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The development and validation of a general measure of well-being: the BBC well-being scale

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Abstract
Purpose The concept of maximising well-being, as opposed to merely treating mental disorder, is a powerful current theme in the area of mental health. Clearly this emphasises the need for appropriate valid and reliable measures of general well-being. This paper examines the appropriateness of a number of measures in this area and concludes that existing assessment tools fail to address the full range of aspects of personal well-being. This paper therefore presents the psychometric properties, validity and reliability of a new measure of well-being—the BBC Well-being Scale.
Methods A total of 1,940 participants completed the new measure, the Goldberg scales of anxiety and depression, the 'List of Threatening Experiences' life events scale, a modified version of the Response Styles Questionnaire and a modified version of the Internal, Personal and Situational Attributions Questionnaire presented via the internet.
Results Exploratory factor-analysis suggested a three-factor solution including themes of psychological well-being, physical health and well-being and relationships. The total 24-item scale had good internal consistency ($\alpha = .935$) and correlated significantly with key demographic variables and measures of concurrent validity.
Conclusions The new measure—the BBC Well-being Scale—is recommended for research and clinical purposes.

Keywords Well being · Mental health · Measurement · Quality of life · Self-esteem · Questionnaire

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Introduction

There is a clear evolution in the areas of mental health and social care from a focus on the diagnosis and treatment of mental illness to the concept of enhancing well-being. The term well-being is perhaps best defined as a state "in which the individual is able to develop their potential, work productively and creatively, build strong and positive relationships with others, and contribute to their community" [1]. As with similar and related concepts such as quality-of-life, invoking the idea of well-being has two key implications. It suggests a concentration on capabilities and positive emotions rather than illnesses, disabilities and negative emotions. It also deliberately aims to encompass multiple domains of human functioning; emotions, attitudes and self-concept, relationships, work and productivity, physical health etc.

This well-being focus is inherent in many major international frameworks of policy—the World Health Organisation in 1946 defined health as "... a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity..." [2] and mental health as "... a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community..." [3]. These aspirations have possibly not been fully realised for several years, and have, in the UK, perhaps been most clearly set out in two major policy documents—the Foresight report into mental capital and well-being [1] and the New Horizons consultation into mental health services [4]. It is an explicit aim of these kinds of service structures to enhance personal well-being.

There is, consequently, an increasing demand for instruments to monitor well-being at the individual and

population level and to guide the evaluation of health and social care initiatives. Clearly, if these policy aspirations are to be realised, the concept of well-being must be operationally defined and, ideally, amenable to psychometric measurement and self assessment. In general terms, most people researching this area suggest that well-being is complex and holistic—with positive well-being dependent upon satisfaction (objective or subjective) in a range of domains relevant to a fulfilled and successful life. The concept, therefore, touches on issues of mental health, life satisfaction and social functioning, as well as more practical concepts of quality of life (see [5–8]).

Many researchers have, consequently, developed measures of well-being and these related concepts. In most cases, however, the measures address rather specific aspects of well-being, rather than attempt to assess well-being in a more integrative fashion. In some ways the most authoritative of such measures are the WHOQOL-100 and WHOQOL-BREF (which have both been translated into many languages other than English) and the Euroqol. The WHOQOL-100 [9, 10] is a 100-item questionnaire covering the six domains of physical health, psychological health, independence, social relationships, environment and spiritual quality of life, and the WHOQOL-BREF [11] is a 26-item questionnaire derived from the larger 100-item scale, but with the items loading on four domains: physical health, psychological health, social relationships, and environment. The Euroqol [12] and its derivative, the Euroqol EQ-5D [13] are much more simple measures, assessing well-being in relation to health status on five domains: mobility, self-care, usual activities, pain/discomfort and anxiety/depression.

Despite the undoubted weight of international development effort behind these measures, many researchers in the mental health field have concluded that these measures are inadequate, especially because they do not address the full range of domains commonly thought to be important [1] and have instead developed alternative measures of well-being. In part, criticisms have focussed on the very medical nature of these scales—especially the Euroqol—emphasising that physical health is only one element of well-being and therefore suggesting that a genuinely holistic measure of well-meaning must assess a range of other important domains. While the Euroqol, WHOQOL and similar measures are excellent for purposes closely related to physical health (health economics, clinical trials etc.), their focus on physical medicine severely limits their utility. Specifically, it means that there is relatively little possibility of change in scores on these measures related to social or psychological change in the absence of a change in medical status. There is a clear, and understandable, tendency for researchers to develop measures of well-being which avoid very specific concepts of 'illness' but nevertheless focus on more general notions of physical health. In part, also, criticism of established measures has been functional, noting that positive mental health seen as particularly poorly served [14]. From other perspectives, including academic psychology and child development, researchers have developed measures of subjective well-being such as the well-established Diener [15] and Lyubomirsky [16] scales. While scales such as these have clear merits, especially in experimental settings or particular contexts, they rarely serve as adequate replacements for general measures of well-being. For example, the Diener scale assesses beliefs and attitudes believed by the authors to be important in supporting subjective well-being (rather than the experienced sense of well-being itself), while the Lyubomirsky scale assesses an individual's sense of comparison with their peers—a useful concept but slightly different to well-being as defined above.

In consequence, researchers have tended to require new assessment tools. Two examples are the Psychological Well-Being Questionnaire [5, 17] which assesses psychological well-being on six subscales: self-acceptance, positive relations with others, autonomy, environmental mastery, purpose of life and personal growth, and the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) [18], which is designed to measure positive psychological functioning in terms of positive affect (feelings of optimism, cheerfulness, relaxation), satisfying interpersonal relationships and positive functioning (energy, clear thinking, self acceptance, personal development, competence and autonomy). These two measures can be seen to offer a more detailed exploration of the psychological health, social relationships and spiritual domains that are somewhat under-emphasised in the WHOQOL-100, WHOQOL-BREF and the EuroQol. That is, while they clearly address aspects of subjective well-being underemphasised in those measures, they suffer from the commensurate weakness of lacking emphasis on those physical aspects of well-being.

Unfortunately, however, this may in turn mean that an invidious choice must be made between the more physical and environmental focus of the WHOQOL-BREF and the more subjective and psychological WEMWBS. It may be argued that, instead or in addition, what is needed is a measure of general wellbeing—a measure which combines both these broad approaches, and thereby incorporates a full spectrum of domains of well-being, as outlined above. Such a measure should, additionally, be designed explicitly to assess key recognised domains of well-being scale in a format simple enough to be used in a wide variety of research settings, from service outcome monitoring or population-level surveys though to hypothesis testing primary research. We report here on the development and validation of such a measure.

Scale design: item selection

Items were selected for the scale from several established measures, supplemented by additional items in the field of mental health. Items were chosen to measure the wide breadth of domains commonly included in the definition of well-being [1, 19]. Items reflecting the four domains of quality of life intrinsic to the WHOQOL-BREF—physical health, psychological health, social relationships and environment—were selected, along with the six domains of psychological well-being of the Psychological Well-Being Questionnaire—self-acceptance, autonomy, environmental mastery, purpose in life, positive relations with others and personal growth. The domain 'positive relations with others' was considered to be synonymous with 'social relationships' for this purpose, yielding nine putative domains. In addition, three items were selected to reflect the 'negative cognitive triad' of thoughts about self, world and future believed to be characteristic of low mood [20].

In the initial version of the scale, a total of 25 items were generated. All were scored positively, with the exception of one item assessing anxiety and depression; reflecting the 'psychological health' domain of the WHOQOL-BREF. Participants completing the scale are instructed that the questionnaire "attempts to measure how happy you feel generally in most parts of your life", and are required to select one of four options (from 'not at all', through 'a little' and 'very much' though to 'extremely') that best describes their experience. Items were scored from 1 to 4, with four reflecting higher well-being.

Development of the scale

The scale was included in a battery of measures presented in a major on-line investigation of the social, environmental and psychological causes of mental ill-health, the results of which will be reported elsewhere (see www.bbc.co.uk/labuk). The investigation was approved by the University of Liverpool Research Ethics Committee (approval number RETH000252) and has therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki. All persons gave their informed consent prior to their inclusion in the study.

Data from the BBC well-being scale were analysed together with additional measures of demographic status and a selection of measures relevant to concurrent validity. These measures included the Goldberg scales of anxiety and depression [21], the 'List of Threatening Experiences' life events scale [22], a modified version of the Response Styles Questionnaire [23] and a modified version of the Internal, Personal and Situational Attributions Questionnaire [24]. These measures were chosen to address the relationship between well-being and mental health (the Goldberg scales) and key psychosocial issues; life-events that may impact on well-being, psychological responses to stress and the manner in which people explain stressful (or potentially stressful) events.

Data analysis

The dimensional structure of the scale was constructed and validated in two steps. A first step randomly selected a subsample of about 1/3 of participants to carry out an exploratory factor analysis (EFA) in order to explore the possible underlying factor structure of the measure. In this step we used an EFA with maximum likelihood extraction and varimax rotation.

In a second step a linear structural equations approach to confirmatory factor analysis (CFA), as implemented in EQS [25], is used to test the hypothesis that a relationship between the observed variables and their underlying constructs exists. The CFA was carried out on an independent subsample of 2/3 of the total sample that was left after 1/3 was randomly selected for the exploratory analysis. This verifies the suggested structure of the measure by testing the fit of the exploratory models. The adequacy of competing models was assessed through an examination of a variety of fit indices as recommended by Bowerman and O'Connell [26]. Model χ^2 and the Comparative Fit Index (CFI) [27] were utilised to estimate overall and incremental model fit; we further report the goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI) [27], and Root Mean Square of Approximation (RMSEA) [28]. All fit indices approximate a maximum value of 1.00 for a perfect fit, with values around .90 indicating a good fit for the data. In contrast, the values of the root mean square error of approximation (RMSEA) decrease with increasingly good fit, and are not limited to the range 0–1. The RMSEA provides a 'rule of thumb' cutoff for model adequacy of less than .08. All statistical analysis was conducted using SPSS (version 18) and EQS (6.1) statistical software packages. EQS was used for the CFA because, unlike SPSS, EQS uses more appropriate methods of analysis, specifically designed to address psychometric issues such as those presented by Likert-style scales with few response options, which otherwise present problems for data analysis [29].

Results

Participants

For the purposes of scale validation, a sample of 1,940 participants was drawn from the larger dataset. The participants' mean age was 29.9 years (SD 12.4, n = 1,932),

1,356 were women and 583 men. In this sample, 1,735 (89.6%) described themselves as 'White British', with 72 describing themselves as 'Asian British', 31 as 'Black British', 2 as 'Chinese', 5 as 'East or South-East Asian', 6 as 'middle eastern', 16 as 'Mixed White Asian', 14 as 'Mixed White Black', 26 as 'Mixed other' and 30 as 'Other'.

Two hundred and twenty eight of the participants reported that they were still at school, 361 at university. Seven hundred and forty one were in full time employment, and 196 in part time employment. Ninety four were self employed, 276 unemployed and 43 retired. Seven hundred and seventy six of the participants described themselves as single, 359 as in a relationship but not living with someone, 402 as married, 293 as cohabitating, 98 as divorced or separated and 11 as widowed.

In this sample, 1,409 participants reported no children, 171 had one child, 239 had two children, 85 three children, 24 four children, 8 reported 5 children and 3 six children.

In terms of formal schooling, 19 participants reported having received no schooling, 19 reported primary (to age 11 or American 5th grade) education, 354 reported secondary school (to age 16/American 10th grade) education, 481 reported education to age 18 (High School Diploma), 239 reported technical or vocational education, 561 a university degree and 266 a postgraduate or professional qualification.

Participants reported that their total gross annual or weekly household income was less than £9,999 per annum (£199 per week) in 337 cases. 297 reported income of £10,000–£19,999 per annum (£200–£389 per week), 251 reported income of £20,000–£29,999 per annum (£390–£579 per week), 181 income of £30,000–£39,999 per annum (£580–£769 per week), 131 income of £40,000–£49,999 per annum (£770–£969 per week), 136 income of £50,000–£74,999 per annum (£970–£1,449 per week), 82 reported income of £75,000 or more per annum (£1,450 or more per week), while 307 did not know their income and 217 preferred not to reveal their income.

Construct validity

Assessment of item response frequencies showed little evidence of highly skewed distributions, with the minimum response being for item 12 "Are you satisfied about your looks and appearance?" with only 39 (2%) of people responding with a maximum score of 4.

Examination of the inter-item correlation matrix revealed a predominance of correlations above .3 among the items supporting suitability for factor analysis. In accordance with Kline's [30] requirements for factor analysis, the Kaiser–Meyer–Olkin Measure of sampling adequacy was appropriate at .96. Bartlett's test of sphericity was highly significant (Chi-square = 21795.42, $df = 300$, $P < .0005$), indicating that a meaningful number of factors could be extracted. As described above a sub sample of about 1/3 of participants ($N = 634$) was randomly selected to explore the initial factor structure of the measure. Exploratory factor analysis using eigenvalue-one procedure and maximum likelihood extraction with varimax rotation was conducted, as maximum likelihood extraction does not suffer from the problem of over-estimation of the first factor observed in principal components analysis, and because there was no assumption that extracted factors would be independent [31].

In the exploratory factor analyses, possible four and three factor solutions were identified that produced factors with an eigenvalue greater than one and that grouped individual items into meaningful clusters. In order to test the overall fit and validity of the suggested four and three factor structure of the measure confirmatory factor analyses were conducted on the independent sample of the majority of 1,298 participants.

Four factor model

The four factor solution accounted for 55.6% of the total variance; Factor 1 accounted for 44.1% of variance with an eigenvalue of 10.2, Factor 2 accounted for 5.9% (1.5), Factor 3 for 4.5% (1.2), and Factor 4 for 4.1% (1.1). Twenty-four out of the 25 items loaded significantly onto these factors (with factor loadings limited to a maximum of .35), with one item excluded. Further analyses were conducted on the resulting 24-item scale. Items loading on Factor one can be best described as representing 'psychological well being', items on Factor two best describe 'relationships', items on Factor three characterise 'work and performance', and items loading on Factor four correspond closest to 'physical well being'.

The independent confirmatory factor analysis revealed the four factor model to be a poor fit of the data ($\chi^2 = 1667.60$, $P < .001$). The CFI and corresponding fit indices were .831 and .879 (GFI); the RSMEA was .089 (.086–.092).

Three factor model

There were several reasons for rejecting the original four-factor model. An inadequate fit of the four-factor model was demonstrated by CFA. There were frequency problems for the four items that loaded onto the fourth factor. In addition, many of the original items that were constructed for factor four appeared ambiguous and therefore difficult for respondents to answer.

The alternative three factor solution accounts for 51.5% of the total variance. Factor 1 had an eigenvalue of 10.2

and accounted for 41.1% of the variance, Factor 2 had an eigenvalue of 1.5 (5.9%) and Factor 3 had an eigenvalue of 1.1 (4.5%). Similar to the four factor solution 24 items loaded on these three factors with some items showing loadings on more than one factor. Examination of the items revealed these three subscales to represent 'psychological well-being' (factor 1), 'physical health and well-being' (factor 2) and 'relationships' (factor 3).

A CFA was also performed on this three factor model of the BBC well being scale resulting in a significantly better fit of the data on all indices apart from χ^2 which remained significant ($\chi^2 = 80.71$; $P < .001$). The key fit indices specify an acceptable model fit of the three factor model that originated in the independent subsample; CFI = .921; GFI = .906; RMSEA = .054 (.051–.057). The χ^2 is extremely sensitive, with small variations in fit resulting in statistically significant and sizeable χ^2 [32]. Despite this index, the three-factor model was deemed a good fit of the data. A two-factor solution was also attempted, but failed to meet basic statistical criteria. A summary of the results from all the confirmatory factor analyses is presented in Table 1.

Factor loadings and subscale identification for this acceptable three factor model are presented in Table 2. Only one item (item 6) scored on two factors, otherwise factors appear clearly to differentiate distinct dimensions with very strong item loadings. It is noteworthy that the six items with strongest factor loadings ("Do you feel you have a purpose in life?", "Do you feel optimistic about the future?", "Do you feel satisfied with yourself as a person?", "Do you feel able to grow and develop as a person?", "Do you feel in control over your life?" and "Are

Table 1 Fit indices for CFA models of the BBC well-being scale

Model	Chi-square	GFI	AGFI	CFI	RMSEA
Four factor model	6670.60 ($P < .01$)	.879	.853	.831	.089 (.086–.092)
Three factor model	80.71 ($P < .01$)	.906	.886	.921	.054 (.051–.057)
Two factor model	80.71 ($P < .01$)	.871	.847	.870	.073 (.071–.076)

Table 2 Factor structure and item loadings for three factor solution of the BBC well-being scale

	Factor 1	Factor 2	Factor 3
1. Are you satisfied with your physical health?		.659	
2. Are you satisfied with the quality of your sleep?		.548	
3. Are you satisfied with your ability to perform your daily living activities?		.778	
4. Are you satisfied with your ability to work?		.665	
5. Do you feel depressed or anxious?	.614		
6. Do you feel that you are able to enjoy life?	.585		.176
7. Do you feel you have a purpose in life?	.725		
8. Do you feel in control over your life?	.743		
9. Do you feel optimistic about the future?	.757		
10. Do you feel satisfied with yourself as a person?	.779		
11. Are you satisfied about your looks and appearance?	.603		
12. Do you feel able to live your life the way you want?	.742		
13. Are you confident in your own opinions and beliefs?	.547		
14. Do you feel able to do the things you choose to do?	.682		
15. Do you feel able to grow and develop as a person?	.738		
16. Are you satisfied with yourself and your achievements?	.730		
17. Are you satisfied with your personal and family life?			.712
18. Are you satisfied with your friendships and personal relationships?			.723
19. Are you comfortable about the way in which you relate to and connect with others?			.690
20. Are you satisfied with your sex life?			.465
21. Do you feel able to ask someone for help with a problem if you needed to?			.608
22. Are you satisfied that you have enough money to meet your needs?		.460	
23. Are you satisfied with your opportunity for exercise and leisure activities?		.578	
24. Are you satisfied with your access to health services?		.486	

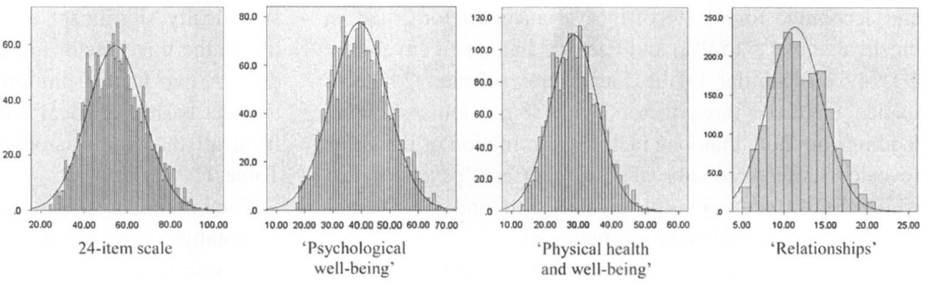

Fig. 1 Score distribution for the entire 24-item BBC well-being scale and the three subscales ('psychological well-being', 'physical health and well-being' and 'relationships'). Data rounded to nearest integer value

you satisfied with yourself and your achievements?") appear to reflect existential concepts of meaning, purpose and self-actualisation.

Cronbach's alpha coefficients were calculated for the total 24-item scale and for each of the three subscales. These revealed very high levels of internal consistency for the whole scale (Cronbach's alpha = .935; 24 items) and for the 'psychological well-being' (Cronbach's alpha = .928; 16 items), 'physical health and well-being' (Cronbach's alpha = .881; 12 items) and 'relationships' (Cronbach's alpha = .787; 5 items).

Distribution

The observed distributions of the total scale and all three subscale scores appeared normally distributed (see Figure 1); although Kolmogorov–Smirnov Z scores for deviation from normality were statistically significant in each case, this is likely to be an artefact of the very large sample size. Neither the main scores nor any of the subscale scores showed evidence of floor or ceiling effects (see Figure 1).

For the total questionnaire, the mean score for the whole sample was 54.56 (Median = 54; SD = 12.99; minimum 24, maximum 96; inter-quartile range 45–63), mean score for the subscale 'psychological well-being' was 39.24 (Median = 39; SD = 9.96; minimum 17, maximum 68; interquartile range 32–46), mean score for 'physical health and well-being' was 28.75 (Median = 28; SD = 7.09; minimum 13, maximum 52; interquartile range 23–34) and mean score for 'relationships' was 11.37 (Median = 11; SD = 3.25; minimum 5, maximum 20; interquartile range 9–14).

Concurrent validity

Concurrent validity was assessed through analysis of correlations with key variables (see Table 3). These revealed that age was unrelated to scores on the total scale and all three subscales ('psychological well-being', 'physical health and well-being' and 'relationships'), but that the level of schooling received (measured on a 7-point scale described above) correlated with total scale scores and all three subscales. Similarly, current household income (again measured on a 7-point scale as described) correlated with total scale and all three subscale scores—although, surprisingly, these are very low absolute correlation coefficients, while reaching statistical significance in this very large sample.

In addition, scores on the Goldberg scales of anxiety and depression both correlated with all subscales of the present scale; as did a self-report measure of adverse experiences in childhood, the List of Threatening Experiences, and self-blame on a modified version of the Internal, Personal and Situational Attributions Questionnaire.

Discussion

This study examined the psychometric properties of the BBC Well-being Scale in a large on-line general population sample. The results strongly suggest that the scale performs exceptionally well as a general measure of well-being, with acceptable internal consistency and concurrent validity. The measure has excellent face-validity—with items chosen to reflect a very wide range of issues relevant to personal well-being, covering the major aspects of life satisfaction, health and mental health identified in previous research. Exploratory factor analysis revealed two possible underlying dimensions, with a four factor solution differentiating 'psychological well being', 'physical well being', 'relationships', and 'work and performance'. A three-factor structure reflected 'psychological well-being', 'physical health and well-being' and 'relationships' components. Confirmatory factor analysis revealed that the three factor solution provided the best fit for the data and also produced a model that separated the items most clearly and with balance across the three dimensions. It is a strength of this model that the exploratory analysis was carried out on an independent sub-sample and then verified using CFA on an independent main sample.

Items were chosen for inclusion in this new measure deliberately in order to reflect the fullest range of aspects of personal well-being. Thus items were chosen to assess

Table 3 Correlations between the BBC well-being scale, its subscales and other key variables

Subscales variable	Total	Psychological well-being	Physical health and well-being	Relationships
Age	$r = .006$	$r = .003$	$r = .030$	$r = -.034$
	$P = .805$	$P = .879$	$P = .181$	$P = .135$
	$n = 1{,}932$	$n = 1{,}932$	$n = 1{,}932$	$n = 1{,}929$
Level of schooling	$r = .213$	$r = .205$	$r = .208$	$r = .151$
	$P < .0005$	$P < .0005$	$P < .0005$	$P < .0005$
	$n = 1{,}939$	$n = 1{,}939$	$n = 1{,}939$	$n = 1{,}936$
Current household income	$r = .088$	$r = .065$	$r = .088$	$r = .100$
	$P < .0005$	$P < .005$	$P < .0005$	$P < .0005$
	$n = 1{,}939$	$n = 1{,}939$	$n = 1{,}939$	$n = 1{,}936$
Goldberg anxiety scale	$r = -.547$	$r = -.524$	$r = -.562$	$r = -.384$
	$P < .0005$	$P < .0005$	$P < .0005$	$P < .0005$
	$n = 1{,}936$	$n = 1{,}936$	$n = 1{,}936$	$n = 1{,}936$
Goldberg depression scale	$r = -.601$	$r = -.605$	$r = -.582$	$r = -.473$
	$P < .0005$	$P < .0005$	$P < .0005$	$P < .0005$
	$n = 1{,}935$	$n = 1{,}935$	$n = 1{,}935$	$n = 1{,}935$
Adverse childhood experiences	$r = -.363$	$r = -.356$	$r = -.367$	$r = -.293$
	$P < .0005$	$P < .0005$	$P < .0005$	$P < .0005$
	$n = 1{,}655$	$n = 1{,}655$	$n = 1{,}655$	$n = 1{,}655$
List of threatening experiences	$r = -.270$	$r = -.243$	$r = -.289$	$r = -.214$
	$P < .0005$	$P < .0005$	$P < .0005$	$P < .0005$
	$n = 1{,}894$	$n = 1{,}894$	$n = 1{,}894$	$n = 1{,}894$
IPSAQ	$r = -.463$	$r = -.482$	$r = -.418$	$r = -.354$
	$P < .0005$	$P < .0005$	$P < .0005$	$P < .0005$
	$n = 1{,}901$	$n = 1{,}901$	$n = 1{,}901$	$n = 1{,}901$

physical health, psychological health, social relationships and environment—reflecting the four domains of the WHOQOL-BREF [11]. Additionally, items were selected to reflect six key domains of psychological well-being—self-acceptance, autonomy, environmental mastery, purpose in life, positive relations with others and personal growth. To address in depth the dominant cognitive psychological model of mental health, three items were selected to reflect the 'negative cognitive triad' of thoughts about self, world and future [20]. As noted above, many previous attempts to assess well-being have tended to result in measures which assess elements of this broad spread in depth, but which have failed to offer a comprehensive and inclusive measure. The scale presented here, uniquely, has such breadth. The confirmatory factor analysis (CFA) serves, therefore, partly to validate the measure presented here, and partly to endorse the definition of well-being used as the basis for its development.

Scores on the new scale appeared to be well-distributed, with near-normal distribution. This implies that floor and ceiling effects are likely to be minimised in practical applications. This is important for a tool designed as a generic measure of well-being in a wide range of situations, from exploring well-being in 'healthy' populations, such as employees benefitting from schemes to minimise workplace stress through to recipients of inpatient mental health care. That is, a measure which is successful in addressing the needs of the former population may suffer from floor effects if applied to the latter population—i.e. record very low levels of subjective well-being failing to distinguish between individuals or respond to change—and vice versa. Psychometric properties of the scale were good, with well-distributed scores robust to demographic variation. The scale, as presented here, used a four-point Likert-style scale. This may have some limitations, as some forms of analysis are more appropriately conducted with five-point or seven-point scales (as these more closely approximate an interval scale). Other researchers may wish to re-examine this decision. Nevertheless, through the use of EQS as the statistical package, the three-factor solution proposed can be considered robust to such considerations.

The present study's findings suggest that the BBC Well-being Scale has acceptable construct and convergent validity: high negative correlations with the Goldberg scales of anxiety and depression [20], and the 'List of Threatening Experiences' life events scale [22] suggest strongly that the new scale is measuring issues relevant to mental health and well-being. In addition, the BBC Well-

being Scale correlated meaningfully with a modified version of the Response Styles Questionnaire [23] and a modified version of the Internal, Personal and Situational Attributions Questionnaire [24]. These analyses revealed that ruminative response styles and self-critical causal attributions for negative events were associated with lower levels of well-being—suggesting that well-being as measured by this scale reflects meaningful psychological processes. Obviously, these measures assess distress and problematic psychological processes rather than the more positive aspects of well-being. Their interpretable statistical association with this new measure, then, could be seen as non-redundant validation of the approach.

Clearly there are many useful and valid measure of well-being available to researchers and clinicians. The findings from this study, however, support the contention that this new scale—the BBC Well-being Scale—is a reliable and valid measure for the assessment of subjective well-being with good psychometric properties. The broad scope of the new measure means it has considerable scope for use in both research and clinical settings.

References

1. Beddington, J., Cooper, C. L., Field, J., Goswami, U., Huppert, F. A., Jenkins, J., et al. (2008). The mental wealth of nations. *Nature, 455*(23), 1057–1060.
2. World Health Organisation. (1946). *Constitution of the world health organisation*. New York: World Health Organisation.
3. World Health Organisation. (2003). *Investing in mental health*. Geneva: World Health Organisation.
4. Department of Health. (2009). *New horizons: Towards a shared vision for mental health*. London: Department of Health.
5. Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology, 69*(4), 719–727.
6. Kashdan, T. B. (2004). The assessment of subjective well-being (issues raised by the Oxford Happiness Questionnaire). *Personality and Individual Differences, 36*, 1225–1232.
7. Kahneman, D., & Krueger, A. B. (2006). Developments in the measurement of subjective well-being. *Journal of Economic Perspectives, 20*(1), 3–24.
8. Diener, E. (Ed.). (2009). *Assessing well-being: Defining and measuring subjective well-being (Social indicators research series)*. New York: Springer.
9. WHOQOL Group. (1994). The development of the world health organization quality of life assessment instrument (the WHOQOL). In J. Orley & W. Kuyken (Eds.), *Quality of life assessment: International perspectives* (pp. 41–57). New York: Springer-Verlag.
10. WHOQOL Group. (1998). The world health organisation quality of life assessment (WHOQOL): Development and general psychometric properties. *Social Scientific Medicine, 46*(12), 1569–1585.
11. WHOQOL Group. (1998). Development of the world heatlh organisation WHOQOL-BREF quality of life assessment. *Psychological Medicine, 28*, 551–558.
12. The euroqol Group. (1990). Euroqol-a new facility for the measurement of health related quality of life. *Health Policy, 16*, 199–208.
13. Brooks, R. (1996). Euroqol: The current state of play. *Health Policy, 37*(1), 53–72.
14. Hu, Y., Stewart-Brown, S., Twigg, L., & Weich, S. (2007). Can the 12 item general health questionnaire be used to measure positive mental health? *Psychological Medicine, 37*(7), 1005–1013.
15. Diener, E., Emmons, R. A., Larson, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*, 71–75.
16. Lyubomirsky, S., & Lepper, H. S. (1999). A measure of subjective happiness: Preliminary reliability and construct validation. *Social Indicators Research, 46*, 137–155.
17. Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57*, 1069–1081.
18. Tennant, R., Hiller, L., Fishwick, R., Platt, S., Joseph, S., Weich, S., et al. (2007). The Warwick-Edinburgh mental well-being scale (WEMWBS): Development and UK validation. *Health and Quality of Life Outcomes, 5*, 63.
19. Huppert, F. A., Baylis, N., & Keverne, B. (2005). *The science of well-being*. Oxford: Oxford University Press.
20. Beck, A. T. (1967). *Depression: Clinical, experimental, and theoretical aspects*. New York: Harper & Row.
21. Goldberg, D., Bridges, K., Duncan-Jones, P., & Grayson, D. (1988). Detecting anxiety and depression in general medical settings. *British Medical Journal, 8:297*(6653), 897–899.
22. Brugha, T. S., & Cragg, D. (1990). The list of threatening experiences: The reliability and validity of a brief life events questionnaire. *Acta Psychiatrica Scandinavica, 82*, 77–81.
23. Nolen-Hoeksema, S., & Morrow, J. (1993). Effects of rumination and distraction on naturally occurring depressed mood. *Cognition and Emotion, 7*, 561–570.
24. Kinderman, P., & Bentall, R. P. (1996). A new measure of causal locus: The internal, personal and situational attributions questionnaire. *Personality and Individual Differences, 20*, 261–264.
25. Bentler, P. M. (1995). Comparative fit indices in structural models. *Psychological Bulletin, 107*, 238–246.
26. Bowerman, B. L., & O'Connell, R. T. (1990). *Linear statistical models: An applied approach* (2nd ed.). Belmont, CA: Duxbury.
27. Jöreskog, K. G., & Sörbom, D. (1993). *New features in LISREL8*. Chicago: Scientific Software.
28. Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Newbury Park, CA: Sage.
29. Hu, L. T., & Bentler, P. M. (1999). Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*, 1–55.
30. Kline, P. (1994). *An easy guide to factor analysis*. London: Routledge.
31. Field, A. (2005). *Discovering statistics using SPSS*. London: Sage.
32. Hu, L. T., & Bentler, P. M. (1995). Evaluating model fit. In R. H. Hoyle (Ed.), *Structural equation modelling: Concepts, issues and applications* (pp. 77–99). Thousand Oaks, CA: Sage.