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# Development and preliminary validation of the South Wales Social Well-being Scale (SWSWBS)

Juping Yu<sup>1\*</sup> , Siva Ganesh<sup>1</sup> , Steven R Smith<sup>2</sup> and Carolyn Wallace<sup>1</sup> 

## Abstract

**Background** Physical, mental and social components of well-being are known to be important to health. However, research on well-being often focuses on physical and mental well-being with little attention paid to social well-being. This research aims to develop and preliminarily validate the South Wales Social Well-being Scale (SWSWBS) to measure social well-being.

**Methods** A non-experimental and cross-sectional design was applied with two phases: scale development and preliminary validation. Initially, 24 items were drawn from a Group Concept Mapping study exploring the concept of social well-being. These items were reviewed and reduced to 14 for preliminary validation among 103 university students and staff in health and social care disciplines. Construct validity (exploratory factor analysis and convergent validity) were tested. Reliability was demonstrated by internal consistency. Floor and ceiling effects were also evaluated.

**Results** A 3-factor structure was identified and explored, which highlight the most important features of the social world a person inhabits: "Safe and inclusive interaction with others" (6 items), "Learning, helping, and feeling useful" (4 items), and "Security, worthwhile activities, family and friends" (4 items). The SWSWBS was correlated to the Warwick Edinburgh Mental Well-being Scale and the Four measures of Personal Well-being Scale to some extent. The Cronbach alpha coefficient was 0.85 for the sum score and 0.83–0.86 for individual items. The item-total correlation coefficients ranged between 0.08 and 0.65. The split half reliability coefficient was 0.78. There is absence of a floor effect, but most items had a ceiling effect.

**Conclusions** Preliminary validation of the SWSWBS shows the scale has satisfactory psychometric properties with good validity, reliability, and reasonable variability. This study needs to be replicated with larger and representative populations to explore how the scale can be used alongside the Warwick Edinburgh Mental Well-being Scale to capture a holistic/multi-dimensional understanding of well-being.

**Keywords** Well-being, Social well-being, Public health interventions, Social care, Social work

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## Background

According to the World Health Organization, health is “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” [1]. This definition endorses a holistic account of health by regarding health as a state of well-being with three key features: physical, mental and social well-being [2]. However, there is a lack of consensus on the definition of well-being and how it can be measured.

Broadly, well-being refers to what helps lives go better for people, such as individuals’ mental and emotional states, social environments, and ability to access and enjoy social and economic resources (e.g., access to health, education, employment, housing, income, community assets, and inclusive and empowering social and relational networks) [3–5]. Physical, mental, and social components of well-being are known to be important to health [1, 6]. However, research and practice in health and social care often focuses on physical and mental well-being with less attention paid to social components of well-being, which would detrimentally affect the development of health policies and practices, as it is evident that both mental well-being and social well-being are distinct and important for health [1, 7, 8]. A systematic and multi-dimensional measure of well-being is therefore needed to offer a richer and more holistic account of well-being. Subsequently, tools that can capture both mental and social aspects of well-being are required to understand the social well-being of populations and evaluate the impact of various types of public health interventions.

To date, the most common tool assessing well-being is the Warwick Edinburgh Mental Well-being Scale (WEMWBS) [9], which focuses on ‘subjective’ or ‘internal’ mental and emotional states, that an individual has self-reportedly experienced over the previous two weeks [10]. However, our conversations with practitioners such as social prescribers and public health practitioners have revealed the limitations of using this tool [7, 8]. Whilst the WEMWBS captures some important aspects of well-being of the general public and health and social care service-users, the claim is that it is unable to sufficiently uncover the *social* dynamics of well-being, which are also ‘subjectively’ experienced and interpreted. So, WEMWBS (see items 4, 9, and 12) makes some gestures toward social well-being in its exploration of mental and emotional states, but it does not directly measure these as social aspects of well-being, but rather as indirectly reflecting certain types of mental and emotional states. Addressing this limitation, we propose to simultaneously assess well-being by combining the WEMWBS with a new measurement tool to assess directly the ‘subjective’ or ‘internal’ interpretation of a person’s *social* well-being. Thus, a Group Concept Mapping (GCM) study was

undertaken to explore the concept of social well-being [8]. The findings from the GCM study were used to create the South Wales Social Well-being Scale (SWSWBS), which measures the quality of individuals’ overall experience of social well-being, as related to what is subjectively understood as a person’s ‘social world’. The report here explores the development and preliminary validation of the SWSWBS. How the scale relates to the WEMWBS is also explored, alongside the Four Measures of Personal Well-being Scale (ONS 4) developed by the UK Office for National Statistics, to inform the next stage of testing with a larger sample from the general population to refine the SWSWBS.

## Methods

The study applied a non-experimental and cross-sectional design with two phases: scale development and preliminary validation.

Ethical approval was granted from the University of South Wales (200607LR for Phase 1; 210905LR for Phase 2). Ethical principles set by UK Health Research Authority for health and social care research were followed [11]. An information sheet was provided and participants had the opportunity to ask any questions about the study. Participants gave their written consent (phase 1) or implied (phase 2). Participation was voluntary and anonymity was guaranteed.

### Phase 1: scale development

#### Design

The SWSWBS was developed based on a GCM study that was conducted to explore people’s perspectives on what makes up their ‘social world’, with a view to identifying and developing a shared multi-dimensional concept of social well-being [8]. GCM is a consensus method, integrating the qualitative component with quantitative multivariate statistical analysis to gain consensus on a subject of interest, here social well-being [12].

#### Participants

Participants were recruited from academics, social prescribing practitioners, health and social care professionals and service-users, and members of the public. Invitations were sent to a range of gatekeeper organizations and networks (e.g., the Wales Social Prescribing Research Network, Wales School for Social Prescribing Research, Wales Council for Voluntary Action, International Academic Networks, Wales Centre for Primary and Emergency Care Research, Regional Centers of Expertise Cymru, and Older People’s Commissioner for Wales). Gatekeepers were asked to share the invitation with members in their networks. Ninety-six participants were recruited, whose characteristics are described in Table 1. The largest proportion of participants for each

**Table 1** Characteristics of the participants (phase 1)

Variables	Grouping	Frequency	Percent
Age (n=78)	18–20	1	1.28
	21–30	10	12.82
	31–40	14	17.95
	41–50	13	16.67
	51–60	21	26.92
	61–70	12	15.38
	71–80	4	5.13
	81–90	3	3.85
Location (n=78)	England	12	15.38
	Wales	57	73.08
	Republic of Ireland	1	1.28
	Outside of the United Kingdom	8	10.26
Residence (n=77)	City	19	24.68
	Town	22	28.57
	Village	16	20.78
	Rural	15	19.48
	Other	5	6.49

characteristic were aged 51–60 (26.92%); lived in Wales (73.08%); lived in towns (28.57%). Fifty-eight participants (77.33%) reported having no disability, while 17 (22.64%) reported having a mental health condition, a physical impairment, and/or a medical condition.

### Procedures

Data were collected online via the GroupWisdom™ software July–September 2020. Participants completed three activities: brainstorming, sorting, and rating. In the brainstorming activity, participants generated statements by responding to a focus prompt: “When I think of the things that have made up my social world over the last year, I include...” The following information was given to explain the broad meaning of ‘social world’: “Rather than focusing on your feelings and thoughts about yourself, we want you to think about your social world. By social world we mean things that you have or owe, and other things that help you do what you want to do in your everyday life, so that you can be the person you want to be. It also covers when you’re inside and outside of your home.”

The brainstorming activity opened for three weeks. Sixty-seven participants participated and generated an initial list of 363 raw statements, which were reviewed using the Key Words in Context method [13]. Duplicates and irrelevant statements were removed; statements with multiple meanings were split; statements with grammatical errors were edited (minor). This resulted in 462 statements. Each statement was assigned a code. There were 38 codes in total (for example, sport, outdoors, family, friends, and celebrations). Each set of statements within a code were reviewed by the research team and synthesized into statements that shared a similar meaning. Nine additional statements from various literatures on social

well-being were added, mainly taken from the disciplines of anthropology, applied philosophy, sociology, psychology, and the health sciences [3–5, 14–26]. Then, both raw and synthesized lists were reviewed and discussed with the study advisory group,<sup>1</sup> producing a final list of 125 statements for sorting and rating.

The sorting activity opened for two weeks. Fifty participants participated. They sorted the 125 statements into ‘piles’ based on perceived similarity so as to cluster different statements into related domains or themes of social well-being, and labelled each pile.

The rating activity opened for three weeks, where participants rated each statement on a 5-point Likert scale for importance (1=not important; 5=extremely important), accessibility (1=no access; 5=constant access), and enjoyment (1=not enjoyable; 5=extremely enjoyable).

### Initial item pool

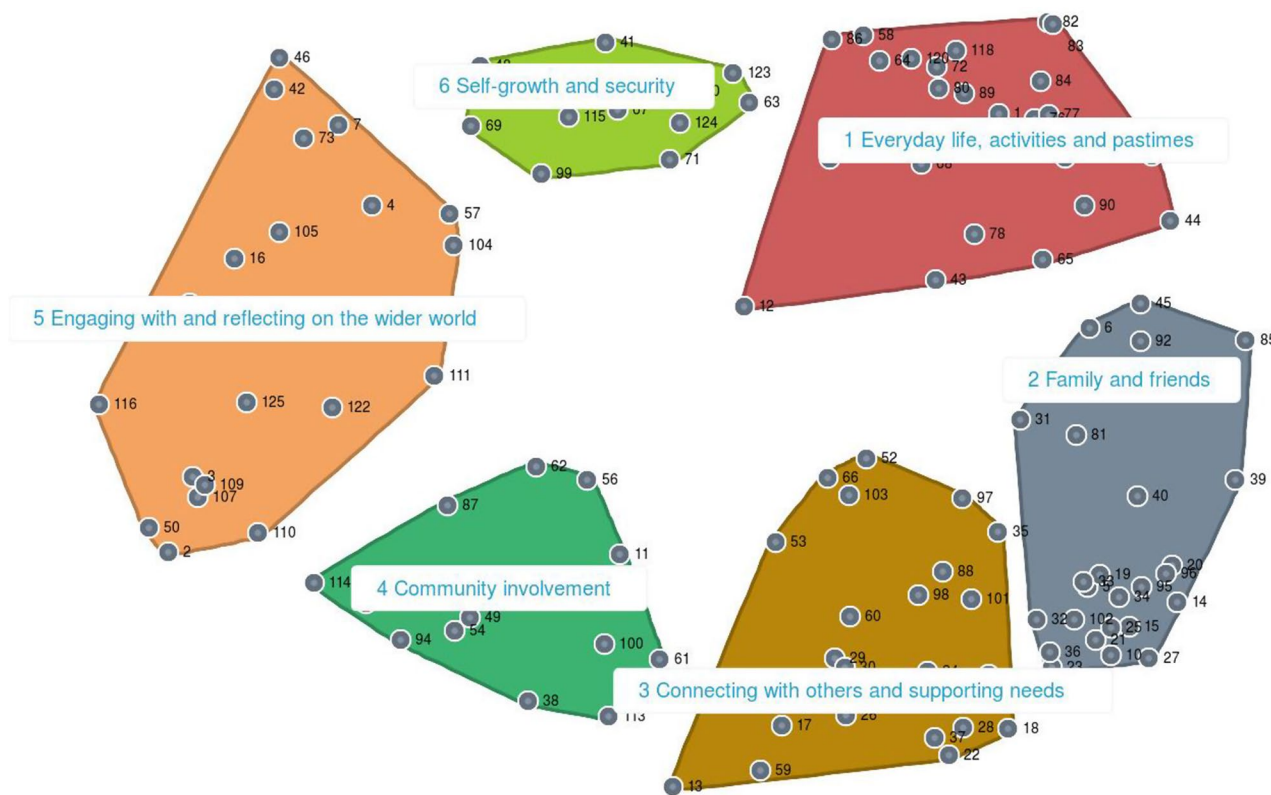
A series of solutions (4–12 cluster) were generated by the GroupWisdom™ software based on how statements were sorted by participants. A concept map comprising the following six clusters (themes) was chosen based on the sorted data, discussions within the research team, and consultation with the advisory group (Fig. 1). The statements (items) in each cluster (theme) are presented as points, along with their corresponding statement numbers. The relationship between statements or clusters is indicated by the distance between them, with a shorter/longer distance showing a stronger/weaker relationship respectively.

1. Everyday life, activities and pastimes (29 items).
2. Family and friends (25 items).
3. Connecting with others and supporting needs (22 items).
4. Community involvement (16 items).
5. Engaging with and reflecting on the wider world (21 items).
6. Self-growth and security (12 items).

To reflect the cluster map overall, four statements from each of the six clusters that participants rated of highest importance were selected to form the initial item pool (Table 2).

Each statement was then reviewed by the team. Statements with similar sentiments were merged. For example, statement 117 (Living in a safe home environment) and statement 118 (Living in a healthy home environment) were combined to form item ‘Living in a safe and healthy home environment’. Fourteen statements (items)

<sup>1</sup> The group comprised of researchers, healthcare professionals, social prescribers, third sector representatives, and members of the public, who were involved in every stage of the study: developing the focus prompt, reviewing statements, number of clusters, cluster labels, and interpreting the results.



**Fig. 1** Cluster map with labels

remained to form the SWSWBS (Table 3). The items are scored on a 5-point Likert scale (1=none of the time; 2=rarely; 3=some of the time; 4=often; 5=all of the time). Statements that do not focus on a person’s social world were removed, such as statement 58, which refers to mental health.

**Phase 2: preliminary validation of the SWSWBS**

**Participants and data collection**

Students and staff in health and social care disciplines in the University of South Wales were invited to test the SWSWBS November-December 2021. The data collection was hosted online via the ‘Online Surveys’ platform. A link to the study website was sent to eligible participants, and people who were willing to take part completed the questionnaires online. In total, 103 valid responses were received.

**Measures used for validation**

Three measures were used for validation: the SWSWBS; the WEMWEBS; and the ONS 4.

The WEMWEBS was developed to measure mental/emotional well-being and initially validated with university students and the general population [10]. As with the SWSWBS, the WEMWEBS contains 14 items, which are scored on a 5-point Likert scale: from 1 (none of the time) to 5 (all of the time). The sum of scores (‘sum scores’)

ranges 14–70. The higher the score, the better the mental well-being. Validity of the scale was demonstrated by content validity, criterion validity, and construct validity via confirmatory factor analysis, which supports a one-factor scale structure. Reliability of the scale was supported by internal consistency (Cronbach’s alpha=0.89 for the student sample and 0.91 for the general population sample) and test-retest reliability ( $r=0.83$ ).

The ONS 4 was developed by the UK Office for National Statistics to assess what it calls ‘subjective’ or ‘personal’ well-being [27]. It comprises four questions about aspects of life (life satisfaction, worthwhile, happiness, and anxiety). Each question is answered on a scale of 0 (not at all) to 10 (completely). There are four thresholds based on means of each of the four questions: low (0–4), medium (5–6), high (7–8), and very high (9–10) for the first three questions on life satisfaction, worthwhile and happiness; very low (0–1), low (2–3), medium (4–5), and high (6–10) for anxiety. The scale has often been used by UK policy makers and others to measure well-being [28].

**Validity testing**

Validity relates to accuracy, so the extent a scale can measure the underlying concept it is designed to evaluate [29]. Assessing validity is important when researching something that cannot be easily measured and/or



**Table 2** Initial item pool (24 items) in order of importance within each cluster

Cluster number	Statement number	Statement	Importance rating
1	117	Living in a safe home environment	4.54
1	118	Living in a healthy home environment	4.52
1	58	Mental health	4.44
1	120	Living in a healthy environment outside my home	4.44
2	10	Being close to my family	4.23
2	15	Eating meals with family	3.96
2	27	Meeting up with family and friends and doing things together, for example, playing games, playing music, following sports, watching films	3.92
2	21	Hugging friends and family	3.80
3	24	Making time for others and supporting them emotionally - just listening when they need an ear, just being there for each other	4.11
3	97	Face-to-face interaction	4.00
3	52	Having a life where I can mix with people from all backgrounds	3.78
3	30	Providing long-distance support for isolated friends and family	3.78
4	56	Using local businesses - cafes, pubs, bookshops, record stores, DIY stores	3.88
4	100	Interacting online with colleagues and people I come into contact with at work, for example, online meetings with colleagues	3.47
4	49	Becoming more of a community	3.39
4	112	Interacting face-to-face with colleagues and people I come into contact with at work	3.31
5	122	Being able to do worthwhile paid or unpaid work	4.06
5	7	Covid-19, social distancing and lockdown	4.00
5	121	The ability to use government services, for example, health, community	3.65
5	125	Being able to express beliefs and opinions which help other people make decisions	3.50
6	41	Being financially secure (having enough income to meet my needs)	4.33
6	123	Being able to make worthwhile plans for myself and my future	4.08
6	124	Being able to put into practice worthwhile plans for myself and my future	3.94
6	69	Security, for example, in old age, of health, against social exclusion, against racism, against discrimination and harassment	3.90

**Table 3** SWSWBS items

No	Item
1	I've been living in a safe and healthy home environment
2	I've been able to enjoy a safe and healthy environment outside my home
3	I've been financially secure and so have had enough income to meet my needs
4	I've been doing worthwhile activities (paid/unpaid) when I've wanted
5	I've been able to carry out what I've set out to do when I've wanted
6	I've met up with family and friends and we have done things together when I've wanted
7	I've been free from harassment and discrimination
8	I've been able to use local services and facilities when I've needed
9	I've felt useful when I help and support other people
10	I've had my opinions taken seriously
11	I've interacted with others in person when I've wanted
12	I've interacted with others digitally, online and/or using a phone when I've wanted
13	I've been involved with community groups and/or activities when I've wanted
14	I've learnt about the world

observed directly, such as intelligence, self-confidence or happiness, as multiple observable or measurable indicators are needed to measure constructs. The validity of the SWSWBS was tested by construct validity using exploratory factor analysis and convergent validity.

Construct validity of the SWSWBS was demonstrated by exploratory factor analysis (EFA) to produce independent/uncorrelated factors associated with the 14 SWSWBS items. Also known as 'principal factor analysis' or 'principal axis factoring', principal component analysis was carried out for factor extraction as the initial step for carrying out EFA [30, 31]. If the set of items of an instrument are highly correlated with one another, the items would emerge under one factor or construct. Mathematical rotations are often used to improve the interpretation of extracted underlying factors. The varimax and the oblique rotation methods are most popular [30, 31] and were performed in this study. The orthogonal varimax provided a better factor solution. The suitability of the data for the factor analysis was confirmed by Kaiser-Meyer Olkin Measure of sampling adequacy (MSA) (0.5-1.0) and significant Bartlett's Test of Sphericity ( $p < 0.05$ ). The items that had relatively high factor loadings ( $> |0.40|$  or so) were retained to identify the items that are represented well by each factor. The aim was to attach a meaningful 'label' to the newly found factors or constructs.

Convergent validity evaluates how well a scale correlates with a conceptually relevant measure [29]. To establish this type of validity, the SWSWBS was tested by comparing the scale with the WEMWEBS and with the ONS 4, which measure different constructs of well-being. A

correlation efficiency value above 0.7 indicates acceptable validity [29]. The comparisons were based on:

- 1) 'Paired differences' and 'correlation coefficient' between the sum score of the SWSWBS and that of the WEMWBS.
- 2) Regression of the sum score of the SWSWBS on that of the WEMWBS.
- 3) Pairwise correlations and Canonical correlation analysis (CCA) between the SWSWBS items and the WEMWBS items and between the SWSWBS items and the ONS 4 items.

CCA can be useful when examining the multivariate associations between two sets of variables [32]. It seeks linear functions of one set of variables that are highly 'correlated' with linear functions of the second set of variables. These correlations are known as 'Canonical Correlations (CC)' and the correlated pairs of linear functions are generally known as 'Canonical Correlation Functions (CCFs) or dimensions.' Correlations between the variables in the two sets are channeled through these canonical correlations, providing 'layers of correlations' or associations between the two sets of variables. Furthermore, the CCFs can be used to obtain 'canonical scores' for each individual response in the data and explored via scatterplots. To highlight the relationship between the two sets of variables, an 'association' score between pairs of variables in the two sets can be computed in the chosen canonical correlation space (that is, using the first few CCFs), and these scores can then be visualized as clustered image maps (CIMs).

#### **Reliability testing**

Reliability relates to consistency, referring to whether a scale can measure a concept in a reproducible manner, often demonstrated by internal consistency, stability, and equivalence [29]. In this study, the reliability of the SWSWBS was tested by internal consistency using: (1) Cronbach's alpha to test how closely the set of SWSWBS items were related as a group; (2) split-half technique to compare whether the scores on the (randomly split) two halves of the SWSWBS items were related; (3) item-total correlations to assess whether an individual SWSWBS item is correlated with the total score of the scale without that item. A Cronbach's alpha value or correlation coefficient above 0.7 indicates acceptable internal consistency, which means a scale can address different constructs well and deliver reliable scores consistently [29].

#### **Variability testing**

The variability of the SWSWBS was explored by analyzing floor and ceiling effects to check whether there is a lower or higher limit on the scale, and whether a large

proportion of responses are near this limit [33]. The occurrence of such an effect was considered if more than 15% of respondents scored the lowest or the highest possible scores for each item (1 or 5), or for the sum scores (14 or 70). The presence of a floor or ceiling effect shows that extreme items at either end of a scale may be missing, limiting content validity, and making it difficult/impossible to differentiate respondents with the lowest or the highest possible scores from each other, thereby reducing the scale's reliability [33].

## **Results**

### **Descriptive statistics**

The sum score ranged between 31 and 70, with a mean of 52.1. A normality test was conducted to determine whether the data were drawn from a normally distributed population (within some tolerance). The sum score was slightly negatively skewed with a lower peak (kurtosis < 3; *platykurtic*). Either the skewness or the kurtosis statistics, which measure the skewness or the peak of a distribution, were less than 1.96 times their respective standard error, suggesting a normal distribution of data. Moreover, the histogram of the data was approximately bell-shaped and symmetric, showing too that the data were normally distributed. The QQ plot (a scatterplot where quantiles of observed and expected data are plotted next to each other) also indicated normality of the distribution as the two sets of quantiles approximately agreed. In addition, the Shapiro-Wilk test indicated normal distribution of the data with a p value of more than 0.05 that failed to reject null hypothesis, indicating that the data was normally distributed.

### **Exploratory factor analysis**

The Kaiser-Meyer-Olkin factor adequacy MSA and the Bartlett's Test of Sphericity were performed to assess the suitability of the data for factor analysis. The overall MSA of the SWSWBS scale was 0.85, which is within the recommended range (0.5-1.0). The Bartlett's Test of Sphericity was also statistically significant ( $\chi^2_{(91)}=446.67$ ,  $p<0.001$ ), indicating the suitability of the data for the analysis to explore dimensions of the scale.

The Kaiser rule was used to determine the number of factors with eigenvalues greater than 1 to retain [34]. Accordingly, a 4-factor solution was computed first, followed by 3-factor and 2-factor solutions. It was found that the 3-factor model was the best solution, providing a reasonably 'good fit' that could be interpreted easily. The varimax rotation of the principal component analysis yielded a 3-factor model solution (Table 4). Each corresponding principal component (factor) had an eigenvalue greater than 1 (2.995, 2.664 & 1.947 respectively), and the three principal components (factors) accounted for 54.3% of the total variance. The varimax rotated composition of

**Table 4** Exploratory factor analysis (based on principal components) using varimax rotation

No	Item	Factor 1	Factor 2	Factor 3
7	I've been free from harassment and discrimination	0.762		
12	I've interacted with others digitally, online and/or using a phone when I've wanted	0.731		
1	I've been living in a safe and healthy home environment	0.624		
10	I've had my opinions taken seriously	0.581		
11	I've interacted with others in person when I've wanted	0.535		
8	I've been able to use local services and facilities when I've needed	0.508		
14	I've learnt about the world		0.669	
9	I've felt useful when I help and support other people		0.625	
13	I've been involved with community groups and/or activities when I've wanted		0.561	
5	I've been able to carry out what I've set out to do when I've wanted		0.525	
2	I've been able to enjoy a safe and healthy environment outside my home			0.756
4	I've been doing worthwhile activities (paid/unpaid) when I've wanted			0.742
3	I've been financially secure and so have had enough income to meet my needs			0.662
6	I've met up with family and friends and we have done things together when I've wanted			0.574

Factor 1: Safe and inclusive interaction with others (6 items); Factor 2: Learning, helping, and feeling useful (4 items); Factor 3: Security, worthwhile activities, family and friends (4 items)

each component (factor) is as follows (and see Table 4). Factor 1 “Safe and inclusive interaction with others” was explained by six items (1, 7, 8, 10, 11, and 12); Factor 2 “Learning, helping, and feeling useful” was explained by four items (5, 9, 13 and 14); Factor 3 “Security, worthwhile activities, family and friends” was explained by four items (2, 3, 4, and 6). Criterion ‘only one factor represents each of the 14 items’ was applied to get a clearer interpretation of the factors as much as possible. For any cross loadings, factor loadings that were greater than 0.5 were chosen for a practical choice to provide a clearer and more straightforward interpretation and labelling of the 3-factor structure.

The suggested 3-factor measurement model is as follows: The 14 items modelled as resulting from one of three underlying latent variables, and the corresponding latent variable structure is shown in Fig. 2.

**Convergent validity**

Convergent validity was tested by comparing the SWSWBS with the WEMWEBS and with the ONS 4.

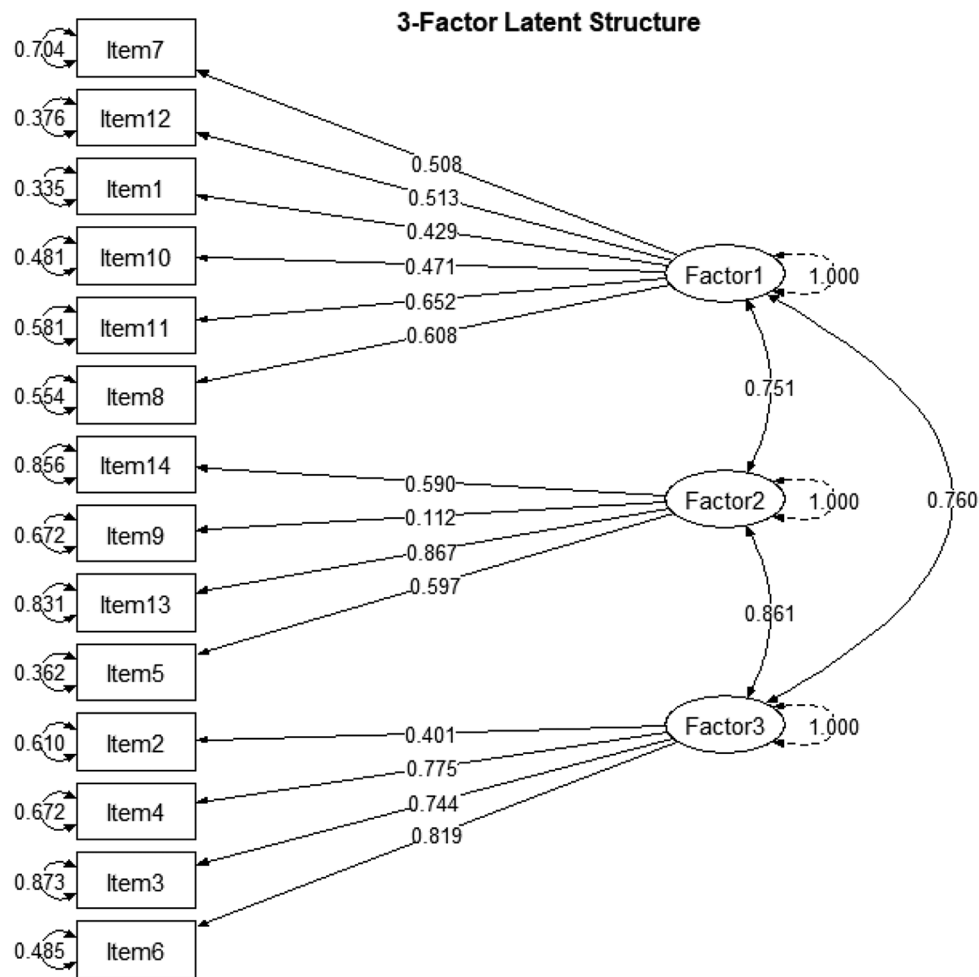
**The correlation between the SWSWBS and the WEMWEBS**

First, we examined the sum scores of SWSWBS items and the sum scores of WEMWEBS items of all participants. The ‘paired difference’ between these two sets of scores was highly significant with an estimated mean difference of about 8 ( $t=11.287, df=102, p<0.001$ ). The correlation coefficient between the sum scores was moderate at 0.67 and the regression of the sum scores of SWSWBS on the sum scores of WEMWEBS was significant ( $F(1, 101)=82.31, p<0.001$ ), but weak with adjusted R-squared value at only 44.4%. These findings imply that, based on the sum of item scores, the similarity between the two sets of scores is marginal.

We conducted further comparison between the items of the two sets of scales using canonical correlation analysis (CCA), finding layers of correlations between linear functions of items of the SWSWBS and the WEMWBS. The maximum number of these canonical correlations is 14, but only the first four (0.784, 0.692, 0.639 & 0.563) were larger than the largest pairwise correlation between the items of the sets. This indicates that at least the first two of these (linear) ‘canonical correlation functions’ of the two sets of items bring out notable linear associations and layers of correlations among the two sets of items.

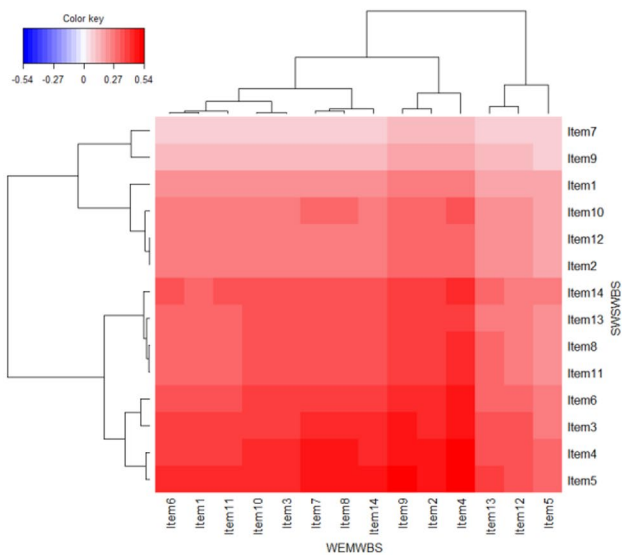
The ‘association’ measures between pairs of items in these first two canonical correlation spaces (dimensions), one at a time, were computed and are shown as CIM graphs in Fig. 3 (and see Table 5). These graphs are color coded to show both positive and negative associations. The graphs also show how the items grouped (clustered) together with respect to these association measures. The clustering is shown as dendrograms on the left and top of the graphs. The first canonical correlation functions (1st CIM graph) indicate the existence of only positive associations between SWSWBS and WEMWBS items. The SWSWBS items appear to fall into two large clusters or maybe 4 small ones, while the WEMWBS items either fall into one small and one large groupings, or perhaps 2 small and one large groups. This implies blocks of associations between SWSWBS and WEMWBS items. For example, a positive strong association between items 3, 4, 5 and 6 of SWSWBS and items 2, 4 and 9 of WEMWBS. On an individual basis, it appears that strong associations appear between SWSWBS item 5 and WEMWBS items 2, 4, 7, 8, 9 and 14, and notably weak associations appear between SWSWBS item 7 and all WEMWBS items (Table 5).

The 2nd canonical correlation functions bring out both positive and negative associations between the two sets of items. WEMWBS items 3 and 5 (forming a small cluster) appear to have a notable positive association with items 6 and 13 of SWSWBS (also forming a small cluster), while having a negative association with SWSWBS

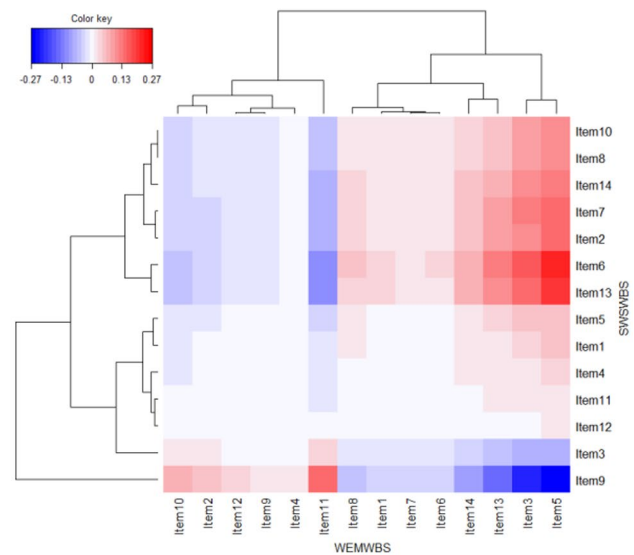


**Fig. 2** Suggested 3-factor model. Factor 1: Safe and inclusive interaction with others (6 items); Factor 2: Learning, helping, and feeling useful (4 items); Factor 3: Security, worthwhile activities, family and friends (4 items)

### 1<sup>st</sup> Canonical space



### 2<sup>nd</sup> Canonical space



**Fig. 3** CIM graphs in the first two canonical dimensions (SWSWBS vs. WEMWBS). Color key indicates the strength of positive and negative associations



**Table 5** SWSWBS and WEMWBS items

No	Items for SWSWBS
1	I've been living in a safe and healthy home environment
2	I've been able to enjoy a safe and healthy environment outside my home
3	I've been financially secure and so have had enough income to meet my needs
4	I've been doing worthwhile activities (paid/unpaid) when I've wanted
5	I've been able to carry out what I've set out to do when I've wanted
6	I've met up with family and friends and we have done things together when I've wanted
7	I've been free from harassment and discrimination
8	I've been able to use local services and facilities when I've needed
9	I've felt useful when I help and support other people
10	I've had my opinions taken seriously
11	I've interacted with others in person when I've wanted
12	I've interacted with others digitally, online and/or using a phone when I've wanted
13	I've been involved with community groups and/or activities when I've wanted
14	I've learnt about the world
No	Items for WEMWBS
1	I've been feeling optimistic about the future
2	I've been feeling useful
3	I've been feeling relaxed
4	I've been feeling interested in other people
5	I've had energy to spare
6	I've been dealing with problems well
7	I've been thinking clearly
8	I've been feeling good about myself
9	I've been feeling close to other people
10	I've been feeling confident
11	I've been able to make up my own mind about things
12	I've been feeling loved
13	I've been interested in new things
14	I've been feeling cheerful

item 9 (which appears on the dendrogram as an outlier (or an anomaly or deviant from other items).

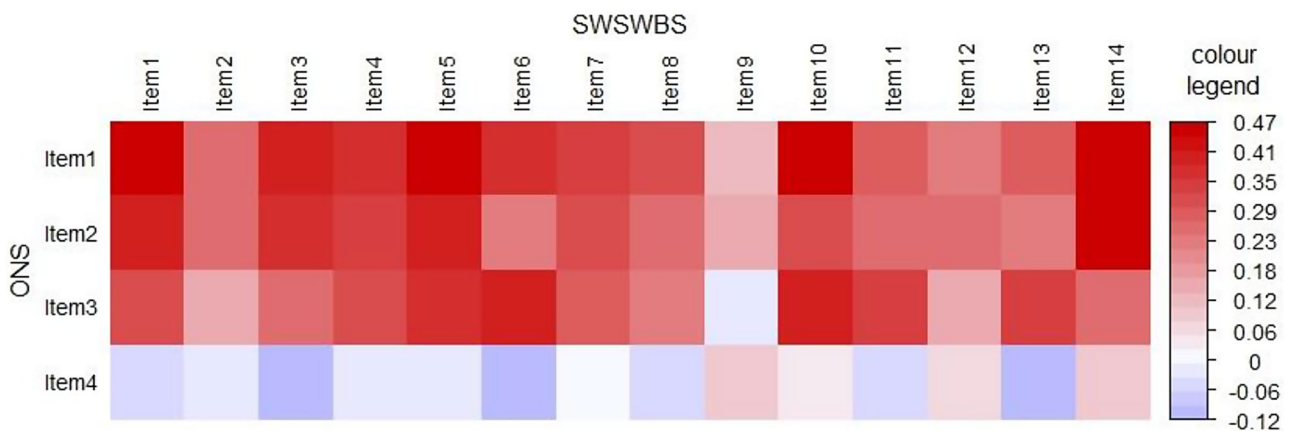
**The correlation between the SWSWBS and the ONS 4**

Pairwise correlations between the SWSWBS items and the ONS items were weak ranging between  $-0.12$  and  $0.47$  (Fig. 4). Negative correlations were found between ONS item 4 and all but four SWSWBS items (9, 10, 12 & 14), and between ONS item 3 and SWSWBS item 9. This suggests that, on item-by-item basis, the sets of scores are barely related and some are negatively associated.

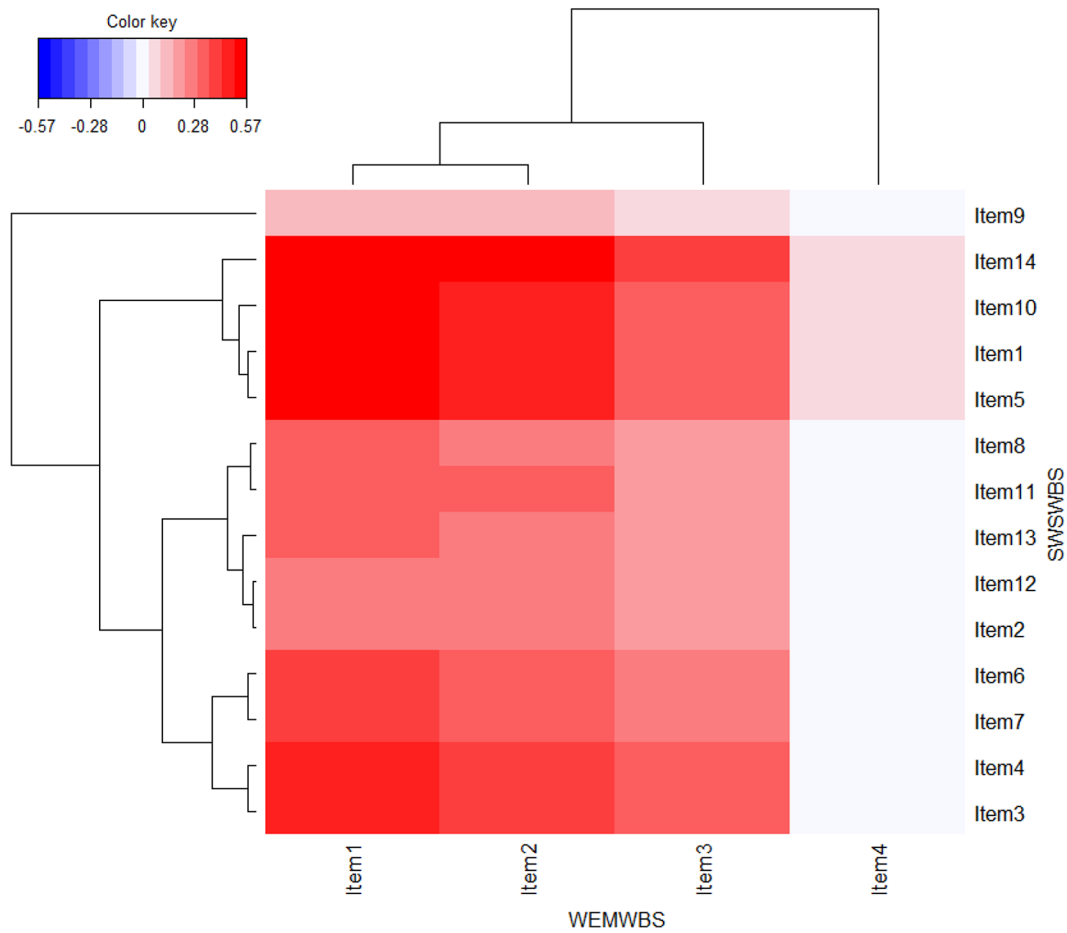
Next, we considered the connection between the items of the two sets of scales using the canonical correlation analysis. The maximum number of canonical correlations is 4. The corresponding canonical correlations were  $0.723$ ,  $0.462$ ,  $0.254$  and  $0.175$ , and only the first one was larger than the largest pairwise correlation between the scores of the two sets. This indicates that at least the first 'canonical correlation function' of the two sets of items brings out strong linear associations and perhaps this is the only dominant layer of correlation among the two sets of items. The 'association' measures between pairs of items in the first canonical correlation space and were computed as a CIM graph (Fig. 5). This graph indicates the existence of only positive associations between SWSWBS and ONS items. The weakest associations appear between ONS item 4 (appearing as an outlier in the dendrogram) and all SWSWBS items. The strongest associations appear between ONS item 1 and SWSWBS items 1, 5, 10, and 14 (forming a cluster). Furthermore, ONS items 1 and 2 appear to fall into a cluster, while the WEMWBS items seem to fall into three small groups with an outlier, item 9.

**Reliability**

As shown in Table 6, the Cronbach's alpha coefficient was  $0.85$  for the sum score and ranged between  $0.83$  and  $0.86$



**Fig. 4** Pairwise correlations between SWSWBS and ONS 4 with color legend. ONS Item 1 = Life satisfaction; Item 2 = Worthwhile; Item 3 = Happiness; Item 4 = Anxiety



**Fig. 5** CIM graph in the first canonical dimension (SWSWBS vs. WEMWBS). Color key indicates the strength of positive and negative associations.) Items 1–4 for WEMWBS are (1) I've been feeling optimistic about the future. (2) I've been feeling useful (3) I've been feeling relaxed. (4) I've been feeling interested in other people

**Table 6** Performance of the South Wales Social Well-being Scale (SWSWBS) (N= 103)

No	Item	Mean	SD	Item-total correlation if item deleted	Cronbach $\alpha$ if item deleted	Floor effect %	Ceiling effect %
1	I've been living in a safe and healthy home environment	4.65	0.72	0.49	0.84	0.97	75.73
2	I've been able to enjoy a safe and healthy environment outside my home	4.08	0.88	0.39	0.84	0.97	35.92
3	I've been financially secure and so have had enough income to meet my needs	3.58	1.20	0.58	0.83	4.85	31.07
4	I've been doing worthwhile activities (paid/unpaid) when I've wanted	3.42	1.13	0.54	0.83	4.85	20.39
5	I've been able to carry out what I've set out to do when I've wanted	3.37	0.85	0.60	0.83	0.00	10.68
6	I've met up with family and friends and we have done things together when I've wanted	3.10	1.08	0.65	0.83	4.85	12.62
7	I've been free from harassment and discrimination	4.34	0.99	0.37	0.84	1.94	60.19
8	I've been able to use local services and facilities when I've needed	3.66	0.97	0.58	0.83	1.94	20.39
9	I've felt useful when I help and support other people	4.07	0.83	0.08	0.86	0.97	33.01
10	I've had my opinions taken seriously	3.73	0.84	0.50	0.84	0.97	16.50
11	I've interacted with others in person when I've wanted	3.53	1.01	0.55	0.83	0.97	19.42
12	I've interacted with others digitally, online and/or using a phone when I've wanted	4.22	0.80	0.50	0.84	0.00	42.72
13	I've been involved with community groups and/or activities when I've wanted	3.01	1.26	0.59	0.83	12.62	15.53
14	I've learnt about the world	3.37	1.10	0.45	0.84	6.80	16.50

for individual items (with item of interest deleted). All alpha values of individual items were around the overall value, indicating that the 14 items had good internal consistency.

Item-total correlation coefficients (with item of interest deleted) ranged between 0.08 (item 9, the only item below the rule of thumb for internal consistency) and 0.65 (item 6).

A random split of all 14 SWSWBS items into halves (seven items in each half) was carried out to test split half reliability of the SWSWBS scale by analyzing the correlation between the two half splits.

- Split 1: items 4, 3, 7, 11, 14, 6, and 12.
- Split 2: items 1, 2, 5, 8, 9, 10, and 13.

The correlation coefficient between the sum scores of the two half splits was 0.78, indicating a good internal reliability. A pairwise t-test was conducted to compare the total scores of the two split halves ( $t = -3.475$ ,  $df=102$ ,  $p<0.001$ ), indicating a significant correlation between the two split halves.

#### Floor and ceiling effects

Regarding the sum scores, less than 15% of respondents had the possible lowest (14) or highest (70) sum scores, indicating absence of floor or ceiling effects. Indeed, no respondents achieved the minimum expected score of 14 and 1.94% achieved the maximum expected score of 70.

With regard to 14 individual SWSWBS items, items scoring on the lowest possible score of 1 did not exceed the 15% cut off, indicating absence of a floor effect. However, 12 items, except for items 5 and 6, had a ceiling effect (so more than 15% of respondents scored the highest possible score of 5 for these items).

#### Discussion

This study attempts to develop and preliminarily validate a newly developed social well-being measure (SWSWBS), applicable to health and social care users and the general public. The findings of this pilot study indicate that the scale has good validity and reliability according to a sample of university students and staff in health and social care disciplines.

The mean of the sum score for the SWSWBS was 52.1 (out of 70). A higher score suggests greater positive social well-being, but there are no cut-off points or thresholds to divide social well-being into high, medium or low levels. Similarly, a higher score for the WEMWBS suggests greater positive mental well-being, but there are no cut-off points either [10]. Our overall contention for both scales is that it is not appropriate to have such cut-off points as well-being is a multifaceted concept, comprising at least three components (physical, mental and

social well-being). These components will likely interact in complex and unpredictable ways, making it difficult/impossible to generalize about the levels of well-being experienced by individual service-users. This inability to generalize is also compounded by a lack of agreement (both empirically and theoretically) concerning precisely how these components may connect or affect one another [6, 8].

However, given the SWSWBS is a self-completed measurement that may help practitioners assess the well-being of service-users, it might be useful to refer to a rough *range* of points, related to the sum score and for each factor. This range would aid practitioners, working alongside service-users, in deciding whether a particular intervention is likely to be effective or not, and if so, how or the degree it can be offered. Thus, creating a ‘traffic light’ system may be appropriate in the future, that instead of identifying a sharp cut-off point, would highlight likely/potential *trajectories* of well-being. So, a green range could indicate ‘likely good social well-being’; an amber range ‘possible issues to consider and address’; while a red range ‘likely poor social well-being and the need for urgent action.’ Nevertheless, to reiterate, such a ‘traffic light’ system could/should only provide a rough guide/range. Practitioners and service-users would therefore need to use their discretion and judgement when interpreting the score and subsequent light color.

Furthermore, from the statistical evidence reported here, it seems that the SWSWBS score can be reliably interpreted *alongside* the WEMWBS score, in our view, providing a more holistic and multi-dimensional account of a person’s well-being (so both mental and social aspects). This finding is encouraging, as the SWSWBS was first developed to complement the WEMWBS. The WEMWBS focuses on an individual’s internal or ‘subjective’ *experiences* as related to the person’s emotional and mental states [12], while the SWSWBS focuses on an individual’s internal or ‘subjective’ *interpretations* as related to the person’s understanding of the ‘objective’ social world the person inhabits. Taken together, then, our main claim is that these different but related measurements of well-being offer a more nuanced and multi-layered understanding of an individual’s *subjective* experiences and interpretations, as related to the person’s *objective* social circumstances. It is difficult to predict the idiosyncrasies (with a low score on one scale but a high score on the other), *even though* this would not be *generally* expected according to the statistical analysis offered here. However, a ‘traffic light system’ may still risk oversimplifying the character of well-being and the intervention strategies that are implemented as a result, which again reinforces the importance of maintaining discretion and judgement in the practitioner/service-user relationship. So, any traffic light system could be divided further

at factor (domain) levels (using the 3-factor structure suggested here), but then individual items *within* each factor could also be attended to and examined. Exploring this possibility could also be the subject of further study, with a view to making interventions more individually tailored, and so more specifically targeted to the needs of individual service-users.

Finally, developing the last point, the SWSWBS showed good convergent validity when compared with the WEMBES and the ONS 4, which includes four subjective wellbeing measures assessing life satisfaction, happiness, worthwhileness and anxiety. Three factors suggested by the principal component analysis were “Safe and inclusive interaction with others”, “Learning, helping, and feeling useful”, and “Security, worthwhile activities, family and friends”. So, we might say that the SWSWBS, which measures the social well-being a person experiences, starts with the external or ‘objective’ social world or environment a person inhabits as its first reference point. This starting point is markedly different from the ‘subjective’ mental and/or emotional states of a person as measured by the WEMWBS, which starts with the internal or ‘subjective’ world a person experiences. However, as previously stated, our development of the SWSWBS has also consistently engaged with the ‘internal’ or ‘subjective’ *interpretation* a person has of his or her external social world or environment. As a result, we have explicitly linked ‘subjective’ and ‘objective’ conceptions of well-being, so resisting presenting these conceptions as either/or dichotomies, rather as phenomena which are profoundly and symbiotically related [24]. The subsequent pluralistic understanding and measurement of well-being (which combines both these conceptions) we also contend is more relevant and useful for practitioners and policy makers, than using a monistic understanding and measurement of well-being in isolation.

### Strengths and limitations

One of the main strengths of this study is the use of the GCM method (a highly systematic and sophisticated approach to consensus-building and the generation of new ideas on social phenomena) to generate the initial item pool of our scale. There are, though, some limitations. There are potential biases in the samples. For the participants involved in the concept development in Phase 1, variables such as poverty that may play a role in social well-being were not included, although the wealthy may also experience poor social well-being as evidenced by the presence of depression and suicides in celebrities [35]. This was because only up to five demographic variables were allowed to be included in data analysis for a GCM study. The participants used for the pilot testing in Phase 2 were recruited from one university. The sample size was also relatively small and not representative

of the inequality in wider society, which limited the generalizability of the results. It is also worth noting that both phases were conducted online due to Covid-related restrictions, which limited who engaged with the research. Individuals with limited digital technology skills or not having the means to access digital devices in the time to undertake this research were digitally excluded. Online fatigue during the pandemic may have also contributed to the low response rate. A larger sample that represents the population of interest would ensure the newly developed scale is fit for its intended purpose. There is the potential for adapting the scale to other contexts (e.g., social prescribing in health setting and other allied services) and populations (e.g., young people; older people; ethnic minority populations). Nevertheless, this is a pilot study that needs to be replicated with a larger and much more representative sample for further validation of the scale. The use of self-reported measures was another limitation, which although is also the case with the WEMWBS and the ONS 4, may have resulted in biased responses on one’s well-being status. However, when using the newly developed social well-being scale, respondents are asked to refer to aspects of their lives that are more tangible than proximate psychological states as measured in psychological wellbeing measures (e.g., WEMWBS). Despite these limitations, some practical implications can be drawn.

### Practical implications

The SWSWBS scale provides an opportunity to directly measure social well-being in health and social care services, where one of their main purposes is connecting citizens to community support provision in order to promote their health and well-being [36]. Moreover, as previously stated, the SWSWBS provides an opportunity to measure social well-being *alongside* mental well-being, providing a more holistic and multi-dimensional approach to well-being measurement, and therefore more precise and ‘tailor-fitted’ interventions for service-users. Notably, too, the 14-item scale is not only manageable from a service-users’ perspective for self-assessment purposes. This is also in line with the number of items used for the WEMWBS, enabling a symmetrical and evenly balanced use of the latter scale alongside the SWSWBS. In short, we anticipate that this more holistic measure will be helpful for social prescribers (and other allied practitioners) who are engaged in maintaining and enhancing health and well-being, across what are inevitably various and complex domains of people’s lives.

### Conclusion

From the statistical analysis we provide here concerning those items which constitute mental and social well-being, we conclude that the SWSWBS can be legitimately

used alongside the WEMWBS. This combination provides a multi-layered but manageable tool for assessing individuals' well-being levels across a range of social policy and welfare practice settings. In short, these well-being levels reflect the complex interplay between *so-called* 'subjective/internal mental and emotional states' and the *so-called* 'objective/external' social worlds people inhabit. Recognizing these complexities and their interplay in developing policy and intervention strategies is therefore based on a thoroughly 'holistic' view of the individuals, having highly complex needs, wants, and aspirations.

Moreover, the SWSWBS we have developed and preliminarily tested has very satisfactory psychometric properties. It shows good validity, demonstrated by exploratory factor analysis and convergent validity; good reliability, demonstrated by internal consistency; and acceptable variability. It has also proven to be a valid and reliable measure for social well-being (amongst university students and staff in health and social care disciplines). Future research is needed to confirm these psychometric properties across different populations using larger more representative samples. Future research also needs to explore how the SWSWBS can be used alongside the WEMWBS to gain a more holistic understanding of well-being. This promotion would, in turn, lead to development of improved 'tailor-made' policy and intervention strategies for service-users across a range of health and other related settings.

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#### Author contributions

JY, SRS, and CW conceptualised the study. JY was responsible for data collection. SG was responsible for data analysis. JY drafted the first version of the manuscript. SG, SRS and CW critically revised the manuscript for important intellectual content. All authors have approved the submitted version. All authors have agreed both to be personally accountable for the author's own contributions and to ensure that questions related to the accuracy or integrity of any part of the work.

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#### Data availability

The datasets generated and/or analysed during the current study are not publicly available as due to the nature of this research, participants of this study did not agree for their data to be shared publicly, but are available from the corresponding author on reasonable request.

#### Declarations

##### Ethics approval and consent to participate

Ethical approval was granted by the Faculty of Life Sciences and Education Research Ethics Committee at the University of South Wales, UK (200607LR for Phase 1; 210905LR for Phase 2). All participants gave their written consent or inclined consent to participate.

#### Consent for publication

No individual person's data are presented.

#### Competing interests

The authors declare no competing interests.

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