HHS Public Access

Author manuscript

Res Aging. Author manuscript; available in PMC 2017 June 05.

Published in final edited form as:

Res Aging. 2013 March ; 35(2): 123–143. doi:10.1177/0164027511431989.

Psychometric Properties of the Connor-Davidson Resilience Scale With Older American Indians: The Native Elder Care Study

R. Turner Goins, PhD[1], **Jeffrey J. Gregg, MS**[2], and **Amy Fiske, PhD**[2]

[1]Oregon State University, Corvallis, OR, USA

[2]West Virginia University, Morgantown, WV, USA

Abstract

Resilience is a term that refers to a person's ability to successfully adapt to adversity. Resilience research has been relatively limited with older adults, particularly with older American Indians. Also, none of the resilience measures have been validated in older American Indians. This study's objective was to assess the psychometric properties of the full 25-item and abbreviated 10-item versions of Connor-Davidson Resilience Scale (CD-RISC) with a sample of older American Indians. Both CD-RISC versions performed similarly in the study sample compared with what has been reported in other populations. The full version demonstrated adequate internal consistency and convergent and divergent validity, but a meaningful factor structure was not confirmed. The abbreviated version showed good internal consistency and convergent and divergent validity and appeared to have a stable one-factor solution. These findings lend greater support to the use of the abbreviated version than the full version of the CD-RISC with older American Indians.

Keywords

aging; Indians; North American; resilience; psychological; psychometrics

Recently, there has been growing research interest in resilience among older adults (Becker & Newsom, 2005; Hardy, Concato, & Gill, 2004; Harris, 2008; Hildon, Smith, Netuveli, & Blane, 2008; Kinsel, 2005; Lamond et al., 2009; Mehta et al., 2007; Montross et al., 2006; Wagnild, 2003; Wells, 2009). In this context, resilience has been most often conceptualized as adapting to life stressors and changes primarily associated with declining health. Much of the literature on aging and resilience has shown resilience to be associated with components of "successful aging" or "healthy aging," such as functional independence, excellent or good mental and physical health, and social engagement (Hardy et al., 2004; Lamond et al., 2009; Nygren et al., 2005; Wells, 2009). Interestingly, we know virtually nothing about resilience in older American Indians, a group for whom the elevated prevalence of trauma exposure

Corresponding Author: R. Turner Goins, PhD, Oregon State University, School of Social and Behavioral Health Sciences, Center for Healthy Aging Research, 220 Bates Hall, Corvallis, OR 97331, USA. turner.goins@oregonstate.edu.

Declaration of Conflicting Interests The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

and higher rates of disease and disability make resilience a key construct to understand. Moreover, there are no validated measures of resilience in American Indians.

Understanding resilience is particularly relevant for older American Indians given the population's increased likelihood of trauma exposure both contemporarily as well as historically. In a study of two American Indian reservation-based populations, participants exhibited higher trauma exposure than their general U.S. population counterparts (Manson, Beals, Klein, Croy, & the AI-SUPERPFP Team, 2005). It has been suggested that historical trauma among American Indians is a result of colonialism, genocide, forced relocation, boarding schools, acculturative stress, and racism that has been internalized and institutionalized (Brave Heart & DeBruyn, 1998; Gagne, 1998). For instance, a significant portion of today's older American Indians attended Indian boarding schools, which were designed to assimilate American Indians into the "mainstream" and eradicate their culture (Adams, 1995; Davis, 2001). These historical events continue to be present in the minds of American Indians today (Jervis et al., 2006).

Older American Indians also experience hardships associated with poor health. More than one in five older American Indians have diabetes (Denny, Holtzman, Goins, & Croft, 2005), which usually co-occurs with other chronic health conditions, such as cardiovascular disease (Howard et al., 1999). Cardiovascular mortality rates in American Indians equal or exceed national all-races rates (Indian Health Service, 2009), and is the leading cause of death in American Indians beginning at age 45, whereas it does not become the leading cause of death in the general U.S. population until age 65 (Howard et al., 1999). The data also indicate that older American Indians suffer some of the highest disability rates of any U.S. racial group (Goins, Moss, Buchwald, & Guralnik, 2007; Waidmann & Liu, 2000), exceeding those of their White counterparts. Using 2000 census data, among persons aged 55 years and older, the prevalence of a functional limitation, mobility disability, and self-care disability was 36%, 21%, and 12% among American Indians compared with 25%, 17%, and 9% for Whites (Goins et al., 2007).

Altogether, these issues faced by older American Indians make understanding resilience in this population especially salient. Surprisingly few studies have examined resilience among American Indians, with most focusing on adolescents (Borowsky, Resnick, Ireland, & Blum, 1999; LaFromboise, Hoyt, Oliver, & Whitbeck, 2006; Strand, 2002). One study has been conducted, however, whose focus was on older adults (Grandbois & Sanders, 2009). This study examined resilience with eight older American Indians with the objective to learn how they had coped with life's challenges. The authors identified five themes from in-depth open-ended interviews: that resilience (a) must be understood within the context of the American Indian worldview; (b) is embedded in American Indian cultures; (c) is obtained from peers, families, and tribal communities; (d) comes from the connection with all creation; and (e) comes from a legacy of survival. These findings affirm the relevance of resilience with older American Indians and suggest the importance of ensuring that existing scales that operationalize resilience are valid with older American Indians.

Many survey-based resilience measures have been developed, including the Baruth Protective Factors Inventory (Baruth & Carroll, 2002), the Brief Resilient Coping Scale

(Sinclair & Wallston, 2004), the Resilience Scale (Wagnild & Young, 1993), the Resilience Scale for Adults (Friborg, Hjemdal, Rosenvinge, & Martinussen, 2003), and the Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003). The CD-RISC appears to be one of the more widely used resilience measures. Although few such measures have been well validated, initial psychometric analyses of the CD-RISC have demonstrated support for its internal consistency, test-retest reliability, and convergent and divergent validity in samples of Australian adolescents and adults (Burns & Anstey, 2010; Gucciardi, Jackson, Coulter, & Mallett, 2011), young U.S. adults (Campbell-Sills & Stein, 2007), general U.S. adults and patient populations aged 18 years and older (Connor & Davidson, 2003), Chinese adults aged 18 years and older (Yu & Zhang, 2007), and older adults aged 60 years and older (Lamond et al., 2009). To accurately understand psychological constructs in any cultural group, it is necessary to use valid and reliable assessments. Moreover, it is imperative that culturally competent assessments be used. One way to address this need is to evaluate the utility of an existing measure with another cultural group.

Given the relevance of resilience with older American Indians and that no such measures have been validated in older American Indians, our study's aim was to assess the psychometric properties of a popular measure of resilience, the CD-RISC, with a sample of older American Indians. Specifically, the objectives of this study were to (a) examine the internal consistency of the CD-RISC, (b) establish the convergent and diversity validity of the CD-RISC, and (c) compare the factor structure of the CD-RISC with what has been reported with other study populations.

Methods

Data Source

Data for this research were collected as part of the Native Elder Care Study, a cross-sectional study of community-dwelling older members of an American Indian tribe. The participating tribe is a federally recognized tribe in a rural southeastern region of the U.S. The study gathered in-depth information via interviewer-administered surveys on disability-related issues, including functional ability, personal assistance needs, health conditions, psychosocial resources, and the use of health care and supportive services. Data were collected between July 2006 and August 2008. To be included in the study, participants had to be enrolled tribal members, aged 55 years or older, noninstitutionalized, cognitively intact, and residing in the tribe's service area. A lower age criterion was used because research suggests that health declines with age more rapidly among American Indians than among other racial groups and that chronic disease burden is continuing to increase in American Indians (Hayward & Heron, 1999). In addition, many American Indian communities, including the tribe participating in this study, consider elders as those aged 55 years and older.

The tribal enrollment records indicated that there were 1,430 potentially eligible adults on the basis of age and residential location. Given that our target sample size was 500, random names were drawn from the list of potentially eligible adults and distributed to the interviewers, stratified by three age groups: 55 to 64, 65 to 74, and 75 years and older. The age ranges in the groups were determined on the basis of the number of potential

participants. In particular, there were not enough persons aged 85 years or older to use as an age group that would be equal in size to the younger age groups. We elected to stratify sampling on the basis of the age groups to ensure that we had equal representation of participants across the three age groups across the full range of ages greater than 55 years. Potentially eligible persons were invited to participate via telephone calls or home visits by interviewers. Forty-seven adults could not be located, 50 were determined to be ineligible [3 were living outside of the service area, 14 were living in a nursing home, 19 were deceased, 14 did not pass the dementia screen (Inouye, Robison, Froehlich, & Richardson, 1998)], and 78 declined participation. The remaining 505 participated in the study and received comprehensive, in-person assessments. All of the assessments were conducted by trained interviewers and lasted between 60 to 90 minutes. The majority of interviews were conducted in the participants' homes (87%), and the remaining were performed in a tribal building. Propensity to decline participation increased with age, although this was not significant, and men were more likely to decline than women ($p \leq .001$).

Of these 505, a random sample was sought to participate in a substudy that included answering additional survey items regarding physical activity and resilience. At the conclusion of the main study survey, interviewers asked a random sample of participants if they would also participate in a substudy that involved answering additional questions that would take approximately 20 minutes. Our target sample size for the substudy was 175. As such, interviewers asked 191 of the 505 to participate in the substudy, with 2 refusals yielding a sample of 189 substudy participants. The tribe's institutional review board, tribal council, and tribal elder council and the West Virginia University institutional review board approved both the main and substudies. All study participants received $20 gift cards for completing the main study interview and $10 gift cards for completing the substudy interview.

Measures

CD-RISC—This study examined the psychomotor properties of two versions of the CD-RISC, including the full scale (Connor & Davidson, 2003) and an abbreviated version (Campbell-Sills & Stein, 2007). The full CD-RISC consists of 25 items, such as "You can achieve your goals," "I have a strong sense of purpose," and "I am not easily discouraged by failure." For each item, respondents indicated their level of agreement on a 5-point, Likert-type scale (0 = *not true at all*, 1 = *rarely true*, 2 = *sometimes true*, 3 = *often true*, and 4 = *true nearly all of the time*). To score the CD-RISC, responses for all 25 items are summed and can range from 0 to 100, with higher scores indicative of greater levels of resilience. In prior research, the full CD-RISC has demonstrated acceptable internal consistency (e.g., α =.89; Connor & Davidson, 2003).

An exploratory factor analysis in a community-based general population sample yielded a five-factor structure (Connor & Davidson, 2003). These factors were labeled "personal competence, high standards, and tenacity;" "trust in one's instincts, tolerance of negative affect, and strengthening effects of stress;" "positive acceptance of change and secure relationships;" "control;" and "spiritual influences." However, subsequent studies have been

unable to replicate this original five-factor structure (Burns & Anstey, 2010; Campbell-Sills & Stein, 2007; Gucciardi et al., 2011; Yu & Zhang, 2007).

The abbreviated version of the CD-RISC examined in the present study was developed in response to the instability in the factor structure of the original (or full) scale (Campbell-Sills & Stein, 2007). The abbreviated version contains 10 of the original 25 items. The 10 items were identified on the basis of results from exploratory and confirmatory factor analyses. Six items were dropped because they did not load consistently onto any of the factors. The 2 items that constituted the "spiritual influences" factor were dropped, because factors with fewer than three indicators are generally viewed as poorly specified (MacCallum, Browne, & Sugawara, 1996). An additional 4 items were dropped because they loaded onto a single factor with two disparate themes, which was, consequently, not interpretable. Finally, 3 items were dropped because of redundancy. The remaining 10 items loaded onto one factor. To score the abbreviated version, responses to all 10 items are summed and can range from 0 to 40, with higher scores reflective of greater resilience (Campbell-Sills & Stein, 2007). In prior research, the abbreviated CD-RISC has demonstrated acceptable internal consistency (e.g., α =.85; Campbell-Sills & Stein, 2007).

The full CD-RISC is a widely used measure of resilience, but the abbreviated version appears to have better psychometric properties, including a more stable factor structure (Campbell-Sills & Stein, 2007). However, neither version of the CD-RISC has been evaluated in an older American Indian population; thus, the psychometric properties of both the full and the abbreviated versions of the scale were examined in the present study.

Sample characteristics—Demographic characteristics of the sample included age, sex, marital status (never married, married or life partner, separated or divorced, and widowed), living arrangements (live alone or with others), educational attainment, and annual household income (≤$19,999, $20,000 to $49,999, $50,000 to $99,999, or ≥$100,000). Other characteristics included Indian boarding school attendance (yes or no) and traumatic experience, which was obtained with the question

> Have you ever had an extremely frightening, traumatic, or horrible experience? Here we mean something like being a victim of a violent crime or domestic violence, being in a disaster like a flood or fire, or being in combat. Other examples are being seriously injured in an accident or being sexually assaulted. It could also mean seeing someone seriously injured or killed (Ritsher, Struening, Hellman, & Guardino, 2002).

Health characteristics included diagnosis by a physician with diabetes and cardiovascular disease, and functional status. Cardiovascular disease included diagnosis by a physician with angina, congestive heart failure, heart attack, and/or heart disease. Functional status was determined by reporting some or alot of difficulty performing at least one activity of daily living (Fillenbaum, 1988).

Center for Epidemiologic Studies Depression Scale (CES-D)—The CES-D is a multidimensional screening instrument for mood disorders and acute depressive symptoms experienced over a 7-day period ascertained with 20 items (Radloff, 1977). Scores range

from 0 to 60, with higher scores reflecting the presence of greater depressive symptomatology. The CES-D is a widely used instrument and has been validated with older American Indians (Chapleski, Lamphere, Kaczynski, Lichtenberg, & Dwyer, 1997). In the present study, the CES-D had acceptable internal consistency (α =.89).

General Self-Efficacy Scale—The General Self-Efficacy Scale assesses perceived coping competence or one's confidence in coping with a range of demanding situations (Jerusalem & Schwarzer, 1992). All 10 items are scored on a 4-point scale, and total scores range from 10 to 40, with higher scores indicative of greater generalized self-efficacy. This scale has been used with American Indians (Buchwald et al., 2005) as well as older adults (Bosscher & Smit, 1998). The General Self-Efficacy Scale demonstrated acceptable internal consistency in the current study (α = .89).

Personal Mastery Scale—The Personal Mastery Scale is a measure of generalized expectations about a person's sense of control (Pearlin & Schooler, 1978). The scale consists of seven items, with response options on a 4-point scale. Two items are stated in the negative and are reverse coded. Personal mastery scores range from 7 to 28, with a higher summary score indicating greater personal mastery. This measure has been used with American Indians (Hobfoll, Jackson, Hobfoll, Pierce, & Young, 2002) as well as with older adults (Deshpande et al., 2008). In our sample, the Personal Mastery Scale had acceptable internal consistency (α = .81).

Medical Outcomes Study Social Support Survey (MOS-SSS)—The MOS-SSS contains 19 items that measure emotional support, informational support, tangible support, positive social interaction, and affectionate support (Sherbourne & Stewart, 1991). When scored, the measure ranges from 0 to 100, with higher scores reflective of more support. The MOS-SSS has been used with older adults (Lee, Gazmararian, & Arozullah, 2006). The MOS-SSS demonstrated excellent internal consistency in the present study (α = .96).

Handgrip strength—Assessment of handgrip strength of the dominant hand followed standardized testing procedures per the American Society of Hand Therapists (Fess, 1992) with the Jamar handheld dynamometer (Sammons Preston Inc., Bolingbrook, IL). Handgrip strength has been established as a reliable measure in community-dwelling older adults (Bohannon & Schaubert, 2005). The average of three trials was recorded in pounds.

Body mass index—Body mass index was calculated using anthropometric measurements weight in kilograms divided by height in meters squared.

Analyses

To assess the psychometric properties of the CD-RISC, we evaluated (a) internal consistency, (b) convergent and divergent validity, and (c) factor structure of both the full and abbreviated versions of the scale. Internal consistency was assessed using Cronbach's α and item-total correlations. Convergent validity was assessed by examining the correlations of the full and abbreviated scales with the CES-D, the General Self-Efficacy Scale, the Personal Mastery Scale, and the MOS-SSS. These scales were selected because resilience is

conceptually related to protection from depressive symptoms as well as self-efficacy, mastery, and social support, and prior studies have shown that resilience is negatively related to depressive symptoms and positively related to constructs such as social support and self-esteem (Campbell-Sills & Stein, 2007; Connor & Davidson, 2003). To assess divergent validity, we examined the correlations between the full and abbreviated scale with handgrip strength and body mass index. These measures were chosen as examples of constructs that would not be expected to be strongly associated with resilience. Specifically, it was anticipated that the CD-RISC would be strongly correlated with depressive symptoms and self-efficacy, moderately correlated with personal mastery and social support, and unrelated to handgrip strength and body mass index.

To examine the factor structure of both the full and abbreviated versions of the CD-RISC, we tested a series of models using confirmatory factor analysis (CFA). In the first model, we evaluated the full 25-item CD-RISC scale using the five-factor structure reported by Connor and Davidson (2003). The second model tested whether the five factors identified by Connor and Davidson loaded onto an overarching (second-order) construct (i.e., resilience). This model tested whether the items constituted a single, coherent scale in addition to five distinct subscales. In the final model, we evaluated whether the abbreviated 10-item scale presented by Campbell-Sills and Stein (2007) loaded onto a single factor.

All CFAs were conducted with maximum likelihood estimation using AMOS Version 18.0 structural equation software (Arbuckle, 2009). We considered factor loadings of .40 and higher as salient, consistent with practices reported by other investigators (e.g., Campbell-Sills & Stein, 2007). Goodness of fit was evaluated using multiple indices of fit, including (a) relative χ^2, which is the ratio of χ^2 to degrees of freedom, for which values less than 3 are recommended (Bollen, 1989); (b) the comparative fit index (CFI), which uses baseline comparisons, with values greater than .90 indicating good fit (McDonald & Ho, 2002); (c) the root mean square error of approximation (RMSEA), a parsimony-adjusted measure of model fit with values less than .08 indicating adequate fit (McDonald & Ho, 2002); and (d) the standardized root mean square residual (SRMR), an absolute fit index with values less than .08 demonstrating adequate fit (Jöreskog & Sörbom, 1986). The CFI was weighted more heavily than the other fit statistics because it has been shown to be less dependent on sample size. Nonetheless, considering these indices jointly, and using these criteria, provides a cautious and sound evaluation of model fit.

Of the 189 substudy participants, 29 had incomplete data on one or more CD-RISC items. For our study, a complete case analysis was conducted; thus, the final sample included 160 of the 189 substudy participants. In the correlational analyses for convergent and divergent validity, listwise deletion was used for participants with any missing data on the measures used (see below for the number of participants included in each analysis). We examined whether there were statistically significant differences in age, sex, educational level, and annual household income between those with missing and those who had complete data on the CD-RISC. Tests revealed that those with missing data were statistically significantly more likely to be older.

Results

Table 1 presents study participant sample characteristics. The sample had a mean age of 67.9 ± 9.9 years. The sample was primarily female (68.8%), 47.8% were married or with life partners, 25.6% lived alone, 31.2% had high school diplomas, and 35.6% reported annual household incomes of $19,999 or less. With respect to life stressors, 35.6% had attended Indian boarding school, 35.0% had traumatic experiences, 35.6% were diagnosed with diabetes, 31.3% were diagnosed with cardiovascular disease, and 43.8% had at least one activity of daily living limitation.

The internal consistency of both the full and abbreviated CD-RISC appeared adequate. Cronbach's α for the full CD-RISC was .93, and item-total correlations ranged from .32 to .77. In the abbreviated CD-RISC, Cronbach's α was .88, and item-total correlations ranged from .51 to .70. Scores on the full CD-RISC in our sample were similar to the means and standard deviations reported in the initial evaluation of the measure with a community-based general population sample ($M = 83.0$, $SD = 13.4$ vs. $M = 80.4$, $SD = 12.8$, respectively; Connor & Davidson, 2003). Scores on the abbreviated CD-RISC were slightly higher in our sample compared with its initial evaluation with a sample of college students ($M = 33.5$, $SD = 6.2$ vs. $M = 27.2$, $SD = 5.8$, respectively; Campbell-Sills & Stein, 2007). The full and abbreviated CD-RISC scales were highly correlated with each other ($r = .94$, $p \leq .001$).

The convergent and divergent validity assessments demonstrated that the full and abbreviated versions of the CD-RISC were associated with the other measures in the expected directions (see Table 2). Both the full and abbreviated CD-RISC versions were more strongly correlated with the CES-D than with any other measure; higher levels of resilience were related to lower levels of depressive symptomatology. Both versions of the CD-RISC were significantly and positively related to measures of self-efficacy, personal mastery, and social support. With regard to divergent validity, the full scale was weakly correlated with handgrip strength and had no significant relation to body mass index. The abbreviated scale was not significantly correlated with either handgrip strength or body mass index.

Table 3 presents the results of the three models that were examined through CFA. Means, standard deviations, and item-total correlations for individual items, as well as standardized factor loadings for each model, are provided. The first model examined the five-factor solution originally proposed by Connor and Davidson (2003). All items had salient loadings on their respective latent constructs, ranging from .40 to .79 (all p values < .001; see Table 3). The most relevant indicator of goodness of model fit, the CFI, suggested less than optimal fit, although other fit indices (relative χ^2, RMSEA, and SRMR) all suggested adequate fit (see Table 4). We observed that the factor intercorrelations were high (data not shown), suggesting that the five factors may load onto a single overarching construct.

Subsequently, we tested a second model with the five latent factors from the first model loading onto a single higher order factor, representing the overarching construct of resilience. Each of the five factors had salient loadings onto the second-order construct, ranging from .61 to .98 (all p values < .001; see Table 3). As before, however, this model

provided a suboptimal fit for the data. The CFI and the RMSEA did not fall within the specified a priori ranges and therefore suggested poor model fit, although the relative χ^2 and the SRMR suggested adequate fit (see Table 4). Taken together, these results did not support the notion that the five factors identified by Connor and Davidson (2003) constituted a single, second-order latent construct (i.e., resilience).

Finally, we tested a third model examining whether the abbreviated 10-item CD-RISC constituted a single scale with all items loading onto one factor. All items had salient loadings onto the latent construct, ranging from .54 to .75 (all *p* values <.001; see Table 3). This one-factor solution provided a good fit for the data, satisfying a priori criteria for most fit indices, including the relative χ^2, SRMR, and CFI. The RMSEA suggested less than optimal fit. However, the RMSEA has been shown to be negatively influenced by smaller sample sizes.

Discussion

The purpose of this study was to assess psychometric properties of the CD-RISC in community-dwelling older American Indians. American Indians' elevated prevalence of trauma exposure and chronic health conditions are two reasons why resilience is an especially relevant construct for this population. As shown, our sample is no exception, with substantial percentages who attended Indian boarding schools, had traumatic experiences, had diabetes, had cardiovascular disease, and had at least one activity of daily living limitation.

Although the CD-RISC is one of several commonly used resilience measures, it has been neither successfully replicated nor validated with American Indians. Findings from the present study showed that the abbreviated 10-item CD-RISC showed good internal consistency and convergent and divergent validity and appeared to have a stable one-factor structure in older American Indians. In contrast, the full 25-item version of the CD-RISC demonstrated adequate internal consistency and convergent and divergent validity, but a meaningful factor structure was not confirmed. Thus, the full and abbreviated versions of the CD-RISC performed similarly in our sample compared with what has been reported in other populations. Overall, the present analysis lends greater support for the use of the abbreviated CD-RISC with older American Indians. Although both scale versions demonstrated sound psycho-metric properties, the abbreviated CD-RISC contained the same relations to other constructs, had greater parsimony, and had a more stable factor structure compared with the full CD-RISC.

The findings of the present study corroborate the results of earlier studies that examined the psychometric properties of the CD-RISC and expand these findings into an older American Indian sample. As in early research (i.e., Campbell-Sills & Stein, 2007), the current study demonstrated adequate internal consistency and found evidence of convergent and divergent validity in both the full and abbreviated versions of the scale. Furthermore, results of the CFA from the present study are consistent with findings from earlier investigations. Studies using samples of American college students (Campbell-Sills & Stein, 2007), Australian adults and adolescents (Gucciardi et al., 2011), and Chinese adults (Yu & Zhang, 2007) were

also unable to confirm the original five-factor structure of the CD-RISC proposed by Connor and Davidson (2003). As in previous research (e.g., Gucciardi et al., 2011), the present study found the revised, unidimensional, 10-item version of the CD-RISC proposed by Campbell-Sills and Stein (2007) to be preferable.

Our results must be interpreted within the context of some limitations. Perhaps the most important limitation is that the extent to which our findings are generalizable to all older American Indian populations is unknown, because our sample was drawn from citizens of a single American Indian tribe. Also, study participants were restricted to community-dwelling persons aged 55 years and older, and the findings may not be generalizable to other age groups or to those residing in institutions. With the exception of the CES-D, the psychometric properties of the other psychosocial scales have not been systematically assessed in American Indian populations. If the psychosocial scales do not accurately measure the intended traits in American Indian populations, our evaluation of convergent validity for the CD-RISC may be limited. Similarly, the assumption is that the CD-RISC items were meaningful and culturally appropriate with our sample. Subsequent research would be useful to determine exactly how older American Indians understand the individual scale items. Another potential limitation of the current study is the relatively small sample size for conducting CFA. However, a stable factor structure was still identified for the abbreviated CD-RISC.

Our study contributes to the existing literature on resilience and aging with an in-depth examination of the psychometric properties of the CD-RISC among older American Indians. No resilience measure has been validated in older American Indians. Our findings suggest that the abbreviated CD-RISC (Campbell-Sills & Stein, 2007) is a useful tool for future inquiry of resilience for older American Indians, which is an area of research that remains relatively unexplored. The abbreviated version of the CD-RISC could be clinically useful to identify those with low resilience. There is emerging evidence that brief resilience training may be effective in promoting health behaviors and outcomes with persons with diabetes (e.g., Bradshaw et al., 2007; Steinhardt, Mamerow, Brown, & Jolly, 2009). The abbreviated CD-RISC can also be used to identify those with high resilience, because many interventions use strength-based approaches, and the CD-RISC offers a quick way to identify such strengths. Future research in this area can help make important contributions by identifying components to successful aging as well as aid in clinical and public health interventions with American Indians.

Acknowledgments

Funding The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by the National Institute on Aging at the National Institutes of Health (Grant K01 AG022336).

References

Adams, DW. Education for extinction: American Indians and the boarding school experience, 1875–1928. Lawrence: University Press of Kansas; 1995.

Arbuckle, JL. AMOS Version 18.0 [Computer software]. Chicago: SPSS; 2009.

Baruth KE, Carroll JJ. A formal assessment of resilience: The Baruth Protective Factors Inventory. Journal of Individual Psychology. 2002; 58(3):235–244.

Becker G, Newsom E. Resilience in the face of serious illness among chronically ill African Americans in later life. Journal of Gerontology. 2005; 60B(4):S214–S223.

Bohannon R, Schaubert K. Test-retest reliability of grip strength measures obtained over a 12-week interval from community-dwelling elders. Journal of Hand Therapy. 2005; 18(4):426–428. [PubMed: 16271690]

Bollen, KA. Structural equations with latent variables. New York: John Wiley; 1989.

Borowsky IW, Resnick MD, Ireland M, Blum RW. Suicide attempts among American Indian and Alaska Native youth. Archives of Pediatrics and Adolescent Medicine. 1999; 153(6):573–580. [PubMed: 10357296]

Bosscher RJ, Smit JH. Confirmatory factor analysis of the General Self-Efficacy Scale. Behaviour Research and Therapy. 1998; 36(3):339–343. [PubMed: 9642852]

Bradshaw BG, Richardson GE, Kumpfer K, Carlson J, Stanchfield J, Overall J, … Kulkarni K. Determining the efficacy of a resiliency training approach in adults with Type 2 diabetes. Diabetes Educator. 2007; 33(4):650–659. [PubMed: 17684166]

Brave Heart MYH, DeBruyn LM. The American Indian Holocaust: Healing historical unresolved grief. American Indian and Alaska Native Mental Health Research. 1998; 8(2):56–78. [PubMed: 9842066]

Buchwald D, Goldberg J, Noonan C, Beals J, Manson S. the AI-SUPERPFP Team. Relationship between post-traumatic stress disorder and pain in two American Indian tribes. Pain Medicine. 2005; 6(1):72–79. [PubMed: 15669952]

Burns RA, Anstey KJ. The Connor-Davidson Resilience Scale (CD-RISC): Testing the invariance of a uni-dimensional resilience measure that is independent of positive and negative affect. Personality and Individual Differences. 2010; 48(5):527–531.

Campbell-Sills L, Stein MB. Psychometric analysis and refinement of the Connor-Davidson Resilience Scale (CD-RISC): Validation of a 10-item measure of resilience. Journal of Traumatic Stress. 2007; 20(6):1019–1028. [PubMed: 18157881]

Chapleski EE, Lamphere JK, Kaczynski R, Lichtenberg PA, Dwyer JW. Structure of a depression measure among American Indian elders: Confirmatory factor analysis of the CES-D Scale. Research on Aging. 1997; 19(4):462–485.

Connor KM, Davidson JRT. Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). Depression and Anxiety. 2003; 18(2):76–82. [PubMed: 12964174]

Davis J. American Indian boarding school experiences: Recent studies from Native perspectives. OAH Magazine of History. 2001; 15(2):20–22.

Denny CH, Holtzman D, Goins RT, Croft JB. Health behavior and health status disparities of American Indian and Alaska Native elders: Findings from the Behavioral Risk Factor Surveillance System, 2001 and 2002. American Journal of Public Health. 2005; 95(5):825–827. [PubMed: 15855458]

Deshpande N, Metter EJ, Bandinelli S, Lauretani F, Windham BG, Ferrucci L. Psychological, physical and sensory correlates of fear of falling and consequent activity restriction in the elderly: The InCHIANTI Study. American Journal of Physical Medicine and Rehabilitation. 2008; 87(5):354–362. [PubMed: 18174852]

Fess, E. Grip strength. In: Casanova, J., editor. Clinical assessment recommendations. Chicago: American Society of Hand Therapists; 1992. p. 41-45.

Fillenbaum, GG. Multidimensional functional assessment of older adults: The Duke Older Americans Resources and Services procedures. Hillsdale, NJ: Lawrence Erlbaum; 1988.

Friborg O, Hjemdal O, Rosenvinge JH, Martinussen M. A new rating scale for adult resilience: What are the central protective resources behind healthy adjustment? International Journal of Methods in Psychiatric Research. 2003; 12(2):65–76. [PubMed: 12830300]

Gagne, MA. The role of dependency and colonialism in generating trauma in First Nations citizens: The James Bay Cree. In: Danieli, Y., editor. International handbook of multigenerational legacies of trauma. New York: Plenum; 1998. p. 355-372.

Goins RT, Moss MP, Buchwald D, Guralnik J. Disability among older American Indians and Alaska Natives: An analysis of the 2000 Census Public Use Microdata Sample. The Gerontologist. 2007; 47(5):690–696. [PubMed: 17989411]

Grandbois DM, Sanders GF. The resilience of Native American elders. Issues in Mental Health Nursing. 2009; 30(9):569–580. [PubMed: 19657871]

Gucciardi DF, Jackson B, Coulter TJ, Mallett CJ. The Connor-Davidson Resilience Scale (CD-RISC): Dimensionality and age-related measurement invariance with Australian cricketers. Psychology of Sport and Exercise. 2011; 12(4):423–433.

Hardy SE, Concato J, Gill TM. Resilience of community-dwelling older persons. Journal of the American Geriatric Society. 2004; 52(2):257–262.

Harris PB. Another wrinkle in the debate about successful aging: The undervalued concept of resilience and the lived experience of dementia. International Journal of Aging and Human Development. 2008; 67(1):43–61. [PubMed: 18630190]

Hayward MD, Heron M. Racial inequality in active life among adult Americans. Demography. 1999; 36(1):77–91. [PubMed: 10036594]

Hildon Z, Smith G, Netuveli G, Blane D. Understanding adversity and resilience at older ages. Sociology of Health and Illness. 2008; 30(5):726–740. [PubMed: 18444953]

Hobfoll SE, Jackson A, Hobfoll I, Pierce CA, Young S. The impact of communal-mastery versus self-mastery on emotional outcomes during stressful conditions: A prospective study of Native American women. American Journal of Community Psychology. 2002; 30(6):853–871. [PubMed: 12385486]

Howard BV, Lee ET, Cowan LD, Devereux RB, Galloway JM, Go OT, … Welty TK. Rising tide of cardiovascular disease in Ameri-can Indians: The Strong Heart Study. Circulation. 1999; 99:2389–2395. [PubMed: 10318659]

Indian Health Service. Trends in Indian health, 2002–2003. Rockville, MD: Indian Health Service, U.S. Department of Health and Human Services; 2009.

Inouye SK, Robison JT, Froehlich TE, Richardson ED. The time and change test: A simple screening test for dementia. Journal of Gerontology. 1998; 53(4):M281–M286.

Jerusalem, M., Schwarzer, R. Self-efficacy as a resource factor in stress appraisal processes. In: Schwarzer, R., editor. Self-efficacy: Thought control of action. Washington, DC: Hemisphere; 1992. p. 195-213.

Jervis LL, Beals J, Croy CD, Klein SA, Manson SM. the AI-SUPERPFP Team. Historical consciousness among two American Indian tribes. American Behavioral Scientist. 2006; 50(4): 526–549.

Jöreskog, KG., Sörbom, D. LISREL IV: Analysis of linear structural relationships by maximum likelihood and least square methods. Mooresville, IN: Scientific Software; 1986.

Kinsel B. Resilience as adaptation in older women. Journal of Women & Aging. 2005; 17(3):23–39. [PubMed: 16186093]

LaFromboise TD, Hoyt DR, Oliver L, Whitbeck LB. Family, community, and school influences on resilience among American Indian adolescents in the upper Midwest. Journal of Community Psychology. 2006; 34(2):193–209.

Lamond AJ, Depp CA, Allison M, Langer R, Reichstadt J, Moore DJ, … Jeste DV. Measurement and predictors of resilience among community-dwelling older women. Journal of Psychiatric Research. 2009; 43(2):148–154.

Lee SYD, Gazmararian JA, Arozullah AM. Health literacy and social support among elderly Medicare enrollees in a managed care plan. Journal of Applied Gerontology. 2006; 25(4):324–337.

MacCallum RC, Browne MW, Sugawara HM. Power analysis and determination of sample size for covariance structure modeling. Psychological Methods. 1996; 1(2):130–149.

Manson SM, Beals J, Klein SA, Croy CD. the AI-SUPERPFP Team. Social epidemiology of trauma among 2 American Indian populations. American Journal of Public Health. 2005; 95(5):851–859. [PubMed: 15855465]

McDonald RP, Ho MHR. Principles and practice in reporting structural equation analyses. Psychological Methods. 2002; 7(1):63–82.

Mehta M, Whyte E, Lenze E, Hardy S, Roumani Y, Subashan P, … Studenski S. Depressive symptoms in late life: Associations with apathy, resilience and disability vary between young-old and old-old. International Journal of Geriatric Psychiatry. 2007; 23(3):238–243.

Montross LP, Depp C, Daly J, Reichstadt J, Golshan S, Moore D, … Jeste DV. Correlates of self-rated successful aging among community-dwelling older adults. American Journal of Geriatric Psychiatry. 2006; 14(1):43–51. [PubMed: 16407581]

Nygren B, Alex L, Jonsen E, Gustafson Y, Norberg A, Lundman B. Resilience, sense of coherence, purpose in life and self-transcendence in relation to perceived physical and mental health among the oldest old. Aging & Mental Health. 2005; 9(4):354–362. [PubMed: 16019292]

Pearlin LI, Schooler C. The structure of coping. Journal of Health and Social Behavior. 1978; 19(1):2–21. [PubMed: 649936]

Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. Applied Psychological Measures. 1977; 1(3):385–401.

Ritsher J, Struening E, Hellman F, Guardino M. Internal validity of an anxiety disorder screening instrument across five ethnic groups. Psychiatry Research. 2002; 111(2–3):199. [PubMed: 12374637]

Sherbourne CD, Stewart AL. The MOS social support survey. Social Science and Medicine. 1991; 32(6):705–714. [PubMed: 2035047]

Sinclair VG, Wallston KA. The development and psychometric evaluation of the Brief Resilient Coping Scale. Assessment. 2004; 11(1):94–101. [PubMed: 14994958]

Steinhardt MA, Mamerow MM, Brown SA, Jolly CA. A resilience intervention in African American adults with Type 2 diabetes: A pilot study of efficacy. Diabetes Educator. 2009; 35(2):274–284. [PubMed: 19204102]

Strand, J. Nurturing resilience and school success in American Indian and Alaska Native students. Charleston WV: Clearinghouse on Rural Education Small Schools; 2002. Education Resources Information Center Digest, ED471488

Wagnild G. Resilience and successful aging: Comparison among low and high income older adults. Journal of Gerontological Nursing. 2003; 29(12):42–49.

Wagnild GM, Young HM. Development and psychometric evaluation of the Resilience Scale. Journal of Nursing Measurement. 1993; 1(2):65–178.

Waidmann TA, Liu K. Disability trends among elderly persons and implications for the future. Journal of Gerontology: Social Sciences. 2000; 55B(5):S298–S307.

Wells M. Resilience in rural community-dwelling older adults. Journal of Rural Health. 2009; 25(4): 415–419. [PubMed: 19780924]

Yu X, Zhang J. Factor analysis and psychometric evaluation of the Connor-Davidson Resilience Scale (CD-RISC) with Chinese people. Social Behavior and Personality. 2007; 35(1):19–30.

Biographies

R. Turner Goins is an associate professor in the School of Social and Behavioral Health Sciences, Center for Healthy Aging Research, at Oregon State University. Her area of research includes rural aging, with an emphasis on functional disability, long-term care access, and caregiving issues among older American Indians and Alaska Natives.

Jeffrey J. Gregg is a doctoral student in clinical psychology at West Virginia University. His research interests are broadly focused in clinical geropsychology, with an emphasis on late-life depression and dementia.

Amy Fiske is an associate professor in the Department of Psychology at West Virginia University. Her research focuses on risk and protective factors associated with depression

and suicidal behavior in late life and the implications for assessment, treatment, and prevention.

Table 1

Sample Characteristics (n = 160).

Variable	%	*n*	*M*	*SD*
Age (years)			67.9	9.9
55 to 64	45.6	73		
65 to 74	31.3	50		
≥75	23.1	37		
Women	68.8	110		
Marital status				
Never married	2.5	4		
Married/life partner	47.8	76		
Separated/divorced	17.6	28		
Widowed	32.1	51		
Lives alone	25.6	40		
Education (years)				
1 to 11 (less than a high school degree)	28.8	46		
12 (high school graduate or General Educational Development diploma)	31.2	50		
13 to 15 (some college or associates)	29.4	47		
≥16 years (college graduate or post graduate)	10.6	17		
Annual household income				
≤$19,999	35.6	57		
$20,000 to $49,999	33.1	53		
$50,000 to $99,999	8.1	13		
≥$100,000	1.3	2		
Don’t know/refused	21.9	35		
Attended an Indian boarding school	35.6	57		
Had a traumatic experience	35.0	56		
Diagnosed with				
Diabetes	35.6	57		
Cardiovascular Disease	31.3	50		
≥ activity of daily living limitation	43.8	70		

Table 2

Associations of Select Psychosocial Measures, Handgrip Strength, and Body Mass Index With the CD-RISC (n = 160).

		Pearson's Correlation	
Variable	***n***	**Full CD-RISC**	**Abbreviated CD-RISC**
Convergent validity			
CES-D	128	−.51***	−.51***
General Self-Efficacy Scale	157	.47***	.45***
Personal Self-Mastery Scale	159	.29***	.31***
MOS-SSS	160	.27***	.21**
Divergent validity			
Handgrip strength	157	.17*	.15
Body mass index	156	−.01	−.02

Note: CD-RISC = Connor-Davidson Resilience Scale; CES-D = Center for Epidemiologic Studies Depression Scale; MOS-SSS = Medical Outcomes Study Social Support Survey.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 3

CD-RISC Item Means, Standard Deviations, Item-Total Correlations, and Factor Loadings ($n = 160$).

Item	*M*	SD	Full CD-RISC Item-Total Correlations	Abbreviated CD-RISC Item-Total Correlations	First- Order CFA Loading	Second- Order CFA Loading	Abbreviated CD-RISC CFA Loading[a]
Factor 1						.96	
11. You can achieve your goals	3.5	0.8	.75	.70	.79	.81	.75
24. Work to attain my goals	3.5	0.8	.60		.72	.70	
16. Not easily discouraged by failure	3.2	1.0	.61	.60	.63	.63	.66
25. Pride in my achievements	3.7	0.6	.52		.62	.59	
17. Think of self as strong person	3.6	0.7	.57	.51	.62	.64	.55
10. Best effort no matter what	3.6	0.7	.58		.61	.63	
12. When things look hopeless, I don't give up	3.6	0.7	.56		.60	.61	
23. I like challenges	2.8	1.1	.50		.52	.52	
Factor 2						.92	
14. Under pressure, focus and think clearly	3.3	0.9	.71	.68	.78	.78	.73
7. Coping with stress strengthens	3.1	1.1	.64	.68	.68	.66	.71
19. Can handle unpleasant feelings	3.3	0.9	.60	.57	.63	.62	.62
18. Make unpopular or difficult decision	2.8	1.1	.57		.62	.62	
6. See the humorous side of things	3.5	0.8	.56	.58	.59	.58	.62
15. Prefer to take the lead in problem solving	2.7	1.2	.54		.57	.59	
20. Have to act on a hunch	2.4	1.1	.47		.52	.53	
Factor 3						.89	
5. Past success gives confidence for new challenge	3.3	0.9	.71		.79	.80	
4. Can deal with whatever comes	3.4	0.9	.59	.59	.67	.67	.64
8. Tend to bounce back after illness	3.5	0.9	.54	.58	.60	.58	.62
1. Able to adapt to change	3.3	1.0	.52	.51	.56	.57	.54
2. Close and secure relationships	3.5	0.8	.40		.42	.44	
Factor 4						.98	
21. Strong sense of purpose	3.4	0.8	.75		.79	.81	
22. In control of my life	3.6	0.8	.58		.68	.65	
13. Know where to turn for help	3.5	0.9	.39		.40	.42	

Item	*M*	SD	Full CD-RISC Item-Total Correlations	Abbreviated CD-RISC Item-Total Correlations	First- Order CFA Loading	Second- Order CFA Loading	Abbreviated CD-RISC CFA Loading[a]
Factor 5						.61	
9. Things happen for a reason	3.4	0.8	.39		.63	.69	
3. Sometimes fate or God can help	3.5	0.8	.26		.46	.42	

Note: CD-RISC = Connor-Davidson Resilience Scale; CFA = confirmatory factor analysis.

[a]All items on the abbreviated scale loaded onto one factor (resilience).

Table 4

Confirmatory Factor Analysis Fit Statistics for the CD-RISC (n = 160).

Model	χ^2	df	χ^2/df	CFI	RMSEA	SRMR
Full CD-RISC, first order	518.48	265	1.96[a]	.846	.078[a]	.070[a]
Full CD-RISC, second order	548.73	270	2.03[a]	.831	.081	.072[a]
Abbreviated CD-RISC	92.34	35	2.64[a]	.902[a]	.102	.062[a]

Note: CD-RISC = Connor-Davidson Resilience Scale; CFI = comparative fit index; RMSEA = root mean squared error of approximation; SRMR = standardized root mean square residual.

[a]A priori model fit criterion met.