Psychological Assessment

Validating Measures of Psychological Flexibility in a Population With Acquired Brain Injury

Diane L. Whiting, Frank P. Deane, Joseph Ciarrochi, Hamish J. McLeod, and Grahame K. Simpson

Online First Publication, November 24, 2014. http://dx.doi.org/10.1037/pas0000050

Psychological Assessment

1040-3590/14/$12.00 http://dx.doi.org/10.1037/pas0000050

Validating Measures of Psychological Flexibility in a Population With Acquired Brain Injury

Diane L. Whiting
Liverpool Brain Injury Rehabilitation Unit and University of Wollongong

Frank P. Deane
University of Wollongong

Joseph Ciarrochi
Australian Catholic University

Hamish J. McLeod
University of Glasgow

Grahame K. Simpson
Ingham Institute of Applied Medical Research, Liverpool, Australia and University of Sydney

This study presents preliminary validation data on both the Acceptance and Action Questionnaire—Acquired Brain Injury (AAQ-ABI) and the Acceptance and Action Questionnaire—II (AAQ-II). Data from 150 participants with ABI was subject to exploratory factor analysis on the AAQ-ABI (15 items). A subset of 75 participants with ABI completed a larger battery of measures to test construct validity for the AAQ-ABI and to undertake a confirmatory factor analysis (CFA) on the AAQ-II (7 items). Three meaningful factors were identified on the AAQ-ABI: Reactive Avoidance, Denial, and Active Acceptance. Reactive Avoidance demonstrated good internal and test–retest consistency ($\alpha = .89$) and correlated in expected directions with other related measures including the AAQ-II. CFA of the AAQ-II did not provide a good fit but did have similar correlations with measures of psychological distress as found in prior non-ABI samples. The results suggest both measures can be used with individuals following an ABI but they index different facets of psychological flexibility. The AAQ-ABI appears to measure psychological flexibility about the thoughts and feelings relating to the brain injury itself while the AAQ-II measures psychological flexibility around general psychological distress. Future research could explore the additional 2 factors of the AAQ-ABI and use these measures in outcome studies that promote psychological flexibility in individuals with an ABI.

Keywords: acceptance, acceptance and commitment therapy, acquired brain injury, psychological flexibility

The rehabilitation process after an acquired brain injury (ABI) is a challenging journey requiring adjustment to, and ultimately acceptance of, the changes that have occurred. An ABI encompasses any injury to the brain sustained after birth caused by a lack of oxygen, infection, disease, or a traumatic injury to the head. The injury can result in changes to personality, behavior, physical, and sensory abilities. In addition, cognitive impairments are well documented after a traumatic brain injury (TBI; Draper & Ponsford, 2008; Millis et al., 2001) but also occur in other ABIs including brain tumor (Taphoorn & Klein, 2004), stroke (Nys et al., 2005; Patel, Coshall, Rudd, & Wolfe, 2003), and hypoxia (Caine & Watson, 2000).

As a result of postinjury changes, people with ABI often display high levels of psychological distress, which can present as depression (Bombardier et al., 2010), anxiety (Gould, Ponsford, Johnston, & Schönberger, 2011), irritability (Alderman, 2003), and anger (Baguley, Cooper, & Felmingham, 2006). In addition self-identity problems can develop (Myles, 2004) as the person struggles to come to terms with their postinjury self. Hence, facilitating acceptance of emotional dysregulation and identity changes after an ABI is an important therapeutic outcome. However, acceptance is not a passive process. It requires an individual to develop psychological flexibility, operationalized as the ability to persist with and/or change behavior that is consistent with personal values while allowing difficult thoughts or feelings to occur (Hayes, Strosahl, & Wilson, 2003). Interventions that foster acceptance of the post-ABI changes may have relevance with this client group and as a by-product, alleviate symptoms of psychological distress.

Diane L. Whiting, Liverpool Brain Injury Rehabilitation Unit, New South Wales, Australia and School of Psychology, University of Wollongong; Frank P. Deane, School of Psychology, University of Wollongong; Joseph Ciarrochi, Institute of Positive Psychology & Education, Australian Catholic University; Hamish J. McLeod, Institute of Health and Wellbeing, University of Glasgow; Grahame K. Simpson, Ingham Institute of Applied Medical Research, Liverpool, Australia and Rehabilitation Studies Unit, University of Sydney.

Correspondence concerning this article should be addressed to Diane L. Whiting, Brain Injury Rehabilitation Unit, Liverpool Hospital, Locked Bag 7103, Liverpool BC, NSW 1871, Australia. E-mail: diane.whiting@sswahs.nsw.gov.au

Acceptance and Commitment Therapy

One of the main therapy approaches that focus on promoting psychological flexibility is acceptance and commitment therapy (ACT) (Hayes et al., 2003). ACT is a third-wave behavioral therapy that proposes when people engage in a narrow repertoire of behavior to manage or avoid difficult thoughts or experiences, they are demonstrating psychological inflexibility, which, in turn, is associated with worse psychopathology (Kashdan & Rottenberg, 2010). Rather than addressing specific symptoms, ACT focuses more on promoting psychological flexibility by using principles from the underlying philosophy of functional contextualism (Hayes et al., 2003).

Functional contextualism from an ACT perspective involves analysis of internal (thoughts, feelings, and memories) and/or external experiences (behaviors) within the context in which they occur. It proposes that by changing a person's relationship to their thoughts, the contingencies controlling behavior are changed and more adaptive behavioral contexts can be created. For example, a major component of ACT focuses on activating behavior that is consistent with personally held values. Another component involves being willing to allow difficult inner experience to occur (e.g., self-doubt), in the service of valued action. Hence, a behavioral context is created that promotes adaptive behavioral repertoires rather than focusing on removing maladaptive ones (e.g., changing negative self-concepts).

ACT may be particularly useful for addressing the mixed psychological distress presenting after a brain injury, where a major goal is to improve an individual's functioning and engagement in a meaningful life. In addition, ACT uses a mixture of written work, visual metaphors, and experiential role plays allowing the therapist to work in novel ways to compensate for comprehension difficulties that may arise from the cognitive impairments presenting after an ABI. The suitability of this approach has been supported in two recent reviews examining the use of ACT with individuals with an ABI (Kangas & McDonald, 2011; Soo, Tate, & Lane-Brown, 2011).

Measuring Psychological Flexibility

Despite suggestions that ACT may be effective in the treatment of psychological distress after an ABI, no measures of psychological flexibility have been validated with this client group. To date, three different measures of psychological flexibility have been used in treatment studies with participants demonstrating cognitive impairment (Brown & Hooper, 2009; Pankey & Hayes, 2003) and only one of those with an ABI sample (Sylvester, 2011). These measures include a simple ACT process measure that used a Likert scale with items around defusion of psychotic symptoms and willingness to accept aversive emotions and take action to achieve behavioral goals (Pankey & Hayes, 2003). A modified version of the Acceptance and Action Questionnaire-9 (AAQ-9; Hayes et al., 2004) has also been administered. The researchers simplified the language of the AAQ-9 and used a 5-point visual scale (sections in a pie chart) instead of a Likert scale (Brown & Hooper, 2009).

The third study developed a measure specifically to address the acceptance and avoidance of issues relating to an ABI, the Acceptance and Action Questionnaire-Acquired Brain Injury (AAQ-ABI; Sylvester, 2011). The AAQ-ABI comprises 15 items and is adapted from other measures of psychological flexibility (e.g., Acceptance and Action Questionnaire-II item: "I worry about not being able to control my worries and feelings' translates to the AAQ-ABI item: 'My worries and fears about my brain injury are true'). The items specifically focus on identifying thoughts, feelings and behaviors that may arise around functional disability occurring after an ABI. The AAQ-ABI was used as a process measure during an ACT intervention with individuals with an ABI (Sylvester, 2011), but the psychometric properties of the scale have not been evaluated. As such, it is not clear if it is an appropriate tool to assess psychological flexibility after an ABI.

In considering current measures of psychological flexibility, the Acceptance and Action Questionnaire (AAQ; Hayes et al., 2004) is the most commonly used scale to measure this construct in ACT research. The latest version, the Acceptance and Action Questionnaire-II (AAQ-II) was developed to overcome reliability issues with the original AAQ and demonstrates superior psychometric properties over the earlier version across a range of populations (Bond et al., 2011). The AAQ-II is considered a general measure of psychological flexibility relating to anxiety and depression but increasingly the measure has been adapted to assess psychological flexibility in the context of specific issues, whether psychological or situational. Focused measures related to psychological and health related conditions include weight-related problems (Lillis & Hayes, 2008), diabetes (Gregg, Callaghan, Hayes, & Glenn-Lawson, 2007), pain (Hayes, Luoma, Bond, Masuda, & Lillis, 2006; McCracken, Vowles, & Eccleston, 2004), and tinnitus (Westin, Hayes, & Andersson, 2008).

Previous studies using the AAQ-II with various populations have found that low levels of acceptance or psychological flexibility are associated with high levels of psychological distress (e.g., Beck Depression Inventory scores) and behavioral ineffectiveness including avoidance (e.g., the White Bear Suppression Inventory scores; Bond et al., 2011; Wegner & Zanakos, 1994). This kind of psychological inflexibility relates to the avoidance of both internal and external experiences and is linked to a number of avoidance measures including avoidant coping (Hayes et al., 2004) and thought suppression (MacKenzie, 2008).

Purpose of the Study

To date, none of the measures of psychological flexibility have been validated on a population with cognitive impairment. This is an important gap because the aftermath of ABI is marked by significant problems with psychological distress and behavioral and emotional functioning. These issues may hinder the rehabilitation process and psychological interventions that promote acceptance of these changes, such as ACT, might improve therapeutic outcome. This measure may also contribute to an improved ecological perspective of cognitive flexibility, traditionally measured by neuropsychological tests (Greve et al., 2002), as this is considered to be a component of psychological flexibility (Chawla & Ostafin, 2007; Kashdan & Rottenberg, 2010). Finally, this research addresses this gap by undertaking a preliminary validation of two measures of psychological flexibility, the AAQ-II and the AAQ-ABI. The first step in the analysis involves an exploratory factor analysis (EFA) to determine the factor structure of the AAQ-ABI. Following this process, tests of construct validity (emotional distress and avoidance as supported in previous research) are performed on both the AAQ-II and AAQ-ABI to determine the appropriateness of each measure for people with an ABI.

Methods

Participants

This study involved 150 participants (116 males, 34 females) with an ABI who were recruited from the Liverpool Brain Injury Rehabilitation Unit, Sydney. The relatively low proportion of women reflects the fact that 117 participants had suffered a TBI, which is more common in men. The sample size ensured a sufficient participant item ratio of 10:1 to conduct the EFA on the AAQ-ABI (15 items) (Streiner, 1994). The inclusion criteria included having sustained the ABI after the age of 17 years, currently being aged between 17 and 65 years and having sufficient language skills and cognitive ability to complete the measures. A total of 294 participants were screened, of these 26 (8.8%) declined to participate and 107 (36.4%) did not meet the study criteria. In addition to this, 11 (3.7%) were excluded when they were found to be feigning neuropsychological impairment on the Test of Memory Malingering (Tombaugh & Tombaugh, 1996), which is lower than rates reported in other head injury samples (Mittenberg, Patton, Canyock, & Condit, 2002; Moss, Jones, Fokias, & Quinn, 2003). Participants with dementia or other degenerative neurological illnesses (e.g., Parkinson's disease, multiple sclerosis) were also excluded ($N = 2$, 0.7%).

Measures

The AAQ-ABI (Sylvester, 2011) is a questionnaire assessing psychological flexibility specifically relating to the acceptance and avoidance of thoughts and feelings that may arise as a result of an ABI. The scale comprises 15 items using a 5-point Likert scale ranging from 0 (*not at all true*) to 4 (*very true*). It has scores ranging from 0 to 60 with higher scores indicating greater levels of acceptance. The original developers were experts in either ACT or brain injury and they reviewed the items to ensure they correctly encapsulated the construct of the acceptance in an ABI population (DeVellis, 2003). In this study, the wording of one item received a minor revision to disambiguate its meaning (Item 5 was changed from "My brain injury defines me" to "My brain injury defines me as a person"). The scores were reversed so higher scores were indicative of greater psychological inflexibility to ensure consistent scoring with the AAQ-II (Bond et al., 2011). Currently there are no validation data available on this measure, nor an analysis of its factor structure or clear reporting of how items were generated.

Demographics. Demographic and background information related to the participants' injuries and premorbid and current functioning were collected. Injury severity for individuals with a TBI was determined by the length of posttraumatic amnesia (PTA). A PTA of less than 1 h is classified as mild TBI; 1–24 h as moderate, 1–7 days as severe, and greater than 7 days as very severe (Russell & Smith, 1961).

Psychological flexibility. The AAQ-II (Bond et al., 2011) is a 7-item questionnaire using a 7-point Likert scale ranging from 1 (*never true*) to 7 (*always true*) with scores ranging from 0 to 49, and higher scores indicative of greater psychological inflexibility or experiential avoidance. The AAQ-II is positively related to psychological distress including measures of depression and anxiety. Previous CFA on three different samples supports a one-factor model with scores indicating good reliability and validity (Cronbach's alpha ranging from 0.78 to 0.88: Bond et al., 2011). The main difference between the AAQ-ABI and the AAQ-II relates to specific references to brain injury in the items (e.g., AAQ-II Item 1: "It's OK if I remember something unpleasant;" AAQ-ABI Item 7: "It is OK for me to feel different after my brain injury").

Mood. The Depression Anxiety and Stress Scales-21 (DASS-21) is a 21-item self-report measure that assesses depression, anxiety, and stress over the previous week using a 4-point scale. The DASS-21 has good reliability for scores achieved on all three subscales with Cronbach's alpha = .73–0.81 (Lovibond & Lovibond, 1995), and it has been shown to be a valid measure of depression, anxiety, and stress in people with ABI (Ownsworth, Little, Turner, Hawkes, & Shum, 2008). Also the current factor structure of the DASS-21 has been recently been confirmed in a severe TBI population (Randall, Thomas, & Whiting, 2014) providing additional support for its use in a population with brain injury. In a sample of university students, scores on the subscales of the DASS showed a significant positive association with psychological inflexibility (Bond et al., 2011).

The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) is a 20-item scale with two independent subscales of affective mood state, Positive Affect (PA) and Negative Affect (NA). Single word descriptors are used (e.g., inspired, proud, enthusiastic or ashamed, nervous, scared). Participants are required to rate the extent they have experienced the mood state over the past week using a 5-point Likert scale ranging from 1 (*very slightly*) to 5 (*extremely*). High PA scores demonstrate the extent to which an individual experiences pleasure in their environment, whereas high NA is indicative of distress and lack of engagement. Scores on the subscales have good internal reliability (PA $\alpha = .88$, NA $\alpha = .85$) (Watson et al., 1988). The PANAS was selected as scores on the NA subscale has been associated with psychological inflexibility in both cross sectional studies (Kashdan, Barrios, Forsyth, & Steger, 2006; Shallcross, Troy, Boland, & Mauss, 2010) and in experimental studies where increases in acceptance (psychological flexibility) have resulted in lowered negative affect (Campbell-Sills, Barlow, Brown, & Hofmann, 2006; Twohig, Hayes, & Masuda, 2006).

Threat appraisal and experiential avoidance. The Avoidance and Threat Appraisals Questionnaire (ATAQ; Riley, Brennan, & Powell, 2004) is a 36-item measure developed to identify specific threat appraisals and related avoidance that may occur after an individual experiences a TBI (e.g., "Sometimes I worry I might get attacked and injured when I am out"). Participants are required to indicate whether in the previous month they have experienced that appraisal and if they have avoided something as a result of the appraisal. This yields two scores for total threat appraisal and total avoidance behavior. The questionnaire demonstrates good internal reliability for scores on both indices (Cronbach's alpha being 0.92 and 0.94, respectively) (Riley et al., 2004). Avoidance of thoughts and memories that result in psychological distress are associated with psychological inflexibility (Hayes et al., 2006). Therefore it is expected that scores on the ATAQ will be positively related to scores on both the AAQ-II and AAQ-ABI.

Procedure

Ethical approval was granted by the local health district Human Research Ethics Committee and informed consent was obtained from participants before administration of the measures. The first sample of 75 participants (who completed the full battery of tests, comprising the DASS-21, PANAS, ATAQ, AAQ-II, and AAQ-ABI) was recruited when they attended a neuropsychological assessment at the Liverpool Brain Injury Rehabilitation Unit. The two measures of acceptance (AAQ-II and AAQ-ABI) were readministered between 1 and 2 weeks later to assess test–retest reliability. The second sample of 75 participants was recruited from the active outpatient clients of the brain injury unit and completed the AAQ-ABI only, to meet the sample size requirements of the EFA and to reduce assessment burden on participants. In addition, demographic information including injury information was collected for all participants from their medical file.

Data Analysis

Data were entered and analyzed using IBM SPSS version 22.0 (IBM Corp, 2013). The analysis of the AAQ-ABI involved an EFA using principal axis factoring followed by direct Oblimin rotation. The analysis of the AAQ-II involved a CFA examining the chi-square statistic and four additional indicators of fit including the root-mean-square error, the standardized root-mean-square residual (SRMR), the comparative fit index, and the nonnormed fit index (also known as the Tucker-Lewis index). Goodness of fit was explored using a two-index presentation format as suggested by Hu and Bentler (1999). Internal consistency was assessed using Cronbach's alpha and test–retest reliability used intraclass correlations. Construct validity was undertaken using Spearman's rank correlation coefficient as the measures have ordinal data (Likert scales). To control for Type I error, arising from the multiple comparisons in testing construct validity, a Bonferonni correction was applied with alpha set at .001 with one-tailed testing.

Results

Participant Characteristics

All measures in the assessment battery were completed by participants ($n = 150$) with the exception of a small amount of missing data ($n = 3$, 4%) on the AAQ-ABI and AAQ-II second administration for the test–retest reliability. Participants' ABI resulted from either a severe traumatic injury ($n = 117$) that is with a period of PTA greater than 1 day), a brain tumor ($n = 11$), a hypoxic injury ($n = 9$), or a cerebrovascular accident (CVA: $n = 13$). All participants showed some degree of cognitive impairment as measured on the Trail Making Test (Reitan, 1958) (Trails A z score M $= -1.2$, $SD = 1.71$; Trails B z score M $= -2.52$, $SD = 3.52$). The Trail Making Test is a recommended test of neuropsychological impairment for a brain injury population (Wilde et al., 2010). Participants were more likely to have been born in Australia and had a mean age of 38.12 years ($SD = 13.74$). This is older than the typical TBI population with the mean age being influenced by the nontraumatic ABI participants who are usually older. A series of nonparametric comparisons between the TBI group and those with other forms of ABI confirmed this and revealed age as the only significant difference between the groups, with the TBI group being younger in age (z = 2.98, $p < .01$; TBI 36.4 years ± 13.4 vs. other ABI 44.4 years ± 13.2). Demographic information is detailed in Table 1.

Data and Item Level Screening: AAQ-ABI

Individual items on the AAQ-ABI were examined in the first instance to review skewness and unbalanced distributions (Clark & Watson, 1995). A number of the items had unbalanced distributions (e.g. item 11, 'Other people make it hard to accept myself' and item 13, 'I often pretend I don't have a brain injury') where the majority of participants endorsed 'not at all true" (item 11 = 58%; item 13 = 49.2%). However, these were still retained due to the small item pool and with clinical populations there is a greater tendency to have unbalanced distributions (Clark & Watson, 1995). Inspection of frequencies found none of the 15 items had a restricted range such that none of the items had more than 90% of responses falling on any two points of the Likert scale (Streiner, 1993).

Factor Analysis

Exploratory factor analysis of the AAQ-ABI. The 15 items of the AAQ-ABI were subjected to an EFA using principal axis factoring followed by direct Oblimin rotation using IBM SPSS Version 22 (IBM Corp, 2013), as it is anticipated there would be some correlation between the factors (Costello & Osborne, 2005). This analysis resulted in three factors with eigenvalues greater than 1.0 which accounted for 44.82% of the variance, the first factor accounted for 32.2% of the variance, the second factor 7.96% of the variance and the third factor 4.66% of the variance. This was supported by a review of the Scree plot which indicated a two or three factor solution. The pattern matrix for the EFA is displayed in Table 2.

Inspection of the pattern matrix was undertaken and suggested three factors. Items that performed poorly were excluded including items with a loading of less than .4 and also items that loaded equally on more than one factor (Costello & Osborne, 2005). This removed two items (Items 12 and 15) and left Factors 2 and 3 with only two items each. All three factors were interpretable: Factor 1

Table 1
Demographic Variables

Variable	M (*SD*)/Number (%)		
	Total participants ($N = 150$)	TBI ($n = 117$)	Other ABI ($n = 33$)
Gender			
Male	116 (77.3%)	97 (83%)	19 (58%)
Female	34 (22.7%)	20 (17%	14 (42%)
Age (years)	38.1 (13.7)	36.5 (13.4)	44.4 (13.2)
Born in Australia			
Yes	100 (66.7%)	80 (68.4%)	20 (60.1%)
No	50 (33.3%)	37 (31.6%)	13 (39.9%)
Education (years)	11.6 (2.2)	11.3 (2.0)	11.6 (2.3)
Time since injury (months)	15 (6–39)	32.8 (34.4)	27.5 (38.6)
Posttraumatic amnesia (months)		32.6 (38.8)	N/A

Table 2
Pattern Matrix of the Exploratory Factor Analysis (n = 150)

Item No.		Factor 1	Factor 2	Factor 3
5	My brain injury defines me as a person	**.814**	−.133	.147
9	My worries and fears about my brain injury are true	**.778**	.204	.093
2	I hate how my brain injury makes me feel about myself	**.765**	.041	−.033
3	I need to get rid of my anxiety about my brain injury	**.762**	.002	.157
4	I stop doing things when I feel scared about my brain injury	**.760**	.011	.077
11	Other people make it hard for me to accept myself	**.595**	.016	−.066
14	Most people are doing better than me	**.583**	.013	−.296
8	I would give up important things in my life if I could make the brain injury go away	**.571**	.197	−.129
6	I am moving forward with life	**−.467**	.260	.288
13	I often pretend that I don't have a brain injury	.247	**.503**	−.334
10	I try not to think about having a brain injury	.151	**.477**	−.011
15[a]	Even with my brain injury I can do good work	**−.409**	**.467**	.208
12[b]	I don't need to be ashamed of my brain injury	−.123	.305	.239
1	I do things I care about even when I feel upset about my brain injury	.040	.152	**.594**
7	It is OK for me to feel different after my brain injury	.065	−.085	**.477**

Note. Extraction method: Principal axis factoring. Rotation method: Oblimin with Kaiser normalization. Rotation converged in 17 iterations.
[a] Item 15 excluded due to loading on two factors. [b] Item 12 excluded due to factor loading < .4. Factor loadings <.4 are in bold.

appeared to represent reactive avoidance of emotions arising from the ABI; Factor 2, denial of the ABI; and Factor 3, active acceptance of the ABI itself. Further analyses were undertaken on all three factors. The same extraction and rotation was run again on the remaining 13 items. These three factors accounted for 47.01% of the variance (Factor 1 = 35.43%, Factor 2 = 6.65%, Factor 3 = 5.01%) with the following Cronbach's alpha coefficients:.89,.38, and.46, respectively, for Factors 1, 2, and 3. Small or no correlations existed between each factor score: −.27 between Factor 1 (Reactive Avoidance) and Factor 2 (Denial), .29 between Factor 1 and Factor 3 (Active Acceptance), and no correlation −.02 between Factors 2 and 3. The mean scores for the sample on the three factors were $M = 12.61$ ($SD = 9.32$), $M = 3.46$ ($SD = 2.46$), and $M = 3.10$ ($SD = 2.10$), respectively, for Factors 1, 2, and 3.

CFA of the AAQ-II. Before conducting a CFA, all data, including all item scores and the AAQ-II total score, were tested for normality. Only Item 5 fell outside the acceptability ranges for skewness (Clark & Watson, 1995). A CFA was run on the seven items of the AAQ-II with SPSS Amos Version 22 (IBM Corp, 2013). Using Hu and Bentler's (1999) two index presentation strategy, the current one-factor model of the AAQ-II was not a good fit for this ABI sample. All measures of fit with the exception of SRMR, fell outside recommended guidelines (see Table 3). Scores on the AAQ-II demonstrated high internal consistency (Cronbach's alpha = .90). The AAQ-II mean score for this sample ($n = 75$) was $M = 20.16$ ($SD = 10.18$).

Table 3
Confirmatory Factor Analysis Results for the Acceptance and Action Questionnaire—II in an ABI Sample (n = 75)

Model	χ^2	*df*	RMSEA (≤.06)	SRMR (≤.09)	CFI (≥.95)	NNFI (≥.95)
ABI ($N = 75$)	46.22**	14	.176	.065	.890	.835

Note. RMSEA = root-mean-square error of approximation; SRMR = standardised root-mean-square; CFI = comparative fit index; NNFI = nonnormed fit index; values in parentheses define good model fit for the respective fit index (Hu and Bentler (1999); ABI = acquired brain injury.
** $p < .001$.

Test–Retest Reliability AAQ-ABI and AAQ-II

Test–retest reliability was undertaken on both measures after a 7–14 day (M = 9.74, $SD = 3.23$) interval between the two test occasions. A high degree of reliability was found between scores on Factor 1 (Reactive Avoidance) of the AAQ-ABI between the two time points, with an ICC coefficient of .92 (95% CI = .86 to .95). Scores on the other two factors were not as reliable over the two time points (Factor 2—Denial: ICC = .75, 95% CI = .60–.85; Factor 3—Active Acceptance: ICC = .68, 95% CI = .49–.80). The scores on the AAQ-II also had good test–retest reliability (AAQ-II: ICC = .86, 95% CI = .78–.91).

Relationship With Age

The relationship between age and both the AAQ-ABI (three factors) and the AAQ-II was explored as earlier analysis had indicated that participants with an injury from a trauma were significantly younger than participants with a brain injury from other sources (CVA, brain trauma, or hypoxic). Factor 2 of the AAQ-ABI (Denial of the ABI), had an inverse relationship with age ($r_s = -.33$, $p = .003$) such that as age increased denial decreased. This relationship with age was not present on any of the other subscales on the AAQ-ABI or the AAQ-II.

Construct Validity

Psychological flexibility. There was a moderate to strong positive relationship between AAQ-II Factor 1 scores and the AAQ-ABI but this was at a low enough level to indicate they are not measuring exactly the same construct (see Table 4). Factor 2 and 3 scores of the AAQ-ABI were not significantly correlated with scores on the AAQ-II.

Psychological distress. High psychological inflexibility as assessed by both the AAQ-ABI Factor 1 and the AAQ-II were

Table 4
Correlation Matrix (R_S) of AAQ-ABI and AAQ-II With Other Measures (n = 75)

	AAQ-ABI				
	Reactive avoidance (RA)	Denial (D)	Active acceptance (AA)	AAQ-II	AAQ-ABI (RA) (Control variable-AAQ-II)
Psychological flexibility					
AAQ-ABI (RA)					
AAQ-ABI (D)	.28				
AAQ-ABI (AA)	.18	.11			
AAQ-II	.70**	.20	.06		
Depression (DASS-21)	.67**	.26	.15	.67**	.39**
Anxiety (DASS-21)	.63**	.44**	.21	.55**	.53**
Stress (DASS-21)	.64**	.30	.08	.58**	.36**
Positive Affect (PANAS)	−.35**	−.10	.37**	−.27	−.16
Negative Affect (PANAS)	.74**	−.27	.11	.70**	.54**
Appraisal Threat (ATAQ)	.66**	.28	−.02	.63**	.50**
Avoidance (ATAQ)	.72**	.40**	.06	.62**	.51**

Note. AAQ-ABI = Acceptance and Action Questionnaire—Acquired Brain Injury; AAQ-II = Acceptance and Action Questionnaire—II; DASS-21 = Depression Anxiety Stress Scale-21; PANAS = Positive Affect, Negative Affect Scale; ATAQ = Appraisal Threat and Avoidance Questionnaire; AAQ-ABI (RA) = Reactive Avoidance factor.
** $p < .001$.

associated with high levels depression, anxiety, stress, and negative affect. Table 4 details the correlations of the AAQ-ABI (3 factors) and AAQ-II with other psychological measures. Positive affect had a moderate inverse relationship with psychological inflexibility. Threat appraisal and behavioral avoidance as measured by the ATAQ, demonstrated a moderate to strong positive relationship, with both measures. Overall the AAQ-ABI Factor one had slightly stronger relationships in the hypothesized direction than did the AAQ-II. The other two factors of the AAQ-ABI had different and smaller correlations with other measures compared to both Factor one of the AAQ-ABI and the AAQ-II (see Table 4).

AAQ-ABI partial correlations with psychological distress. As there were significant relationships between the measures of psychological distress and both measures of psychological flexibility, we examined the association between the AAQ-ABI Factor 1 and measures of psychological distress (DASS-21, PANAS, ATAQ), while controlling for general psychological flexibility (AAQ-II). Significant partial correlations between Factor 1 of the AAQ-ABI with measures of psychological distress (DASS-21, PANAS, ATAQ) are present when the impact of general psychological flexibility (AAQ-II) is controlled (see Table 4).

Discussion

The main focus of this study was to assess the psychometric properties of the AAQ-ABI to explore its use with individuals who have an ABI. We also assessed the widely used AAQ-II. This is the first validation of two ACT-based measures of psychological flexibility in an ABI population and the preliminary findings appear promising. The EFA of the original 15-item AAQ-ABI revealed three subscales comprising of 13 items. Scores on the Factor 1 (Reactive Avoidance) had good internal and test–retest reliability, and good construct validity. They were also highly correlated to scores on a measure of avoidance of thoughts and feelings associated with the brain injury (ATAQ), providing evidence of convergent validity. Although scores on the AAQ-ABI-Reactive Avoidance subscale were strongly correlated with scores on the AAQ-II, the magnitude of the correlation suggested both measures may be capturing different aspects of psychological flexibility. Partial correlations confirmed that scores on the AAQ-ABI were significantly related to scores on the other measures (e.g., psychological distress) even when the effects of the AAQ-II were controlled. This suggested unique variance was being captured by the AAQ-ABI.

The other two factors (Denial and Active Acceptance), only had two items each but were retained due to their descriptive clarity and because they appeared to be conceptually different to Factor 1. Factor 2 appeared to capture denial of the injury and demonstrated a moderate positive relationship with measures of psychological distress. Factor 3 appeared to represent a more active acceptance as demonstrated by its relationship with positive mood. Both factors in their current form had poor reliability and factors with fewer than three items are often excluded due to their weak and unstable structure (Costello & Osborne, 2005). Thus, we can only recommend that Factor 1 (Reactive Avoidance) be used clinically with Factors 2 and 3 being retained for research and future item generation efforts.

The AAQ-II is a general measure of psychological flexibility and is meant to be relevant to a wide range of contexts and disorders. This measure has previously performed well in assessing psychological inflexibility across a range of samples including undergraduate students, substance abuse outpatients, and employees of a U.K. retail bank (Bond et al., 2011). However, CFA in the current study indicated that the one-factor model of the AAQ-II is not a good fit in an ABI population. Despite this, the AAQ-II had similar correlations with other measures in our ABI sample compared to those found in other populations (Bond et al., 2011). In addition, scores on the AAQ-II had good test–retest reliability in individuals with an ABI.

In comparing the two measures, scores on the AAQ-ABI had slightly stronger associations with psychological distress and avoidance when compared to the AAQ-II, providing additional support for the premise that psychological flexibility is somewhat context dependent (Hayes et al., 2003). The decision to use the AAQ-ABI or the AAQ-II in an ABI population requires consideration of the targeted outcome. If the outcome is to measure processes of change relating to acceptance of feelings that may arise after an ABI, the ABI specific measure may be more appropriate as has been indicated with other adaptations in clinical health populations (e.g., diabetes and tinnitus, Gregg et al., 2007; Westin et al., 2008). Population specific measures are also more likely to reveal significant mediational effects of psychological flexibility in clinical interventions when compared to general measures (Ciarrochi, Bilich, & Godsell, 2010). However, if improvement in general psychological flexibility is the target then the AAQ-II may be the better choice. There is little difference in the length of the Reactive Avoidance scale (nine items) of the AAQ-ABI compared to the AAQ-II (seven items) but the 5-point response scale used in the AAQ-ABI is likely to reduce cognitive demand (Weijters, Cabooter, & Schillewaert, 2010) compared to the AAQ-II's 7-point scale.

Limitations and Further Research

At this stage, the AAQ-II is the more extensively validated and refined measure used to assess changes in psychological flexibility in ACT treatment trials. In contrast, the AAQ-ABI is a new measure that had a number of limitations in its early conception. The development of the AAQ-ABI did not follow the most conceptually, robust process nor in the recommended order (DeVellis, 2003). First, there was a relatively small item pool generated when good scale development recommends a large item pool be generated based on sound conceptual foundation (Worthington & Whittaker, 2006). The procedure used for generating items for the AAQ-ABI included revision of items from other measures of acceptance including the earlier 10-item version of the AAQ-II (Bond et al., 2011). This is one strategy suggested in scale development (Streiner & Norman, 2008), but it is also recommended that more than one process is used to generate items to achieve good scale development (Clark & Watson, 1995). A larger item pool may have resulted in more robust second and third factors that appear to have some initial face validity but would benefit from further development. Despite these limitations, the current study has systematically evaluated the AAQ-ABI and found Factor 1 (Reactive Avoidance) to be psychometrically sound and likely to capture aspects of psychological flexibility in an ABI population albeit in those with sufficient cognitive capacity to complete self-report measures.

There are a number of steps still required in order to complete the validation process in an ABI population for both of these measures. One approach would be to undertake an ACT intervention with individuals experiencing an ABI and administer both measures to assess change. The 15-item AAQ-ABI has been previously used as a process measure in a small unpublished study and detected a significant increase in psychological flexibility from pre- to postintervention but this improvement was not sustained at the 1-month follow up (Sylvester, 2011). It would be anticipated the AAQ-ABI will be more sensitive to relevant areas of change than the AAQ-II, as the questions are targeted directly toward thoughts and feelings that may arise as a result of an ABI. It is recommended that future research also test the sensitivity of the AAQ-ABI and AAQ-II to changes over a longer period than the 1- to 2-week test–retest time frame that was undertaken in this study. Finally, it may be useful to further explore the Denial and Active Acceptance factors on the AAQ-ABI, by generating additional items and undertaking further factor analysis and construct validity assessment. In a clinical context, denial among individuals with ABI is often observed and commonly associated with impairments in self-awareness, a prevalent and often impeding factor in successful rehabilitation after an ABI (Prigatano, 2005). Thus, there is potentially high clinical utility for the Denial factor in the AAQ-ABI.

The sample used in this study was generally older than a typical TBI population due to the inclusion of nontraumatic ABI and this was indicated by the statistical significant difference between the mean age of participants with a TBI and those with a nontraumatic ABI. Furthermore, exploratory correlations indicated that age had a significant inverse relationship to scores on the Denial factor. This relationship has been demonstrated previously where older people had more accurate self-awareness than younger people and it was suggested that they may have developed better coping strategies and overall psychological functioning with age (Sherer et al., 2003).

Both the AAQ-II and AAQ-ABI provide a measure of psychological flexibility in a population who typically demonstrate impairments in their cognitive flexibility (Heled, Hoofien, Margalit, Natovich, & Agranov, 2012). As it is proposed that a component of psychological flexibility is cognitive flexibility (Chawla & Ostafin, 2007; Kashdan & Rottenberg, 2010), undertaking further research into the relationship between the AAQ-ABI and AAQ-II and neuropsychological measures of cognitive flexibility may contribute to our understanding of both these constructs in an ABI population. One criticism of neuropsychological tests is their low ecological validity (Burgess et al., 2006) because individuals who perform poorly on testing are often still able to function effectively in a familiar environment. As both the AAQ-II and AAQ-ABI items address an individual's relationship to their thoughts and experiences contextually, these measures may provide a complementary source of information to neuropsychological testing in individuals with an ABI.

Conclusions

The study provides preliminary validation of two measures of psychological flexibility for individuals with an ABI. Scores on both the AAQ-ABI and AAQ-II had satisfactory internal consistency, good reliability across time, in addition to having expected relationships with theoretically relevant constructs. This suggests that both measures are appropriate for measuring psychological flexibility in an ABI population. If treatment is specifically targeting acceptance toward thoughts and feelings around the changes occurring after an ABI, then the AAQ-ABI questions may be more relevant to this context than a general measure like the AAQ-II (Bond et al., 2011). The ABI specific measure may also contribute to our understanding of how interventions that promote psychological flexibility work as has been demonstrated with other population specific measures (Gregg et al., 2007; Lillis, Hayes, Bunting, & Masuda, 2009). The study provided further support that psychological flexibility has some situational specificity and that psychological inflexibility is associated with great psychopathology. In addition, these measures of psychological flexibility may augment neuropsychological assessment for individuals with an ABI, particularly measures of cognitive flexibility, by providing a measure of flexibility that is specific to the ABI context.

References

Alderman, N. (2003). Contemporary approaches to the management of irritability and aggression following traumatic brain injury. *Neuropsychological Rehabilitation, 13,* 211–240. http://dx.doi.org/10.1080/09602010244000327

Baguley, I. J., Cooper, J., & Felmingham, K. (2006). Aggressive behavior following traumatic brain injury: How common is common? *The Journal of Head Trauma Rehabilitation, 21,* 45–56. http://dx.doi.org/10.1097/00001199-200601000-00005

Bombardier, C. H., Fann, J. R., Temkin, N. R., Esselman, P. C., Barber, J., & Dikmen, S. S. (2010). Rates of major depressive disorder and clinical outcomes following traumatic brain injury. *JAMA: Journal of the American Medical Association, 303,* 1938–1945. http://dx.doi.org/10.1001/jama.2010.599

Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. C., Guenole, N., Orcutt, H. K., . . . Zettle, R. D. (2011). Preliminary psychometric properties of the Acceptance and Action Questionnaire—II: A revised measure of psychological flexibility and acceptance. *Behavior Therapy, 42,* 676–688. http://dx.doi.org/10.1016/j.beth.2011.03.007

Brown, F. J., & Hooper, S. (2009). Acceptance and commitment therapy (ACT) with a learning disabled young person experiencing anxious and obsessive thoughts. *Journal of Intellectual Disabilities, 13,* 195–201. http://dx.doi.org/10.1177/1744629509346173

Burgess, P. W., Alderman, N., Forbes, C., Costello, A., Coates, L. M., Dawson, D. R., . . . Channon, S. (2006). The case for the development and use of "ecologically valid" measures of executive function in experimental and clinical neuropsychology. *Journal of the International Neuropsychological Society, 12,* 194–209. http://dx.doi.org/10.1017/S1355617706060310

Caine, D., & Watson, J. D. (2000). Neuropsychological and neuropathological sequelae of cerebral anoxia: A critical review. *Journal of the International Neuropsychological Society, 6,* 86–99. http://dx.doi.org/10.1017/S1355617700611116

Campbell-Sills, L., Barlow, D. H., Brown, T. A., & Hofmann, S. G. (2006). Effects of suppression and acceptance on emotional responses of individuals with anxiety and mood disorders. *Behaviour Research and Therapy, 44,* 1251–1263. http://dx.doi.org/10.1016/j.brat.2005.10.001

Chawla, N., & Ostafin, B. (2007). Experiential avoidance as a functional dimensional approach to psychopathology: An empirical review. *Journal of Clinical Psychology, 63,* 871–890. http://dx.doi.org/10.1002/jclp.20400

Ciarrochi, J., Bilich, L., & Godsell, C. (2010). Psychological flexibility as a mechanism of change in Acceptance and Commitment Therapy. In R. Baer (Ed.), *Assessing mindfulness and acceptance: Illuminating the processes of change* (pp. 51–76). Oakland, CA: New Harbinger Publications.

Clark, L. A., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment, 7,* 309–319. http://dx.doi.org/10.1037/1040-3590.7.3.309

Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research & Evaluation, 10,* 1–9.

DeVellis, R. F. (2003). *Scale development: Theory and applications* (2nd ed., vol. *26*). Thousand Oaks, CA: Sage.

Draper, K., & Ponsford, J. (2008). Cognitive functioning ten years following traumatic brain injury and rehabilitation. *Neuropsychology, 22,* 618–625. http://dx.doi.org/10.1037/0894-4105.22.5.618

Gould, K. R., Ponsford, J. L., Johnston, L., & Schönberger, M. (2011). The nature, frequency and course of psychiatric disorders in the first year after traumatic brain injury: A prospective study. *Psychological Medicine, 41,* 2099–2109. http://dx.doi.org/10.1017/S003329171100033X

Gregg, J. A., Callaghan, G. M., Hayes, S. C., & Glenn-Lawson, J. L. (2007). Improving diabetes self-management through acceptance, mindfulness, and values: A randomized controlled trial. *Journal of Consulting and Clinical Psychology, 75,* 336–343. http://dx.doi.org/10.1037/0022-006X.75.2.336

Greve, K. W., Love, J. M., Sherwin, E., Mathias, C. W., Ramzinski, P., & Levy, J. (2002). Wisconsin Card Sorting Test in chronic severe traumatic brain injury: Factor structure and performance subgroups. *Brain Injury, 16,* 29–40. http://dx.doi.org/10.1080/0269905011008803

Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour Research and Therapy, 44,* 1–25. http://dx.doi.org/10.1016/j.brat.2005.06.006

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2003). *Acceptance and commitment therapy: An experiential approach to behavior change*. New York, NY: Guilford Press.

Hayes, S. C., Strosahl, K. D., Wilson, K. G., Bissett, R. T., Pistorello, J., Toarmino, D., . . . Bergan, J. (2004). Measuring experiential avoidance: A preliminary test of a working model. *The Psychological Record, 54,* 553–578.

Heled, E., Hoofien, D., Margalit, D., Natovich, R., & Agranov, E. (2012). The Delis-Kaplan Executive Function System Sorting Test as an evaluative tool for executive functions after severe traumatic brain injury: A comparative study. *Journal of Clinical and Experimental Neuropsychology, 34,* 151–159. http://dx.doi.org/10.1080/13803395.2011.625351

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6,* 1–55. http://dx.doi.org/10.1080/10705519909540118

IBM Corporation. (2013). SPSS Statistics for Windows (Version 22.0) Armonk, NY: IBM Corp.

Kangas, M., & McDonald, S. (2011). Is it time to act? The potential of acceptance and commitment therapy for psychological problems following acquired brain injury. *Neuropsychological Rehabilitation, 21,* 250–276. http://dx.doi.org/10.1080/09602011.2010.540920

Kashdan, T. B., Barrios, V., Forsyth, J. P., & Steger, M. F. (2006). Experiential avoidance as a generalized psychological vulnerability: Comparisons with coping and emotion regulation strategies. *Behaviour Research and Therapy, 44,* 1301–1320. http://dx.doi.org/10.1016/j.brat.2005.10.003

Kashdan, T. B., & Rottenberg, J. (2010). Psychological flexibility as a fundamental aspect of health. *Clinical Psychology Review, 30,* 865–878. http://dx.doi.org/10.1016/j.cpr.2010.03.001

Lillis, J., & Hayes, S. C. (2008). Measuring avoidance and inflexibility in weight related problems. *International Journal of Behavioral Consultation and Therapy, 4,* 30–40.

Lillis, J., Hayes, S. C., Bunting, K., & Masuda, A. (2009). Teaching acceptance and mindfulness to improve the lives of the obese: A preliminary test of a theoretical model. *Annals of Behavioral Medicine, 37,* 58–69. http://dx.doi.org/10.1007/s12160-009-9083-x

Lovibond, S., & Lovibond, P. (1995). *Manual for the Depression Anxiety Stress Scales* (2nd ed.). Sydney, Australia: Psychology Foundation.

MacKenzie, M. B. (2008). *Self-reported acceptance of social anxiety symptoms: Development and validation of the Social Anxiety-Acceptance and Action Questionnaire*. Theses and Dissertations (Comprehensive), Paper 896. Retrieved from http://scholars.wlu.ca/etd/896

McCracken, L. M., Vowles, K. E., & Eccleston, C. (2004). Acceptance of chronic pain: Component analysis and a revised assessment method. *Pain, 107,* 159–166. http://dx.doi.org/10.1016/j.pain.2003.10.012

Millis, S. R., Rosenthal, M., Novack, T. A., Sherer, M., Nick, T. G., Kreutzer, J. S., . . . Ricker, J. H. (2001). Long-term neuropsychological outcome after traumatic brain injury. *The Journal of Head Trauma Rehabilitation, 16,* 343–355. http://dx.doi.org/10.1097/00001199-200108000-00005

Mittenberg, W., Patton, C., Canyock, E. M., & Condit, D. C. (2002). Base rates of malingering and symptom exaggeration. *Journal of Clinical and Experimental Neuropsychology, 24,* 1094–1102. http://dx.doi.org/10.1076/jcen.24.8.1094.8379

Moss, A., Jones, C., Fokias, D., & Quinn, D. (2003). The mediating effects of effort upon the relationship between head injury severity and cognitive functioning. *Brain Injury, 17,* 377–387. http://dx.doi.org/10.1080/0269905031000070125

Myles, S. M. (2004). Understanding and treating loss of sense of self following brain injury: A behavior analytic approach. *International Journal of Psychology & Psychological Therapy, 4,* 487–504.

Nys, G. M., Van Zandvoort, M. J., De Kort, P. L., Jansen, B. P., Van der Worp, H. B., Kappelle, L. J., & De Haan, E. H. (2005). Domain-specific cognitive recovery after first-ever stroke: A follow-up study of 111 cases. *Journal of the International Neuropsychological Society, 11,* 795–806. http://dx.doi.org/10.1017/S1355617705050952

Ownsworth, T., Little, T., Turner, B., Hawkes, A., & Shum, D. (2008). Assessing emotional status following acquired brain injury: The clinical potential of the depression, anxiety and stress scales. *Brain Injury, 22,* 858–869. http://dx.doi.org/10.1080/02699050802446697

Pankey, J., & Hayes, S. C. (2003). Acceptance and commitment therapy for psychosis. *International Journal of Psychology & Psychological Therapy, 3,* 311–328.

Patel, M., Coshall, C., Rudd, A. G., & Wolfe, C. D. (2003). Natural history of cognitive impairment after stroke and factors associated with its recovery. *Clinical Rehabilitation, 17,* 158–166. http://dx.doi.org/10.1191/0269215503cr596oa

Prigatano, G. P. (2005). Disturbances of self-awareness and rehabilitation of patients with traumatic brain injury: A 20-year perspective. *The Journal of Head Trauma Rehabilitation, 20,* 19–29. http://dx.doi.org/10.1097/00001199-200501000-00004

Randall, D., Thomas, M., & Whiting, D. L. (2014). *The factor structure of the Depression Anxiety and Stress Scales (DASS-21) in Australian adults with severe traumatic brain injury*. Paper presented at the 37th Annual Brain Impairment Conference, Fremantle, Australia.

Reitan, R. M. (1958). Validity of the Trail Making Test as an indicator of organic brain damage. *Perceptual and Motor Skills, 8,* 271–276. http://dx.doi.org/10.2466/pms.1958.8.3.271

Riley, G. A., Brennan, A. J., & Powell, T. (2004). Threat appraisal and avoidance after traumatic brain injury: Why and how often are activities avoided? *Brain Injury, 18,* 871–888. http://dx.doi.org/10.1080/02699050410001671829

Russell, W. R., & Smith, A. (1961). Post-traumatic amnesia in closed head injury. *Archives of Neurology, 5,* 4–17. http://dx.doi.org/10.1001/archneur.1961.00450130006002

Shallcross, A. J., Troy, A. S., Boland, M., & Mauss, I. B. (2010). Let it be: Accepting negative emotional experiences predicts decreased negative affect and depressive symptoms. *Behaviour Research and Therapy, 48,* 921–929. http://dx.doi.org/10.1016/j.brat.2010.05.025

Sherer, M., Hart, T., Nick, T. G., Whyte, J., Thompson, R. N., & Yablon, S. A. (2003). Early impaired self-awareness after traumatic brain injury. *Archives of Physical Medicine and Rehabilitation, 84,* 168–176. http://dx.doi.org/10.1053/apmr.2003.50045

Soo, C., Tate, R. L., & Lane-Brown, A. (2011). A systematic review of acceptance and commitment therapy (ACT) for managing anxiety: Applicability for people with acquired brain injury? *Brain Impairment, 12,* 54–70. http://dx.doi.org/10.1375/brim.12.1.54

Streiner, D. L. (1993). A checklist for evaluating the usefulness of rating scales. *Canadian Journal of Psychiatry, 38,* 140–148.

Streiner, D. L. (1994). Figuring out factors: The use and misuse of factor analysis. *Canadian Journal of Psychiatry, 39,* 135–140.

Streiner, D. L., & Norman, G. R. (2008). *Health measurement scales: A practical guide to their development and use*. New York, NY: Oxford University Press. http://dx.doi.org/10.1093/acprof:oso/9780199231881.001.0001

Sylvester, M. (2011). *Acceptance and commitment therapy for improving adaptive functioning in persons with a history of pediatric acquired brain injury*. Doctor of Philosophy in Clinical Psychology Dissertation, University of Nevada, Reno, Nevada.

Taphoorn, M. J., & Klein, M. (2004). Cognitive deficits in adult patients with brain tumours. *Lancet Neurology, 3,* 159–168. http://dx.doi.org/10.1016/S1474-4422(04)00680-5

Tombaugh, T. N., & Tombaugh, P. W. (1996). *Test of Memory Malingering: TOMM*. New York, NY: Multi-Health Systems North Tonawanda.

Twohig, M. P., Hayes, S. C., & Masuda, A. (2006). Increasing willingness to experience obsessions: Acceptance and commitment therapy as a treatment for obsessive-compulsive disorder. *Behavior Therapy, 37,* 3–13. http://dx.doi.org/10.1016/j.beth.2005.02.001

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54,* 1063–1070. http://dx.doi.org/10.1037/0022-3514.54.6.1063

Wegner, D. M., & Zanakos, S. (1994). Chronic thought suppression. *Journal of Personality, 62,* 616–640. http://dx.doi.org/10.1111/j.1467-6494.1994.tb00311.x

Weijters, B., Cabooter, E., & Schillewaert, N. (2010). The effect of rating scale format on response styles: The number of response categories and response category labels. *International Journal of Research in Marketing, 27,* 236–247. http://dx.doi.org/10.1016/j.ijresmar.2010.02.004

Westin, V., Hayes, S. C., & Andersson, G. (2008). Is it the sound or your relationship to it? The role of acceptance in predicting tinnitus impact. *Behaviour Research and Therapy, 46,* 1259–1265. http://dx.doi.org/10.1016/j.brat.2008.08.008

Wilde, E. A., Whiteneck, G. G., Bogner, J., Bushnik, T., Cifu, D. X., Dikmen, S., . . . Malec, J. F. (2010). Recommendations for the use of common outcome measures in traumatic brain injury research. *Archives of Physical Medicine and Rehabilitation, 91,* 1650–1660. e1617.

Worthington, R. L., & Whittaker, T. A. (2006). Scale development research a content analysis and recommendations for best practices. *The Counseling Psychologist, 34,* 806–838. http://dx.doi.org/10.1177/0011000006288127

Received February 14, 2014
Revision received September 22, 2014
Accepted September 29, 2014 ■