

Assessment of Awareness of Connectedness as a Culturally-Based Protective Factor for Alaska Native Youth

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Research with Native Americans has identified connectedness as a culturally based protective factor against substance abuse and suicide. Connectedness refers to the interrelated welfare of the individual, one's family, one's community, and the natural environment. We developed an 18-item quantitative assessment of awareness of connectedness and tested it with 284 Alaska Native youth. Evaluation with confirmatory factor analysis and item response theory identified a 12-item subset that functions satisfactorily in a second-order four-factor model. The proposed Awareness of Connectedness Scale (ACS) displays good convergent and discriminant validity, and correlates positively with hypothesized protective factors such as reasons for living and communal mastery. The measure has utility in the study of culture-specific protective factors and as an outcomes measure for behavioral health programs with Native American youth.

Keywords: American Indian youth, Alaska Native youth, assessment, indigenous psychology

This paper describes the development of the Awareness of Connectedness Scale (ACS). We support the premise that scientific measurement tools for assessing risk, resiliency, and change among Native Americans can, and should, be based on cultural notions of disorder, wellness, and healing. Research with various Native American populations has identified a holistic sense of connectedness of the individual with their family, community, and natural environment as an important element of Native American world views (Hazel & Mohatt, 2001; Bowen, 2005; Hill, 2006), a

protective factor against substance use and suicide (Allen et al., 2006; Allen, Mohatt, Fok, Henry, & People Awakening Team, 2009; Mohatt, Rasmus, et al., 2004), and an aid in recovery from substance use disorders (Gone, 2009; Mohatt et al., 2007).

First we review the role of culture, colonization, and community-identified cultural factors in health research among Native Americans to contextualize and frame the development of the ACS. Then we address the main scale development objectives, which include: (a) analysis of the underlying structure of awareness of connectedness as measured by the ACS, (b) investigation of the item pool characteristics to assess how each item functions, and (c) assessment of the convergent and discriminant validity of the scale. In conclusion, we discuss the utility of the instrument in terms of potential contributions to the fields of indigenous and cross-cultural psychology. We argue that assessment of awareness of connectedness is a valuable tool for research and practice, and that the identification and measurement of protective culture-based variables can help clarify the relationship between Native American cultural identification and behavioral health outcomes.

The ACS development is an example of identifying a culturally specific protective factor within the epistemology of a Native American culture that can be measured and verified. Oetting and Beauvais (1990), Dana (2000), Duran (2006), Mohatt, Hazel, et al. (2004), and Gone (2009) raise culture and community as cornerstone considerations when conducting research or interventions in Native American communities, with particular attention to the diversity of cultural world views represented within this broad population. Duran (2006) further recommends transcendence of notions such as "cross-cultural" and "cultural sensitivity" by identification and validation of the epistemology or "life-world" of the people with whom we are working (p. 14). Mohatt, Hazel, et al. (2004) and Mohatt et al. (2007) describe how community-based

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participatory research (CBPR) with Alaska Native (AN) peoples has led to important insights into the resiliency and strengths of AN cultures, such as culture-specific ways of thinking about alcohol use, sobriety, and recovery from substance abuse, as well as ways of framing and understanding the relationships between the individual, community, and holistic wellness.

Culturally grounded protective factors are important for study precisely because the history of colonization has disrupted the connections to traditional values among Native American cultures. Durkheim (as cited in Hill, 2009) describes how colonization leads to a disruption of life and cultural systems, which, in turn, leads to increased suicide risk. Today, Native American adolescents experience some of the highest substance abuse rates in the country (Hawkins, Cummins, & Marlatt, 2004) and suicide rates nearly twice as high as the national average (Alcantara & Gone, 2007). Hawkins et al. (2004) link the heightened risk for substance abuse in Native American youth to cultural dislocation, acculturative stress, and alienation.

Duran (2006) indicates that historical and present day trauma has ruptured the physical, mental, and spiritual relationships between people and their holistic life-world. Duran suggests this trauma manifests in behavioral health issues such as family violence, suicide, and depression, as well as in dysfunction in community-based support systems. Duran emphasizes the need to construct a sociocultural narrative that is grounded in the native life-world. Such a narrative would rebuild awareness of connections between people and their culture, community, and life-world. We developed the ACS because it allows us to assess success at promoting and reconstructing values grounded in the native life-world and to quantify the relationship between these efforts and other behavioral health outcomes.

The ACS development took place within a larger CBPR project that seeks to identify AN pathways to sobriety and strengthen culturally based protective factors (Allen et al., 2006). This project, The People Awakening (PA) project, has engaged AN communities for over 15 years to address substance use disorders and suicide in rural Alaska. PA grew out of a grassroots response to change the deficit-focused discourse surrounding substance use issues in native communities (Mohatt, Hazel, et al., 2004). In an approach aligned with Duran's (2006) call for positive cultural narratives, community members sought to highlight narratives of sobriety, resilience, and wellness. PA began with a qualitative study that identified AN pathways to sobriety and concluded with the development of an heuristic model describing the processes leading to sobriety (Mohatt, Rasmus, et al., 2004). Investigators with the Center for Alaska Native Health Research (CANHR) and the Yup'ik Regional Coordinating Council (YRCC)¹ community research partner have furthered the PA work with the development of quantitative measures of PA protective factors and testable models (Allen et al., 2006; Allen, Mohatt, Fok, Henry, & Burket, 2008). The ACS was refined in *Cuqyun*,² the portion of PA that focused on the development of culturally appropriate outcomes measures for use in suicide and substance use research, and for intervention with Yup'ik youth.

PA researchers and community members identified an awareness of one's connectedness with family, community, and natural environment as a central factor that protected individuals from alcohol problems (Hazel & Mohatt, 2001; Mohatt, Hazel, et al., 2004; Mohatt, Rasmus, et al. 2004; Allen et al., 2006). Awareness

is embodied in the Yup'ik concepts of *Ellam-iinga*, the eye of awareness; *ellanaq*, the process of becoming aware; and *ellang-neq*, awareness of consequences (Hazel & Mohatt, 2001; Mohatt, Hazel, et al., 2004; Mohatt, Rasmus, et al., 2004). *Yuuyaraq*, or "the way of the human being," is a related Yup'ik concept that prompts living in harmony with the natural environment because land, water, heavens, animals, and plants are viewed as spiritual entities (Napoleon, 1996, p. 5). This notion of holistic connectedness and interdependence is also present in many other Native American cultural epistemologies. While PA identified and employed the Yup'ik terms for awareness, they identified a very similar idea across all AN cultural groups (Mohatt, Rasmus, et al., 2004). Also similar is the Lakota Sioux people's notion of relatedness, embodied in the term *mitakuye oyas'in*, which means "all of my relatives." This word, which is central to Lakota spirituality and is used to close every prayer, refers to everything that is, has been, or ever will be created (Bowen, 2005). These concepts suggest sense of connectedness as a prosocial value associated with Native American cultural world views.

Many authors have more broadly identified cultural identity³ and enculturation⁴ as protective factors for native youth (Oetting & Beauvais, 1990; Lafromboise, Hoyt, Oliver, & Whitbeck, 2006; Whitbeck, McMorris, Hoyt, Stubben, & Lafromboise, 2002). However, Hawkins et al. (2004) reported that cultural identity and engagement research among native youth has produced mixed results in terms of identifying engagement in traditional cultural practices as protective against substance use. Chandler, Lalonde, Sokol, and Hallett (2003) demonstrated how cultural continuity, the degree to which a culture preserves a sense of identity and meaningfulness from the past through to the present and a foreseeable future, is inversely related to suicide rates in Native American communities. Alcantara and Gone (2007) reported mixed results between connection with cultural practices and suicidality, but concluded that cultural continuity remains a useful construct in understanding native youth suicide. Bates, Beauvais, and Trimble (1997) were unable to identify a direct relationship between native cultural identification and substance use, but pointed out that culture communicates values, beliefs, and norms, whether positive or negative. They recommended that substance use prevention programs for Native American youth focus on building youth's relationship to cultural values and traditions that promote positive behavior.

Identity and enculturation encompass cultural values and participation without distinguishing the values and world views endorsed by the culture that are most salient in health, resiliency, and well-being. Research with specific cultural components, such as awareness of connectedness, should yield clearer results. We developed the ACS to measure youth's awareness of a culturally defined experience of connectedness with family, community, and

¹ The YRCC is a 10-member advisory council that acts as the CBPR partner voice for the regions engaged in research and ensures cultural validity of the projects.

² *Cuqyun* means "measurement tool" in the Yup'ik language.

³ Cultural identification is the degree to which a person self-identifies with a culture (Oetting & Beauvais, 1990; Bates et al., 1997).

⁴ Enculturation is the degree to which a person is steeped in the cultural traditions and values (Whitbeck et al., 2002).

nature in response to the identification of a sense of connectedness as both a central factor in a cultural theory of protection among AN cultures and as a potential bridge between theories of cultural identification and substance use outcomes. Accordingly, the objectives of this study were to (a) test the multidimensional nature of connectedness as measured by the ACS and its fit with our theory of the construct from which we developed the measure, (b) investigate the item characteristics functioning of the ACS item pool, and (c) assess the evidence for validity of ACS score interpretations.

Based on the PA research and other literature on the protective nature of a sense of connectedness, we anticipated that awareness of connectedness would be positively associated with experiences of purpose and meaning in one's life (Hypothesis 1). As this sense of connectedness is a culture-based value, we also anticipated that it would be positively associated with AN cultural identification (Hypothesis 2), while unrelated with identification with a European American or White American lifestyle (Hypothesis 3). Similar to Hypothesis 2, we expected that the ACS would be positively associated with higher levels of mastery with a communal focus, defined as problem solving to overcome challenges through the assistance of family and friends (Hypothesis 4), as a communal approach to problem solving should be closely aligned with a heightened sense of connectivity to family and community. Conversely, we predicted the ACS would not display associations with self-focused mastery, defined as problem solving to overcome challenges on one's own (Hypothesis 5). We expected that connectedness levels would not correlate with age (Hypothesis 6).

Method

Participants

Participants included 284 AN 12- to 18-year-olds from rural, remote Alaska communities. Of this total, 194 were recruited from a boarding school serving rural residents located in a regional hub community in Southeast Alaska. The school attracts students from all the cultural-linguistic groups indigenous to Alaska. Yup'ik was the largest cultural group within the student body. The other 90 participants lived in a predominantly Yup'ik regional hub community in Southwest Alaska. Gender distribution included 120 males and 164 females. The mean participant age was 15.5 years, with no significant age difference between males and females. Participants described their parent's marital status as 62% married, 7% single, 19% divorced, and 12% separated. When living at home, 78% participants reported living with mom, 68% living with dad, 13% living with a grandparent, and 11% living with another relative. Self-identified AN cultural linguistic group membership was largely Yup'ik, with 72% identifying as Yup'ik, 21% as Inupiat, 11% as Athabaskan, 4% as Tlingit/Haida, and 6% as Aleut/Alutiq (some individuals identified with two or more ethnic categories).

Procedures

The university institutional review board, school boards, and local AN advisory school boards at each school approved all procedures. Parents of youth were contacted through their children's schools and through direct contact with research staff. Parents were invited to allow their child to participate in a study to

help develop measures of the effectiveness of programs designed to enhance sobriety and reasons for life among rural AN youth. Youth were offered an honorarium of \$15 for completing the survey. Following parental consent, youth were informed of the purposes, risks, and benefits of the study, and completed an assent to participate.

Participants completed an online survey in small groups, ranging from 2 to 12 individuals. Computer administration was via a secure Web server. The response format used a continuous "slider" scale, with a salmon⁵ icon that the respondent clicked and moved across a horizontal blue background with three semantic anchors. At the suggestion of our linguistic advisors, most anchors read, Not at all, Somewhat, and A lot. The continuous analog scale was automatically segmented according to 20 response scores. Responses were transmitted via encryption from the remote locations in rural Alaska back to the secure server housed at the University of Alaska Fairbanks. Prior to analysis, we transformed the data into 5-point scores, for ease of interpretation, by evenly dividing the original 20-point scores (derived directly from the continuous "slider" assessment scale) by 4. In this way, responses that had been automatically coded as 1–4 were recoded as a 1, 5–8 as a 2, 9–12 as a 3, 13–16 as a 4, and 17–20 as a 5. The resulting 5-point scale retained the approximately normal distribution of the 20-point scale and made it possible for us to conduct interpretable Item Response Theory (IRT) analysis.

The objectives of this study are to assess the properties, functionality, and utility of the ACS through (a) confirmatory factor analysis (CFA) to assess the factor structure of the original 18 items of the ACS and establish the unidimensionality of the proposed subscales, and (b) IRT modeling to examine each item's properties; and to explore the associations between the ACS and other scales to assess convergent and discriminant validity.

Measures

ACS. The ACS consists of 18 items developed by students from the University of Alaska, CANHR researchers, and the YRCC. The items are targeted at assessing awareness of self as a member of a broader human and natural community, including an awareness of connections between one's own well-being and the well-being of other entities in the various ecological spheres that one occupies. The ACS assesses the degree to which a person endorses the concept of interrelatedness between self, family, community, and natural environment. In this case, interrelatedness refers to a relationship of reciprocal well-being or ill effect.

Initial development of the ACS began in a graduate research methods class and focused on developing a brief scale for assessing awareness of connectedness among adults. Three students,⁶ two of whom are coauthors on this paper, drew upon their cultural backgrounds and an interview with the CANHR cultural consultant to develop a preliminary 30-item pool. For the original scale, authors independently rated the preliminary items for relevance, representativeness, clarity, and specificity in order to evaluate each

⁵ Salmon are a central cultural icon of the region and were used based on input from local advisors.

⁶ Nathaniel Mohatt (University of Alaska Fairbanks), Rebekah Burket (University of Alaska Fairbanks), and Tonie Quaintance (University of Alaska Anchorage).

item's ability to tap the target construct. The items rated as most relevant, representative, clear, and specific across evaluators were retained. The student project produced a final 12-item scale grounded in indigenous philosophies such as the Yup'ik concept of *ellanaq*, the Lakota concept of *mitakuye oyas'in*, and general knowledge of pan-Indian concepts such as the medicine wheel. CANHR researchers agreed to include the scale for pilot testing in the *Cuqyun* study due to the scale's conceptual connection to the AN youth-focused measurement development project.

The ACS includes items deliberately selected to maintain balance between the domains of self, family, community, and natural environment. The readability of the assessment is at the fourth-grade level to accommodate participants for whom English is a second language and to ensure appropriateness for use with youth. We solicited the YRCC's critique of the items for cultural validity and included an additional six questions based on their input. The resultant scale includes four subscales—Awareness-Individual and Awareness-Family (four items each), and Awareness-Community and Awareness-Natural Environment (five items each)—for a total of 18 items. Whereas the Awareness-Family, Awareness-Community, and Awareness-Natural Environment subscales are comprised of items to assess one's awareness of connectedness to the respective domain, the Awareness-Individual subscale consists of items assessing awareness of how one's individual actions can impact oneself.

Alaska Native Cultural Identification (ANCI). The ANCI is an 8-item scale adapted from the Orthogonal Cultural Identification scale (Oetting & Beauvais, 1990) by the Center for Alaska Native Health Researchers (Wolsko, Mohatt, Lardon, & Burket, 2009). The ANCI uses two item stems: "How much you live by or follow the [Native/White American] way of life?" and "How much do you speak [Native language/English]." We asked these question stems under the heading "When you are at [home/school]" because cultural behavior and identification can differ based on setting (Okazaki & Sue, 1995). This resulted in two subscales, Alaska Native Identification (ANI) and White American Identification (WAI), which tap elements of identity with the culture of origin and the dominant culture.

Reasons for Life (RFL). The RFL scale is a new 13-item scale for use with AN adolescents (Allen et al., 2008). The RFL is modeled after Osman et al.'s (1996) Brief Reasons for Living-Adolescent (BRFL-A) scale. Whereas the BRFL-A assesses the reasons that a person would choose not to end their life if they felt suicidal, the RFL explores beliefs and experiences that contribute to making life enjoyable, worthwhile, and meaningful. The RFL includes four subscales: Other's Assessment of Me, Cultural and Spiritual Beliefs, Personal Efficacy, and Family Responsibility.

Multicultural Mastery Scale (MMS). The MMS was adapted from the Mastery scale (Pearlin, Lieberman, Menaghan, & Mullan, 1981) and the Communal Mastery scale (Jackson, McKenzie, & Hobfoll, 2000) for AN youth by Center for Alaska Native Health researchers (Fok, Allen, & Henry, 2011). The multicultural mastery scale is comprised of three subscales: Mastery-Self, Mastery-Family, and Mastery-Friends. The Mastery-Self subscale measures a personal sense of control over goal achievement and the sense an individual can overcome life challenges through their own effort. The Mastery-Family subscale evaluates the young person's belief that he or she can face life's problems successfully through joining with family, while the Mastery-Friends subscale

assesses this sense with regards to friends. Together the Mastery-Family and Mastery-Friends subscales represent a Communal-Mastery Scale that we expect to correlate positively with the ACS as an indicator of convergent validity.

Results

Objective 1: Assessing the Scale Structure of the ACS

Because IRT assumes that the items represent a single dimension, we examined the eigenvalues of the data matrices for each subscale to decide whether IRT analysis was appropriate. According to Lord's (1980) criterion, if the ratio between the first and the second eigenvalues is greater than 3, the scale is essentially unidimensional. In addition to indicating which subscales did not measure a single underlying dimension, principal components analysis identified six items that loaded strongly on secondary dimensions. Removing these items⁷ resulted in unidimensional subscales with ratios of the first to second eigenvalues approaching 3. See the Appendix for the final 12-item scale, which includes two-item Awareness-Individual and Awareness-Family subscales, and four-item Awareness-Community and Awareness-Natural Environment subscales.

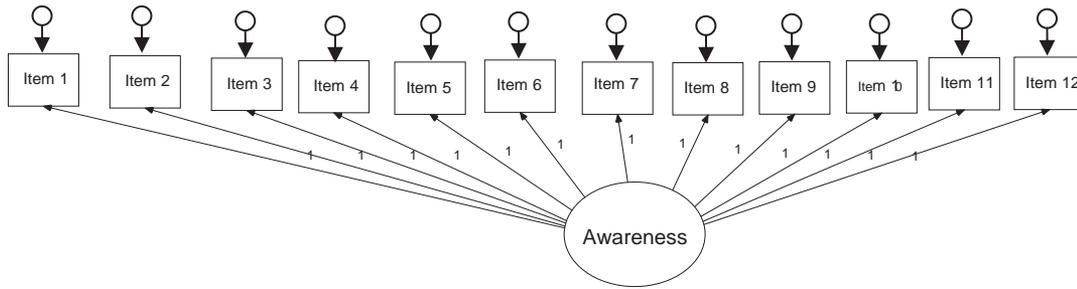
After establishing unidimensionality of the subscales, we used confirmatory factor analysis to compare three essentially tau-equivalent models of the 12 items to test which underlying structure best fit the data (Lee, Dunbar, & Frisbie, 2001). We conducted the CFA analyses using AMOS-16 (Arbuckle, 2006), using maximum likelihood estimation to appropriately model the items as ordered categories. Use of the slider for data collection provided us with truly continuous data, which we divided into equal intervals for analysis. Thus we avoided having to make assumptions about our response scale that often prove incorrect in practice (cf., Wirth & Edwards, 2007).

In the tau-equivalent models, factor loadings for all items were fixed at 1.0. Error variances were estimated, as were the covariances among factors that were appropriate to the model of factor structure being estimated. These models permitted us to compare factor structures with loadings held constant. We compared a unidimensional model, a first-order four-orthogonal factor model, and a second-order four-factor model (see Figure 1). Although the unidimensional model is not suggested by the theory underlying the scale construction, it is the most parsimonious model and should be rejected before a more complex model is retained. In the first-order four-orthogonal factor model, each scale taps a separate unique dimension. The second-order four-factor model retains this multidimensionality but structures the correlations among the dimensions in a single higher-order factor. In addition to constraining all factor loadings to 1.0, we left the unique variances of the items uncorrelated with each other.

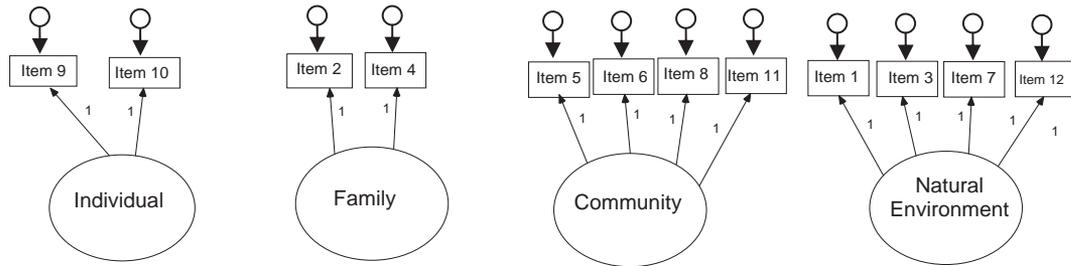
We assessed model fit using four fit indices: (a) chi square to degrees of freedom ratio (χ^2/df ; Hatcher, 1994); (b) comparative fit

⁷ "I put myself first when making decisions," "my spirit affects the people around me," "my actions have an effect my family," "I show respect to my family members in different ways depending upon who they are," "life in my community has little effect on me," and "the land, water and air keep us alive" were removed based on PCA results.

Unidimensional Model



First-order four orthogonal factor model



Second-order four-factor model

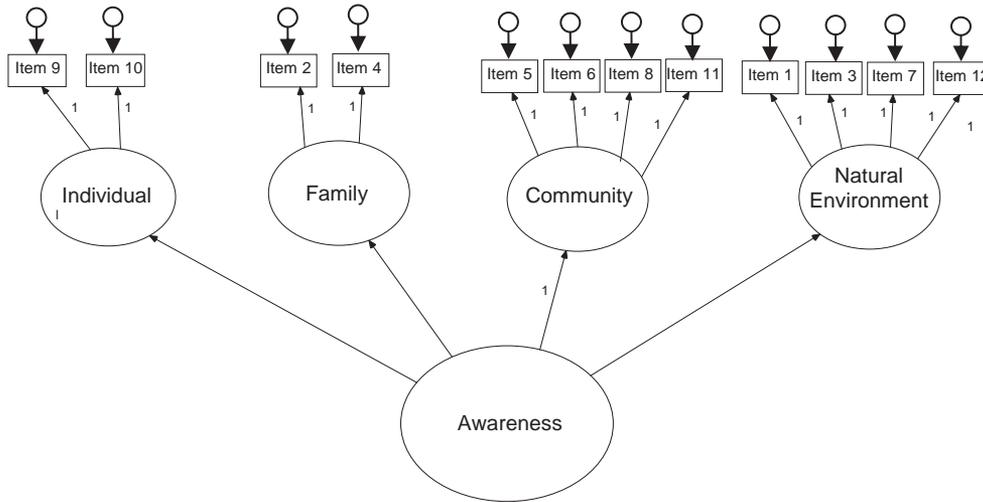


Figure 1. Confirmatory factor analyses comparison between the unidimensional, first-order four-orthogonal factor and second-order four-factor models.

index (CFI; Bentler, 1990); (c) goodness-of-fit index (GFI; Bentler & Bonett, 1980); and (d) root mean square error of approximation (RSMEA; Browne & Cudeck, 1993). Bentler (1990) and Hu and Bentler (1999) suggest that a χ^2/df ratio of less than 2, and CFI and GFI of .90 or higher, are indicators of good fit. RMSEA values lower than .08 are generally considered acceptable, with values lower than .05 indicating good fit (Browne & Cudeck, 1993). We also compared models using the Bayesian information criterion (BIC; Bollen, 1980; Guo, Morales, Schwartz, & Szapocznik, 2009). According to Raftery (1993), a BIC difference value of 9.2 or greater between two models indicates an important difference.

Table 1 reports fit statistics for all models. The unidimensional model fit better than the four-orthogonal factor model, $\Delta\chi^2(3) = 141, p < .01$. The second-order four-factor model fit better than either the unidimensional model, $\Delta\chi^2(7) = 144, p < .01$, or the four-orthogonal factor model, $\Delta\chi^2(5) = 285, p < .01$. Comparing the BIC values of these models also supported the conclusion that the second-order four-factor model fit best, with the BIC for this model being more than 9.2 smaller than the BIC for either of the other models ($\Delta\text{BIC} = 105.5$).

Having determined that the second-order model fit best, we reran the CFA, freeing the item loadings in order to estimate the

Table 1
Model Fit Indexes for the Unidimensional, First-Order Three-Orthogonal Factor, Second-Order Three-Factor, and Other Modified Models

Model	Number of Items	$\chi^2(df)$	χ^2/df	BIC	GFI	CFI	RMSEA
Unidimensional	12	299.1 (65)	4.60	372.57	.840	.775	.113
First-order four-orthogonal factor	12	440.1 (62)	7.10	530.49	.774	.637	.147
Second-order four-factor	12	155.1 (58)	2.67	268.07	.917	.907	.077
Modified second-order four-factor	12	79.5 (47)	1.69	254.64	.958	.969	.049

Note. Three pairs of observed variables' unique variances were allowed to correlate in the modified second-order four-factor model: (a) items 15 and 16, (b) items 8 and 13, and (c) items 13 and 12. BIC = Bayesian information criteria; GFI = graduated fit index; CFI = comparative fit index; RMSEA = root mean square error of approximation.

magnitude and significance of the factor loadings. In order to obtain accurate estimates of each factor loading and its standard error, we used modification indexes to guide us in allowing correlated pairs of error terms. Error terms were only correlated across subscales and only if there were similarities in item content or wording that would explain why they would produce covariances. MacCallum and Austin (2000) describe the problems inherent in the model-generation approach in which data are fit to a model and then model fit is improved solely on the basis of modification indices. Because such methods can lead different researchers with the same model to produce different final models, we were careful to correlate errors only after model selection was completed, based on the tau-equivalent comparison and in cases of related item content. Following review of the modification indices and item content, we chose to correlate the errors for 3-item pairs: 10 and 11, 8 and 4, and 8 and 7. Items 10 and 11 both discuss giving. We would expect a sense of having a lot to give (item 11) varying similarly across the sample with a belief in giving without expecting anything in return (item 10). Items 7 and 8 both refer to an awareness of the impact that one's actions have on another person, and are further related due to their close physical proximity on the scale. Schwartz (1999) explains that people use surrounding items to interpret how to respond to any given items; hence, proximity can have significant impact on how people respond to an item. Items 8 and 4 are related through an inverse logic with each other, with item 4 emphasizing how another's emotional state impacts the self and item 8 emphasizing how the self's actions on another can have a reciprocal impact on the self.

As can be seen in Table 1, the fit of the modified second-order model was acceptable, $\chi^2(47) = 79.5$, $p < .01$, $\chi^2/df = 1.69$, GFI = .96, CFI = .97, and RMSEA = .049. The first-order and second-order standardized factor loadings of this model, displayed in Figure 2, were all greater than 0.40 and were significant, except in the cases where unstandardized loadings were initially constrained to 1 to scale the latent variables. Awareness-Community had the highest loading on the general factor (.89), indicating that this factor is the most associated with the underlying construct, awareness of connectedness. The loadings for the Awareness-Individual, Awareness-Family, and Awareness-Natural Environment subscales were .82, .78, and .73, respectively. These results support the notion that the ACS is comprised of four factors subsumed under one higher order factor.

Objective 2: Evaluate Item Functioning With Item Response Theory

In the next step of analysis, we used IRT modeling to examine individual item functioning. We adopted Samejima's (1996) graded response model, which is often used when items consist of more than two ordered response categories, and conducted the analyses using the *ltm* package through *R* (Rizopoulos, 2006). Table 2 displays the descriptive statistics using the 20- and 5-category response formats for the 12-item set. Item parameters for the 12 items are shown in Table 3, which lists discrimination or slope parameters (*as*) and location parameters (*bs*). Items 4 (family's happiness), 6 (community's happiness), and 9 (give and receive abundantly) display the highest slopes, indicating that they are best at discriminating between participants with varying levels of awareness of connectedness. Items 10 (give without expecting) and 12 (come from and return to land) displayed the lowest slopes, indicating that they are least discriminating.

The location parameters (*bs*) suggest that although the items represent varying levels of the attribute, most represent lower levels of the latent trait. Values for location parameters from b_2 through b_4 for items 2 (family hurts with me), 6 (community's happiness), and 8 (energy into community) are relatively higher than the other items, indicating that these three items are more informative in distinguishing people with a higher awareness levels. While these three items are somewhat less likely to receive endorsement of the highest anchors, like most of the items on the scale, they appear to represent much of the range of the latent variable. This is to say that none of the items on the scale would be endorsed only by people with high levels of the attribute. On the other hand, items 3 (respect nature like family), 4 (family's happiness), and 10 (give without expecting) have lower location parameters, indicating that they are better at distinguishing among people with low levels of awareness of connectedness.

Another means of assessing item functioning is through item information curves. These curves plot the amount of information each item provides at each level of the latent trait (low to high awareness of connectedness), allowing an examination of the precision of each item (Marshall, Orlando, Jaycox, Foy, & Belzberg, 2002). Information in IRT analysis is roughly equivalent to the inverse of standard error, as standard error can be understood to represent what we do not know, but item information has the benefit of being additive such that the information provided by a

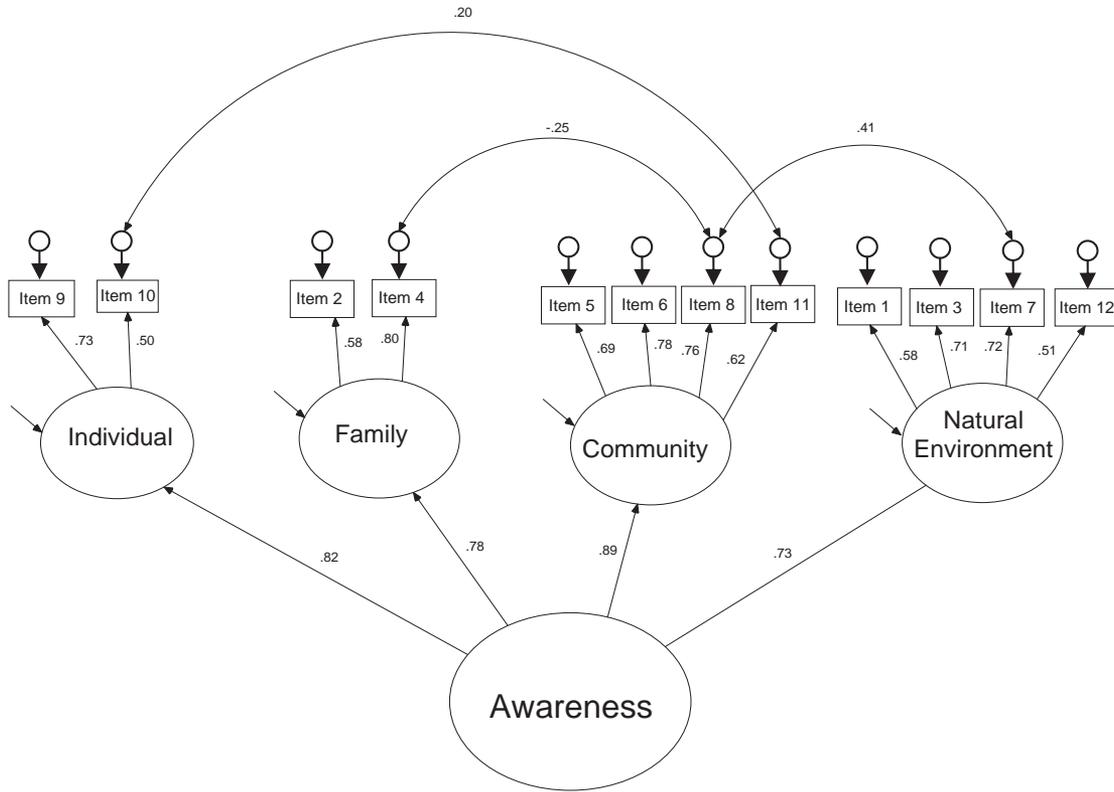


Figure 2. Modified second-order four-factor confirmatory factor analysis model. Three pairs of observed variables' unique variances were allowed to correlate in this model.

test is equal to the sum of the information of each item (Edwards & Edelen, 2009).

The item information curves for each item by subscale are plotted in Figure 3. Items 1 (feel connected to nature), 2 (family hurts with me), 10 (give without expecting), 11 (a lot to give community), and 12 (come from and return to land) have relatively flat information curves at lower levels of information than other items on their respective subscales. The relative levels of infor-

mation displayed by these items and the flat nature of their curves indicates that they provide low to moderate levels of information across all levels of awareness. This relatively lower level of information indicates that the items may be individually less informative, but that they provide recognizable levels of information at all levels indicates that they remain useful in describing the construct and contribute meaningfully to the overall information provided by the scale. In contrast, items 3 (respect nature like family), 5 (community believes important), 7 (mistreating nature), and 8 (energy into community) offer relatively greater information at moderate levels of awareness, with the least information at the lowest and highest levels of awareness, indicating that they are best suited for characterizing people with moderate levels of awareness. Item 6 (community's happiness) provides moderate to high information at low to moderate levels of awareness, whereas item 4 (family's happiness) provides high information at low levels of the latent trait, indicating that both items are especially informative for people with low levels of awareness. The majority of items discriminate best at low levels of awareness while providing relatively low information at higher levels.

Table 2
Means and Standard Deviations of the ACS Items

Item	20-Point analog scale		5-Item calibration	
	M	SD	M	SD
1	12.06	5.72	3.36	1.30
2	11.38	6.04	3.19	1.36
3	13.96	4.91	3.79	1.11
4	16.71	4.43	4.37	.96
5	12.04	5.67	3.36	1.29
6	10.82	5.56	3.06	1.26
7	11.81	6.01	3.27	1.38
8	10.89	5.16	3.08	1.18
9	13.05	4.91	3.58	1.10
10	14.07	4.97	3.79	1.16
11	12.48	5.47	3.44	1.24
12	13.20	5.52	3.60	1.25

Note. ACS = Awareness of Connectedness Scale.

Objective 3: Convergent and Discriminant Validity

We assessed convergent and discriminant validity of the final 12-item ACS using ANCI, RFL, and MMS. All measures were range-standardized for comparability of data. As can be seen in Table 4, convergent validity was evidenced through moderate to

Table 3
Item Parameters for 12-Item ACS by Subscale

Item	Abbreviated Content	a	b ₁	b ₂	b ₃	b ₄
Awareness-Individual						
9	Give and receive abundantly	2.686	-2.064	-1.293	-0.026	0.766
10	Give without expecting	1.092	-3.023	-2.072	-0.600	0.769
Awareness-Family						
2	Family hurts with me	1.340	-1.604	-.818	0.221	1.241
4	Family's happiness	4.218	-2.332	-1.774	-.980	-0.321
Awareness-Community						
5	Community believes important	2.111	-1.599	-.841	0.137	.878
6	Community's happiness	2.901	-1.183	-0.534	0.376	1.180
8	Energy into community	2.169	-1.552	-0.614	0.444	1.428
11	A lot to give community	1.438	-2.173	-1.136	0.139	1.008
Awareness-Natural Environment						
1	Feel connected to nature	1.442	-1.895	-1.051	0.064	1.065
3	Respect nature like family	2.404	-2.200	-1.398	-0.435	0.583
7	Mistreating nature	2.018	-1.380	-.722	0.133	0.855
12	Come from and return to land	1.060	-2.664	-1.852	-0.102	0.834

Note. ACS = Awareness of Connectedness Scale.

strong positive correlations with RFL, ANCI, Mastery-Family, and Mastery-Friends. While there was a statistically significant inverse relationship between the ACS and the WAI subscale, the magnitude of correlation is small ($r = -.12, p < .05$), suggesting limited relationship between the two variables. This limited relationship, along with limited relationships between the ACS and Mastery-Self ($r = .13, p < .05$) and age ($r = .05, ns$) were consistent with expectations related to discriminant validity.

Cronbach's alpha for the final 12-item ACS was an acceptable .85. Table 5 displays the internal consistency coefficients (Cronbach's alpha) for the full-scale and subscale scores. Alpha coefficients for the 4-item subscales were in the conventionally acceptable range (Nunnally & Bernstein, 1994, p. 264), but alphas for the 2-item subscales were lower (.54 and .61).

Discussion

This research suggests that a concept of awareness of connectedness, as described in many Native American epistemologies, can be measured as a multidimensional construct, and that this construct is related to hypothesized suicide and substance abuse protective factors such as reasons for living and communal mastery among AN youth. Awareness of connectedness as measured by the ACS includes items that assess the individual's sense of connectedness in relation to their self, family, community, and the natural environment. The ACS assesses connectedness as evidenced by the degree to which a person endorses the view that they exist in a web of reciprocal relationships. Final scale analyses identified 12 items from the 18-item pool that fit the model and function best. These results confirm awareness of connectedness as a measurable construct and corroborate other researchers' work regarding awareness of connectedness as positively related to well-being (Hill, 2006, 2009), recovery processes (Hobfoll, Jackson, Young, Pierce & Hobfoll, 2002; Bowen, 2005; Gone, 2009; Mohatt et al., 2007), and a sober and healthy life (Hazel & Mohatt, 2001; Mohatt, Rasmus, et al., 2004; Allen et al., 2006) among American Indian/AN cultures. Future research should continue to investigate these relationships in order to elucidate the complex ways in which

this positive cultural value contributes to community and individual well-being.

The development and validation of the ACS provides a measurement tool that may be useful for future examination of hypotheses regarding possible relationships between Native American cultural identification and positive behavioral health outcomes. Bates et al. (1997) suggest that internalization of cultural norms likely provides a more direct link to substance use outcomes than general cultural identification. They further suggest that cultural identification may be linked to behavioral outcomes via these specific cultural norms—greater identification with traditional culture leads to internalization of the culture-specific value system. Depending on whether the cultural norms that are internalized are protective or risk factors, this internalization could lead to either higher or lower prevalence of substance use. The moderate correlation between the ACS and ANCI support the theory that the ACS measures a culturally based value. The moderate to strong correlations of ACS with RFL and Communal Mastery, two identified protective factors, suggests the ACS also taps a protective variable that could be useful in explaining the variance in substance use and other behavioral health outcomes among native youth. Additionally, the relation with communal forms of mastery over self-based mastery is again suggestive of the cultural overlay in the construct tapped by the ACS, indicating its association with a preference to alternatives to individualistically focused coping and mastery.

The results of this research should not be interpreted to suggest that the ACS taps all levels of awareness of connectedness. IRT results indicate that the scale provides more information and discriminates participants best at low to moderate levels of the latent trait. This makes the scale relatively more useful for research seeking to identify and help people with low levels of awareness of connectedness, such as in suicide and substance abuse interventions and prevention programs. Further scale development could result in a more discriminating scale across the full range of the latent trait through identification of more challenging questions. However, in cases where it is most important for the measure to be sensitive to low to moderate levels of awareness of connectedness,

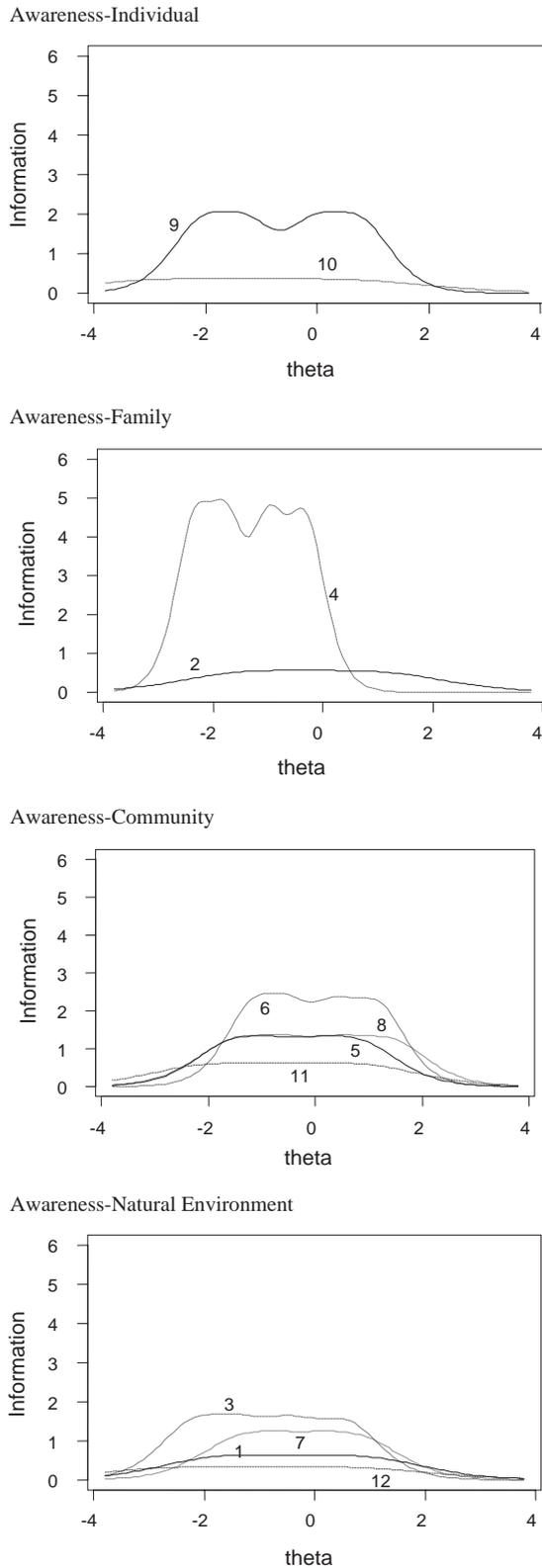


Figure 3. Item information functions by subscale.

Table 4
Correlation Between the ACS and Reasons for Life, Alaska Native Identification, White American Identification, Communal Mastery, Mastery-Self and Age

	ACS
Reasons for life	.62**
Alaska Native identification	.34**
White American identification	-.12*
Communal mastery (family & friends)	.44**
Mastery-family	.46**
Mastery-friends	.25**
Mastery-self	.13*
Age	.05

Note. ACS = Awareness of Connectedness Scale.
* $p < .05$. ** $p < .01$

IRT results suggest the current 12-item ACS will be a valuable tool.

Gone (2009) recommends that the distance between evidence-based practices and culture-based treatment programs be bridged through the development of locally identified, culturally based outcomes. The ACS is one example of this type of development effort. IRT results suggest that the scale could easily be pared down to a brief measure of change suitable for repeated measurements in intervention outcomes analyses. Many of the items on the scale provide information across the same (low to moderate) levels of awareness of connectedness. Removal of the least informative and least discriminating items could result in a 4- to 5-item scale. These results indicate that the ACS could be a valuable quantitative assessment tool for intervention and prevention efforts that seek to increase cultural connectedness by assessing the degree to which these programs enhance people's endorsement of this key cultural value. While the ACS may prove useful in bridging the gap between culture-based interventions and evidence-based practice, it should not be construed to measure improvement in health or pathology. The ACS is instead conceptualized as a culturally based protective factor contributing to resiliency and well-being. It is a targeted measure of one potential culture-based outcome independent from measures of pathology.

Future research into connectedness among Native Americans should investigate the different path relationships between awareness of connectedness and protective factors, risk factors, recovery, and resiliency. Of particular interest is the question of what levels of awareness of connectedness are considered protective and

Table 5
Internal Consistency (Cronbach's Alpha) for the Full Scale and the Subscales

	n	5-Point calibration	
		M (SD)	α
Awareness of connectedness scale	12	41.88 (9.01)	.85
Awareness-individual	2	7.37 (1.86)	.54
Awareness-family	2	7.56 (1.99)	.61
Awareness-community	4	12.93 (3.94)	.80
Awareness-natural environment	4	14.03 (3.74)	.72

to what degree is there protective function. Also important is development of research into the complex relationships between behavioral health, cultural identity and enculturation, and the mediating role of specific cultural values such as awareness of connectedness. Development and validation of the ACS is a first step for these new lines of inquiry.

In future research, it will be important to explore the generalizability of the ACS with other AN and American Indian cultural groups. While interpretations of ACS scores were validated predominantly with one Native American cultural group, the Yup'ik people of southwestern Alaska, literature on the world views of other indigenous cultures echoes similar traditional ways of thinking about the world. The reciprocal well-being of the self in relation to the broader life-world is similar across AN cultures (Mohatt et al., 2007) and the Lakota people (Bowen, 2005), as well as evidenced by related research with other tribes (Hill, 2006; Gone, 2009). Indigenous concepts such as *ellam-iinga*,⁸ *yuy-yaraq*,⁹ and *mitakuye oyas'in*¹⁰ all indicate that the notion of connectedness is based on understanding how all spirit-beings, including family members, other people, and the natural environment, are related and equally demanding of respect. The land may be different than a human or an animal, but as a spirit that is part of the whole, any harm we cause the land may be visited back on us in the same way harm to a brother or sister can harm oneself. Conversely, life choices that positively impact the people and world around also positively impact the self. In this world view, the self is defined broadly to encompass the relationship with all spirit-beings.

Despite promising results, this research has certain limitations. This study was predominantly conducted with youth from a single cultural group, yet the theory behind the scale suggests that the construct could be useful with adults and across other American Indian and AN cultures. Future research should seek validation with other cultural and age groups.

Another important limitation is the low reliability of the subscales. In particular, the Individual and Family subscales, each composed of only two items, had low *alphas* in this sample. For this reason, we recommend that if the ACS is to be used in clinical applications, only the full scale be used. We believe that the subscales can still be appropriate for research, where measures with modest reliabilities can be useful for research, particularly in the early stages of construct validation (Nunnally & Bernstein, 1994). Future research should seek to develop other items and to elaborate the constructs underlying these two subscales in order to provide more precision at the subscale level. Finally, the IRT analysis suggested that few ACS items discriminate among people at higher levels of awareness of connectedness. This may not be a limitation for identifying people who are at risk, but for conducting broader research, it will be useful to develop additional more "difficult" items.

As we advance research into these indigenous ways of thinking about our place in the world, we must retain the same respect for cultural difference that led us to develop the ACS. This research does not yet answer more nuanced questions of how the people understand and situate the measured construct. For example, although the Yup'ik and Lakota people express a similar epistemology of connectedness, they use different linguistic constructions to express the concept. Future research should also explore cultural difference in understandings of the notion of connectedness. By

better understanding potential cultural variation with regard to the construct, we will be better equipped to interpret research findings and identify how the value of connectedness contributes to individual, community, and cultural well-being from one culture to the next. While the ACS was developed in collaboration with AN people, the construct holds significant promise for research into how different cultures, native and otherwise, view and relate to a sense of connectedness with the entire life-world.

The ACS measures a multidimensional construct of awareness of connectedness based on a Native American world view. The scale is intended for use with youth and is related to other hypothesized protective factors for native youth. Native people across the United States have emphasized that a notion of a holistic connectedness with the larger spiritual universe is an important cultural value underpinning a healthy native lifestyle. This work represents a first step in taking this native way of thinking as a basis for empirical research.

⁸ Yup'ik for "eye of awareness."

⁹ Yup'ik for "way of the human being."

¹⁰ Lakota for "all of my relatives."

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Appendix

Awareness of Connectedness Scale

Awareness-Individual

9. I Believe That if I Give I Will Receive Abundantly.
10. I Give Without Expecting Anything in Return.

Awareness-Family

2. When I am Hurting, my Family Hurts With me.
4. My Family's Happiness Is Part of my Happiness.

Awareness-Community

5. My Community Believes I am Important.
6. My Community's Happiness Is Part of my Happiness.

8. The Energy I put into the Community Comes Back to me.
11. I Believe I Have a lot to Give my Community.

Awareness-Natural Environment

1. I Feel Connected to Nature.
3. I Treat Nature With Respect Like a Family Member.
7. Mistreating Nature Is the Same as Mistreating Myself.
12. We Come From the Land and Will Return to the Land.

Response scale. *The response scale used for this measure was a continuous analog scale presented on a computer with semantic anchors of Not at all, Somewhat, and A lot.*