JADARA

Volume 51
Number 1 *(Fall 2016 and Winter 2017)*

Article 5

5-15-2017

Translation and Validation of an Online Suite of Assessments in American Sign Language

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Cover Page Footnote

Funding for this program was made possible by a grant (90DP0067) from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR). Disclaimer: The opinions expressed in this article are those of the authors and not of the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR).

Individuals in need of social-behavioral assessments benefit from having access to a wide range of measures in their native language. This access is compromised for many deaf and hard of hearing (DHH) individuals due to a lack of available assessments that are linguistically and culturally appropriate and normed for this population (Guthmann & Blozis, 2001; Guthmann & Graham, 2004; Guthmann & Moore, 2007; Sligar, Cawthon, Morere, & Moxley, 2013; Titus & Guthmann, 2010). Assessments are usually administered to DHH individuals in English, which is not a primary language for many. Some service providers may attempt to interpret instruments into American Sign Language (ASL) themselves and adapt questions, but such efforts typically limit the validity of the instruments.

Prior research estimates that, in the United States, there are approximately 1 million deaf individuals and 10 million hard of hearing people (Mitchell, 2006). One in eight people in the United States (13%, or 30 million) aged 12 years or older has hearing loss in both ears (Lin, Niparko & Ferrucci, 2011). Culturally Deaf persons identify themselves as being part of a distinct group that communicates visually in ASL, a recognized language with its own grammar, syntax, and vocabulary. As with any other language, it is shaped by the culture of the people who use it (Stokoe, 1980).

The Gallaudet Research Institute (2005) estimates the median reading (in English) comprehension grade equivalents for 18-year-olds are 4.5 for students with a severe hearing loss and 3.8 for students with a profound hearing loss. The median reading level of hearing American adults is between the seventh to eighth grade level (Kutner, Greenberg, Jin, & Paulsen, 2006). An estimated 40% of children with hearing loss may have additional issues that could impact their education and development. This means that, in addition to being culturally inappropriate, assessments that require reading and responding to written questions may yield invalid scores for some DHH individuals.

There are few standardized assessments available in ASL (Hauser, Cohen, Dye, & Bavelier, 2007; Moore et al., 2009; Titus & Guthmann, 2010). Simply interpreting an assessment into ASL does not make it accessible to DHH individuals, nor does it necessarily test the same ability or skill that it does with hearing people. English-language instruments that are translated into ASL must also be normed for DHH individuals. Over the years, attempts have been made to validate assessments in ASL, but, many were never completed. Some of the reasons for this include the expense and time to translate and validate an instrument correctly, inability to get consensus on how concepts should be signed, and rapidly changing technology. Other reasons include interpretations that could only be understood by persons with high education or fluency levels, variations across translators, and extensive time required for administration (Vernon & Miller, 2001).

Assessment plays a central role in providing optimal services to DHH individuals. Questions have been raised about the appropriateness of many instruments used with DHH people and about the lack of cultural sensitivity among (hearing) counselors and psychologists who administer them (Sligar et al., 2013). The DHH population encounters its own unique set of barriers, including communicating with people who do not sign and a lack of information about deafness for service providers (Feldman & Gum, 2007; Guthmann & Blozis, 2001; Guthmann & Graham, 2004; Moore, Guthmann, Rogers, Fraker, & Embree, 2009). These barriers create a critical need for development and evaluation of innovative, web-based assessments as alternatives for DHH individuals.

The peer-reviewed literature regarding translation of assessment instruments into ASL and validation for DHH individuals is quite limited. The majority of the available literature includes research completed by Dr. Debra Guthmann, Dr. Janet Titus, and by SARDI staff on a project funded by a NIDRR RRTC grant and two projects funded by the Substance Abuse and Mental Health Service Administration (SAMHSA): Deaf Off Drugs and Alcohol (DODA; Federal Grant #TI019320) and eCAM (Federal Grant #TI023833).

Current Project

The Substance Abuse Resources and Disability Issues (SARDI) Program in the Boonshoft School of Medicine at Wright State University (WSU) partnered with rehabilitation counseling faculty in the College of Education and Human Services (CEHS) at WSU and leading experts to propose the development of an online suite of valid assessment instruments in ASL focusing on substance abuse, mental health, and a career-related interest inventory. Funding was received from the National Institute on Disability, Independent Living, and Rehabilitation Research's (NIDILRR's) Disability and Rehabilitation Research Project (DRRP Grant #90DP0067) program to increase accessibility of standardized instruments for individuals who are DHH and communicate using ASL. The online assessments being validated for this project are expected to help remove access barriers, with the long-term goal being the development web-based assessment instruments in ASL. In addition to cost savings, culturally and linguistically appropriate assessment instruments will enhance service provision for consumers who communicate in ASL.

The project includes both an advisory board and expert panel. The expert panel has been involved in guiding the team in developing the online assessment tools, while the advisory board assists with project-related tasks such as field testing, recruitment, and psychometric analyses. The expert panel is comprised of deaf and hearing professionals from around the nation who are fluent in ASL and knowledgeable about Deaf culture. They work with deaf individuals (i.e., in substance abuse treatment services, statewide mental health service, education and vocational rehabilitation, research psychology, and ASL instruction) and were selected to represent a wide geographical area. In contrast, the advisory board consists of academic leaders in psychometric analysis and national and state leaders in the vocational rehabilitation field, as well as experts in Deaf culture and language. The project also utilizes a team of Deaf native ASL signers to make sure the assessment tools are designed to meet consumers' needs, values, and experiences.

NIDLLRR Project Screening Instruments

The criterion to determine which instruments would be selected includes brevity, psychometric properties, and current use of instruments utilized by service providers working with DHH individuals. Brevity is an important factor because watching signed questionnaire items and their responses in ASL may take much longer than reading the English version. Only instruments that have been demonstrated to have predictive validity and reliability in the general population were considered for inclusion in this project. To determine the current use of instruments by service providers, the SARDI research team gathered data regarding the use of vocational rehabilitation assessments from Rehabilitation Counselors for the Deaf (RCDs) on a national list serve for RCDs and compared these findings with a national survey of general vocational rehabilitation counselors conducted by Betters and Sligar (2012).

Based on these criteria, the eight instruments selected to be translated from English to ASL and validated for use with DHH individuals were:

- Alcohol Use Disorders Identification Test (AUDIT-C; Bush et al., 1998; Saunders et al., 1993)
- Drug Abuse Screening Test (DAST-10; Skinner, 1982)
- Satisfaction with Life Scale (SWLS; Diener et al., 1985)
- Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965)
- The Beck Depression Inventory (BDI-II; Beck, et al., 1996)
- The Patient Health Questionnaire (PHQ-9; Kroenke & Spitzer, 2002; Kroenke, Spitzer, & Williams, 2001)
- Generalized Anxiety Disorder(GAD-7; Spitzer, Kroenke Williams et. al., 2006)
- Occupational Information Network (O*NET) Interest Profiler (IP; Rounds et al., 1999).

In addition, the Global Appraisal of Individual Needs - Short Screener (GAIN-SS; Dennis, Feeney, & Titus, 2006), which was translated to ASL in an earlier project (Titus, 2012), is being validated in the current project.

Alcohol Use Disorders Identification Test (AUDIT-C) is a 3-item screener based on the 10-item AUDIT developed by the World Health Organization to determine if a person's alcohol consumption may be harmful. The 10-item AUDIT is one of the most accurate alcohol screening tests available, rated as 92% effective in detecting hazardous or harmful drinking (Saunders, Aasland, Baber, De la Fuente, & Grant, 1993). Unlike some alcohol screening tests, the AUDIT has proven to be accurate across all ethnic and gender groups. Its reliability and validity have been established in research conducted in a variety of settings and across many nations (Allen, Litten, Fertig, & Babor, 1997). It also has been translated into at least 20 languages and dialects, including ASL (Alexander, DiNitto, & Tidblom, 2005).

Drug Abuse Screening Test (DAST) was developed in 1982 to provide a brief but valid method for identifying individuals who abuse psychoactive drugs. Originally a 28-item instrument, the DAST is now available as a 10-item, self-report scale that has virtually identical psychometric properties with the 28-item DAST (Yudko, Lozhkina, & Fouts, 2007). Primary care physicians use this tool to assess for potential substance abuse in all new patients (NIAA, 2005). The DAST has been used in a variety of populations including substance abuse and psychiatric patients and prison inmates with a high degree of validity and reliability (Yudko et al., 2007).

Satisfaction with Life Scale (SWLS) is a valid and reliable measure of happiness (Diener, Emmons, Larsen & Griffin, 1985) with five items that can be administered in interview or written format. The reliability and validity of this scale has been reported for deaf populations by a number of investigators (Gilman, Easterbrooks, & Frey, 2004; Harris, Anderson, & Novak, 1995; Hintermair, 2008; Leigh, 2009). However, a valid ASL version of the instrument has yet to be developed.

Rosenberg Self-Esteem Scale (RSES) is a 10-item, easy-to-score scale that is the most widely used self-esteem measure. The scores on the RSES range from 0 to 30, with scores between 15 and 25 considered in the normal range, and scores below 15 suggesting low self-esteem. Numerous studies have validated its use for deaf populations (Bat-Chava, 1993, 1994; Crowe, 2002; Edwards, Croker, & Crocker, 2008; Singelis, Bond, Sharkey, & Lai, 1999), but an ASL version of the RSES has yet to be validated.

Beck Depression Inventory (BDI-II) is a 21-item self-report inventory that measures the severity of depression and is one of the most widely used depression scales in healthcare settings for research and clinical purposes (Beck, Brown, & Steer, 1996). Like the SWLS and RSES, the BDI-II has been validated for use with deaf populations, although an ASL version of this highly respected scale has yet to be validated.

The Patient Health Questionnaire (PHQ-9) is used to screen, monitor and measure the severity of depression. The PHQ-9 provides a scoring severity index that combines DSM-IV depression diagnostic criteria with other major depressive symptoms (Kroenke, Spitzer R, 2001). Question 9 on the PHQ-9 asks about the presence and duration of suicidal ideation. With possible scores ranging from 0-27, scores on the PHQ are highly correlated with other validated measures of depression severity (Kroenke, Spitzer, & Williams, 2001).

Generalized Anxiety Disorder (GAD-7) is a seven-item self-administered questionnaire that is used as a screening tool and severity measure for generalized anxiety disorder. The GAD-7 provides cut-off points for mild, moderate and severe anxiety. When used as a screening tool, further evaluation is recommended when the score is 10 or greater (Spitzer RL, Kroenke K, Williams JB, et al; 2006). When the threshold score of 10 is used, the GAD-7 has a sensitivity of 89% and a specificity of 82% for generalized anxiety disorder, a sensitivity of 74% and a specificity of 81% for panic disorder, a sensitivity of 72% and specificity of 80% for social anxiety disorder, and a sensitivity of 66% and specificity of 81% for post-traumatic stress disorder（Kroenke, Spitzer, Williams et al., 2007).

The Occupational Information Network (O*NET) offers a set of self-directed career exploration and assessment tools to help individuals, including students, make decisions about career choices (Rounds, et., al., 1999). The O*NET instruments include the O*NET Ability Profiler, O*NET Interest Profiler and the O*NET Work Importance Locator/Profiler. For this project, we are validating the 60-item O*NET Interest Profiler (IP). The O*NET IP is a web-based instrument that assesses vocational interest. After completing the IP, users receive a profile of their vocational interests that suggests career search activities and links their vocational interests to O*NET's Standard Occupational Classification (SOC). The O*NET IP enables individuals to identify and learn about broad occupational areas that are of highest interest to them.

The Global Appraisal of Individual Needs Short Screener (GAIN-SS) is a 23-item instrument designed to identify individuals who are likely to have a mental health and/or substance use disorder and are potential referrals for further assessment or treatment. The GAIN-SS identifies problems along four dimensions: Internalizing Disorders, Externalizing Disorders, Substance Use Disorders, and Crime/Violence Problems (Titus, 2012; Titus & Guthmann, 2010). It requires minimal training to administer and score and is used widely across the United States and Canada in diverse settings (e.g., schools, mental health clinics, substance abuse programs, workplaces, health clinics, child welfare and criminal justice systems.) For both adolescents and adults, the GAIN-SS scales exhibit good to excellent internal consistency, evidence for construct (concurrent and discriminant) validity, and efficiency in measurement. Interpretive cut points with excellent sensitivity and specificity have been defined (Dennis, Feeney, & Titus, 2013).

Translation Methodology

The translation and validation procedures for the eight targeted screening instruments in this project used protocols based on state-of-the-science translation methodology developed by the World Health Organization (WHO, 2005) and the MAPI Research Trust (Acquadro, Conway, Giroudet, & Mear, 2004). These methods were used previously to translate assessments from English to ASL, including the SASSI (Guthmann & Moore, 2007; Titus & Guthmann, 2010) and the GAIN-SS (Titus, 2012). The translation of all instruments followed the same basic steps: forward translation, back translation and reconciliation, cognitive debriefing, and field testing.

Forward Translation. The process of forward translation started with the original language instrument (in this case, English) and translated it into a target language (in this case, ASL). The translation team was composed of native and non-native Deaf ASL signers. During forward translation, the team had to address challenges related to language structures, idioms, technical terms, time frames, and other features that could differ between languages and thus impact the meaning of translated items. Rather than a literal translation, the goal was to maintain semantic equivalence between the English and ASL versions. The team also translated response options and directions. Once reaching consensus on the translation of an instrument, the ASL version was videotaped using WSU's video production facilities. The on-screen talent who signed all but one instrument (the GAIN-SS) is a native Deaf-signing member of the Deaf community in Dayton, Ohio. The translation of the GAIN-SS was completed in an earlier project (Titus, 2012) and was signed by a native signer of the Deaf community in Fremont, California.

Back Translation and Reconciliation. The back translation process required that native users of the target language (in this case, ASL) who were bilingual and unfamiliar with a given instrument to translate the ASL version of the instrument back into the target language (English). To accomplish this, 30 native signers were recruited from throughout the United States to view the selected instruments online and translate items, responses, and directions into English. Members of the expert panel provided recommendations for individuals who should participate in the back translation process.

The reconciliation process was accomplished by having bilingual language users compare the original language instrument (English) with the back translated instrument (in English). Discrepancies in meaning (rather than literal discrepancies) functioned as "red flags" signaling a possible problem in the forward translation. The reconciliation team reviewed the text across all 30 back translators and identified discrepancies that could point to a problem. In most cases, discrepancies signaled a misunderstanding, mistranslation, or another irregularity. Information from the reconciliation was shared with the forward translation team, and both teams contributed to revisions. The teams met via email, videophone, and teleconferencing to review the results from the back translation, view the original ASL version of the problematic items, and recommend revisions. All revised items, response choices, and directions were re-filmed in the studio. The newly retranslated items were then subjected to the same process: back translation, reconciliation, and revisions if necessary. The process stopped when all translated items, response choices, and directions passed reconciliation.

Cognitive Debriefing. Cognitive debriefing involved interviewing native individuals on understanding of the translated items. The interviewees provided feedback on signs or expressions that were ambiguous or unclear as well as the meaning of the items. Feedback was

also gathered about the ease with which the website and instruments could be navigated. We recruited 20 deaf individuals from throughout the United States fluent in ASL to participate in this phase of the project. Members of the expert panel provided recommendations for deaf individuals who should participate in the cognitive debriefing. Participants needed to be willing to spend as much time as necessary to review the in-depth questions being used in the study and meet multiple times on a one-on-one basis with the staff interviewers. These individuals completed one of the online assessment instruments and then were interviewed in ASL using a structured protocol. As part of the interview, participants were asked to paraphrase each item in ASL to assess understandability and to identify any unclear or ambiguous signing. Interviewers tracked feedback in an Excel spreadsheet.

Feedback received from the structured interviews was summarized across all participants. The translation team met again via videophone, email and/or web conferencing to discuss the results and made suggestions for revisions.

Field Testing. Initial field testing of each instrument was completed using a general population sample of 300 Deaf signers (who do not receive vocational rehabilitation services) and 150 Deaf-signing vocational rehabilitation consumers. All instruments were completed online using an open source survey tool called LimeSurvey (Schmitz, 2015), allowing participants to complete the instrument on their own time anywhere with an Internet connection. Field testing can be done on all browsers and across all major platforms, as well as on mobile devices. Low-vision participants can also scale the instrument to larger size, and all text is screen reader-compatible. Data is encrypted during transmission and is stored securely on SARDI's HIPAA-compliant server. Additionally, participant identities are protected by through an assigned, unique alphanumeric identifier and storing contact information separately from research data. Instruments are administered in clusters of conceptually similar measures to permit inspection of inter-correlations between them.

Validation Methodology

Data from the field testing will be used to estimate psychometric properties of each instrument (internal consistency, concurrent validity, for the GAIN-SS equivalence). To date, analyses on the ASL GAIN-SS are underway and have yielded internal consistency estimates (using Cronbach alpha scores) equal to or stronger than those published on the English GAIN-SS. Analyses to estimate concurrent validity between the GAIN-SS's Internalizing Disorders Scale, Satisfaction with Life Scale, and the Rosenberg Self-Esteem Scale are also underway; similar analyses will be conducted between the GAIN-SS's Substance Disorders Scale (GAIN-SS), AUDIT, and DAST. An equivalence analysis between the English and ASL GAIN-SS instruments is also underway. A total of 120 bilingual Children of Deaf Adults (CODAs) ages 18 years and older have been randomly assigned to complete either the English GAIN-SS or the ASL GAIN-SS. If the meanings of the items between the two versions are equivalent, we expect to see no significant differences between the four scale scores on the ASL GAIN-SS when compared with the four scale scores on the English version.

Limitations of the Study

One of the ongoing issues is discrepancies in individuals' Internet connections. If a person doesn't have access to adequate bandwidth, the video clips used for the assessments may freeze and result in frustration and inability to accurately complete the assessment. Secondly, not all individuals who use this assessment will be 100% in agreement with the sign choices. We erred

on the side of being comprehensive and redundant (i.e., fingerspelling a word and then using one or two sign options). A reason for this was to address regionalisms in ASL. Thirdly, given the nature of translation work, video retakes were common in response to feedback. Thus, it was more feasible to use a local deaf person as the signing model given the signer's proximity to the university.

Next Steps

The goals of this federally funded project are to: 1) develop normed, ASL-based instruments for consumers who are deaf; 2) disseminate information about the online instruments; and 3) provide training to professionals working in the field who work with deaf individuals on how to access and utilize the online assessments. The project is using current technology to develop innovative, online mental health, substance abuse and career-related assessments for use with Deaf-signing individuals. The ultimate goal of this research team is to provide an online portal that will make available a variety of screening and assessment instruments in ASL. Nearly all of these instruments are public access, which means that they are free to the public.

We acknowledge that all clients must have full access to communication with a behavioral health provider and an interpreter, where appropriate, while completing the screeners and assessments in ASL and when getting the results. Our goal is to make validated instruments in ASL available, given these instruments are currently available only in English. We are in the process of developing conference workshops and online webinars to offer training on how to use the online instruments. The training will consist of three parts: 1) a module focusing on Deaf culture and the appropriate way to use these online instruments with Deaf consumers; 2) a module about the purpose, design, scoring and interpretation for each assessment; and 3) a module about how to use the computer interface and navigate the online portal when accessing and scoring each instrument. Module 1 will provide information to individuals who may work with DHH clients but who may not be fluent in ASL or knowledgeable about Deaf culture. As mentioned, the online option should *not* take the place of having full access to communication at all times. Module 2 will include a brief description of each instrument, discuss scoring and interpretation, and present a screen-by-screen walkthrough of the measures. Directions on accessing scores and reports will also be reviewed. As indicated, Module 3 will focus on how to use and navigate the online portal when accessing and scoring each instrument. Every module produced will stress the necessity for a behavioral health provider and a qualified interpreter, where appropriate, to be available whenever a deaf consumer takes one of the online instruments in ASL.

Current plans are underway to add two more measures to the suite. The 10-item AUDIT is one of the most accurate alcohol screening tests available and will provide a more comprehensive screening compared to the 3-item AUDIT. In addition, we have received requests from professionals in the field to add a suicide screener to the suite. We are currently researching options and plan to add an appropriate measure.

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