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An Interprofessional Collaborative Approach to the Development of a Content Valid Interview Questionnaire for Persons with Hearing Loss and Their Communication Partners

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Assessment activities require professionals to utilize instruments that combine data collection with a format that facilitates interpretation. When developing a new measure, investigators adhere to rigorous scale development procedures (Polit & Beck, 2006). The Standards for Educational and Psychological Testing is a set of testing standards developed jointly by the American Educational Research Association (AERA), American Psychological Association (APA), and the National Council on Measurement in Education (NCME). These standards state that content validity is a critical source of evidence and should be assessed in any instrument construction or adaptation process (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 1999). Thus, an assessment instrument needs to be reliable and valid in order for data to be collected, and the results accurately interpreted and applied.

Validity is the extent to which an instrument measures the elements of the construct under investigation (DeVon et al., 2007). In qualitative research, instruments often start out with face validity as the researcher selects those items for a questionnaire that appear likely to measure the particular construct of interest. Face validity is defined as “when the items look like they measure what they are supposed to measure” (Friedenberg, 1995, p. 251) and is dependent on the judgment of the key stakeholder (Lawshe, 1975). When an instrument has face validity, the items selected appear to be reasonable *on the face* for whatever purpose the measure is being used.

Content validity is generally understood as the degree to which an appropriate sample of items represents the construct the instrument is designed to measure (Polit & Beck, 2004; Polit & Beck, 2006). These researchers further emphasized that the content validity of a measure is viewed as necessary in reaching conclusions about its quality. Sireci and Faulkner-Bond (2014) defined content validity as the extent to which the content of a measure is congruent with assessment purposes. Since a validity study begins with the selection of evidence-based items for potential inclusion in an assessment measure (Gilbert & Prion, 2016), formal aspects of the elements should be considered (Haynes, Richard, & Kubany, 1995). Several features include the validity and representativeness of the definition of the construct, clarity of the instructions, linguistic aspects of the items, representativeness of the item pool, and appropriateness of the response format (Koller, Levenson, & Glück, 2017), including the item-domain conceptual relationship (Delgado-Rico, Cerretero-Dios, & Ruch, 2012). Content validity is usually determined by the judgment of a panel of experts (Lawshe, 1975). Invariability, face validity occurs when no formal instrument content validation procedure is performed (Suen, 1990).

Hearing Loss-Related Quality of Life

Hearing loss is one of the most predominant chronic conditions affecting adults today. Chien and Lin (2012) reported that 26.7 million American adults aged 50 years and older have clinically significant hearing loss, with only 3.8 million or 14.2% using hearing aids. The prevalence of hearing loss increases dramatically with age; approximately 3 in 10 adults over 60 years of age (Weinstein, 2014) and two-thirds of adults over 70 years of age (Lin, Thorpe, Gordon-Salant, & Ferrucci, 2011b) experience hearing loss. Among those over age 70 who could benefit from hearing aids, fewer than one in three adults have used them (National Institute on Deafness and Other Communication Disorders, 2016). Hearing loss can have significant

bearing on a person's quality of life such as impacting active participation in personal, social, and work activities (Schulz et al., 2016).

If hearing loss is not addressed, the potential for negative social and emotional consequences may include poor social functioning (Weinstein & Ventry, 1982), diminished psychological well-being (Dye & Peak, 1983), dementia, anxiety, and depression (Lin et al., 2011a), low self-esteem (Harless & McConnell, 1982), and reduced quality of life (Dalton et al., 2003; Mulrow et al., 1990a; Mulrow et al., 1990b). Kramer, Kapteyn, Kuik, and Deeg (2002) examined the association of hearing loss and chronic disease with psychosocial status among older adults, and their findings underscored the negative effects on quality of life. Older adults with hearing loss were found to have more depressive symptoms, lower self-efficacy, feelings of loneliness, and a smaller social network compared to peers without hearing loss.

Understanding the impact of hearing loss on the quality of life is important not only for the person with a hearing loss (PHL), but also for his/her communication partner (CP) such as spouses, siblings, children, friends, relatives, colleagues, and caregivers (Manchaiah, Stephens, & Lunner, 2013). Communication invariably suffers when one member in the relationship has a hearing loss, whether in a marriage, partnership, or friendship (Tye-Murray, 2015). When the hearing loss results in various physical, mental, and psychosocial effects for the PHL, the CP may experience related activity limitations and participation restrictions as well. When associated with the health condition of the significant other, the reduced function of family members is characterized as a third-party disability (World Health Organization, 2001).

Barker, Leighton, and Ferguson (2017) examined the psychological experiences of hearing loss from the perspectives of both PHLs and their CPs. A meta-synthesis of the qualitative literature using the meta-ethnographic approach was conducted to explore the lived experience of the psychological implications of hearing loss. From a search of 889 records, 12 qualitative papers met the inclusion criteria of PHLs, CPs, or both, and explored psychosocial issues. Four themes were associated with the psychological experience of hearing loss: the effect of hearing loss, the response of hearing aids, stigma and identity, and coping strategies. The findings revealed that hearing loss had a dyadic effect on the PHL and CP's relationship that included changes to identity, use of hearing aids, and coping strategies that may influence subsequent adjustment to hearing loss for both parties.

Factors Influencing Hearing Loss-Related Quality of Life

Schulz et al. (2016) emphasized that hearing loss can impact a person's quality of life. However, prediction on the quality of life simply by degree of hearing loss is poor (Mulrow et al., 1990b; Weinstein & Ventry, 1983). Factors affecting quality of life for PHLs are multi-factorial, with variables including age (Gordon-Salant, Lantz, & Fitzgibbons, 1994; Schulz et al., 2016; Wiley, Cruickshanks, Nondahl, & Tweed, 2000), gender (Garstecki & Erler, 1996), personality characteristics (Cox, Alexander, & Gray, 2007), and psychosocial features such as mood (Preminger & Meeks, 2010), social isolation (Mulrow et al., 1990a; Weinstein, 2014), auditory processing ability (Fire, Lesner, & Newman, 1991), and stigma (Barker et al., 2017). Furthermore, acceptance of hearing loss, when viewed as a natural part of the aging process, can be an obstacle to seeking appropriate evaluation and treatment (Schulz et al., 2016).

Hearing Loss-Related Self-Assessment Questionnaires

Hearing loss-related quality of life (HLQoL) instruments encapsulate the physical, emotional, and social ramifications resulting from hearing loss and assess activity limitations and participation restrictions experienced by PHLs (Tye-Murray, 2015). Although a myriad of assessment instruments are available to evaluate the impact of hearing loss, there is little agreement among researchers as to either preference or psychometric adequacy (Vas, Akeroyd, & Hall, 2017). These measures focus on various generic and hearing-specific concerns such as hearing disability, quality of life, hearing aid benefit, communication, and psychological outcomes. A systematic analysis of outcome measures in audiological research identified 39 standardized patient-reported instruments in use (Granberg, Dahlstrom, Moller, Kahari, & Danermark, 2014).

Persons with hearing loss. The American Academy of Audiology recommends four instruments that are valid and useful (Dancer & Gener, 1999): Hearing Handicap Inventory for the Elderly (HHIE; Ventry & Weinstein, 1982), Hearing Handicap Inventory for Adults (HHIA; Newman, Weinstein, Jacobson, & Hug, 1990), Self-Assessment of Communication (SAC; Schow & Nerbonne, 1982), and Communication Profile for the Hearing Impaired (CPHI; Demorest & Erdman, 1987). The HHIE is a 25-item scale that measures the emotional and social/situational implications of living with hearing loss. This instrument is used for adults, ages 65 years and older, and has two scales. One scale addresses emotional adjustments to hearing loss; whereas, the other scale focuses on social/situational adjustments to hearing loss. Each item is scored on a 3-point response scale: yes, sometimes, and no (Ventry & Weinstein, 1982). The HHIA is a revised and updated version of the HHIE, also with two scales and differing by only three out of 25 items. This instrument is used for adults, ages 64 years and younger, and scored on a three-point response scale: yes, sometimes, and no (Newman, Weinstein, Jacobson, & Hug, 1990). The SAC is a 10-item questionnaire used to evaluate hearing loss and its contributions to disability, handicap, and quality of life. This instrument has six items that relate to communication and four items that relate to participation restrictions. Each item is scored on a five-point scale, ranging from almost never/never to practically always/always (Schow & Nerbonne, 1982). The CPHI is a 145-item questionnaire that assesses four areas: communication performance, communication environment, communication strategies, and personal adjustment. Each item is scored on a five-point scale, ranging from rarely to almost always (Demorest & Erdman, 1987). Table 1 summarizes several HLQoL instruments commonly used with PHLs.

Table 1
Summary of Selected Self-Reported Hearing Loss - Related Quality of Life Questionnaires Designed for Adults with Hearing Loss

Adults with Hearing Loss	
Instrument	Purpose and Description
Hearing Handicap Inventory for the Elderly (HHIE; Ventry & Weinstein, 1982)	To assess non-institutionalized older adult's (65 years and older) perception of hearing loss. This is a 25-item scale with two subscales (emotional adjustments and social/situational adjustments to hearing loss). Each item is scored on a three-point response scale: <i>yes, sometimes, and no</i> .
Hearing Handicap Inventory for Adults (HHIA; Newman, Weinstein, Jacobson, & Hug 1990)	To assess adult's (64 years and younger) perceived hearing handicap and benefits of hearing aids. This is a 25-item scale with two subscales (emotional adjustments and social/situational adjustments to hearing loss). Each item is scored on a three-point response scale: <i>yes, sometimes, and no</i> .
Self-Assessment of Communication (SAC; Schow and Nerbonne, 1982)	To assess adult's perception of living with a hearing loss and its contribution to disability, handicap, and quality of life. This is a 10-item questionnaire with 6 items that relate to communication and 4 items that relate to participation restrictions. Each item is scored on a five-point scale, ranging from <i>almost never/never</i> to <i>practically always/always</i> .
Communication Profile for the Hearing Impaired (CPHI; Demorest & Erdman, 1987)	To assess a wide-ranging array of communication issues. This is 145-item questionnaire with four areas including communication performance, communication environment, communication strategies, and personal adjustment. Each item is scored on a five-point scale, ranging from <i>rarely to almost always</i> .

Communication partners. Two proxy self-assessment instruments have been designed to assess the CP's emotional effects and the social situation of living with a PHL: Significant Other Assessment of Communication (SOAC; Schow & Nerbonne, 1982) and Hearing Handicap Inventory for Adults – Spouses (HHI –SP; Newman & Weinstein, 1988). The SOAC is a 10-item questionnaire designed to evaluate the significant other's perception of the effects of hearing loss and its contributions to disability, handicap, and quality of life. Like the SAC, the SOAC has six items that relate to communication and four items that relate to participation restrictions. Each item is scored on a five-point scale, ranging from almost never/never to practically always/always (Schow & Nerbonne, 1982). The HHI-SP a version of the Hearing Handicap Inventory developed for significant others, is a 25-item scale that measures the significant other's emotional and social/situational implications of living with a PHL. This version is nearly identical to the HHIA except the word "you" is changed to "significant other." Each item is scored on a three-point response scale: *yes, sometimes, and no* (Newman & Weinstein, 1988).

In addition, two measures are available to evaluate third-party disability: the Significant Other Scale for Hearing Disability (SOS-HEAR; Scarinci, Worrall, & Hickson, 2009) and Hearing Impairment Impact-Significant Other Profile (HII-SOP; Preminger & Meeks, 2012). The SOS-HEAR is a 27-item scale that measures the influences of hearing loss on the CP's everyday life and assesses his/her need to adapt to the partner's hearing loss. This measure examines six different domains of third-party disability: communication changes, communicative burden, relationship changes, socialization, emotional reactions to adaptations, and concern for the partner. Each item is scored on a five-point response scale ranging from no problem to a complete problem (Scarinci, Worrall, & Hickson, 2009). The HII-SOP is a 20-item scale with three subscales that measures third-party disability: community strategies, relationship and emotions, and social impact. Each item is scored on a three-point response scale: yes, sometimes, and no (Preminger & Meeks, 2012). Table 2 describes several HLQoL questionnaires commonly used with CPs.

Table 2
Summary of Selected Self-Reported Hearing Loss - Related Quality of Life Questionnaires Designed for Communication Partners

Communication Partners	
Instrument	Purpose and Description
Significant Other Assessment of Communication (SOAC; Schow & Nerbonne, 1982)	To assess the significant other's perception of the impact of hearing loss and its contribution to disability, handicap, and quality of life for the person with hearing loss. This is a 10-item questionnaire has six items that relate to communication and four items that relate to participation restrictions. Each item is scored on a five-point scale, ranging from <i>almost never/never</i> to <i>practically always/always</i> .
Hearing Handicap Inventory for Adults - Spouses (HHIA-SP; Newman & Weinstein, 1988)	To assess the hearing loss-related quality of life of the person with hearing loss as evaluated by the significant other. This is a 25-item scale that measures the significant other's emotional and social/situational implications of living with a person with a hearing loss. Each item is scored on a three-point response scale: <i>yes</i> , <i>sometimes</i> , and <i>no</i> .
Significant Other Scale for Hearing Disability (SOS-HEAR, Scarinci, Worrall, & Hickson, 2009)	To assess the influences of hearing loss on the communication partner's daily life activities and to evaluate their need to adapt to their partner's hearing loss. This is a 27-item scale that examines six different domains of third-party disability including communication changes, communicative burden, relationship changes, socialization, emotional reactions to adaptations, and concern for the person with hearing loss. Each item is scored on a five-point response scale ranging from <i>no problem</i> to a <i>complete problem</i> .
Hearing Impairment Impact-Significant Other Profile (HII-SOP; Preminger & Meeks, 2012)	To assess third-party hearing loss-related quality of life in spouses of persons with hearing loss. This is a 20-item scale with three subscales that measures third-party disability including community strategies, relationship and emotions,

	and social impact. Each item is scored on a three-point response scale: <i>yes</i> , <i>sometimes</i> , and <i>no</i> .
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Rationale for Well-Designed Content-Valid Interview Questionnaires

Currently, rigorous content evaluations have been performed on a limited number of hearing-related questionnaires (Smith, Pichora-Fuller, Watts, & La More, 2011). During the developmental phase of the Listening Self-Efficacy Questionnaire (LSEQ; Smith et al., 2011), 10 subject matter experts evaluated the initial 33 items for content relevance, clarity, simplicity, and ambiguity utilizing a four-point response scale. Content validity index values were computed for each of these elements and found to exceed .75, indicating good content validity. Further construct validation resulted in a revised 18-item instrument containing three subscales that assess self-efficacy for understanding speech: dialogue in quiet, directed listening, and complex listening. Respondents rate self-efficacy levels for understanding speech in various listening situations using a 0% to 100% scale.

Heffernan, Coulson, and Ferguson (2018) underscored the importance of conducting a content evaluation study in developing a new patient reported outcome measure and uncovering irrelevant, unclear, or offensive content that can reduce the amount and quality of data collected by an instrument (Brod, Tesler, & Christensen, 2009; Rubio, Berg-Weger, Tebb, Lee, & Rauch, 2003). During in the initial development of the Social Participation Restrictions Questionnaire (SPaRQ; Heffernan, Coulson, & Ferguson, 2018), two content evaluation strategies were employed to evaluate the 49 items of the measure initially referred to as the SPaRQ-49. First, semi-structured interviews were conducted with 14 adults with hearing loss to evaluate the content of the items and understand their thought processes when completing the questionnaire. Second, a panel of 20 subject matter experts completed an online survey answering a series of open- and closed-ended questions. These experts evaluated the proposed factor structure, response scales, comprehensiveness, and responsiveness of the SPaRQ-49. They also rated the relevance and clarity of each item using a four-point response scale. In evaluating their measure's content, the majority of the items were found to be relevant, clear, comprehensive, and acceptable. These researchers further recommended that new and existing hearing-specific questionnaires be evaluated to confirm that they have adequate content validity and minimal respondent burden.

A well-designed content-valid questionnaire is a key data collection tool in qualitative research. Although instruments with closed-ended items allow for a quantitative analysis of responses, one shortcoming is the risk of missing descriptive information about communication difficulties specific to the participant (Tye-Murray, 2015). In contrast, questionnaires with open-ended items permit the participant to share information that could not have been otherwise anticipated (Tye-Murray, 2015). The most appropriate measure for capturing a representative account of hearing-related concerns is by participant report (Macefield et al., 2014). As previously noted, a limited number of hearing-related questionnaires have undergone thorough content evaluations (Smith et al., 2011). Research studies exploring HLQoL with PHLs and CPs may not indicate if their qualitative instruments have undergone a content validity evaluation. Moreover, there is a paucity of content-valid questionnaires employed as a data collection tool in

qualitative research to gather information of the PHLs' and CPs' perspectives of their own HLQoL as well as how they perceived each other's HLQoL. Thus, the goal of this research study was to develop a content-valid HLQoL questionnaire with open-ended items for gathering descriptive information from PHLs and CPs for research purposes. The research question for this study was: What is the content validity evidence of the Interview Questionnaire for Persons with Hearing Loss and Their Communication Partners as evaluated by a panel of subject matter experts? The step-by-step process used to obtain content validity evidence in the development of the interview questionnaire is described in this paper.

Methods

A two-member interprofessional research team collaborated on the design and development of the interview questionnaire. Green and Johnson (2015) described interprofessional collaboration as two or more professions working together to achieve common goals in addressing various problems and complex issues. One was a Deaf licensed clinical social worker and a PHL, and the other was a hearing licensed clinical audiologist/rehabilitation counselor and a CP. To establish content validity evidence, the researchers followed the multiphase process as described by McKenzie, Wood, Kotecki, Clark and Brey (1999): (a) create an initial version of the instrument, (b) establish a panel of subject matter experts, (c) conduct a qualitative review, and (d) complete a quantitative review.

Phase I: Create an Initial Version of the Instrument

Investigators adhere to rigorous scale development procedures when a new measure is created (Polit & Beck, 2006). McKenzie et al. (1999) stated that development of an instrument involves defining the concept to be evaluated and establishing the objectives delineating the purpose of the instrument. Since content validity evidence cannot be achieved without accurately defining the construct of interest (Delgado-Rico et al., 2012), describing the construct that serves as the foundational basis of the instrument under study is vital. Several steps were involved in the construction of the interview questionnaire for PHLs and their CPs. The first step was identifying the main construct or content domain of HLQoL for both PHLs and their CPs after a literature review. The construct indicated the concept or attribute that is the focus of measurement (Haynes et al., 1995).

The second step was identifying the four content subdomains which included: (a) PHL's experience of his/her HLQoL, (b) CP's experience of his/her HLQoL, (c) PHL's experience of his/her CP's HLQoL, and (d) CP's experience of the PHL's HLQoL. Polit and Beck (2006) emphasized that the instrument developer should conduct vigilant *a priori* efforts to enhance content validity through careful conceptualization and domain analysis prior to item generation as well as careful *posteriori* efforts to evaluate the relevance of the instrument's elements through the evaluation by experts.

The third step involved generating the items for the questionnaire within the context of the four content subdomains: the first content subdomain, the PHL's experience of his/her HLQoL, consisted of 16 items. The second content subdomain, the CP's experience of his/her HLQoL, comprised 13 items. The third content subdomain, the PHL's experience of his/her

CP's HLQoL, had six items. The fourth content subdomain, the CP's experience of the PHL's HLQoL, consisted of six items. Altogether, the questionnaire had 41 items. Table 3 illustrates examples of items generated within each of the four content subdomains.

Table 3

Examples of Items Generated Under Each of the Four Content Subdomains

Content subdomain	Examples of items included in subdomain
Person with hearing loss' experience of his/her hearing loss-related quality of life	<p>As a person with a hearing loss, tell me how confident you are in your ability to manage various communication situations.</p> <p>As a person with a hearing loss, tell me any advantages or positive experiences of having a hearing loss.</p>
Communication partner's experience of his/her hearing loss-related quality of life	<p>As a communication partner, tell me how you manage various communication situations involving your partner.</p> <p>As a communication partner, tell me how your partner's hearing loss has affected your perception of yourself.</p>
Person with hearing loss' experience of his/her communication partner's hearing loss-related quality of life	<p>As a person with a hearing loss, tell me what your communication partner can do to make communicating with you easier.</p> <p>As a person with a hearing loss, tell me about any changes in your communication partner's various life activities due to your hearing loss.</p>
Communication partner's experience of the person with hearing loss' hearing loss.	<p>As a communication partner, tell me how you perceive your partner feels about his/her hearing loss-related quality of life</p> <p>As a communication partner, tell me about any changes in your partner's various life activities due to his/her hearing loss.</p>

Content validity of a newly developed instrument is the determination of the content relevance of its items via the development of a two-stage process (Lynn, 1986; Yaghmale, 2003). The first stage in the construction of a valid instrument is the developmental stage and includes

three steps: (a) domain generation, (b) item generation, and (c) instrument formation (Lynn, 1986; Nunnally & Bernstein, 1994; Yaghmale, 2003). The developmental stage requires a comprehensive review of the literature to identify content for the instrument and establish relevant domains. The second stage in the construction of a valid instrument is the judgment-quantification stage and includes two steps: (a) assertion by a specific number of experts that the items are content valid and (b) assessment to determine that the entire instrument is content valid (Lynn, 1986).

Phase II: Establish a Panel of Subject Matter Experts

Content validity involves evaluation of the instrument content by knowledgeable experts in the domain of interest (Allen & Yen, 2002). A jury of experts can offer beneficial feedback about the merit of the instrument (Rubio et al., 2003). The quality of a content validity study is determined through the selection, qualifications, and training of a panel of experts (Sireci & Faulkner-Bond, 2014). Sireci and Faulkner-Bond further emphasized that experts need to be familiar regarding the knowledge and skills being evaluated as well as completing item reviews and other relevant tasks. Rubio et al. (2003) stated that the criteria for selecting experts are the number of publications or work experience. The number of experts selected for a panel depends on the desired level of expertise and diversity of knowledge (Grant & Davis, 1997). The number can range from a minimum of three (Lynn, 1986) to at least 10 experts (Sireci & Faulkner-Bond, 2014). Rubio et al. (2003) stated that using a larger number of experts might generate more information about the measure being evaluated. Moreover, increasing the number of experts facilitates the identification and exclusion of rater outliers (Carmines & Zeller, 1979; Lynn, 1986).

Sixteen certified/licensed clinicians, researchers and university professors in the fields of social work, audiology, speech-language pathology, rehabilitation counseling, and deaf education were recruited as experts for this study. Criteria for selecting experts for this interprofessional panel included professionals with a deep understanding of PHLs within their particular discipline who were actively working and/or had published in their specific disciplines. The experts were contacted in person, by telephone or videophone, and/or via email to inform them of the purpose of the investigation and to invite them to participate in the study. They were also informed that participation in the study was voluntary and responses would be kept confidential.

Phase III: Conduct a Qualitative Assessment

Cover letter. Once the selection of the interprofessional expert panel was completed, the qualitative review of the newly developed instrument could be conducted (McKenzie et al., 1999). Upon invitation, the experts were each sent a packet with a cover letter stating the purpose of the study, the reason they were invited, a description of the questionnaire response form, and instructions for evaluating the content relevance and content clarity of the 41-item instrument. The experts were further informed that the questionnaire consisted of items for gathering information on the communication needs, communication management skills, and HLQoL for both PHLs and their CPs.

Description of interview questionnaire response form. The questionnaire response form and instructions for evaluating the content validity of the 41-item instrument were included in the packet mailed to the experts. The experts were also informed that the content validity study of the questionnaire consisted of content relevance and content clarity. They were then asked to review all 41 items first before rating each individual item for its content relevance and content clarity. The questionnaire response form provided a place for the experts to rate each item for content relevance and content clarity on a two-point dichotomized (yes/no) scale within each of the content subdomains. An item was to be rated “yes” for content relevance if it was relevant to the content subdomain and should be retained in the questionnaire. However, an item was to be rated “no” if it was not relevant to the content subdomain and should be deleted from the questionnaire. Next, each expert was instructed to evaluate the content clarity of each item of the questionnaire. An item was to be rated “yes” for content clarity if the item was clearly understandable/readable. Conversely, an item was to be rated “no” if any part of the item was not clearly understandable/readable. If scored “no,” the experts were instructed to provide suggestions and/or edit any item to improve its clarity and fit within the assigned content subdomain.

After evaluating the questionnaire, each expert was asked to return the questionnaire response form using a self-addressed stamped envelope. McKenzie et al. (1999) recommended that instrument designers analyze each component of the instrument in the light of the experts’ responses. Thus, comments from the experts regarding possible deletions, additions, or revisions of the items were considered after the completion of the qualitative assessment phase for the present study.

In the current study, comments from the experts regarding possible deletions, additions, or revisions of the items were considered after the completion of the quantitative analyses.

Phase IV: Complete a Quantitative Review

Numerous approaches to the quantifying experts’ degrees of agreement regarding the content relevance of an instrument were proposed (Polit & Beck, 2006; Polit, Beck, & Owen, 2007; Wynd, Schmidt, & Schaefer, 2003). The content validity index (CVI) is the most widely used quantification measure of content validity (Lynn, 1986; Waltz & Bausell, 1981; Waltz, Strickland, & Lenz, 2005), based on expert ratings of relevance (Polit et al., 2007), and traditionally used to estimate representativeness, comprehension, ambiguity, and clarity (Delgado-Rico et al., 2012). Assessment instruments should be clear, brief, easy to administer, and appropriate for use with the targeted population under consideration (Rubio et al., 2003; Schilling et al., 2007).

Investigators should compute two types of CVIs: the content validity of individual items and the content validity of the total scale (Lynn, 1986). Scale developers need to be explicit in how they compute the CVI. Specifically, this means differentiating between content validity at the item level (I-CVI) and the overall scale level (S-CVI; Polit & Beck, 2006). In this study, the CVI was used to evaluate content validity of the questionnaire, and included both the I-CVI and S-CVI.

Content relevance. In computing the I-CVI, content experts were asked to rate each item in terms of its relevance to the targeted construct (Polit & Beck, 2006). Although the CVI can be calculated in various ways (Delgado-Rico et al., 2012), the I-CVI for relevance in this study was computed based on the experts' rating of each of the 41 questionnaire items as either (a) relevant or (b) not relevant on a two-point dichotomized scale. Defined as the proportion in expert agreement regarding relevance of an item, the I-CVI for content relevance is a measure of inter-rater agreement. Inter-rater reliability refers to the level of agreement between a designated group of experts using the same scoring criteria on a specific measure at a particular time (Stemler, 2004). This calculation is computed as the number of experts rating an item as relevant divided by the total number of experts (Polit & Beck, 2006; Polit et al., 2007). In this study, computing the S-CVI for relevance was the S-CVI/Ave, which computes the I-CVI for each item on the scale and then calculates the average I-CVI across items conserved (Polit & Beck, 2006; Polit et al., 2007).

Content clarity. The content clarity of an item needs to be evaluated on the basis of how clearly an item is worded (Rubio et al., 2003). Rubio and associates stated that some researchers have proposed asking about the clarity of all items with one question at the end of the survey; however, their experience found this method to be confusing for the experts. Thus, it was proposed evaluating content clarity with each item at the same scale as the representativeness. In the current study, the I-CVI for content clarity was computed based on the experts' rating of each of the 41 items in the questionnaire as either (a) clearly understandable/readable or (b) not clearly understandable/readable on a 2-point dichotomized scale. The I-CVI for content clarity is a measure of inter-rater agreement and defined as the proportion in expert agreement regarding clarity of an item. This calculation is computed as the number of experts rating an item as clearly understandable/readable divided by the total number of experts. Items are then deleted, added, or revised based on the experts' suggestions for improving content clarity. However, decisions on deleting, retaining, or revising items should not be solely based on empirical data. Rather, consideration should be given to the definition of the construct and the intended objective when the items are developed (Delgado-Rico et al., 2012). The S-CVI for content clarity is then calculated which computes the I-CVI for each item on the scale and then calculates the average I-CVI across items conserved.

For a scale to be judged as having excellent content validity, it should be composed of items with a minimum I-CVI of .78 when utilized by a panel of six to 10 experts (Polit & Beck, 2006; Polit et al., 2007). Moreover, many researchers have indicated that an S-CVI of .80 or higher is acceptable (Davis, 1992; Grant & Davis, 1997; Polit & Beck, 2004) for this index of average congruity.

Results

Participants

Fifteen of the 16 subject matter experts consented to participate in the study and evaluate the 41 items for content validity, yielding a 94% response rate; see Table 4 for demographic information. As illustrated, the representative disciplines of the interprofessional panel included social work ($n=4$), audiology ($n=3$), speech-language pathology ($n=3$), rehabilitation counseling

($n=3$), and deaf education ($n=2$). Five experts had a master’s degree and 10 had a doctoral degree. All were currently employed, and their years of professional service ranged from 15 to 39 years with a mean of 30.8 years. The number of peer-reviewed publications ranged from 0 to 17 publications, with a mean of 6.0 publications. Two members of the panel had a bilateral mild-to-moderate sensorineural hearing loss acquired in late adulthood. Three members had a bilateral severe-to-profound sensorineural hearing loss acquired in childhood. Two members were communication partners and married to a spouse with a bilateral sensorineural hearing loss.

Table 4
Demographic Characteristics of the Subject Matter Experts

Discipline	Educational Level	Employment	Years of Service	Number of Publications
1. Social Work	Doctoral Degree	University Professor	39	5
2. Social Work	Master’s Degree	Clinical Social Worker	38	1
3. Social Work	Doctoral Degree	University Professor	53	8
4. Social Work	Master’s Degree	Clinical Social Worker	15	0
5. Audiology	Master’s Degree	Clinical Audiologist	40	4
6. Audiology	Doctoral Degree	University Professor	31	4
7. Audiology	Master’s Degree	Clinical Audiologist	41	0
8. Speech Pathology	Doctoral Degree	University Professor	23	9
9. Speech Pathology	Master’s Degree	Clinic Director	15	0
10. Speech Pathology	Doctoral Degree	University Professor	33	5
11. Rehab Counseling	Doctoral Degree	University Professor	12	15
12. Rehab Counseling	Doctoral Degree	University Professor	19	12
13. Rehab Counseling	Doctoral Degree	University Professor	39	7
14. Deaf Education	Doctoral Degree	University Professor	42	17
15. Deaf Education	Doctoral Degree	University Professor	22	3

Content Clarity and Content Relevance

After obtaining each expert’s ratings for content relevance and content clarity, values were entered into a spreadsheet. Suggested comments from the experts were also recorded for each item to improve content clarity and fit within the content subdomain in which the item was placed.

The I-CVI for content relevance ranged from .93 to 1.0 for the 41 items on the questionnaire, with 37 items having an I-CVI of 1.0 and 4 items having an I-CVI of .93. The S-CVI for content relevance was .99. All 41 items on the questionnaire exceeded the minimum .78 criteria for the I-CVI and the minimum .80 criteria for the S-CVI/Ave for content relevance.

The I-CVI for content clarity ranged from .67 to 1.0 with 5 of the 41 items having an I-CVI of 1.0, 9 items having an I-CVI of .93, 7 items having an I-CVI of .87, 9 items having an I-CVI of .80, 8 items having an I-CVI of .73, and 3 items having an I-CVI of .67. The S-CVI for

content clarity was .84. Although 11 of the 41 items did not meet the minimum .78 criteria regarding I-CVI for content clarity, all items rated below 1.0 were revised to improve content clarity based on the experts' suggestions.

Revised Questionnaire

After reviewing the I-CVI and S-CVI quantitative analyses for content relevance and content clarity, and then rewording items based on the experts' recommendations, the number of items was reduced from 41 to 40 to improve item clarity and avoid duplication within the content subdomains. The retained 40 items were then further revised within each of the four subdomains based on the experts' suggestions. The revised questionnaire consisted of 16 questions regarding the PHL's experience of his/her HLQoL, 14 questions regarding the CP's experience of his/her HLQoL, 4 questions regarding the PHL's perception of the CP's HLQoL, 4 questions regarding the CP's perception of the PHL's HLQoL, and 2 concluding questions. The S-CVI for the retained 40 items remained .99 for content relevance and improved to .85 for content clarity. After incorporating these revisions, the content validation process of the interview questionnaire was completed.

Discussion

This study describes the multiphase process in which the Interview Questionnaire for Persons with Hearing Loss and Their Communication Partners was developed, content validated, and revised. The results demonstrated that all 41 items and the overall scale of the questionnaire exceeded the minimum criteria for content relevance; whereas, the majority of the items and the overall scale were found to exceed the minimum criteria for content clarity. After rewording items based on the experts' recommendations, the number of items was reduced from 41 to 40 and reorganized within the four subdomains. Several authors suggest that a S-CVI of .80 or higher is acceptable for content validity (Davis, 1992; Grant & Davis, 1997; Polit & Beck, 2004). Since the S-CVI for content relevance and content clarity in this study were .99 and .85 respectively for the retained items, these results indicate high content validity for the questionnaire.

The strong content validity evidence for the revised questionnaire most likely reflects the benefits of several resources. First, a literature review was conducted to examine published HLQoL assessment measures and instrument construction methods as well as to identify content domains believed to be essential to the topic of HLQoL. Second, a collaborative interprofessional research team generated the questionnaire's initial main content domain, subdomains, and items. The items for the interview questionnaire were created within the context of the four content subdomains. Third, an interprofessional expert panel provided input regarding content relevance and content clarity for the questionnaire's items and overall scale. Fourth, Lynn's (1986) two-stage approach was employed within the multiphase process as described by McKenzie et al. (1999) to construct and estimate content validity evidence for the questionnaire.

Currently, only a few hearing-related measures have undergone a thorough content evaluation (Smith et al., 2011). This investigation underscored the importance of the step-by-

step process to establish the content validity evidence of the *Interview Questionnaire for Persons with Hearing Loss and Their Communication Partners* designed to explore the PHLs' and CPs' perspectives of their own HLQoL, and how they perceive each others' HLQoL. Thus, confirming content validity for both new and existing patient-reported outcome measures is foundational to the instrument development process according to scientifically established principles (Brod et al., 2009).

Limitations

This study contains several potential limitations. One limitation is in regards to expert selection in that content relevance and content clarity evaluations are subjected to potential bias among the experts. An expert's perceived knowledge may or may not reflect his/her actual knowledge (Paul, Connor, McCabe, & Ziniel, 2016). Paul et al. (2016) noted the possibility that an expert may under- or over-estimate his/her capabilities and knowledge with self-report surveys. A second limitation is the dichotomous "yes/no" scale utilized for the experts' ratings of content relevance and content clarity in the evaluation of the questionnaire's items. Although a Likert scale could provide a range of possible responses, Krosnick, Judd, and Wittenbrink (2005) emphasized that a dichotomous scale elicits a clear binary response. Krosnick et al. also noted that when dichotomous response option pairs are clear in meaning, there is likely to be consensus on the meaning of the options. To obtain a full variation of views on each item's content relevance and content clarity, experts were invited to provide qualitative comments in addition to their dichotomous ratings for the items in the questionnaire.

A third limitation is that this study does not necessarily identify content that may have been overlooked during the development of the questionnaire. However, the experts were asked to suggest other items for the measure, which helped to minimize this concern. A fourth limitation relates to the number and diverse selection of experts employed to evaluate the instrument. The 15 experts utilized in this study are considered more than sufficient which exceeds the minimum of three experts needed to evaluate the instrument for content validity (Lynn, 1986; Polit & Beck, 2006; Polit et al., 2007). Rubio et al. (2003) stressed that making appropriate and representative choice of experts ensures a thorough assessment. Schilling et al. (2007) suggested that using a heterogeneous panel may provide for a more comprehensive assessment of the content validity of an instrument. Objectivity may be compromised if the group of experts is too homogeneous or too small (Koller et al., 2017). These concerns were addressed by including an interprofessional panel of 15 experts that possessed a professional understanding of hearing loss, and were actively working and/or have published in their specific disciplines.

Implications

There are several implications of this study. First, clinicians who work with this population such as social workers, rehabilitation counselors, psychologists, audiologists, speech-language pathologists, and nurses may consider utilizing the Interview Questionnaire for Persons with Hearing Loss and Their Communication Partners, which can serve as an assessment questionnaire to gather HLQoL information with PHLs and their CPs as well as an intervention tool to increase awareness of communication strategies that may improve HLQoL for both

parties. The questionnaire takes approximately 45 to 60 minutes to administer via a conjoint semi-structured interview with a PHL and his/her CP. Second, a paucity of content-valid hearing-related measures exists (Smith et al., 2011). A content validity evaluation should be conducted on every new hearing-related assessment instrument; otherwise, face validity inevitably results (Suen, 1990). Furthermore, Portney and Watkins (2000) stated that reliability establishes the limit of validity. This signifies that a measure could not be valid if it lacks reliability. Instrument developers may use the process described in this article to develop and validate an assessment measure that combines data collection with a format that facilitates interpretation. Third, this questionnaire can be used in future studies to collect qualitative data regarding the HLQoL experiences for both PHLs and their CPs. Future research can include the exploration of the HLQoL experience through semi-structured interviews with the PHL and his/her CP together when using the *Interview Questionnaire for Persons with Hearing Loss and Their Communication Partners*.

Conclusion

The present study validated the Interview Questionnaire for Persons with Hearing Loss and Their Communication Partners. This investigation further highlighted an interprofessional collaborative approach for obtaining content validity evidence in the development of a questionnaire for exploring the HLQoL experience for both PHLs and their CPs. The multiphase approach can be followed in constructing and analyzing a content-valid questionnaire. Currently, this approach to the development of an HLQoL qualitative instrument is rare. Determining I-CVI and S-CVI for content clarity and content relevance are necessary in the construction and analysis of a content-valid questionnaire. The study's interview questionnaire demonstrated high content validity evidence and can be used for future studies in gathering HLQoL information about PHLs and their CPs.

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