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Brief Report

Development and initial psychometric properties of the Warwick–Edinburgh Mental Wellbeing Scale-Intellectual Disability version

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Abstract

Background The Warwick–Edinburgh Mental Wellbeing Scale (WEMWBS; Tennant *et al.*, 2007) is yet to be validated in the intellectual disability (ID) population. The aim of this study was to report the development process and assess the psychometric properties of a newly adapted version of the WEMWBS and the Short WEMWBS for individuals with mild to moderate IDs (WEMWBS-ID/SWEMWBS-ID).

Method The WEMWBS item wordings and response options were revised by clinicians and researchers expert in the field of ID, and a visual aid was added to the scale. The adapted version was reviewed by 10 individuals with IDs. The measure was administered by researchers online using screenshare, to individuals aged 16+ years with mild to moderate IDs. Data from three UK samples were collated to evaluate the WEMWBS-ID (n = 96). A subsample (n = 22) completed the measure again 1 to 2 weeks later to assess test–retest reliability, and 95 participants additionally completed an adapted version of the adapted Rosenberg Self-Esteem Scale to examine convergent validity. Additional data from a Canadian sample (n = 27) were used to evaluate the SWEMWBS-ID (n = 123).

Results The WEMWBS-ID demonstrated good internal consistency (ω = 0.77–0.87), excellent test–retest reliability [intraclass correlation coefficient (ICC) = .88] and good convergent validity with the self-esteem scale (r = .48–.60) across samples. A confirmatory factor analysis for a single factor model demonstrated an adequate fit. The SWEMWBS-ID showed poor to good internal consistency (ω = 0.36–0.74), moderate test–retest reliability (ICC = .67) and good convergent validity (r = .48–.60) across samples, and a confirmatory factor analysis indicated good model fit for a single factor structure.

Conclusions The WEMWBS-ID and short version demonstrated promising psychometric properties, when administered virtually by a researcher. Further

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exploration of the scales with larger, representative samples is warranted.

Keywords Intellectual disability, Measurement, Mental wellbeing, Psychometric properties

Background

Mental wellbeing, encompassing dimensions of hedonia ('feeling good') and eudaimonia ('functioning well') (Ryan & Deci 2001), is considered a valuable resource for individuals and communities (Stewart-Brown *et al.* 2015; Faculty of Public Health and Mental Health Foundation 2016). There is also growing evidence relating to the protective effect of mental wellbeing on the relationship between exposure to stressors and poorer mental and physical health (Siahpush *et al.* 2008; Keyes *et al.* 2010).

The Warwick–Edinburgh Mental Wellbeing Scale (WEMWBS; Tennant *et al.* 2007) is a 14-item positively focused measure of mental wellbeing. The scale draws on a wide conception of wellbeing, including affective-emotional aspects, cognitive-evaluative dimensions and psychological functioning, which load on one factor of overall wellbeing. The WEMWBS has been extensively validated with adults and adolescents in the UK and cross-culturally, demonstrating robust psychometric properties (e.g. McKay & Andretta 2017; Fung 2019). A 7-item version of the measure, the Short Warwick–Edinburgh Mental Wellbeing Scale (SWEMWBS, Stewart-Brown *et al.* 2009) was developed using Rasch modelling, enabling interval scale measurement. This has also been validated in general and clinical populations (e.g. Bass *et al.* 2016; Koushede *et al.* 2019), demonstrating sensitivity to change as a clinical measure (Shah *et al.* 2018, 2021).

The WEMWBS was piloted in an outpatient clinic with individuals with intellectual disabilities (IDs) by Vlissides *et al.* (2017), who reported that the wording of some of the questions was too difficult, indicating a need to adapt the WEMWBS for this population. Accordingly, we set out to adapt the measure for people with mild to moderate IDs.

The aim of this study was to describe the adaptation process and report initial psychometric data for an adapted version of the WEMWBS (and SWEMWBS) for individuals with mild to moderate IDs.

Method

Participants

Participants were included if they were aged 16+ (18+ for Sample 4) and had an intellectual disability (by an administrative definition, in terms of receipt of specialist services for people with IDs), capacity to consent to taking part and the necessary cognitive, visual and communicative skills [likely to equate to a mild to moderate intellectual disability (ID)] to be able to complete the measures in English (with support if necessary). That these criteria were met was checked by the researcher while sharing information about the study and administration of the measures. Additionally, participants were required to have access to the internet and a computer, smartphone or tablet to be able to join a video call for data collection.

Data were analysed from four samples drawn from four different studies (see Table S1 for further details). Data from Samples 1 to 3 were collected in the UK, with Sample 2 collected at baseline in an intervention study (Scior *et al.* 2022). Data from Sample 4 were collected as part of a Canadian study (St. John *et al.* 2022). Participants in Sample 4 completed a version of the WEMWBS-ID in which the wording of one item deviated slightly in error, and therefore, only data from Samples 1 to 3 (n = 96) were analysed to assess the full WEMWBS-ID. The analysis of the SWEMWBS-ID included data from all four samples (n = 123), as the erroneous item is not part of the sort version.

Procedure

Samples 1 to 3 were recruited through organisations for people with IDs and educational providers in the UK, in addition to via social media. Interested individuals contacted the researchers directly, or a family member or carer expressed an interest on their behalf. Individuals with IDs in Canada (Sample 4) were recruited through various national and provincial self-advocacy organisations. Participants in Samples 1, 2 and 4 received gift vouchers to thank them for participating.

They were required to have the cognitive, visual and communicative skills to be able to complete the

measures in English (with support if necessary) and to provide consent. Thus, participants were likely to have had a mild to moderate ID. Additionally, participants were required to have access to the internet and a computer, smartphone or tablet to be able to join a video call for data collection.

In the present study, the WEMWBS-ID was researcher administered to all four samples, to ensure that all participants were offered appropriate support and procedural standardisation. An administration guide was provided to all researchers involved in data collection. Participants completed the measures during a video call with a researcher using the screenshare function, so that participants were able to see the items, response options and visual aid. Items were read aloud by the researcher to facilitate comprehension. Participants were given the option to have a supporter present during the video call. However, it was emphasised that the participants' own views were of interest. Participants in Sample 1 completed the measures again one to 2 weeks later, if they agreed.

The study was approved by the first author's institution's ethics board (Project ID: 0241/005).

Measures

Warwick–Edinburgh Mental Wellbeing Scale-Intellectual Disability

Adapting the Warwick–Edinburgh Mental Wellbeing Scale. The scale was adapted in line with recommendations in the literature (for an overview, see Kooijmans *et al.* 2022). Item wordings were revised by the authors, as clinicians and researchers expert in the field of ID. Proposed revisions, alternative rewordings for individual items and different options for the response scale and its visual representation were then reviewed in detail by two research advisory panels, with a total of 10 members with IDs, and their recommendations integrated into the final version. Changes to the measure included altering the item stem, for example, 'I've been feeling' to simple past tense, that is, 'I felt'. Some concepts were explained through more familiar words (e.g. 'optimistic about the future' was changed to 'hopeful about the future'). The original reference period of 2 weeks was considered too complex for individuals who frequently struggle with concepts of time and was reduced to 1 week, ensuring retention of the focus on current wellbeing. The Likert scale was changed from a five-point scale (*none of the time*; *rarely*; *some of the time*; *often*; *all of the time*) to a four-point scale (*never*; *sometimes*; *often*; *always*). A visual aid to the scale in the form of a diagram of blocks in ascending size with the scale wording was provided, and two practice items ('I watched sports on TV' and 'I ate rotting food') were added to help with familiarisation and to assess understanding of the response scale. A response of 'never' to the latter item was expected. If a participant selected another option and was able to explain why, this suggested that they were able to understand and reliably respond to the items. If the participant was not able to explain why they chose a given response, or it appeared that they did not understand the items and/or response scale, data collection was discontinued. The adapted version of the scale was approved by the developer of WEMWBS (author SSB). The WEMWBS-ID is available on request from the corresponding author.

Adapted Rosenberg Self-Esteem Scale

Based on evidence that low self-esteem and depression co-occur in this population (Lee *et al.* 2023), to test convergent validity we hypothesised a positive association between self-esteem and wellbeing. The Rosenberg Self-Esteem Scale (RSES; Rosenberg 1965, 1982) has been adapted for people with IDs (Dagnan & Sandhu 1999). This adapted RSES comprises six items (four positively worded and two negatively worded, reverse scored). In the present study, the response scale was simplified from five to four points (never to always). Responses were scored from 0 to 3 (range of total scores was 0–18), higher total scores indicating higher self-esteem. The adapted RSES was administered to Samples 1 to 3, also using an interview style format and screenshare. McDonald's omega in the present study was 0.65 across the three samples, with a poor $\omega = 0.56$ for Sample 2 and a fair $\omega = 0.76$ for Samples 1 and 3.

Results

Warwick–Edinburgh Mental Wellbeing Scale-Intellectual Disability

The psychometric data for each of the four samples are presented in Table 1. McDonald's omega ranged

from fair (0.77) to good (0.87) across Samples 1 to 3, demonstrating overall good internal consistency. Item-total correlations for the combined samples ranged between .18–.71 [lowest for item 11 ('I felt able to make my own decisions'); highest for item 8 ('I felt good about myself')].

Test–retest reliability, calculated for 22 participants in Sample 1 who completed the WEMWBS-ID twice, with an average interval of 8 days (range = 6 to 14 days, *SD*: 2.10), was excellent [intraclass correlation coefficient (ICC) = .88, 95% CI = .72, .95].

Using Spearman's rank correlation, positive associations were found between total scores on the WEMWBS-ID and RSES, ranging between fair (r = .48) and good (r = .66) across samples, demonstrating overall good convergent validity.

A confirmatory factor analysis (CFA) for a single factor model on combined data from Samples 1 to 3, indicated an adequate model fit: χ^2 [77, N = 96) = 117.45, P = .002; root mean square error of approximation (RMSEA) = .07, 90% CI (.04; .09); comparative fit index (CFI) = .90; Tucker–Lewis index (TLI) = .86]. Factor loadings were all statistically significant and varied from .28 to .69, see Table 2. Factor loadings for items 1, 6 and 11 were weak (weakest for item 11), while those for items 3, 5, 7, 8 and 10 were strong. The average value explained by each item was R^2 = .32 (range = .076 to .618).

Possible total scores on the WEMWBS-ID range from 0 to 42, with a higher score indicating higher levels of mental wellbeing. The observed total scores ranged from 10 to 42 [M = 27.39; SD = 7.66; 95% CI (21.76, 33.02)]. No participants scored the minimum score and one scored the maximum, suggesting the absence of floor and ceiling effects. The distribution of scores showed the skewness of the data to be approximately symmetric (0.08) with a kurtosis value of −0.88. Visual examination of the histogram approximated to a normal distribution. The

Table 2 Confirmatory factor analysis loadings for the WEMWBS-ID and SWEMWBS-ID.

Item	WEMWBS-ID	SWEMWBS-ID
1	0.36	0.41
2	0.43	0.45
3	0.72	0.56
4	0.46	
5	0.69	
6	0.38	0.48
7	0.60	0.67
8	0.79	
9	0.52	0.48
10	0.74	
11	0.28	0.31
12	0.58	
13	0.59	
14	0.57	

SWEMWBS-ID, Short Warwick–Edinburgh Mental Wellbeing Scale-Intellectual Disability; WEMWBS-ID, Warwick–Edinburgh Mental Wellbeing Scale-Intellectual Disability.

Table 1 Psychometric data for the WEMWBS-ID and SWEMWBS-ID.

	Mean total score (*SD*)	McDonald's omega	Item-total correlations	Convergent validity
WEMWBS-ID				
Sample 1 (n = 44)	26.91 (7.81)	0.87	−.02–.57	r(42) = .66, P < .001
Sample 2 (n = 22)	32.41 (6.19)	0.77	−.36–.72	r(19) = .48, P = .015
Sample 3 (n = 30)	24.40 (6.73)	0.82	−.34–.77	r(28) = .59, P < .001
SWEMWBS-ID				
Sample 1 (n = 44)	12.98 (3.97)	0.74	.04–.47	r(42) = .60, P < .001
Sample 2 (n = 22)	14.59 (3.66)	0.62	−.24–.66	r(19) = .48, P = .013
Sample 3 (n = 30)	12.03 (2.75)	0.36	−.34–.38	r(28) = .51, P = .002
Sample 4 (n = 27)	12.22 (3.88)	0.74	.01–.66	Did not complete adapted RSES

RSES, Rosenberg Self-Esteem Scale; SWEMWBS-ID, Short Warwick–Edinburgh Mental Wellbeing Scale-Intellectual Disability; WEMWBS-ID, Warwick–Edinburgh Mental Wellbeing Scale-Intellectual Disability.

distribution of responses per item for both scales is presented in Tables S2 and S3.

Short Warwick–Edinburgh Mental Wellbeing Scale-Intellectual Disability

Responses to the seven items constituting the SWEMWBS-ID (items 1, 2, 3, 6, 7, 9 and 11) were analysed for the separate samples (see Table 1). McDonald's omega ranged from 0.62 to 0.74 in three samples to a poor 0.36 in one sample, demonstrating a need for further examination of the short version's internal consistency. Item-total correlations for the combined samples ranged between .25 and .52 (lowest for item 11; highest for item 7).

Test–retest reliability of the SWEMWBS-ID (Sample 1) was moderate, ICC = .67, 95% CI [.58, .76]. Using Spearman's rank correlations, positive associations were found between total scores on the SWEMWBS-ID and RSES, ranging between fair (r = .48) and good (r = .60), demonstrating overall good convergent validity.

A CFA for a single factor model indicated a good model fit: χ^2 (14, N = 123) = 18.93, P = .17; RMSEA = .05, 90% CI [.00; .11]; CFI = .95; TLI = .92. Factor loadings were all statistically significant and varied from .31 to .67 (lowest for item 11; highest for item 7), see Table 2. The average value explained by each item was R^2 = .24 (range = .10 to .44).

The observed total SWEMWBS-ID scores ranged from 4 to 21 [M = 12.87; SD = 3.70; 95% CI (8.70, 17.04)], out of a possible total score of 0 to 21. No participant scored zero and only three (2.44%) scored 21, suggesting that floor and ceiling effects were absent. Skewness of the data was approximately symmetric (0.11) with a kurtosis value of −0.28. Visual examination of the histogram approximated to a normal distribution.

Discussion

The WEMWBS-ID demonstrated good internal consistency and excellent test–retest reliability. A moderate positive correlation with the adapted RSES indicated good initial convergent validity, although the low internal consistency of the RSES in some of the samples means convergent validity needs examining further and convergent validity with other measures is important to examine in future. The CFA supported the hypothesised one-factor structure, although further exploration of model fit with larger samples is indicated, particularly for the 14-item version tested here on a modest N = 96. Floor and ceiling effects did not appear to be present.

The SWEMWBS-ID demonstrated poorer internal consistency compared with the 14-item version, particularly for one of the four samples. However, it had moderate test–retest reliability and good convergent validity. In contrast to the 14-item version, the results from the CFA also indicated a good model fit. This short version of the measure requires additional research testing, but overall, the results suggest it is also a promising tool. Particularly low internal consistency was restricted to one relatively small sample and may well have been a sample effect.

Participants demonstrated a tendency to respond 'sometimes' and 'always', with fewer participants choosing the option 'often'. This suggests that there was not a bias towards the two most positive response choices. In the original validation of the WEMWBS in the general population (Tennant *et al.* 2007), 'often' was the most popular response chosen overall. It is possible that participants in the present study found 'often' conceptually more abstract compared with 'sometimes' and 'always', as it requires an estimate how frequently something occurs beyond 'it happens but not all of the time', (i.e. 'sometimes') or 'it happens all of the time' (i.e. 'always').

Item 11 ('I felt able to make my own decisions') had the lowest inter-item correlations and factor loadings for both the full and short versions. Over 50% of participants chose 'always' in response to this item, which was greater than the average proportion of 'always' responses. Self-advocacy group membership is associated with empowerment and increased confidence in people with IDs (Fenn & Scior 2019; Tilley *et al.* 2020), and high advocacy group membership (76.42% of participants) may have influenced responses to this item.

Although the sample sizes in the present study were adequate for an initial exploration of the psychometric properties of the measure, they were relatively small compared with other psychometric evaluations of the WEMWBS and SWEMWBS.

The WEMWBS-ID was administered 1-to-1 in interview format by a researcher, as recommended by Kooijmans *et al.* (2022). Although social desirability

bias cannot be ruled out, this approach meant that researchers were able to assess whether participants understood the items and response options well enough to complete the measure and to offer support where needed. Furthermore, a 100% completion rate for the WEMWBS-ID was achieved, with no missing data. It may be important in future to also check that scores on the adapted WEMWBS completed via video link (as in the current study) and face-to-face are equivalent, although we note that existing evidence does suggest that there can be a high degree of equivalence between face-to-face and online/telehealth assessment (McDermott *et al.*, 2023) including in the context of ID (Hodge *et al.*, 2019).

Due to the recruitment strategy, the majority of participants were self-advocacy group members. Research suggests that increases in self-esteem and subjective wellbeing are associated with self-advocacy group membership in people with IDs (Fenn & Scior 2019; Tilley *et al.* 2020). Therefore, it is likely that the sample was less socially isolated and experienced higher levels of overall wellbeing than individuals with IDs as a whole.

Further exploration of the psychometric properties of the WEMWBS-ID and SWEMWBS-ID with larger samples is required to provide further support for the reliability and validity of the scales. The feasibility of self-administration of the scale should be examined as this would allow research on a larger scale. Researchers may also wish to further explore the utility of the 4-point response scale to ascertain whether the option 'often' is acceptable and produces reliable responses. A three-point Likert scale ('never', 'sometimes', 'always') could potentially be piloted as this may be more suitable, as has been found for other measures (Fang *et al.* 2011). However, this limits opportunities for detecting change due to the reduced variability in scores.

The adaptations to the original scale mean that it is not possible straightforwardly to compare ID and general population samples. Future research could assess the potential value of using our adapted version with respondents without disabilities, to allow comparing ID and general population samples. For the present, the WEMWBS-ID allows comparisons in mental wellbeing between different ID populations and also within the same population over time.

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Conflict of interest

There are no conflicts of interest to declare. SSB developed the Warwick–Edinburgh Mental Wellbeing Scale however has no financial interests in the scale.

Authors' contributions

KS, RH, LR, SSB and MO were involved in the conception of the study and adaptation of the measure. MP and JYL were involved in subsequent developments of the study. MP and NH analysed and interpreted data with input from KS. MP, KS and RH drafted the manuscript. All authors reviewed drafts of the manuscript.

Ethical approval

Ethical approval was obtained from the University College London Research Ethics Committee (Project ID Number: 0241/005). An ethics amendment was approved on 26 May 2021, which enabled participants with IDs to be recruited for the purposes of psychometric evaluation of the WEMWBS-ID.

Informed consent

Informed consent was obtained from all individual participants included in the study at the time of the survey, and no further consent or ethical approval was needed.

Disclaimer

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Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Supporting Information

Additional Supporting Information may be found online in the supporting information tab for this article.

Table S1. Outline of participants included in the present study.
Table S2. Frequency of responses per item for the WEMWBS-ID (n = 96).
Table S3. Frequency of responses per item for the SWEMWBS-ID (n = 123).