health related quality of life should be based on public preferences using a choice-based method . . . [and] the EQ-5D is the preferred measure of HRQL in adults."² The EQ-5DTM defines health in terms of 1 of 3 levels of severity (broadly, no problems, some problems, and extreme problems) associated with each of 5 dimensions (mobility, self-care, usual activities, pain/discomfort, anxiety/depression). Each of the 243 (3⁵) health states are represented by a 5-digit code, ranging from 11111 for full health to 33333 for extreme problems on all 5 dimensions. Values for these states have been elicited by asking members of the public for their time tradeoff (TTO) preferences, that is, to state how many years of life in 11111 they consider to be equivalent to a longer

period of time in one of the remaining 242 "poor" health states.^{3,4}

There is a long tradition of asking for people's preferences over future, hypothetical prospects.^{5,6} It is also not without its problems, most notably the fact that circumstances often affect individuals quite differently from how they imagine them.⁷⁻⁹ If, say, we overestimate the impact on our lives of mobility relative to anxiety/depression, then all else equal, agencies such as NICE will end up allocating relatively more priority to health states that affect mobility—and relatively less to anxiety/depression—than would be the case if priorities were set according to the actual impact those states had on our lives.¹⁰

One way of assessing how health states affect us is to consider their association with subjective well-being (SWB).¹¹ In general, SWB can be measured by global evaluations of life overall (e.g., life satisfaction) or by experiences of daily affect (e.g., feelings about yesterday).¹² There is increasing interest in the use of SWB for policy purposes, as highlighted by the recent influential Sarkozy commission¹³ and the widespread assessment of SWB in the United Kingdom.¹⁴ There have, however, been few attempts to relate SWB and health status, although Graham and others¹⁵ did show the association between the EQ5D and Cantrill's "ladder of life," which asks respondents to rate their life with best and worst possible life as endpoints. These data suggest that mobility does indeed have less impact than anxiety/depression.

There are no studies showing how the EQ5D affects life satisfaction, which is a much more widely used evaluative measure of SWB,¹⁶ and there are no studies showing how the EQ5D affects more direct measures of experience, such as "day affect" (mood during the day). Critically, there have also been no previous attempts to show how health state values based on the general public's willingness to give up life-years compare to values estimated

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according to their impact on SWB. This article attempts to fill these important gaps that are central to discussions about how to value the benefits of health care. Our central hypothesis is that the weights given to the different domains of health will be different when they are determined by their impact on SWB as compared with their effect on TTO preferences.

DATA AND METHODS

Shaw and others⁴ elicited US population values for the EQ5D from 3773 respondents using the TTO method. In this sample, the average income was \$46 326, the average age was 45 years, 49% were male, and 51% were married. Our new data come from a representative survey of 1173 older US residents, recruited by RAND US using one of their online panels. The average household income was \$54 237, the average age was 50 years, 46% were male, and 65% were married. In our sample, 62% were employed and 20% retired.

The survey began with a life satisfaction question: “Overall, how satisfied are you with your life?” (on a 0–6 scale) followed by questions relating to affect yesterday: “Overall, how did you feel yesterday? Please rate each feeling on the scale given. A 0 means that you did not experience that feeling at all, and a 6 means that you experienced that feeling very strongly.” The feelings were *friendly*, *lethargic*, *stressed*, *happy*, *sad*, *calm*, *angry*, *tired*, *depressed*, and *worried*. Day affect is taken as the difference between the average of positive and negative affect, which proxies the influential day reconstruction method.¹⁷ All measures are rescaled onto a 0 to 1 scale.

We analyze the impact of the EQ5D on SWB in the same way that Shaw and others⁴ analyze its impact on preferences, that is, by creating a dummy variable for each level of each dimension in a regression model with SWB as the dependent variable and the dummies for the EQ5D as independent variables. With 11111, set equal to 1, a case in which all dummies equal zero, the coefficients on the dummies then represent the (expected to be negative) percentage impact of each level of each dimension based on people’s TTO preferences (using the Shaw and others⁴ data) or their SWB (using our new data on life satisfaction and day affect). To enhance comparability with Shaw and others, we also included 4 ordinal configural variables. D1 is the number of dimensions not at level 1 beyond

the first; I2 is the number of dimensions at level 2 beyond the first, and its square was included in Shaw and others’ model; I3 is the number of dimensions at level 3 beyond the first, and both I3 and I3-squared are included in Shaw and others’⁴ model. Although we acknowledge that the 2 data sets are collected from different individuals and time periods, we feel that an exploratory investigation should determine any differences. If important differences emerge, these should be further explored using a common design.

RESULTS

The estimation of our model is presented in Table 1. We first focus on “some problems,” that is, the second level of each dimension, which are much more commonly observed in the population than extreme problems are.^{4,18} From the first column, the general public is willing to give up between 14.6% and 17.5% of their life expectancy to avoid any one (and only one) of the “some problems.” Moderate anxiety/depression is associated with broadly comparable drops in SWB (15.1% for life satisfaction and 21.8% for day affect). The impact on SWB of the other dimensions is much smaller in comparison to the preference data: between 1.1% and 2.3% on life satisfaction and between 2.2% to 4.8% on day affect. We find an even greater difference between preferences and SWB when we examine the worst level for each dimension. For mobility, self-care, and pain/discomfort, the difference between preferences and SWB is about 0.3 to 0.5 (on a 0 to 1 scale), with the preference-based coefficients always higher than the SWB-based ones.

Using these coefficients and standard errors, we can test whether there are differences in the mean between the domains within the measures of SWB. For life satisfaction, we will compare within “moderate” and “extreme” problems. In comparison to some anxiety, we find that all the other domains are significantly lower at the 1% level. Having moderate anxiety seems to be about 12% to 14% worse for life satisfaction than some/moderate problems with mobility, self-care, usual activities, and pain. For the worst level (i.e., level 3), extreme anxiety is only significantly worse for life satisfaction than being confined to bed and extreme pain. When we compare the domains for day affect, the results are even stronger, in that anxiety is significantly worse than any other domain for day affect, and this applies to both moderate and extreme levels.

Table 1 Impact of the EQ5D on Time Tradeoff Preferences and Subjective Well-Being

	(I) Preferences	(II) Life Satisfaction	(III) Day Affect
Mobility level 2: some problems walking about	-0.146* (0.008)	-0.031 (0.025)	0.026 (0.029)
Mobility level 3: confined to bed	-0.558*(0.016)	0.020 (0.097)	-0.120 (0.086)
Self-care level 2: some problems washing or dressing	-0.175* (0.008)	-0.039 (0.047)	-0.025 (0.046)
Self-care level 3: unable to wash or dress	-0.471* (0.016)	-0.220 (0.146)	0.052 (0.151)
Usual activities level 2: some problems performing usual activities	-0.140* (0.008)	-0.046 (0.028)	-0.027 (0.030)
Usual activities level 3: unable to perform usual activities	-0.374* (0.013)	-0.363* (0.089)	-0.083 (0.094)
Pain level 2: moderate pain or discomfort	-0.173* (0.008)	-0.024* (0.011)	-0.043* (0.013)
Pain level 3: extreme pain or discomfort	-0.537* (0.020)	-0.132* (0.050)	-0.150* (0.051)
Anxiety level 2: moderately anxious or depressed	-0.156* (0.008)	-0.163* (0.016)	-0.237* (0.017)
Anxiety level 3: extremely anxious or depressed	-0.450* (0.015)	-0.364* (0.055)	-0.492* (0.048)
D1	0.140* (0.010)	0.013 (0.025)	-0.008 (0.029)
I2-squared	-0.011* (0.002)	0.003 (0.006)	0.002 (0.007)
I3	0.122* (0.018)	-0.063 (0.123)	-0.031 (0.154)
I3-squared	0.015* (0.003)	0.053 (0.047)	0.029 (0.054)
Obs	3773	1169	1166
R ²	0.38	0.32	0.38

Note: Robust standard errors used and are presented in parentheses. Regression (I) and definitions of D1, I2, and I3 are taken from Shaw and others.⁴ It is important to note that the reference case is no problems at all in each of the 5 domains.

*Significance at the 5% level.

When comparing the same domains using preferences, a very different pattern emerges. For some problems, moderate anxiety does not have a significantly different mean from that of the other domains. For extreme problems, being confined to bed and in extreme pain is significantly worse than extreme anxiety.

Table 2 examines the impact of controlling for the background variables in the SWB function. It is clear that the overall pattern of the coefficients is similar. Overall, anxiety is significantly worse than the other domains in people's SWB. We obtain the same results with or without including the configural variables, none of which is a significant predictor in our models.

DISCUSSION

Health has a large impact on people's well-being. Using preferences as a guide to well-being, there is some evidence that those people in particular health states may have different preferences from those imagining the states¹⁹ and also that the current preference-based systems may not adequately account for the nonhealth consequences of a treatment.²⁰ Assessments of SWB allow researchers to ascertain how health states, conditions, and treatments actually affect the experiences of life, without the need for individuals to predict or imagine those impacts.

Through our TTO preferences, we seem to imagine that "some problems walking about" is about as bad as 'moderate anxiety or depression.' The general public in the United States (and in the United Kingdom, too³) is willing to give up about 15% of their remaining life expectancy to avoid each of these states.⁴ In contrast, through assessments of SWB, we find that anxiety/depression has about 10 times as much impact as mobility. Interestingly, in our imaginations, being confined to bed or having extreme pain is worse for our well-being than having extreme anxiety. But from the experiences of people's lives, extreme anxiety is worse than being confined to bed or having extreme pain. So our hypothesis that the domain weights will differ across preferences and SWB is confirmed here.

The difference in the imagined and experienced impact of mobility is consistent with a body of work that shows that we generally imagine that most good and bad things will have much more of an effect on us than turns out to be the case.⁷ This can largely be explained by a focusing effect, whereby "nothing that you focus on will make as much difference as you think."²¹ A preference task asks us to focus on some problems walking about, but those problems walking are not the focus of anywhere near as much attention in our actual experiences. In contrast, anxiety/depression has a large effect

Table 2 Full Regressions Including Control Variables

	Life Satisfaction	Day Affect
Mobility 2	-0.016	0.000
Mobility 3	0.184	-0.055
Self-care 2	0.017	-0.018
Self-care 3	-0.143	0.066
Usual activities 2	-0.019	-0.031*
Usual activities 3	-0.232***	-0.060
Pain 2	-0.021**	-0.053***
Pain 3	-0.092**	-0.138***
Anxiety 2	-0.134***	-0.203***
Anxiety 3	-0.325***	-0.430***
Log of household income	0.023**	-0.007
Male	-0.031***	-0.022**
Age	-0.003	0.003
Age ²	0.000**	0.000
Unemployed	-0.051*	-0.017
Sick from work	-0.114	-0.080
Disabled	-0.079**	-0.019
Retired	0.028*	0.025*
Homemaker	0.033*	0.016
Job other	0.053*	0.009
Married	0.028	-0.006
Separated	-0.006	-0.001
Divorced	-0.018	-0.020
Widowed	0.001	-0.016
Black race	-0.007	-0.013
Indian race	-0.011	-0.012
Asian race	-0.071**	-0.020
Other race	-0.007	-0.040
Constant	0.579	0.875
R	0.38	0.43

***, **, * represent significance at the 1, 5 and 10% levels respectively.

on experiences, and it makes good sense that mental health problems are a more serious attention seeker in our lives.

SWB data allow us to determine what matters in people's lives when they are not thinking about how much those things matter. Regression analysis determines the importance of different health states and the other determinants of SWB. Any preference question, even if asked of those currently experiencing a health state, will draw attention to things in the valuation task that may be disproportionate to their effect on people's lives, as they experience them. This helps explain why paraplegics, for example, imagine being much happier before their health loss than could possibly have been the case²²; they focus on what was different before (being able to walk) and imagine that this played a much bigger

part in their life than was the case. So, even preferences from those with experience of a condition provide questionable evidence on the impact of that condition on the real experiences of life.

It is, of course, possible to elicit hypothetical life satisfaction and day affect ratings for different health states, but these will again suffer from various biases associated with the focusing effect. One main way to avoid the focusing effect is to elicit SWB ratings without focusing attention on any specific domain of health or aspect of life. Put this way, the key issue here is not so much the degree to which a valuation is hypothetical or not (although this certainly matters) but what attention is focused on when the valuation is elicited.^{23,24}

Many people now recognize that health care systems have, to some extent at least, to take account of quality of life and length of life gains when judging how best to use scarce resources.²⁵ If we allocate resources based on people's preferences, then removing some problems walking about will be about as valuable, all else equal, as curing moderate anxiety or depression. This is the sort of conclusion that agencies such as NICE in the United Kingdom would come to. If we instead look at the impact of health care on SWB, then much greater priority would be given to mental health compared with mobility. This warrants further discussion and investigation, but recent advances in the measurement of SWB provide a useful addition—or possibly even better alternative—to hypothetical preferences in valuing health.

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