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The Development and Initial Validation of a New Measure of Lay Definitions of Health: the Wellness Beliefs Scale

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Abstract

The objective was to develop a psychometrically sound questionnaire measure of lay people's beliefs about the importance of different signs of wellness (the Wellness Beliefs Scale, WBS). Questionnaire items were derived from qualitative literature. 942 people (recruited from the community and patient support groups) participated in 2 cross-sectional studies using paper and web-based questionnaires. Study 1 participants completed the initial version of the WBS. Study 2 participants completed the revised version of the WBS and existing measures of health beliefs, illness perceptions, and health status. Factor analysis confirmed that the WBS measures 3 distinct wellness beliefs: belief in the importance of biomedical (absence of illness), functional (ability to carry out daily tasks), and wellbeing (vitality) indicators of wellness. The 3 resulting subscales all had good internal consistency and could be used to cluster participants into 3 groups. Wellness belief scores were related to gender, health status and subjective health; there were few associations with health beliefs. In conclusion, the WBS is a promising new measure of 3 distinct wellness beliefs, with good initial psychometric properties, which could potentially be used to better target individualised health promotion interventions.

Keywords: Health Knowledge, Attitudes, Practice; Questionnaires; Lay Health Beliefs; Health; Health Promotion; Measurement.

The Development and Validation of a New Measure of Lay Definitions of Health: the Wellness Beliefs Scale

According to the World Health Organisation, "health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (p.1, World Health Organisation, 1999). Much of health psychology is concerned with negative aspects of health: what people do when they are ill and how we can stop people engaging in health-threatening behaviours. There are consequently well-established ways of theorising and measuring people's perceptions of illness, and their attitudes towards related behaviours. For example, people's perceptions of illness are a central component of Leventhal's common sense model of self-regulation (Leventhal, Leventhal, & Contrada, 1998) and are readily measured using the well-validated and evolving illness perception questionnaire (Moss-Morris et al., 2002; Weinman, Petrie, Moss-Morris, & Horne, 1996). This focus on illness rather than health is justifiable, but an extended focus to include the study of health is now being recognised as important. As Lawton (2003) has argued, comparatively little is known about how lay people think about health and yet 'healthy' people are increasingly the subject of health promotion interventions and other forms of medical attention. The need to attend to health beliefs and behaviours, as distinct from illness beliefs and behaviours, was emphasised by Rakowski (1984) and there is a reasonably extensive qualitative literature on lay perceptions of wellness (for a review see Hughner & Kleine, 2004). This study was inspired by and draws on that qualitative literature in order to develop a questionnaire measure of lay definitions of wellness.

Despite recent developments in positive psychology, people's perceptions of wellness have not been widely incorporated into main-stream health psychology. There is no established or widely used theoretical framework for thinking about the impact of wellness beliefs on health and illness behaviours and there are no well-validated measures of lay perceptions of wellness. However, three lines of argument suggest that wellness beliefs could be an important construct for and indeed a necessary addition to health psychology.

From the extant qualitative literature on lay definitions of wellness (discussed further below) we know not only that lay people define health in a range of different ways but also that these varying definitions of health have implications for behaviour (Herzlich 1973, Williams 1983). Two seminal studies describe three remarkably similar dimensions of health. Herzlich (1973) interviewed 80 participants including men and women of professional and middle class from urban and rural areas of France. Williams (1983) interviewed 70 men and women aged 60 and over, recruited from one working class estate and one middle class area of Aberdeen. Firstly, health can be something one is. Herzlich (1973) describes 'health in a vacuum', where health is simply the absence of illness: one is either healthy or not, depending on whether one has an illness or disease, and according to this view health is destroyed by illness. Williams (1983) similarly described health as the absence of serious, objective, socially justifiable disease. Secondly, health can be something one has. Herzlich (1973) labelled this view the reserve of health, which can change over time and which offers resistance to disease. For Williams (1983) having health relates to having strength and resilience (and not having weakness or exhaustion). Finally, health can be something one does. In France health could be equilibrium, an internal and individual state that relates to doing things and that assimilates illness (Herzlich, 1973). Similarly Williams (1983) describes health as functional fitness for work or activity, for one's normal obligations. This literature is discussed further below and would benefit from quantitative hypothesis-testing to corroborate the qualitative patterns described therein.

The literature on subjective (self-assessed) health tells us that people's answer to a deceptively simple question, such as "in general how would you describe your current health status?", predicts mortality and other clinical outcomes after controlling for a whole range of biomedical and psychological covariates (Idler & Benyamini, 1997). Attempts to unpick self-assessed health judgements suggest that the processes and factors involved differ between those who rate their health as poor and those who rate their health as good (Benyamini, Leventhal, & Leventhal, 2003, Kaplan & Baron-Epel, 2003). For example, people who rate their health as

poor may emphasise biomedical status and other negative indicators while those who rate their health as very good may place greater emphasis on risk factors and positive indicators of health such as feeling healthy (Benyamini et al, 2003). However, variation in subjective health is not yet fully understood and an explicit measure of lay definitions of health might further contribute to understanding this individual variation in subjective health. Indeed there is some overlap between findings from this literature and the qualitative literature on lay definitions of wellness. For example Kaplan and Baron-Epel (2003) interviewed participants about what factors influenced their subjective health judgements. They found three broad categories of factors (subjective states, diseases, and functional ability) which resemble the three key lay definitions of wellness described above (health as having, being, and doing). If we can measure how individuals define health we should be better placed to predict the factors that they will emphasise in judging their own health status.

According to a broad interpretation of Leventhal's common sense model of self-regulation, people develop cognitive and emotional representations of stimuli which are then used to guide actions in relation to those stimuli. The actions taken are then evaluated and either one's actions or one's representation of stimuli are modified accordingly. While this model has been extensively applied to understanding illness behaviour (e.g. Leventhal & Nerenz, 1985) it could also be applied to understanding health behaviour. Applying self-regulation logic to the context of wellness, we would expect that certain stimuli (e.g. health promotion materials in the media) trigger people to review their health status and that this process could then lead to the adoption or maintenance of behaviours designed to impact health status. We need to understand what people mean and understand by wellness in order to investigate this process further and to study how definitions of wellness relate to explanations of how wellness can be maintained, understandings of external influences on wellness, and possible links between wellness and behaviour. From this perspective an improved understanding of and new ability to measure people's perceptions of wellness could potentially be used to inform efforts to develop health

behaviour interventions that draw on positive health promotion motivations (to enhance health) rather than negative health protection motivations (to prevent illness).

A review of the qualitative literature identified three major ways of defining wellness, which clearly reflect those identified in the early literature described above: wellness as the absence of illness (to be health), wellness as the ability to carry out daily tasks (to do health), and wellness as positive vitality or wellbeing (to have health) (Hughner & Kleine, 2004). Central to these definitions are the types of signs that are felt to constitute important indicators of wellness. If wellness is the absence of illness then not being ill is an important indicator of wellness; if wellness is the ability to carry out daily tasks then this ability is an important indicator of wellness; finally if wellness is positive vitality then the presence of feelings of energy and wellbeing are important indicators of wellness. The aim of this study was to develop a self-report questionnaire to measure the extent to which lay people agree that each of these different signs are important indicators of health; in other words, to measure lay people's wellness beliefs. While other definitions of health have been identified (e.g. health as constraint) and other explanations of health have been described (e.g. in relation to morality), this study focuses on the three major lay definitions of wellness as identified by Hughner and Kleine (2004).

According to the absence of illness account (biomedical wellness beliefs), someone is well if they do not have any signs, symptoms, or diagnoses of illness. This definition of wellness focuses on the absence of (physical) problems rather than on any positive abilities or characteristics, and as such is a lay version of a biomedical definition of health. This theme was documented in early large-scale qualitative work carried out in France (d'Houtaud & Field, 1984, 1986) which suggested that such ideas were more common in people aged over 50 and in manual workers. Williams also describes the absence of illness account in his research with Scottish participants aged 60 and over living in 'working class' areas (Williams, 1983). However, the absence of illness account is not restricted to older adults: it has also been documented in a content analysis of interviews with children where it was increasingly prevalent from ages 5 to

12 and then decreased in prevalence in older children up to the age of 16; these children also described health in functional and wellbeing terms (Schmidt & Fröhling, 2000). Neither is it restricted to people of lower socioeconomic status, as it was documented in Canadians of diverse social backgrounds (Murray, Pullman, & Rodgers, 2003).

A number of studies have shown that people often describe themselves as healthy despite having chronic illness(es) and/or physical symptoms (Blaxter, 1993; Emami, Benner, Lipson, & Erkman, 2000; Murray et al., 2003; Williams, 1983), implying the presence of alternative definitions of health that do not depend on the absence of illness. According to the functional abilities account (functional wellness beliefs), someone is well if they are able to carry out their usual daily tasks and activities. Qualitative studies suggest that in this conception of health fulfilling one's duties and family responsibilities is prioritised over individual feelings and taking to one's bed or taking time off work in response to ill-health is frowned upon (e.g. Blaxter, 1993). In a Canadian study this definition was frequently employed by men and involved linking health to the ability to work (Murray et al., 2003). Some people in the former Soviet Union also linked their performance of daily tasks to their wellness (Abbott, Turmov, & Wallace, 2006), while Pacific Islanders related family and social functions in particular to their wellness (Torsch & Ma, 2000). Pollock (1993) argued that adhering to a functional definition of wellness might be associated with having relatively low expectations of health. However, believing in functional indicators of health might be empowering and enable people with chronic disease to judge their health by alternative standards. For example people with a diagnosed chronic disease would be able to consider themselves as healthy if, despite this disease, they were able to carry out their usual activities (e.g. Williams 1983).

According to positive definitions of wellness as wellbeing (wellbeing wellness beliefs), wellness encompasses feelings of vitality and equilibrium. Here wellness is a more holistic concept than in the biomedical and functional definitions; the focus is on realizing potential health and balance for the person as a whole. Participants in studies carried out in different

settings report a range of positive definitions of health, including psychological wellbeing (e.g. happiness, enjoyment of life), holistic wellbeing (involving both physical and emotional health) and balance (e.g. physical, psychological, and social equilibrium) (Backett, 1992; d'Houtaud & Field, 1984; Emami et al., 2000; McKague & Verhoef, 2003). In a follow-up survey which assessed agreement with 18 different definitions of health these positive themes tended to be more prominent in people aged under 40 and those of higher socio-economic status (d'Houtaud & Field, 1986). The notion of health as equilibrium was also noted by Pierret (1993), who highlighted the tensions between this definition of health and the definition of health as absence of illness. Again there is evidence of the reflection of culturally specific concepts in wellness beliefs: in one study Chinese elders drew on traditional Chinese concepts of yin and yang balance and harmony in defining health (Torsch & Ma, 2000). The conceptual correspondence between positive, wellbeing definitions of health and un-orthodox or alternative forms of health care that utilise similarly holistic approaches to care has been noted (Emami et al., 2000).

The aim of this research was to develop a quantitative measure that could be used to examine the prevalence, causes and consequences of different wellness beliefs. Previous quantitative questionnaire work has built on the qualitative literature but has not focused specifically on people's definitions of wellness. For example, Furnham (1994) developed a 124 item questionnaire measuring perceptions of current and future health and illness which was based on the work of Stainton Rogers (1991). However, our focus is on what people think constitutes wellness itself, and not on beliefs about behaviours (e.g. exercise) that are linked with wellness or ideas about the causes of health or ways to maintain it.

Two studies were conducted in order to develop a self-report measure, with acceptable psychometric properties, of the three main wellness beliefs. The objectives of study 1 were to: generate scale items consistent with the extant qualitative literature to measure each of the three main wellness beliefs; test the factor structure and internal consistency of the questionnaire in a predominantly well community sample and remove unnecessary or problematic items. The

objectives of study 2 were to test the factor structure and internal consistency of the revised scale in samples of people with and without chronic illness, assess the scale's convergent validity by comparing scores across demographic groups and with other measures of health beliefs and behaviours, and assess divergent validity by comparing scores with measures of illness perceptions. Approval for both studies was granted by the host institution's ethics committee.

Study 1

This study aimed to develop a measure of lay beliefs about indicators of wellness that is able to: distinguish between three wellness beliefs, and measure each wellness belief with good internal consistency.

Method

Measures

Based on the qualitative literature reviewed by Hughner and Kleine (2004) we generated items intended to measure belief in the importance of three dimensions of wellness: functional, biomedical, and wellbeing. Items were mainly derived from six studies carried out in a range of populations (Backett, 1992; d'Houtaud & Field, 1984; Furnham, 1994; McKague & Verhoef, 2003; Monaghan, 2001; Torsch & Ma, 2000). Twenty four items were included on the initial scale; eight were intended to measure belief in each dimension of wellness. The items were presented as 'signs or ingredients of being well' and participants were instructed to 'tick a box for each item below to show how important you think it is as an indicator of being well.' The likert-type response scale ranged from 7 (very important) to 1 (not at all important). Additional items assessing self-reported health status were taken from the Health Survey for England (2004): participants rated their overall subjective health on a 5-point scale (Very Good, Good, Fair, Bad, Very Bad), reported whether they had any 'long-standing illness, disability or infirmity', named any such illness, and stated whether or not it limited their activities in any way.

Participants and Procedure

A convenience sample was recruited from the University community. Undergraduate students were offered course credits in return for participation and postgraduate students and staff members at the School of Psychology were also invited to take part. Participants were given the study measures to complete in their own time and returned them anonymously to the researchers.

Complete questionnaires were received from 133 participants, 108 were female (81%). Participants were aged between 18 and 60 years, with 50% aged between 18 and 20 and 75% aged under 25 years (M = 23.0, SD = 6.91). Thirty five people (26%) reported a longstanding illness or disability, and such an illness limited the activities of 26 (74%) of this group. Participants rated their own health as good (on a 1 to 5 scale where 1 represents very good health, M = 1.86, SD = 0.67).

Analytic Procedure

Exploratory factor analysis was used to assess the scale structure (or construct validity) of the WBS. Principal component analysis with direct oblimin oblique rotation (delta = 0) was conducted and three factors were extracted. Oblique rotation was chosen as there was no a priori reason to expect the different wellness beliefs to be uncorrelated. Items which had loadings greater than 0.5 were interpreted as good measures of a factor; loadings of 0.55 indicate that an item has 30% variance shared with the factor in question (Comrey & Lee, 1992). A sample size of 100 was deemed sufficient for this analysis given that there were 8 proposed indicators for each factor (MacCallum, Widaman, Zhang, & Hong, 1999). Cronbach's alpha was used to test the internal consistency of the resulting subscales.

Results

As predicted, the pattern matrix showed that our items measure three distinguishable underlying constructs (Table 1). The three factors accounted for 60% of the variance in responses to all

items. The items with high loadings on Factor 1 measure functional wellness belief (e.g. 'I can do what I need to do'). Items with high loadings on Factor 2 measure biomedical wellness belief (e.g. 'I do not have any illness'). Items with high loadings on Factor 3 measure wellbeing wellness belief (e.g. 'my life is in balance'). Item 7 ('I feel good') was retained on the wellbeing scale despite having a slightly low loading (0.51) because it had high face validity for this subscale. Three items (items 5, 10, 6) that did not unambiguously relate to a single scale were excluded, as they did not distinguish well between the different factors. Three subscales were computed by summing items that loaded primarily onto each of the three factors (7 items each). The subscales were all inter-correlated (biomedical and functional $r = .27$, $p < .01$; biomedical and wellbeing $r = .39$, $p < .01$; functional and wellbeing $r = .54$, $p < .01$). All subscales showed good internal consistency (biomedical $\alpha = 0.89$; functional $\alpha = 0.90$; wellbeing $\alpha = 0.87$).

Study 2

The aim of this study was to confirm the validity and reliability of the WBS as a measure of wellness beliefs. Our specific objectives were:

1. To test the factor structure and internal consistency of the WBS in a sample of people with chronic illness and a second sample of people without chronic illness.
2. To test the convergent validity of the WBS (with health status). We hypothesised that:
    a. Having a chronic illness will be associated with stronger functional wellness beliefs. This is because these beliefs enable someone with chronic illness to think of themselves as healthy despite their illness.
    b. Having a chronic illness will be associated with weaker biomedical wellness beliefs, because such beliefs prevent someone with chronic illness from thinking of themselves as healthy.
3. To explore the relationship between WBS scores and socio-demographic characteristics, subjective health, and general health beliefs. The literature and theory reviewed above

suggest such relationships exist, but evidence is insufficiently consistent to justify specific a priori hypotheses. For example, Leventhal's Self-Regulation Model (Leventhal et al., 1998) would suggest that people's views of their own health status will impact their undertaking of health-related behaviour, but there is little direct evidence concerning how people's definitions of wellness might be linked to specific health behaviours.

4. To assess whether groups of participants can be identified on the basis of their scores on WBS subscales, and to explore whether any such groups differ in a meaningful way on socio-demographic, health status, and health behaviour variables.

Method

Measures

The WBS.

The 21-item WBS developed in Study 1 was modified slightly for this study. Explicit instructions were added: "Remember, we are not asking whether you currently HAVE these signs of health (e.g. medical signs of illness, enjoying life) but how IMPORTANT you think each of them is as an indication of health." We also prefaced each individual item with the word 'whether'. We had no direct evidence that these changes were needed, but suspected that some of the predominantly young sample in Study 1 who scored highly on most indicators may have been rating items according to current health status rather than as indicators of health. These changes were intended to clarify the questionnaire for participants, and to ensure that they were rating items according to how important they were as an indicator of health.

The Multidimensional Health Profile-Health Functioning Index (MHP-H; Karoly, Ruehlman, & Lanyon, 2005).

The MHP-H is a 69-item self-report measure of a number of health beliefs and behaviours that has shown good psychometric properties in a national US sample. In this study we used the

subscales measuring health behaviours, responses to illness, and health beliefs. Two subscales measure the frequency of positive (14 items, e.g. 'strenuous exercise') and negative (10 items, e.g. 'snacked between meals') health behaviours over the past year. Higher scores on these subscales indicate that people report performing these behaviours more frequently. Four subscales with three items each measure the perceived likelihood of making different responses to illness: seeking professional help (e.g. 'follow all medical advice'), self-help (e.g. 'avoid stress'), help from friends (e.g. 'let friends know about it') and spiritual help (e.g. 'use spiritual healing'). The perceived likelihood of making these responses is measured on a 5-point likert scale where 1 = not at all likely, and 5 = very likely. Six dimensions of health beliefs are assessed on a 5-point likert scale where 1 = don't agree at all, and 5 = strongly agree. Four items assess self-efficacy (e.g. 'I am able to take care of my health'); five items assess health vigilance (e.g. 'I pay careful attention to my health'); four items assess health values (e.g. 'Good health is the most important element of a happy life'); four items assess trust in health care personnel (e.g. 'In general I trust doctors'); three items assess trust in health care system (e.g. 'Our country's health care system is the best in the world'); four items assess hypochondriasis (e.g. 'I am the sort of person who gets sick a lot'). In the sub-sample who completed this measure (n=314) the majority of the sub-scales demonstrated acceptable internal consistency. For self-help Cronbach's $\alpha = .68$, professional help $\alpha = .77$, spiritual help $\alpha = .81$, help from friends $\alpha = .78$, positive health habits $\alpha = .70$, negative health habits $\alpha = .60$, hypochondriasis $\alpha = .62$, trust in health care system $\alpha = .72$, health values $\alpha = .75$, self-efficacy $\alpha = .80$, trust in health care personnel $\alpha = .78$, health vigilance $\alpha = .73$.

Participants and Procedure

Participants were able to complete the study measures either online or as paper-based questionnaires. The content of the materials was identical across formats. To recruit participants with chronic illness, adverts were placed in newsletters and on websites of 10 patient support organisations which provide information and support to people with a range of chronic illnesses.

The adverts directed people to the study website where they were able to complete the questionnaire measures online. To recruit healthy participants, a convenience community-based sample was recruited from the University community using the same methods as Study 1 and these participants completed either paper or electronic versions of the questionnaire measures. All participants completed the WBS and the accompanying measures of health status as in Study 1. The community sample also completed the MHP-H.

The total sample comprised 809 participants (587 were women, i.e. 73% of the sample). The participants were aged between 18 and 82 years (M = 38.1 years, SD = 15.3). Just under half of the participants (n = 368, 45%) were recruited via patient support groups, the remainder were recruited from the university community. Fifty one percent of participants (n = 415) reported having a longstanding illness, 78% of whom (n=323) said it interfered with their daily lives. Fifty five different chronic conditions were reported in total, precluding the exploration of belief differences between conditions. The participants with chronic illness had a mean age of 44.3 years (SD = 13.7) and were significantly older than the participants without chronic illness (M = 31.6, SD = 14.2; $t(796) = 12.81$, $p < .001$). There was also a lower proportion of men in the chronic illness group (n=81, 19.7%) than in the community sample (n=136, 35%; χ^2 (df=1, n=802) = 23.07, p=.000).

Because questionnaire format (online vs paper) and health status were confounded we tested whether responses to the WBS using the different formats were equivalent, examining participants with and without chronic illness separately, and controlling for other known confounders. Responses were equivalent except for one significant difference: participants with a chronic illness who completed the questionnaires online (n = 311) had weaker biomedical wellness beliefs than those who completed paper questionnaires (n = 91), $F(1,397) = 17.72$, $p<.001$.

Analytic Procedure

Participants with more than one missing data-point on a sub-scale were excluded from analyses involving that sub-scale; where only one item was missing from any one sub-scale it was replaced with the mean score on that item. Confirmatory factor analysis was carried out using Amos 6.0 to confirm the structure of the WBS. Cronbach's alpha was used to test the internal consistency of the WBS subscales. Partial correlations were computed to test hypothesised associations (or absence of associations) between scores on the WBS and subjective health and health beliefs/behaviours. Correlations with scores on each dimension of the WBS were assessed separately while partialling out scores on the other two dimensions. MANCOVA was used to test for hypothesised differences on WBS scores between participants with and without chronic illness.

Cluster analysis (Everitt et al., 2001) was used to explore whether it is possible to cluster participants according to their scores on the three dimensions of the WBS. K-means clustering (an iterative partitioning method based on Euclidean distance) was chosen over hierarchical clustering because of the large dataset (Norušis, 2008). Iteration stopped when there was no further change in each cluster centre. The sample was split in half (at random) and k-means clustering was performed on each half specifying 3, 4, 5, and 6 cluster solutions. The 3-cluster solution was the most stable across both halves of sample and solutions with more than 3 clusters tended to have highly imbalanced clusters. Therefore the results of a 3-cluster k-means analysis performed on the whole sample are reported (Norušis, 2008). Tentative exploratory follow-up analyses (Pearson's chi-squared, one-way ANOVAs, independent samples t-tests) were conducted to examine associations between cluster membership and other variables (health status, gender, age, subjective health, MHP-H variables).

Results

Factor Structure of the WBS: Construct Validity and Internal Consistency

A model was fitted in which the three dimensions of wellness belief were predicted by the items on the corresponding sub-scale; the three dimensions were again assumed to be correlated. The CFI index (.96) and RMSEA value (.062; confidence interval .057 to .067) confirmed that this model fitted the data well (CFI values greater than .95 and RMSEA values below .1 are indicative of good fitting models, Browne & Cudeck 1993; Hu & Bentler, 1999). Correlations between the dimensions were similar to Study 1; biomedical wellness belief correlated .38 with both the other dimensions, while wellbeing wellness belief correlated .49 with functional wellness belief. The WBS subscales again demonstrated good internal consistency; in participants with and without chronic illness respectively Cronbach's α = .92 and .91 for biomedical, α = .94 and .94 for functional and α = .88 and .90 for wellbeing. The high alpha values suggested that some items on the WBS may be redundant, and that it might be possible to use a shortened version of the questionnaire without compromising its reliability. To test this, we constructed short versions of each subscale, using the 3 items with the highest factor loadings from the original exploratory factor analysis (Table 1). These new 3-item subscales retained good internal consistency (in participants with and without chronic illness respectively Cronbach's α = .86 and .83 for biomedical, α = .94 and .94 for functional and α = .74 and .79 for wellbeing). Furthermore, the relationships between the subscales and other constructs described below were almost identical using the 3-item versions (results not shown).

Relationships between the WBS and Other Constructs: Convergent and Divergent Validity

People with chronic illness had higher functional wellness belief scores and lower biomedical wellness belief scores than people without chronic illness (Table 2). This was confirmed by MANCOVA which showed that, when controlling for the effect of age, there was a significant multivariate effect of chronic illness on wellness beliefs [$F(3,785) = 19.63$, $p < .001$, partial $\eta^2 = .070$]. Follow-up analyses showed significant effects of chronic illness on functional wellness beliefs [$F(1,787) = 11.59$, $p = .001$, partial $\eta^2 = .015$] and biomedical wellness beliefs [$F(1,787) = 23.78$, $p < .001$, partial $\eta^2 = .029$], but not on wellbeing belief scores. Within the group of

people reporting chronic illness, the impact of this illness on their daily life did not have a significant effect on their wellness belief scores (confirmed by MANOVA). Subjective health ratings were significantly correlated with wellness beliefs only in people without chronic illness. In those without chronic illness (n=387), positive subjective health was associated with stronger wellbeing wellness beliefs (r=-.13, p<.01), stronger biomedical wellness beliefs (r=-.15, p<.01) and weaker functional wellness beliefs (r=.12, p<.05).

Women had higher scores than men on both wellbeing and functional wellness beliefs (Table 2). This was again confirmed by MANCOVA which showed that, when controlling for the effect of age, there was a significant multivariate effect of gender on wellness belief [$F(3,785) = 7.75$, $p < .001$, partial $\eta^2 = .029$]. Gender had an effect on wellbeing [$F(1,787) = 16.03$, $p < .001$, partial $\eta^2 = .020$] and functional [$F(1,787) = 13.10$, $p < .001$, partial $\eta^2 = .016$] scores.

The relationship between wellness beliefs and health beliefs was examined in the community sample. Table 3 shows that the majority of correlations between scores on the WBS and the MHP-H were weak and non-significant. Biomedical and functional wellness belief scores did not correlate with any other measures of health beliefs or illness behaviours. Wellbeing wellness belief scores positively correlated with increased health self-efficacy, increased health vigilance, and increased health values.

Cluster Analysis: Grouping participants based on WBS scores

The cluster analysis grouped participants into 3 clusters based on their scores on the WBS subscales (Figure 1). Cluster 3 was characterised by high scores on all 3 WBS subscales; these participants valued all three types of indicator of health. Cluster 1 members had strong wellbeing and functional beliefs and much weaker biomedical beliefs; these participants valued wellbeing and functional indicators of health highly but did not value biomedical indicators of health. Cluster 2 members had moderate wellbeing and functional beliefs and slightly stronger biomedical beliefs; these participants valued biomedical indicators of health more than they

valued wellbeing and functional indicators (which they valued much less than other participants did).

Cluster membership was associated with other variables in meaningful ways that are consistent with our hypotheses tested above. Cluster membership was significantly associated with having a chronic illness (χ^2 (2) = 81.9, p<.01), in that there were more people with a chronic illness in cluster 1 (χ^2 (1) =51.7, p<.01) and fewer in cluster 2 (χ^2 (1) = 29.1, p<.01) than would be expected by chance. Cluster membership was also associated with gender χ^2 (2) = 22.1, p<.01) in that there were more men than expected by chance in clusters 1 and 2 (cluster 1 χ^2 (1) = 8.7, p<.01; cluster 2 χ^2 (1) = 12.6, p<.01). There were also significant age differences between the clusters, F(2, 794) = 9.24, p<.01. Post hoc Scheffe tests showed that cluster 2 members (M=34.3, SD = 15.4) were younger than cluster 1 members (M=41.3, SD = 12.4) and cluster 3 members (M=38.5, SD = 15.3). Subjective health assessments differed between the clusters, F(2,798) = 5.535, p<.01. Post hoc Scheffe tests showed that subjective health ratings were higher in cluster 1 (M=2.52, SD=0.93) than in cluster 2 (M=2.23, SD=0.87) and cluster 3 (M=2.25, SD=0.94).

We also examined the relationship between cluster membership and other health beliefs and behaviours as measured by the MHP-H, in the community sample. Because there were very few members of cluster 1 in this sample (n=28) (compared to cluster 2 (n=99) and cluster 3 (n=187)) we explored mean differences between clusters 2 and 3 only (Table 4). Independent samples t-tests confirmed that cluster 3 members had higher scores than cluster 2 members on positive health habits (t(284)=-2.86, p<.01), self-efficacy (t(284) = -3.64, p<.01), health vigilance (t(284) = -2.80, p<.01), and health values (t(284) = -2.58, p<.05). Cluster 2 members had a higher mean score that cluster 3 members on negative health habits (t(284)=3.05, p<.01). There were no other significant differences between the clusters on MHP-H variables.

DISCUSSION

We have developed the Wellness Beliefs Scale, a measure of three major wellness beliefs: wellness as the absence of illness, wellness as the ability to carry out daily tasks, and wellness as positive vitality or wellbeing. The questionnaire items that we derived from existing qualitative literature formed three clear subscales that reliably distinguished between each of these definitions of wellness. The stability of the structure of the WBS, as demonstrated with exploratory and confirmatory factor analysis in community and patient groups of participants, confirms the consistency with which these three beliefs have been identified in the qualitative literature (Herzlich 1973; Hughner & Kleine, 2004; Williams, 1983) and demonstrates that they can be reliably distinguished from each other. The internal consistency of all three subscales was very good, again in both community and patient samples. As hypothesised, scores on the Wellness Beliefs Scale tended to have weak correlations with other health-related beliefs, suggesting that definitions of health do not overlap extensively with these other domains for which we already have well-established questionnaire measures. There was also evidence that a shortened (9-item) version of the questionnaire has similar psychometric properties to the full 21-item questionnaire, although this requires direct testing in a new sample.

As hypothesised, people with chronic illness held stronger functional wellness beliefs and weaker biomedical wellness beliefs than those without chronic illness. These results are unsurprising and are consistent with an association between chronic illness and a change in beliefs which facilitates adaptation: having a chronic illness and seeing the presence of illness as an important indicator of wellness would imply a perceived inability to have or be able to strive towards wellness whereas placing more emphasis on functional indicators of wellness allows a person to have an illness and yet consider themselves to be well in other ways. The extent to which having strong functional wellness beliefs within chronic illness is actually predictive of tangible patient-centred outcomes is a question for future research.

Women had stronger beliefs than men in both wellbeing and functional indicators of wellness. This is consistent with the predominance of female users of complementary therapies,

which emphasise alternatives to biomedical definitions of health (Bishop & Lewith, 2008). This pattern of beliefs could be considered indicative of approaching illness through resistance or assimilation, rather than conceiving of illness as destroying one's health.

The relationship between subjective health and wellness beliefs was different in those with and without chronic illness. This observation is compatible with the subjective health literature that suggests poor subjective health judgements are based on different information to good subjective health judgements (Benyamini et al., 2003; Kaplan & Baron-Epel, 2003). Logically, one would expect people's beliefs about the relative importance of different signs of wellness to have an impact on which factors they take into account when rating their own health status: further work could use the WBS to test this hypothesis. For participants without chronic illness, better subjective health was associated with stronger beliefs in biomedical and wellness indicators but weaker beliefs in functional indicators of health. However for those with chronic illness, functional indicators were equally as important as other indicators, which is consistent with the qualitative literature suggesting that those with chronic illness tend to espouse functional definitions of health (Williams, 1983).

The results of the cluster analysis suggest that the WBS can be used to cluster people into groups that differ on their profile of wellness beliefs, and that these groups also differ in terms of their health status, demographic characteristics and health behaviours. Cluster 1 was characterised by strong beliefs in wellbeing and functional indicators of wellness and weak beliefs in biomedical indicators of wellness. Cluster 1 included more men than cluster 3 and members were older (than members of cluster 2). Although Cluster 1 included more people with chronic illness than cluster 2, members had better subjective health than clusters 2 and 3. Cluster 2 was characterised by moderate beliefs in wellbeing and functional indicators of wellness with higher beliefs in biomedical indicators of wellness. This cluster included fewer people with chronic illness (than cluster 1), more men (than cluster 3), younger people (than clusters 1 and 3), and lower subjective health (than cluster 1). Cluster 3 was characterised by very strong

beliefs in all three indicators of health, and included older people (than cluster 2) with worse subjective health (than cluster 1). Within the community sample, members of cluster 3 reported more positive health habits and fewer negative health habits than members of cluster 2, and also reported more positive health beliefs, including higher self-efficacy and health vigilance. These associations must be treated cautiously as this was an exploratory analysis, but the results suggest further cluster analytic work using the WBS might usefully identify groups of people with different profiles of wellness beliefs who also differ in other meaningful ways.

It is important to acknowledge the limitations of the methodology used to develop the Wellness Beliefs Scale. We were unable to assess test-retest reliability and sensitivity to change, but hope this will be evaluated in future studies. Over 900 people took part in this research and the questionnaire was tested in community and clinical samples. However the use of convenience sampling limits the extent to which it is possible to claim that our sample is representative of the general population. In particular, the sample for study 1 was limited by a reliance on a convenience sample of predominantly healthy women aged under 25, although the broader sample achieved in study 2 lends more credibility to our key findings. Within study 2, the confound between health status and mode of completing the questionnaire makes it prudent to suggest a follow-up study with a homogeneous sample to provide better evidence of the equivalence of the internet and paper versions of the WBS. A potential limitation of the questionnaire itself is that high mean scores on all three subscales were found in all sub-samples. However, this may be an accurate reflection of lay people's definitions of health, as previous research has also found that people tend to endorse a large number of definitions of health. In one survey 10 of 18 definitions provided were endorsed by over 70% of respondents, while a further 6 definitions were endorsed by over 50% of respondents (d'Houtaud & Field, 1986).

The Wellness Beliefs Scale constitutes a novel and potentially important contribution to our understanding of lay health beliefs and behaviours. The scale has shown promising initial psychometric characteristics that should encourage its use in future research. The wider

implications of this future work could be practical as well as theoretical. In particular, we hope that understanding people's definitions of health might add to our ability to design and target health promotion interventions successfully. Our results suggest that further cluster analytic work in other samples could test whether there are robust identifiable groups of people with different profiles of wellness beliefs who might differ in their response to health promotion interventions. For example, people who hold wellbeing and functional views of health (cluster 1 in our sample) might be more readily persuaded to take up certain dietary practices if they are informed of the potential positive consequences for their energy levels and activities, whereas for people who emphasise more biomedical views of health (cluster 2) a message emphasising the role of dietary choices in preventing medical illness might be more effective. Further work is of course needed to test these hypotheses.

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Table 1. *Pattern Matrix from Exploratory Factor Analysis of WBS items*

Item	Item Loadings (Functional)	(Biomedical)	(Wellbeing)
12. I can do what I need to do	**.87**	-.10	.04
2. I can fulfil my every day responsibilities	**.81**	-.00	.08
17. I can keep up my daily routine	**.78**	-.01	-.14
11. I can carry out my normal activities	**.75**	.07	-.09
8. I can perform my regular chores	**.74**	-.08	-.15
20. I can carry on as usual in my life	**.68**	.16	-.13
15. Health problems do not stop me carrying out my usual tasks	**.58**	.13	-.08
19. I do not have any illness	-.16	**.83**	-.03
14. I am free of disease	-.15	**.81**	-.04
23. I do not have any diagnosed health problems	-.23	**.79**	-.16
21. I have no warning signs of disease	.05	**.76**	-.06
9. There are no indications that I am ill	.23	**.76**	.09
3. I have no medical signs of illness	.19	**.73**	.01
1. There is no evidence I have any health problems	.24	**.65**	.06
13. I feel full of energy	.03	.00	**-.84**
24. My life is in balance	-.05	-.07	**-.83**
18. I have a lot of get up and go	.03	-.07	**-.80**
22. I feel physically and emotionally strong	-.06	.18	**-.77**
16. I feel I am functioning to my full potential	.06	.07	**-.68**
4. I am enjoying life	.12	-.09	**-.64**
7. I feel good	.10	.18	**-.52**

Note. Bold typeface shows highest factor loading for each item.

Table 2.

Mean Scores on WBS according to Gender and Illness Status.

Characteristics	*n*	Biomedical Mean (*SD*)	Functional Mean (*SD*)	Wellbeing Mean (*SD*)
Whole sample	804	40.41 (8.08)	42.55 (6.90)	42.85 (6.14)
Chronic illness				
Yes	405	38.80 (9.27)*	44.08 (6.24)*	43.14 (6.00)
No	387	42.19 (6.12)	41.02 (7.16)	41.87 (6.20)
Gender				
Male	215	41.13 (7.29)	40.80 (7.92)*	41.03 (6.87)*
Female	586	40.15 (8.34)	43.19 (6.35)	43.04 (5.75)
Chronic illness limits daily life				
Yes	320	38.48 (9.56)	44.04 (6.60)	43.20 (6.11)
No	88	40.00 (7.84)	43.91 (4.93)	42.76 (5.70)

*$p<.001$ for within-subscale comparisons between groups

Table 3.

Partial Correlations between Wellness Beliefs and Health Beliefs in Community Sub-sample (n=314)

Scale	Biomedical	Functional	Wellbeing
Health Behaviours			
Positive habits	-.06	.06	.14
Negative habits	.00	-.06	-.03
Health Beliefs			
Self-efficacy	.03	.05	.19*
Health vigilance	.04	-.05	.20*
Health values	.12	-.06	.17*
Trust in health care personnel	.11	-.15	.04
Trust in health care system	-.01	-.04	.01
Hypochondriasis	-.06	.02	-.10
Responses to Illness			
Self-help	.00	.01	.05
Professional help	.09	-.05	-.01
Help from friends	.04	.00	.00
Spiritual help	-.03	-.00	-.02

Note. Partial correlations controlled for scores on WBS subscales.

* $p<.003$ (Significant at .05 level after Bonferroni correction.)

Table 4

Health Beliefs and Behaviours by Cluster in the Community Sub-Sample

Scale	Cluster 1 (*n*=28) *M* (*SD*)	Cluster 2 (*n*=99) *M* (*SD*)	Cluster 3 (*n*=187) *M* (*SD*)
Health Behaviours			
Positive habits	44.94 (6.39)	43.37 (6.47)**	45.77 (6.89)**
Negative habits	25.75 (4.54)	28.32 (5.32)**	26.39 (4.96)**
Health Beliefs			
Self-efficacy	14.86 (2.84)	13.55 (2.39)**	14.76 (2.85)**
Health vigilance	16.05 (3.54)	15.46 (3.06)**	16.62 (3.47)**
Health values	14.07 (2.75)	14.22 (2.40)*	15.13 (3.03)*
Trust in health care personnel	13.11 (2.91)	14.04 (3.11)	13.55 (2.82)
Trust in health care system	9.07 (3.03)	8.73 (2.36)	8.57 (2.45)
Hypochondriasis	8.29 (2.92)	8.43 (2.54)	7.96 (2.61)
Responses to Illness			
Self-help	7.28 (3.07)	7.26 (2.64)	7.45 (2.90)
Professional help	8.82 (4.07)	8.56 (2.89)	8.62 (3.05)
Help from friends	7.25 (2.80)	7.28 (2.41)	7.52 (3.00)
Spiritual help	4.54 (2.86)	1.68 (3.81)	1.93 (3.89)

* $p<.05$ for comparison between cluster 2 and cluster 3.

**$p<.01$ for comparison between cluster 2 and cluster 3.

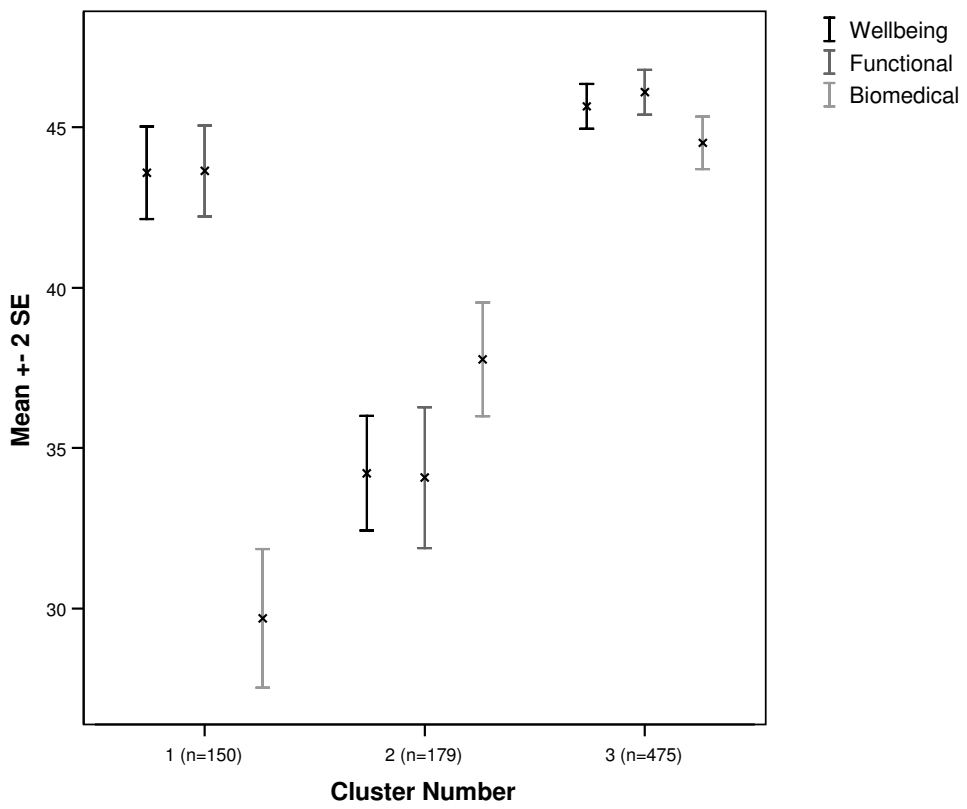

Figure 1. Error bar chart showing mean scores on WBS subscales for each cluster