The British Sign Language Versions of the Patient Health Questionnaire, the Generalized Anxiety Disorder 7-Item Scale, and the Work and Social Adjustment Scale

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The present study is aimed to translate 3 widely used clinical assessment measures into British Sign Language (BSL), to pilot the BSL versions, and to establish their validity and reliability. These were the Patient Health Questionnaire (PHQ-9), the Generalized Anxiety Disorder 7-item (GAD-7) scale, and the Work and Social Adjustment Scale (WSAS). The 3 assessment measures were translated into BSL and piloted with the Deaf signing population in the United Kingdom (n = 113). Participants completed the PHQ-9, GAD-7, WSAS, and Clinical Outcomes in Routine Evaluation–Outcome Measure (CORE-OM) online. The reliability and validity of the BSL versions of PHQ-9, GAD-7, and WSAS have been examined and were found to be good. The construct validity for the PHQ-9 BSL version did not find the single–factor solution as found in the hearing population. The BSL versions of PHQ-9, GAD-7, and WSAS have been produced in BSL and can be used with the signing Deaf population in the United Kingdom. This means that now there are accessible mental health assessments available for Deaf people who are BSL users, which could assist in the early identification of mental health difficulties.

Common mental health problems, including anxiety and depression, are experienced by 9% of the general adult population in the United Kingdom (Singleton, Bumpstead, O'Brien, Lee, & Meltzer, 2001); however, the prevalence of anxiety and depression is higher in the d/Deaf[1] population (Kvam, Loeb, & Tambs, 2007). In only a minority of cases are mental health difficulties and deafness causally connected, that is, where the etiology of deafness is coincidental with organic origins of mental illness or neurological impairment (Hindley, Hill, McGuigan, & Kitson, 1994; Vernon, 2005). Many d/Deaf[1] children struggle to achieve age-appropriate language (whether signed or spoken; Mayberry, 2002), routinely have significant gaps in social knowledge, and have delayed social maturity (Woolfe, Want, & Siegal, 2002). One of the reasons for this is the language delay and communication barriers faced by d/Deaf[1] people. The incidence of mental health problems in d/Deaf[1] children/young people is around 1.6 times greater than that amongst hearing counterparts (Department of Health, 2005).

Access to mental health services for Deaf people is poor in comparison to the hearing population (Department of Health, 2002, 2005). At least 100,000 Deaf people in the United Kingdom use British Sign Language (BSL) as their preferred language (British Society for Mental Health and Deafness [BSMHD], 2010). BSL, a visual language with no written form, was officially recognized in its own right by the British Government in 2003. However, access to culturally appropriate mental health services for Deaf people is limited. Improving Access to Psychological Therapies (IAPT), a mental health service in the United Kingdom, whose aim is to support people with depression and/or anxiety, has acknowledged the lack of access to services for those who use BSL. The Department of Health in the United Kingdom recognized that health professionals working in primary care services (i.e., in community services such as general practice) failed to identify the

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early symptoms of possible mental health difficulties in some Deaf people (Department of Health, 2002).

Mental health services increasingly use self-report mental health assessments to either identify or determine the severity of mental health problems. Although some work has been carried out on translating or adapting assessment tools into BSL (Gascon-Ramos, Young, Petrides, Stone, & Woolfe, 2010; Rogers, Young, Lovell, & Evans, 2012a), there is limited normative data for the Deaf population.[2] The mental health assessments used in the Minimum Dataset in IAPT services in the United Kingdom include the Patient Health Questionnaire (PHQ-9), the Generalized Anxiety Disorder 7-item scale (GAD-7), and the Work and Social Adjustment Scale (WSAS). Once the BSL versions of these three assessments have been validated, they could be used in primary care to assist in determining the severity of mental health difficulties experienced by Deaf people at an earlier stage (Improving Access to Psychological Therapies [IAPT], 2012a). Early identification of mental health difficulties could mean that Deaf people might benefit from appropriate support at the primary- and secondary-care levels. Access to appropriate mental health support could lead to improved mental health in the Deaf population.

The aim of the present study was to evaluate the BSL versions of the mental health assessments with Deaf adults in the United Kingdom. The psychometric properties of the BSL versions of PHQ-9, GAD-7, and WSAS were examined by conducting a pilot study with a sample of Deaf people in the United Kingdom, whose language is BSL. The BSL version of the Clinical Outcomes in Routine Evaluation – Outcome Measure (CORE-OM) was additionally used to establish the convergent validity of the three newly translated BSL mental health assessments.

Methods

Materials

The Patient Health questionnaire.   The Patient Health Questionnaire (PHQ-9) was developed by Spitzer, Kroenke, and Williams (1999) and measures depression. PHQ-9 contains nine items and covers nine criteria listed in the *Diagnostic and Statistical Manual of Mental Disorders*, 4th Edition (*DSM-IV*), on depression

(Kroenke, Spitzer, & Williams, 2001), requiring respondents to rate the frequency of present difficulties during the past 2 weeks. Scores indicate presence and the severity of the depression, with a maximum score of 27 and a minimum score of 0. Scores of 5, 10, 15, and 20 indicate mild, moderate, moderately severe, and severe depression, respectively. The internal reliability of the English version of the PHQ-9 with a clinical, hearing population was in the range of 0.86–0.89 (Kroenke et al., 2001), which indicates good reliability. The cutoff score ("grey zone") for PHQ-9 is 10–15 (Kroenke et al., 2001). This denotes the minimum score that must be met in order to raise concerns regarding the level of severity of the person's mental health state. Factor analyses of the English version of PHQ-9 have found a single-factor solution (Dum, Pickren, Sobell, & Sobell, 2008; Hepner, Hunter, Edelen, Zhou, & Watkins, 2009; Spitzer, Kroenke, Williams, & Löwe, 2006), which indicates that there is one distinct facet of depression in the hearing population.

The PHQ-9 has been translated into several other languages, including Swedish (Hansson, Chotai, Nordstom, & Bodlund, 2009), Thai (Lotrakul, Sumrithe, & Saipanish, 2008), and Greek (Hyphantis et al., 2011). Many translated versions of PHQ-9 have also extracted a single factor (Hansson et al., 2009, for a Swedish population; Liu et al., 2011, for a Chinese population; and Huang, Chung, Kroenke, Delucchi, & Spitzer, 2006, with four different ethnic populations in the United States). Interestingly, the English version for an Australian population did not extract a single-factor solution (Titov et al., 2011). Titov et al. (2011) suggested that the failure to extract a single factor might be owing to the homogeneous characteristic of the sample in their study, as many of them were clinically depressed.

The Generalized Anxiety Disorder 7-item scale.   Spitzer et al. (2006) created the Generalized Anxiety Disorder 7-item scale (GAD-7) to measure generalized anxiety disorder (GAD). Scores of 5, 10, and 15 indicate mild, moderate, and severe anxiety, respectively. The reliability of the GAD-7 English version in a hearing population was found to be excellent (α = .92) and factor analysis of GAD-7 has found that all items in GAD-7 load into one factor (Spitzer et al., 2006).

GAD-7 has been translated into other languages, for example, Dutch (Donker, van Straten, Marks, & Cuijpers, 2011), Bengali, Gujarati, Hindi, Punjabi, Urdu, and Polish (IAPT, 2012b). Similar to the English version, the Spanish version of GAD-7 extracted a single factor (Garcia-Campayo et al., 2010), as did the Dutch version (Donker et al., 2011).

The Work and Social Adjustment scale.   Mundt, Marks, Shear, and Greist (2002) developed the Work and Social Adjustment Scale (WSAS). The purpose of WSAS is to measure impairment in functioning and includes five items related to work and social functioning. The first item on the WSAS relates to work. If respondents are retired or are not in work for reasons unrelated to their problems, then they can select "not applicable" and the score for question one can be substituted with the mean score from the remaining questions. The internal reliability for the English version of WSAS with a hearing population ranged from 0.79 to 0.94. The principal component analysis of the WSAS English version extracted a single factor (Mataix-Cols et al., 2005; Mundt et al., 2002).

The Clinical Outcomes in Routine Evaluation – Outcome Measure. The Clinical Outcomes in Routine Evaluation – Outcome Measure (CORE-OM) measures global distress (Barkham et al., 1998). It measures a range of mental health problems, including depression, anxiety, functional capacity, and risk. It has been translated into other written languages, including Slovak (Gampe, Biešcad, Balúnová-Labanicová, Timulák, & Evans, 2007) and Italian (Palmieri et al., 2009). The BSL version of CORE-OM has been produced and validated by Rogers, Evans, Campbell, Young, & Lovell (2012b) as part of a separate research study. The reliability for all items in the BSL CORE-OM was found to be .94. It was included with the other assessments in the present study.

Procedure

Translating the mental health assessments into BSL.   To produce BSL versions of the GAD-7, PHQ-9, and WSAS, a translation process was carried out following the five-stage procedure outlined by Evans (2008). It was adapted slightly to accommodate the fact that BSL

is a visual language with no written form, in that the various BSL versions produced through this process were filmed.

1. At the first stage, five Deaf people who were bilingual in English and BSL but from different backgrounds (including a mental health professional; a qualified interpreter; and a lay person) each independently carried out forward translations from English into BSL (first draft).
2. During the second stage, the first author of this paper (K. D. Rogers) and one of those involved in the creation of the original mental health assessments met with the forward translators. Together, they reviewed the differences between the five BSL versions of each tool. The meaning of the English versions was clarified and used as a reference point for the identification of the preferred BSL version of each assessment.
3. This was followed by the production of a revised BSL version of each assessment tool (second draft).
4. The second draft of the BSL versions was then translated back into English by two individuals not previously involved in the study. In parallel, five BSL users were asked to complete the assessments online to check whether they had any difficulties with the BSL versions.
5. Feedback from the five people who completed the assessments and those who backtranslated them was incorporated, following further discussion with the person who created the original version about any issues arising therefrom. This led to the production of the final versions of the three assessment tools in BSL, ready to be piloted.

These final versions in BSL were produced in a visual (filmed) format, not in a written form (as were the interim versions). For further details of the translation process and the challenges faced, see Rogers et al. (2012a).

Pilot study of the PHQ-9, GAD-7, and WSAS with a Deaf population.   A bespoke web site was developed for this project, in both BSL and English, which hosted the information sheet explaining the purpose of this project

for both participants and professionals working with Deaf people. It was explained that they will only do the BSL versions of the mental health assessments, with no written English versions involved in the assessments. Lists of the inclusion and exclusion criteria for participation in the study were included on the web site. Professionals working with Deaf people (e.g., counselors, community mental health nurses, and clinical psychologists) were asked to pass on the information to those who might satisfy the inclusion criteria, in order for them to take part. Deaf people were then able to decide whether they wished to take part or not. The process included consenting to take part, the completion of a demographic questionnaire, and the four mental health assessments in BSL. When they had completed the pilot versions of the three assessments, participants were taken directly to the "support" page of the project web site, which hosted additional resources for Deaf people. These included information about the SignHealth Therapy Service, which is a specialist service for Deaf people in the United Kingdom supporting those who experience mental health difficulties.

In addition to the three mental health assessments, participants were also invited to complete the CORE-OM, the BSL version of which had previously been created and checked for reliability (Rogers et al., 2012b). The purpose of using the CORE-OM was to establish convergent validity for each of the other mental health assessments. Examination of the convergent validity of an assessment in the target language, by means of measuring a similar area to that measured by a new version of an assessment, is an approach that has been used in previous studies undertaken with hearing populations (e.g., Garcia-Campayo et al., 2010).

Recruitment

Inclusion criteria.   The inclusion criteria were that participants had to be Deaf BSL users aged 16 years or more and residing in the United Kingdom.

Exclusion criteria.   Participants were excluded if they were not Deaf, did not use BSL, had a learning disability, had psychosis, or were current inpatients on mental health wards, as the norms may be different for these groups. Those who were unable to access signed

information through the visual interface of a computer screen, such as those who were Deafblind, were also excluded.

A broad recruitment strategy was employed, including advertising to the general Deaf population via e-mails, advertisements in magazines or online web sites and presentations at Deaf forums or clubs across the United Kingdom. Information about the present study was also passed on to service users of specialist mental health services for Deaf people, such as National Deaf Child and Adolescent Mental Health Services (a national service in the United Kingdom for d/Deaf[1] children and young people who experience mental health difficulties), SignHealth, and the eight local National Health Service trusts[3] in the United Kingdom.

This project was approved by the National Research Ethics Service (NRES) Committee for Yorkshire and the Humber – Leeds West (REC number: 11/ YH/0180). The project had ethical approval from eight local NHS organizations.

Participants

In total, 136 people provided demographic details and completed the mental health assessments. However, 6 did not meet the inclusion criteria (3 were hearing and 3 hard of hearing), 1 person subsequently withdrew consent, and 14 provided incomplete data, which left a total of 113 sets of data sets with few missing items.

Demographics.   The majority of the 113 participants were female (60%); 86% were White British, 4% were Asian British (Indian), 3% were White Irish, 3% were White with other backgrounds, and there was one person in each of the Asian British (Pakistani), Asian British with other background, Mixed, and Chinese ethnic groups. The age of the participants ranged from 19–65 years: 19% were 19–24 years old, 38% were 25–34 years old, 24% were 35–49 years old, 19% were 50–64 years old, 1% were in the 65 plus years old, and 4% of responses were missing this information. Slightly more than one half (51%) stated that they were the only Deaf person in their families. Regarding language, 76% reported being BSL users, 16% preferred to use

Sign Supported English,[4] and 7% generally used spoken English. Most first learned BSL as a child: 30% learned from birth, 14% when aged 1–3 years old, 13% when 4–7 years old, 7% at 8–11 years of age, 12% when 12–16 years old, 18% at 17–24 years of age, and 6% after 25 years of age. The majority of the participants reported being involved in the Deaf community (83% reported often or very much involved), felt they belonged to the Deaf community (81% reported quite so or very much so), and identified themselves as culturally Deaf (83% reported quite so or very much so).

The sample was divided into two groups: Group 1 included those who reported no mental health difficulties in the previous 12 months ($n = 88$), and Group 2 included those who reported some mental health difficulties in the previous 12 months ($n = 25$). Group 2 was additionally subdivided depending on whether the participant was receiving professional support at the time of the study ($n = 6$), had received support within the previous 12 months but not at the time of the study ($n = 7$), or had not had any professional support ($n = 12$; see Table 1). We reserved, as part of the consent procedure, the right to contact a participant's general practitioner (GP) should their responses, when analyzed, raise cause for concern about their mental well-being. Contact with the GP was made if there had been any cause for concern in response to the following items: No. 1 in PHQ-9, and Nos. 16, 24, and 34 in CORE-OM. In total, 23 participants' GPs were contacted: 6 out of 88 participants in Group 1 and 17 out of 25 participants in Group 2 (the latter comprising 6 out of the 6 who were receiving professional support at the time of study, 2 out of the 7 participants who had received professional support in the previous 12 months but

not at the time of study, and 9 out of 12 participants who had had no professional support).

Statistical Analyses

Data were analyzed using SPSS Release 16. Analyses of the reliability and validity were carried out by including data from both Group 1 and Group 2, owing to the small sample size for Group 2 ($n = 25$). However, for the mean comparison between Group 1 and Group 2, a Mann–Whitney U test was carried out.

The reliability of each assessment was examined in terms of the internal consistency of the items using Cronbach's alpha values. The BSL assessments were examined for construct validity and convergent validity. Construct validity determines how much the operational measures of items in the assessment cover what they are intended to measure of the theoretical construct. Convergent validity tests the degree to which a particular assessment correlates with another assessment that measures similar domains. The way in which missing items were dealt with was dependent on the type of analysis. For the mean and standard deviation analysis and convergent validity analysis (pairwise involved using the total score), the missing items were substituted with mean scores across the other items for the participant. A maximum of one missing item of data was allowed for the PHQ-9, GAD-7, and WSAS (including the first question), and a maximum of three missing items for the CORE-OM. For the reliability analysis and principal component analysis, actual responses to the individual items were analyzed and missing data were dealt with by listwise deletion.

Principal component analysis with Varimax rotation was carried out to establish construct validity.

Table 1 Number of participants in each mental well-being group, including those whose GPs had been contacted

Professional support received	Sample size (n = number of GPs contacted)
Group 1	
No mental well-being difficulties in the previous 12 months	88 (contact GP $n = 6$)
Group 2	
Had mental well-being difficulties in the past 12 months	
Have professional support at the present time	6 (contact GP $n = 6$)
Had professional support in the past 12 months but not now	7 (contact GP $n = 2$)
Had no professional support	12 (contact GP $n = 9$)

Components were extracted if their eigenvalues were greater than 1 (absolute values of loadings less than 0.4 are suppressed in the output for clarity). A recommended minimum sample size to carry out principal component analysis is at least five and preferably 10 times as many observations per variable (Hair, Black, Babin, Anderson & Tatham, 2006). This means, for example, that for the 9-item PHQ-9, the sample size should be approximately 45–90.

Convergent validity for each of the scores PHQ-9, GAD-7, and WSAS was assessed by estimating Pearson's correlation with CORE-OM depressive items (Nos. 5, 9, 23, and 24), CORE-OM anxiety items (Nos. 2, 11, and 15), and the functioning domain of CORE-OM (Nos. 1, 3, 7, 10, 12, 19, 21, 25, 26, 29, 32, and 33), respectively.

Results

Descriptive Statistics

Table 2 shows the mean and standard deviation (SD) scores of the total score for each BSL assessment for all data (both Group 1 and Group 2), for those who reported no mental health difficulties in the previous 12 months (Group 1) and for those who did (Group 2). Means and SDs were higher in Group 2, indicating increased levels of and greater variability in depression, anxiety, impaired function, and global distress.

Comparing Means Between Group 1 and Group 2

Group 2 differed in its scores on the BSL versions of PHQ-9, GAD-7, WSAS, and CORE-OM from Group 1. A Mann–Whitney U test showed that on PHQ-9, Group 2 (median = 12.00) scored significantly higher than Group 1 (median = 3.00), $U = 151.50$, $p < .001$. GAD-7 scores for Group 2 (median = 7.00) were significantly higher than those for Group 1 (median = 2.00), $U = 245.50$, $p < .001$. Significantly higher scores were also noted for WSAS for Group 2 (median = 12.00) compared to Group 1 (median = 1.00), $U = 178.50$, $p < .001$. Differences between Group 1 and Group 2 for the CORE-OM were also significant, with Group 2 (median = 1.26) showing higher values than Group 1 (median = 0.53), $U = 159.50$, $p < .001$.

Psychometric Properties of BSL Versions of PHQ-9, GAD-7, and WSAS

PHQ-9 BSL version.   Internal consistency for both Group 1 and Group 2 together was α = .81, which indicates that the reliability of the PHQ-9 is good (George & Mallery, 2003). However, one item (No. 1) has an item-total correlation lower than .3. The Cronbach's alpha value would increase very slightly (α = .82) if it were to be removed, which indicates that PHQ-9 Item No.1 may possibly need revising, or at least reviewing, to increase the overall reliability of PHQ-9 BSL.

The construct of the PHQ-9 BSL version for the Deaf population showed two factors. Principal components analysis with Varimax rotation also extracted two components. Component 1 contained Item Nos. 2, 3, 5, 6, 7, 8, and 9; and Component 2 contained Item Nos. 1, 4, and 8 (Table 3). Component 1 represented 42.28% of total variance, and Component 2 accounted for 14.10% of total variance, with communality values ranging from .358 to .753. Convergent validity was examined by looking at the correlation between PHQ-9 score and CORE-OM BSL depressive items and was found to be significant ($r = .68$, $n = 90$, $p < .001$). This indicated that the BSL version of the PHQ-9 was convergent with the CORE-OM depressive items.

Table 2 Participants' scores for the Patient Health Questionnaire (PHQ-9), Generalized Anxiety Disorder (GAD-7), Work and Social Adjustment Scale (WSAS), and Clinical Outcomes in Routine Evaluation – Outcome Measure (CORE-OM) by mental well-being group

	Mean (Standard deviation)			
Group	PHQ-9	GAD-7	WSAS	CORE-OM
Both Groups 1 and 2	5.34 (4.71)	3.25 (3.76)	4.71 (6.20)	0.76 (0.58)
Group 1	3.25 (3.25)	2.14 (2.46)	2.68 (3.45)	0.58 (0.37)
Group 2	11.61 (4.12)	7.61 (4.76)	12.93 (7.95)	1.46 (0.68)

Table 3   Component loadings of the Patient Health Questionnaire (PHQ-9) British Sign Language (BSL) items after principal components analysis with Varimax rotation

PHQ-9 BSL Items	Component 1	Component 2
No. 1: Little interest or pleasure in doing things	—	.85
No. 2: Feeling down, depressed, or hopeless	.74	—
No. 3: Trouble falling or staying asleep, or sleeping too much	.50	—
No. 4: Feeling tired or having little energy	—	.74
No. 5: Poor appetite or overeating	.71	—
No. 6: Feeling bad about yourself, or that you are a failure, or have let yourself or your family down	.85	—
No. 7: Trouble concentrating on things, such as reading the newspaper or watching television	.58	—
No. 8: Moving or speaking so slowly that other people could have noticed. Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual	.58	.50
No. 9: Thoughts that you would be better off dead or of hurting yourself in some way	.76	—

Note. Component loadings <.40 have been suppressed for clarity. Kaiser–Meier–Olkin measure of sampling adequacy = .832.

GAD-7 BSL version.   The internal reliability of the GAD-7 BSL version was found to be in the good range of Cronbach's alpha value ($\alpha = .88$). None of the items in GAD-7 had less than a .3 corrected item-total correlation, which indicates that they do not need to be revised to improve reliability.

The validation of the GAD-7 was completed by checking the construct of the assessment itself, as well as its convergent validity with another similar assessment (the CORE-OM BSL). Similar to the English version of GAD-7 used with a hearing population (Spitzer et al., 2006), the BSL version of GAD-7 used in the present study with a Deaf population also had a single-component solution (Table 4), accounting for 58.08% of total variance, of which the communality loadings of each item onto the one component were in the range of .518–.717. This means that the concept of anxiety as expressed in the items in GAD-7 are common to individuals from both the Deaf population using the BSL version and individuals from the hearing population using the English version. The anxiety items in CORE-OM BSL had a positive correlation with GAD-7 items ($r = .75$, $n = 95$, $p < .001$).

WSAS BSL version.   The internal consistency of items within the BSL version of the WSAS was good ($\alpha = .88$). The construct validity of the WSAS was also found to be good. A single-component solution was extracted (Table 5), accounting for 68.68% of the total variance in one component. The communalities ranged from .487 to .812. The BSL version of the WSAS had

a positive correlation with the functioning domains of the CORE-OM BSL ($r = .70$, $n = 83$, $p < .001$).

CORE-OM BSL version.   The internal consistency of the items for each domain of the CORE-OM BSL, as well as all items and items minus risk, were in the range of acceptable to excellent, as suggested by George and Mallery (2003). The Cronbach's alpha values were as follows: $\alpha = .94$ for all items; $\alpha = .79$ for well-being; $\alpha = .92$ for problems; $\alpha = .83$ for functioning, $\alpha = .72$ for risk, and $\alpha = .94$ for items minus risk. This indicates that the response to the items in CORE-OM BSL were consistent with other items in each domain.

Discussion

The reliabilities of the BSL versions of the PHQ-9, GAD-7, and WSAS were found to be good. The only item that reduced reliability was Item No. 1 in the PHQ-9, yet removing this item gave only a minor increase in reliability (.01). This suggests that the current BSL item for No. 1 is acceptable for use and may not need to be revised. The validation of the GAD-7 and WSAS was performed by checking the construction of the BSL assessment itself in comparison with the hearing population. The BSL items of anxiety and functioning in GAD-7 and WSAS, respectively, had one underlying component for anxiety and functioning, as in the hearing population. However, for the PHQ-9, construct validation showed that there were two components for depression in a Deaf population.

Table 4 Component loadings of the Generalized Anxiety Disorder (GAD-7) British Sign Language (BSL) items after principal components analysis

GAD-7 BSL Items	Component 1
No. 1: Feeling nervous, anxious, or on edge	.73
No. 2: Not being able to stop or control worrying	.85
No. 3: Worrying too much about different things	.79
No. 4: Trouble relaxing	.77
No. 5: Being so restless that it is hard to sit still	.74
No. 6: Becoming easily annoyed or irritable	.72
No. 7: Feeling afraid as if something awful might happen	.74

Note. Kaiser–Meier–Olkin measure of sampling adequacy = .845.

Table 5 Component loadings of the Work and Social Adjustment Scale (WSAS) British Sign Language (BSL) items after principal components analysis

WSAS BSL Items	Component 1
No. 1: Because of my [problem], my ability to work is impaired.	.90
No. 2: Because of my [problem], my home management is impaired.	.78
No. 3: Because of my [problem], my social leisure activities are impaired.	.90
No. 4: Because of my [problem], my private leisure activities are impaired.	.70
No. 5: Because of my [problem], my ability to form and maintain close relationships with others, including those I live with, is impaired.	.85

Note. Kaiser–Meier–Olkin measure of sampling adequacy = .839.

The sample size in the present study was too small to carry out a confirmatory factor analysis for the PHQ-9.

The extraction of at least two components has been noted in another study. The psychometric comparison study by Titov et al. (2011) of the PHQ-9 and BDI-II for measuring response during treatment of depression also did not extract a one-factor solution. However, unlike in that study, not all Deaf people in the present study were clinically depressed. Other research not concerned with depression has also demonstrated inconsistencies between Deaf and hearing populations in the investigation of psychometric properties. Crowe's (2002) study of the American Sign Language version of the Rosenberg Self-Esteem Scale extracted a three-component solution in comparison with other studies with a hearing population that showed either one or two components.

There are two potential explanations. First, it might be that the concept of depression, as assessed through the PHQ-9, from a Deaf population perspective, has two distinct facets. Depression in various ethnic hearing populations has been found to be culturally determined, which affects responses to standardized assessments (Huang et al., 2006; Spitzer et al., 2006).

Depression might not be the same for Deaf BSL users as it is for hearing people in its cultural meaning and expression. Second, it might be that the items that fall outside of Group 1 (Items 1 and 4) need to be revised in the BSL version. However, Item 4 in PHQ-9 has item-total correlation greater than .3, which shows that it is reliable and does not need to be revised. This points toward the first explanation being the most probable reason, that is, that the concept of depression has two distinct facets within the Deaf population.

Interestingly, both Item 1 and Item 4 in the PHQ-9 are related to motivation. Poor motivation is indicative of depression, hence items in the PHQ-9 seek to measure it. However, there are other reasons why someone might express poor motivation. Amongst Deaf people who face both daily challenges in a largely uncommunicative world as well as regular instances of direct and indirect discrimination, poor motivation may have different causes or be more common for reasons other than depression. For instance, the motivation-related item in the CORE-OM ("I have felt totally lacking in energy and enthusiasm"), elicited a response of "sometimes" in most Deaf people, demonstrating that it is not an unusual self-perception. Perhaps a

Deaf person's motivation depends on social context. For example, a Deaf person may give a different answer if they are asked whether they have the energy to do things in a hearing social environment as opposed to a Deaf social environment. For Deaf young people, in an educational context, Stinson and Whitmire (2000) pointed out that difficulties with language skills might affect some Deaf people's motivation. It would be interesting for future research to explore Deaf people's perspectives on motivation in a variety of culturally and linguistically distinct contexts in order to understand its roots and the nature of its association with depression. A contextualized approach to research design through the collection of qualitative data would enable such exploration.

Although this was a pilot study, for research purposes, we included in the design the means of identifying any participants whose responses might indicate they were experiencing mental health difficulties that were of immediate concern. Deaf people face barriers to health services and it is possible health professionals may not have spotted the concerns of the Deaf people (Alexander, Ladd, & Powell, 2012; Fellinger, Holzinger, & Pollard, 2012). Of the 136 who participated in the present study, 23 participants' scores raised such concerns and their GPs were informed. Nine of these were drawn from Group 2 ($n = 25$), the group who had reported having had mental well-being difficulties in the previous 12 months. All were amongst those who also had had no contact with any professional support in the previous 12 months. The other 14 whose GPs were contacted came from Group 1 ($n = 88$), the group who reported having had no mental health difficulties in the previous 12 months.

Although not an intended outcome, the referral of these 23 participants showed that without having reliable and validated BSL versions, these participants' mental health difficulties might not have been identified in a timely fashion and they would probably have continued to go on without support. This is of particular importance because these assessments are only designed to identify the most serious of difficulties that would lead to hospitalization. They are much more commonly managed on an everyday basis in the community. However, without support, the distress and difficulty caused can become chronic, leading to much lower general states of well-being than would be necessary.

The Deaf population in the United Kingdom is small and geographically dispersed, with few centers of concentrated numbers of Deaf people in the same location. This presents significant challenges in piloting translated versions of assessments with sufficiently large numbers of people at a reasonable cost and in a time-efficient manner. However, collecting the data securely online has made it possible to recruit a satisfactory number of Deaf people quickly. Deaf people throughout the world have been enthusiastic adopters of information technology and the Internet is widely used by Deaf people and so is an acceptable means of engagement, posing few barriers when the content is delivered directly in signed languages (Power, Power, & Rehling, 2007; Valentine & Skelton, 2008).

The present study has shown that it is feasible to translate standardized mental health assessments, both linguistically and culturally, into signed languages and supports a small body of similar work elsewhere (e.g., Crowe, 2002, for American Sign Language; Fellinger et al., 2005a, for Austrian Sign Language; Graybill et al., 2010, for American Sign Language). For more detailed translation procedure, with particular reference to translating the CORE-OM into BSL, see Rogers et al. (2012a). Successfully translating/adapting standardized assessments into signed languages, in this case BSL, is only the first step in establishing normative data for a signing Deaf population.

This study did not set out with the aim of comparing Deaf and hearing norms and it was not possible to do this from the data collected here because this is only a pilot study and the sample size for Group 2 is too small. In order to confirm the screening data and identify potential difficulties, clinical interview would be necessary. Deaf people tend to be compared against the normative data from a hearing population for any particular assessment. However, as Deaf people have a language and culture different from their hearing counterparts, as well as different life experiences, it may not be correct to compare a Deaf individual against normative data derived from a hearing population, even if the means of collecting that data is linguistically accessible and its reliability and construct validity established. Comparisons with normative data

from a hearing population tend to show Deaf people as apparently having severer difficulties. For example, the results of the General Health Questionnaire–12 Austrian Sign Language version from a Deaf population were compared to normative data for the general hearing, German-speaking population and it was found that Deaf people scored significantly higher for having mental health difficulties (Fellinger et al., 2005b). Without normative data from a Deaf population, however, it is not possible to accurately interpret the results of assessments because the cutoff scores for the level of severity of mental health difficulties have not been established for that particular population. This is an observation widely reported in translations of standard assessments used in a culturally distinct hearing population (Niclasen et al., 2012; Scholte et al., 2011). However, because the cultural–linguistic identity of Deaf people is not always acknowledged or accepted (Alexander et al., 2012), this issue is not fully investigated because "deaf" people are presumed to be hearing people who do not hear. We intend, in future studies with larger numbers of participants, to use the BSL assessments whose reliability and validity we have now established, to ascertain Deaf population norms and recommended cutoffs.

Limitations

The present study has several limitations:

- The diversity of participants. Although the study achieved a good spread of age, gender, hearing status of family members of participants, and the age when first learned BSL, the majority of the participants in the present study are White British. Information on socioeconomic status (SES) of participants was not collected, therefore we are unable to comment on any potential sampling bias resulting from SES.
- The study required the self-declaration of mental well-being difficulties. It is known that the health information in the Deaf community is poor, and it is possible that some participants might not have been aware that what they might have been experiencing was associated with mental well-being difficulties. However, from

the information of those (n = 23) whose GPs were contacted as a result of the concerns raised from their responses, the majority (n = 17) had reported that they have had mental well-being difficulties in the previous 12 months.

- The study required access to a computer to participate, which might have created a sampling bias. Although access to computers is widespread amongst Deaf people in the United Kingdom and there is much public availability in addition to private ownership, the necessity to complete the assessments online might have created a barrier. However, research indicates that Deaf people in the United Kingdom are greater adopters of online technologies than hearing people and that literacy in the written word is not as great a barrier to confident computer use as one might assume (Valentine & Skelton, 2008).
- Although literacy skills are not required in the pilot study, there might have been a bias in the selection because the information available about this project was presented in both BSL and English. The information explaining the purpose of the present study being available in English as well as BSL might have assisted with the recruitment, such as for educated and literate Deaf people.
- The inclusion and exclusion criteria were clearly displayed on the web site as well as in the information sheet; however, as this is a self-participation study, it is difficult to confirm that they understood the exclusion criteria to be eligible to take part.

Conclusion

This project has produced mental health assessments in BSL that can be used in mental health services as well as in other practices working with Deaf BSL users. This means that Deaf people will be able to have access to assessments in their preferred language, BSL. The BSL versions of the PHQ-9, GAD-7, and WSAS have been adopted as part of BSL Healthy Minds project, a specialized IAPT service for Deaf people in some parts of the United Kingdom, and will be used in their final online format. Their wide use over a period of time will afford the opportunity to establish normative data on a Deaf population for common mental health difficulties,

such as anxiety and depression, and thus eventually establish population-specific cutoffs for these assessments in practice. Further work is needed to understand what the concept of depression might mean to culturally Deaf people. The online delivery of the assessments, which does not rely on the variable skills of whoever might be signing, will ensure a high level of consistency of delivery and validity of data.

Notes

1. Capital "D" is used when referring to a person whose first language is Sign Language such as British Sign Language (BSL) and who is culturally Deaf. d/D is used to indicate that those referred to are deaf without specific differentiation.

2. We acknowledge that there are diversities of Deaf people within Deaf populations. However, for simplicity, this study will use population as singular rather plural (populations).

3. The eight National Health Service (NHS) trusts in England that passed on information about the study to potential participants were: [2]gether NHS Foundation Trust, Avon and Wiltshire Mental Health Partnership NHS Trust, Birmingham and Solihull Mental Health NHS Foundation Trust, Greater Manchester West Mental Health NHS Foundation Trust, Northumberland, Tyne & Wear NHS Foundation Trust, Nottinghamshire Healthcare NHS Trust, York Hospitals NHS Foundation Trust, and Somerset Partnership NHS Foundation Trust.

4. Sign Supported English is a visual version of English, which borrows signs from BSL but adopts the grammar and word order of English, often with the addition of spoken English used simultaneously (Sutton-Spence & Woll, 1999).

Conflict of Interest

No conflicts of interest were reported.

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