

# A Protective Factors Model for Alcohol Abuse and Suicide Prevention Among Alaska Native Youth

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**Abstract** This study provides an empirical test of a culturally grounded theoretical model for prevention of alcohol abuse and suicide risk with Alaska Native youth, using a promising set of culturally appropriate measures for the study of the process of change and outcome. This model is derived from qualitative work that generated an heuristic model of protective factors from alcohol (Allen et al. in *J Prev Interv Commun* 32:41–59, 2006; Mohatt et al. in *Am J Commun Psychol* 33:263–273, 2004a; Harm Reduct 1, 2004b). Participants included 413 rural Alaska Native youth ages 12–18 who assisted in testing a predictive model of Reasons for Life and Reflective Processes about alcohol abuse consequences as co-occurring outcomes. Specific individual, family, peer, and community level protective factor variables predicted these outcomes. Results suggest prominent roles for these predictor variables as intermediate prevention strategy target variables in a theoretical model for a multilevel intervention. The model guides understanding of underlying change processes in an intervention to increase the ultimate outcome

variables of Reasons for Life and Reflective Processes regarding the consequences of alcohol abuse.

**Keywords** American Indian and Alaska Native · Community based participatory research · Path analysis · Suicide · Suicide prevention · Alcohol · Alcohol prevention · Community intervention

## Introduction

*Cuqyun* is an Alaska Native Yup'ik word translatable as 'measuring tool.' The *Cuqyun* project developed measures for *Elluam Tungiinun* and *Yupiucimta Asvairtuumallerkaa*, two companion intervention development and feasibility studies that created a community-based participatory research (CBPR) model of community intervention development described in Rasmus et al. (2014). The resulting complex, multilevel intervention for rural Yup'ik youth and their families is intended to promote protective factors that build reasons for life and sobriety, or well-being. The goals of the current study are to provide an empirical test of the theoretical model underlying this cultural intervention to prevent risk for suicide and alcohol abuse, and to better understand the underlying mechanisms of protection promoting the intervention outcome variables of reasons for life and sobriety.

Existing research emphasizes the importance of ecological models using multiple levels of analysis to unravel the sources of protection for American Indian and Alaska Native (AI/AN) youth. Hawkins et al. (2004), in a major review of the prevention literature for substance abuse among AI/AN youth, noted that universal protective factors for youth included self-efficacy, positive relationships with caring, prosocial adults, internalization of social norms and

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cultural involvement, and availability of community resources. Alcántara and Gone (2007), in their review of the protective factors literature from suicide among AI/AN people, identified spirituality, family connectedness and social supports, affectional relationships with leaders and role models, and cultural continuity as protective, with mixed findings regarding tribal cultural engagement. Goldston et al. (2008) reviewed suicide among AI/AN youth; family, cultural orientation and worldview, and religiosity and spiritual beliefs were identified as elements that played varying, yet crucial roles in shaping suicidal behavior. In studies of resilience and adaptive functioning with AI/AN youth, enculturation interacted or displayed indirect effects with other protective factors (Whitbeck et al. 2001). Similarly, LaFromboise et al. (2006) examined family, community, and school influences upon resilience in reservation-based American Indian 10–15 year-olds, identifying relationships with positive behavioral profiles, despite the presence of risk factors including discrimination, family financial stress, or family substance use problems. Stiffman et al. (2007) also identified relationships between personal, familial, and environmental strengths and general adaptive functioning.

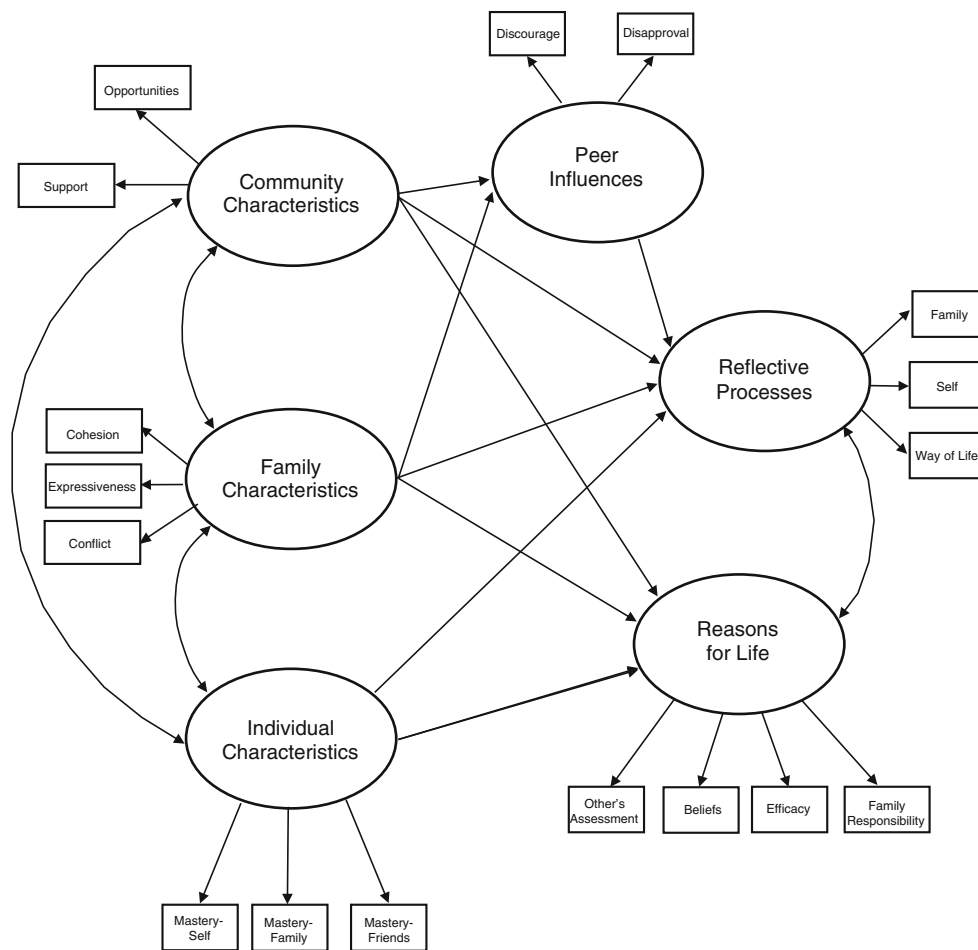
The role of family or significant relationships with prosocial adults has also been well documented. Teufel-Shone et al. (2005) found family relationships played an important role in protecting American Indian youth from suicide and substance abuse, and Pettingell et al. (2008) identified prosocial parental values as protective from suicidal behavior. Across all these studies, protective factors coexisted with risk factors and adverse circumstances, moderating risk exposure, mitigating their impact, and positively influencing outcome. This all harkens back to Werner and Smith's (2001) groundbreaking studies on protective factors with the Indigenous youth of Kauai in which, in addition to biological factors, individual psychological factors, family factors, and other supports, including peers and elements of the community environment emerged as predictive of resilience. In summary, this literature emphasizes the importance of multilevel models in protection that include such factors as cultural engagement, continuity, and worldview, spiritual beliefs, family connectedness, and also community level variables. This strongly influenced our efforts to elaborate a theoretical model that could guide development of a cultural multi-level community intervention.

The present study reports on a test of a protective factors model based on retrospective life history and survey research conducted in collaboration with Alaska Native (AN) adults by the People Awakening (PA) project (Allen et al. 2006; Mohatt et al. 2004a, b). Allen et al. (2014) describe the long-term collaboration that developed this model of protection. The effort was originally conceived to

understand AN pathways to sobriety. The term sobriety as used here is a locally defined, indigenous concept that includes abstinence and nonproblem drinking, as well as recovery from alcohol abuse, as well as broader components of well-being.

In the PA model (Allen et al. 2006), *yuum ayuqucia* or community characteristics predict *nunaput*, the adolescent social environment. Community characteristics together with *ilaput* or family characteristics influence the level of protection from exposure to *picurlak avillukuk*, or trauma. Protective factors and exposure to trauma events combine to influence the course of *meqerraaryaurtellemni*, experimental substance use, i.e., early experiences with substances, including alcohol, prior to the establishment of use patterns or abstinence. Experimental substance use coincides with a period of *umyuangcallemni*, or reflectively thinking over through active consideration of the experience of alcohol use and abuse, and its potential consequences. The PA sobriety model culminates in *meyirutlemnii*, a turning point that leads to a decision to abstain from the use of alcohol, or use alcohol only in nonproblem ways.

We expanded this PA heuristic model in response to AN community requests to develop an intervention to address their deep concerns about youth suicide and alcohol abuse. We hypothesized that these individual, family, and community factors protected from both alcohol abuse and suicide, and these proximal factors influenced more intermediate protective processes, such as reflective processes about alcohol and having reasons for valuing and finding meaning in life, as a co-occurring process. Further, the PA work suggested to us that these types of intermediate protective process could constitute ultimate outcome variables for interventions that were positive and strengths based, rather than deficit focused and risk factor based. The community-engaged measurement development process this effort spawned, which included selection and adaptation of measures as well as the establishment of the actual protective model tested here, is described in Gonzalez and Trickett (2014). This led to a process of adapting existing measures, creating new measures, and discarding measures that proved culturally inappropriate/unacceptable for community members or failed psychometric criteria, as well as alterations to the protective factors model. Although the PA heuristic model stayed largely intact in terms of the levels of ecological influence on outcomes, Gonzales & Trickett describe the interplay of cultural and community factors that led to, for example, our reluctance to ask youth direct questions about trauma experience, suicide attempts, and suicidal ideation. These developments steered creation of the *Cuqyun* model, and led to different assessment approaches that focused on measurement of protective mechanisms from suicide risk and alcohol use.



**Fig. 1** Hypothesized relations based on the PA heuristic model of protective factors for Alaska Native Youth (Allen et al. 2006)

Figure 1 illustrates the *Cuqyun* model, a culturally grounded theory for prevention of suicide and alcohol abuse, and the specific hypothesized relations in this study. First, we hypothesized these newly adapted and developed scales would function as internally consistent, independent measures. Second, we hypothesized these 17 measures would each load on one of the six latent variables defined by the *Cuqyun* measurement model. Third, we hypothesized that the association between the latent variables of Individual, Family, and Community Characteristics would be correlated. Fourth, we hypothesized the latent outcome variables of Reflective Processes about alcohol abuse consequences (protective of sobriety) and Reasons for Life (protective from suicide risk) would function as co-occurring processes as correlated latent variables. Finally, we hypothesized pathways from Individual, Family, and Community Characteristic latent variables to the latent variables of Reasons for Life and Reflective Processes as outcome variables, and a second interrelated pathway, from Family and Community Characteristics, through Peer Influences, to Reflective Processes.

## Methods

### Participants

Participants included 413 AN youth ages 12–18 ( $M = 15.31$ ,  $SD = 1.61$ ) who grew up in rural, remote Alaska communities. Participants were recruited from four settings. A total of 194 were recruited from a boarding school serving rural residents where Yup'ik was the largest group within the student body. Located in a small city (pop. 8800) in Southeast Alaska, the school attracts students from all the cultural linguistic groups indigenous to Alaska living in small communities throughout the state. Another 90 lived in a predominately Yup'ik regional hub community (pop. 6400) in Southwestern Alaska. Finally, 62 and 67 youth lived in two small (pop. 650, 550) Yup'ik communities on or near the Bering Coast. All participants resided in geographically remote communities off the road system. The sample included 223 female and 190 male participants from the following grades: 7 (11 %), 8 (14 %), 9 (20 %), 10 (21 %), 11 (19 %), 12 (13 %). Participants

described their parents' marital status as married (11 %), single (65 %), divorced (15 %), and other (9 %). When living at home, participants reported living with their mother (75 %), father (68 %), grandparent (15 %), and other (13 %). Self-identified Alaska Native cultural linguistic group membership was largely Yup'ik (80 %)/Cup'ik (4 %), and also included Inupiat (15 %), Athabascan (5 %), Aleut (3 %), Alutiiq (2 %), Tlingit/Haida (2 %). Youth could identify with more than one group. Therefore, percentages exceed 100 %. Youth reported the following ethnic identities along with their Alaska Native identification: White (26 %), American Indian (4 %), Asian (2 %), African (2 %), Hispanic (2 %), Pacific Islander (.5 %).

Participants were recruited through active parental consent procedures. Parents of youth were contacted through their schools in the boarding school and the large regional high school. They were invited to allow their child to participate in a study to help develop measures of the effectiveness of programs designed to enhance youth sobriety and reasons for life among rural AN youth. In the two small communities, recruitment occurred through direct contact from research staff, which invited youth to participate and obtained their parents' consent. Youth were offered a payment of \$15 for completing the survey. Following parental consent, youth were informed of the purposes, risks, and benefits of the study, completed an assent to participate, and then completed an online survey in small groups, ranging from 2 to 12 individuals. Computer administration was via a secure web server. Responses were encrypted, then transmitted from the remote locations in rural Alaska back to the secure server housed at the University of Alaska Fairbanks. The University IRB, Yukon Kuskokwim Health Corporation Human Studies Committee, school superintendents, and local AN advisory school boards at each school approved all procedures.

## Procedures

### *Elluam Tungiinun/Yupiucimta Asvairtuumallerkaa Measurement Development Procedures and Process*

The measurement development process included successive waves of item revision and pilot testing by a research team that included Yup'ik and nonnative researchers, Yup'ik cultural consultants, UAF School of Education faculty who had teaching experience with youth in rural and Southwest Alaska, and external research consultants. Meetings were conducted through mixed face-to-face, audio, and video conferencing hosted at the University of Alaska Fairbanks. Gonzalez and Trickett (2014) describe important elements of this collaborative measurement development process

while Allen (online supplement) provides more detailed mapping of the constructs.

This process had two aims. One aim was to describe individual differences in the relations between individual, family, and community protective factors, and the other was to create measures sensitive to change for community interventions with small samples. Development of measures took place in three phases: (1) strategic measurement modeling and item review, (2) construct elaboration and pilot testing, and (3) scale refinement.

### *Phase I: Initial Proposed Measurement Model*

The first phase involved constructing a measurement strategy and identifying candidate instruments. The work of this phase is described in detail in Gonzalez and Trickett (2014). The measurement strategy had to be efficient, as a lengthy, burdensome assessment would not be possible or desirable. It had to be responsive to community preferences, as the intervention was developed as part of a community directed process. In particular, we worked to respond to the unacceptability of direct questions about trauma and suicidal intent/ideation (Gonzalez and Trickett, 2014), and how youth were not comfortable answering direct questions about alcohol use (Allen et al. 2012). The measurement strategy had to allow for simultaneous development of assessments along with the interventions, due to the cost and difficulty of conducting assessments and interventions in rural Alaskan communities. Accordingly, our strategy focused on development of key indicator measures as proximal variables at individual, family, and community levels. For outcome variables, we tailored measures of consequences of alcohol use and reasons for life to AN adolescents. These variables were identified from our retrospective protective factors studies of AN adults (Allen et al. 2006; Mohatt et al. 2004b).

Where possible, we adapted existing measures for use with Yup'ik youth. Where youth measures were not extant, we adapted adult measures we had originally developed for Yup'ik adults or adult measures from the mainstream psychological literature for use with Yup'ik youth. Gonzalez and Trickett describe how this process moved from item identification and modification to become construct elaboration. These efforts encompassed refinement of the measurement model and extension of the underlying theoretical model.

### *Phase 2: Elaboration, Pilot Testing, and Cultural Review*

This involved item review by the research team, followed by pilot testing with Yup'ik Alaska Native youth with follow-up interviewing of youth participants. Item review included identification of items difficult to understand in

local English dialects, which are influenced by Yup'ik grammatical construction, word choice, and sociolinguistic conventions and contextually irrelevant (e.g., “driving in a car,” “shopping at a mall”) or cultural inappropriate items. Cultural experts proposed rewrites or substitutions of culturally appropriate items that were functionally equivalent to the original content. Initial piloting was with Yup'ik 18 year old university freshman recently arrived at the University from rural Southwest Alaska communities.

Through this work, we came to recognize specific variable groupings as latent variables that were tapping important elements of the PA model. With our cultural consultants, we began to narrow the components of the original PA heuristic model into a model that was testable using the measurement tools that we were developing. This revised model presented in Fig. 1 specifies hypothesized relationships between latent variables. Through our construct elaboration work, we came to focus on the individual characteristic of mastery as a higher order construct, measured through scales tapping the levels of self, family, and friends as three constituent second order factors. To measure family characteristics, we developed a scale for the family relationship dimension defined by second order factors of cohesion, expressivity, and conflict resolution, and to tap community characteristics a new youth self-report measure included two subscales that assessed community support and opportunities. A measure of peer influences represented the social environment, tapping peer discouragement and disapproval of alcohol and other substance use. Outcome measures included a brief measure of youth reflective processes of alcohol consequences, and a measure of reasons for life scale as alternatives to direct measure of alcohol use and suicidal ideation, which would have been unacceptable to the communities.

### Phase 3: Refinement of Measures

The third and final phase of measurement development involved use of multiple psychometric approaches in the analysis of data collected as baselines for the preventive intervention in two rural AN communities (Mohatt et al., 2014) and the data collection for the *Cuqyun* study. In this phase we aimed to create versions of the measures appropriate for covariance structure modeling of the relations among variables in the PA model.

In our measurement refinement procedures, unidimensionality was established for each subscale measure within a latent variable in the model using confirmatory factor analysis (CFA). Once unidimensionality was established, item response theory procedures (Wilson 2005) were used to identify best functioning items within the measure. Items that functioned poorly were dropped, and then theoretically devised structures for groups of measures were empirically

tested using CFA in accordance with the proposed subscale structure of each measure. Because the resulting self-report measures tapped only selected elements of the constructs proposed in the original PA heuristic model, we evaluated the measures with the Yup'ik Regional Coordinating Council (YRCC), a regional Alaska Native advisory group, and our co-researchers, who retranslated words that we had used to describe the protective factors. This allowed us to establish new Yup'ik language descriptions. This more narrowly defined *Cuqyun* protective factors model is comprised of 17 brief self-report measures that tap six higher-order variables.

By the end of Phase 3, we had completed five tasks. First, we completed cultural adaptation or development of measures. Second, revisions were made to the model to develop culturally appropriate ultimate outcome measures. Third, we added an intermediate latent variable tapping elements of the social environment as a change agent. Fourth, we devised a more culturally congruent response format for use with computer-administered assessment, described below. Fifth, we devised and implemented a secure web based adaptive testing format that worked within the limitations of rural Alaska satellite Internet connectivity.

### Measures

The measurement development process described above resulted in the following set of culturally anchored measures for rural Yup'ik youth. The response format used an analog scale with a salmon that the respondent slid in a continuous motion across a horizontal blue background with three semantic anchors placed below (salmon are a central cultural icon of the region, and were suggested by our local advisors). For most questions, at the suggestion of our linguistic advisors, the anchors read, “Not at all, Somewhat,” and “A lot.” These analog responses were then segmented according to five likert-type response scores through tier position on the analog scale. A limited number of items used true/false responses or a four alternative radio button response format. We report below the Yup'ik names and definitions given to constructs in the CBPR process of developing the measures, however, knowledge of the Yup'ik language was not required of youth who completed the measures.

#### *Elluarrluni piyugngariluni: “Learning in the Mind of Doing Things in a Masterful Way”–Individual Characteristics*

This measures mastery, the sense of efficacy in solving life challenges and control over goal achievement. Measures of mastery have typically focused on the self, and ignored the

contribution to a sense of efficacy that can come from beliefs that one can face life's problems successfully through joining with other significant figures in the social environment. Jackson et al. (2000) developed the Communal Mastery scale to measure this second facet of mastery experience with a sample of Northern Plains Indian women (Hobfoll et al. 2002). We adapted the Communal Mastery scale for Alaska Native youth. Because we conjectured Alaska Native youth make important distinctions between their family and their adolescent peers, we created communal mastery scales for family and friends. The family items tap the young person's belief that he or she can face life's problems successfully through joining with family, and the friends items ask these same questions with regards to friends, and these were combined with items from the Self Mastery scale (Pearlin et al. 1981) also adapted for Alaska Native adolescents. The Self Mastery scale measures a personal sense of control over goal achievement and a sense that the individual can overcome life challenges through his or her own effort. Fok et al. (2012) describe development and psychometric characteristics of the resulting Multicultural Mastery Scale (MMS), which measures sense of efficacy using three different strategies that focus on self or communal (family or friends) using three five-item subscales: *Mastery-Self*, *Mastery-Family*, and *Mastery-Friends*. All item responses were on five-point Likert-type scales. Latent variables are defined through subscale scores in this study to avoid under identification in structural equation modeling (SEM).

#### *Elluarrluteng ilakelriit: "Nurturing Family"—Family Characteristics*

A 25-item long version of the Brief Family Relationship Scale (Fok et al., 2014) consists of three scales tapping *Cohesion* (9 items), *Expressivity* (7 items), and *Conflict* (9 items), as evaluated by youth. The relationship dimension of the Family Environment Scale (Moos and Moos 1994) provided the initial item pool for this measure, however, each item required extensive rewriting for understandability and contextual relevance with rural Alaska Native youth.

#### *Nunamta: "Our Community"—Community Characteristics*

The Youth Community Protective Factors Scale (Fok et al. 2011) was adapted from the Yup'ik Protective Factors scale, a measure originally developed in PA for Yup'ik adults (Allen et al. 2006). Items from the Yup'ik Protective Factors scale were originally derived from statements in qualitative life history transcripts by abstainers and non-problem drinkers that exemplified important protective

factors. Selected items from this adult measure that described elements of protective communities was adapted for youth. The items comprise two subscales tapping *Support* (3 items) and *Opportunity* (4 items). Items have 5-point Likert-type response scales.

#### *Maryarta: "One Who Leads"—Peer Influences*

We adapted two scales from the American Drug and Alcohol Survey (Oetting and Beauvais 1990), the Peer Discouragement of Alcohol, Tobacco, and Other Drug (ATOD) Use Scale (*Discourage*) and the Disapproval of Peers' ATOD Use Scale (*Disapproval*). Both scales have been used extensively in research with youth in American Indian tribal communities (Beauvais 1990). These two five-item scales measure peer attitudes that discourage alcohol and other drug use using a four-point likert scale, and are conceived as protective peer influences in the young person's social environment. Scale adaptations focused on understandability and relevance to rural Alaska Native youth.

#### *Umyuangcaryaraq: "Reflecting"—Reflective Processes*

Additional items from the adult Yup'ik Protective Factors scale were used in development of measures tapping reflective processes involving thinking over the potential negative consequences of alcohol use and abuse along three dimensions: their impact upon the individual, their family, and their AN way of life. Allen et al. (2012) describe development and psychometric characteristics of the Reflective Processes scale, which consists of three four-item subscales using a five point likert-type scale that measure *Wangnun Piyumiutenka*, or "Things I Want for Myself" (*Self*), *Ilamnun Piyumiutenka*, "Things I Want for My Family" (*Family*), and *Ilamnun Piyumiutenka*, "Things I Want for Our Way of Life (*Way of Life*).

#### *Yuuyaraqegtaar: "A Way to Live a Very Good, Beautiful Life"—Reasons for Life*

This new measure is a strengths-based and positive psychology extension of constructs tapped by the Brief Reasons for Living Inventory for Adolescents (Osman et al. 1996), which itself a modification for youth of an adult measure, the Reasons for Living Inventory (Linehan et al. 1983). These two instruments tap reasons why a person would not end life when they feel suicidal. We significantly adapted this item pool, emphasizing cultural beliefs and experiences that make life enjoyable, worthwhile, and provide meaning in life, without reference to the presence or absence of suicidal feelings. Fourteen items using a five-point Likert-type response format assess four dimensions

tapping reasons for life that are associated with others' assessment of me (*Others' Assessment*), cultural and spiritual beliefs (*Beliefs*), sense of efficacy (*Efficacy*), and *Family Responsibility*.

## Results

Table 1 provides a listing of the 17 subscales, the latent variable that the proposed model specifies each should load on as an observed variable, number of items, response format, and means, standard deviations, and coefficient alphas. Internal consistency estimates ranged from acceptable to good, with the majority of the subscales at  $\alpha > .70$  and all subscales exceeding .60, with the exception of the Family Characteristics-Expressiveness and the Reflective Processes-Family subscales, which were at  $\alpha = .54$  and  $.59$ , respectively. Table 2 reports subscale intercorrelations within the same latent variable ranged from .20 to .65, whereas subscale correlations between latent variables ranged from .01 to .47. This provided support for our first hypothesis. The measures displayed acceptable to good internal consistency with the exception of the Family Characteristics-Expressiveness and the Reflective Processes-Family subscales, which possess adequate reliability for research (Nunnally and Bernstein 1994). Additionally, the measures displayed low to moderate correlations across constructs (Campbell and Fiske 1959).

We fit a bifactor model (Reise et al. 2010) through LISREL-8.52 (Jöreskog and Sörbom 1996) to test the

proposed measurement configuration for the 17 scales as each loading on its intended latent variable. Bifactor modeling is valuable for assessing the dimensionality of measures beyond the common variance across items attributable to individual response tendencies (Reise et al. 2007). The bifactor model had a single general factor on which all items were allowed to load. This factor was constrained to be orthogonal to six content factors representing the six latent variables under which the specific scales were organized. The content factors were allowed to correlate. No error covariances among items were allowed. Although the Chi square “goodness of fit” test was significant ( $\chi^2(87, N = 428) = 194.87, p < .01$ ), the Comparative Fit Index (Bentler 1990; CFI = .97), the Goodness of Fit Index (Jöreskog and Sörbom 1989; GFI = .95), the Root Mean Square Error of Approximation (Brown and Cudeck 1993; RMSEA = .054) and the Root Mean Square Residual (RMR = .043) all were indicative that the bifactor model was a good fit to the data. This analysis is described in greater detail in the online Appendix S1.

We next tested a path model of protective factors using SEM as implemented in AMOS (Version 16; Arbuckle 2006). In this analysis, error terms were allowed to co-vary in two cases where theory suggested relationships. Error terms between Community Characteristics-Support, a measure of how supportive the community was experienced and Individual Characteristics-Mastery-Friends, a measure of perceptions of the capacity of friends in the community to help in solving challenges faced by the individual, were allowed to co-vary. Similarly, error terms between Individual Characteristics-Mastery-Self, or the

**Table 1** Means, standard deviations, and coefficient alphas (n = 413)

| Subscale                  | Latent variable            | Items | Response format | M     | SD   | $\alpha$ |
|---------------------------|----------------------------|-------|-----------------|-------|------|----------|
| IC1 Mastery-Self          | Individual characteristics | 5     | 5-pt likert     | 18.80 | 3.80 | .66      |
| IC2 Mastery-Family        |                            | 5     | 5-pt likert     | 19.84 | 3.83 | .74      |
| IC3 Mastery-Friend        |                            | 5     | 5-pt likert     | 17.81 | 3.87 | .70      |
| FC1 Cohesion              | Family characteristics     | 9     | True/False      | 7.66  | 1.82 | .76      |
| FC2 Expressiveness        |                            | 7     | True/False      | 4.42  | 1.67 | .54      |
| FC3 Conflict              |                            | 9     | True/False      | 6.15  | 2.42 | .78      |
| CC1 Support               | Community characteristics  | 3     | 5-pt likert     | 10.19 | 3.00 | .76      |
| CC2 Opportunities         |                            | 4     | 5-pt likert     | 10.24 | 2.76 | .60      |
| PI1 Discourage            | Peer influences            | 5     | 4-pt likert     | 12.02 | 4.89 | .86      |
| PI2 Disapproval           |                            | 5     | 4-pt likert     | 14.46 | 4.72 | .88      |
| RP1 Self                  | Reflective processes       | 4     | 5-pt likert     | 16.18 | 3.77 | .68      |
| RP2 Family                |                            | 4     | 5-pt likert     | 17.00 | 3.01 | .59      |
| PR3 Way of life           |                            | 4     | 5-pt likert     | 16.03 | 3.13 | .60      |
| RL1 Others' assessment    | Reasons for life           | 4     | 5-pt likert     | 16.12 | 3.59 | .76      |
| RL2 Beliefs               |                            | 4     | 5-pt likert     | 18.59 | 3.27 | .71      |
| RL3 Efficacy              |                            | 3     | 5-pt likert     | 13.07 | 2.25 | .70      |
| RL4 Family responsibility |                            | 3     | 5-pt likert     | 14.18 | 2.40 | .77      |

IC individual characteristics, FC family characteristics, CC community characteristics, PI peer influences, RP reflective processes, RL reasons for life

**Table 2** Intercorrelation of measures (n = 413)

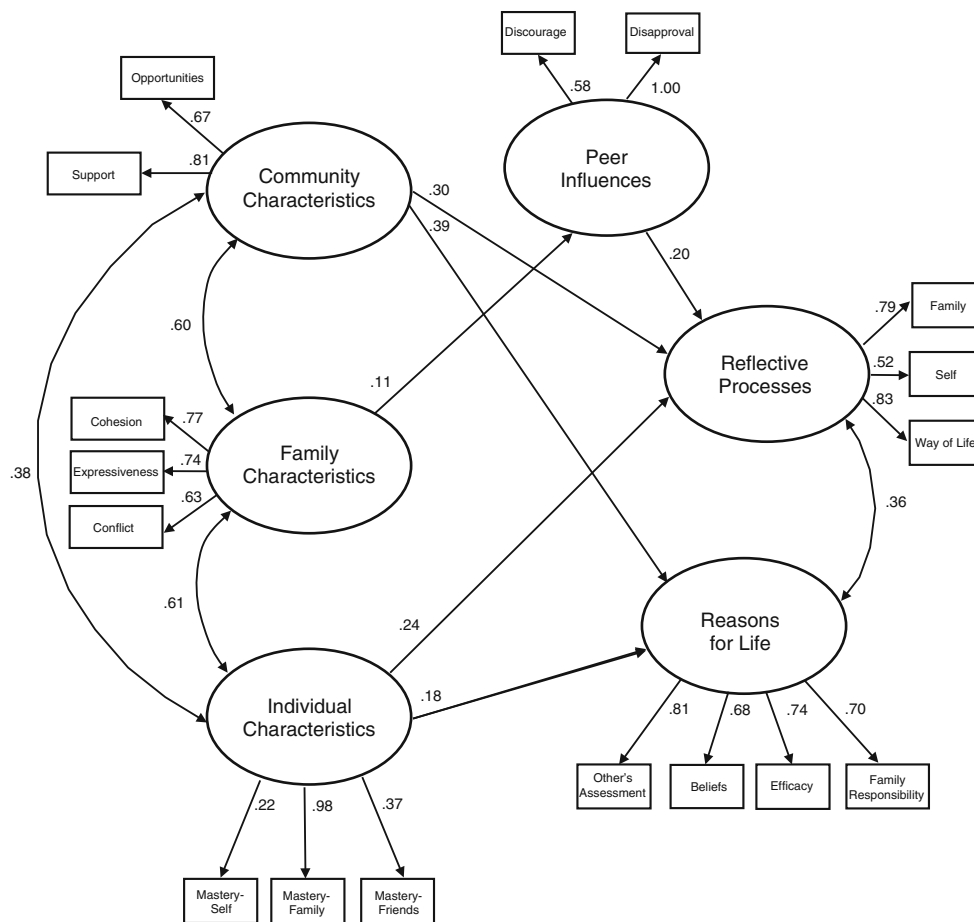
|                              | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | 11    | 12    | 13    | 14    | 15    | 16    |
|------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 IC1 Mastery-Self           |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 2 IC2 Mastery-Family         | .20** |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 3 IC3 Mastery-Friends        | .21** | .37** |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 4 FC1 Cohesion               | .14*  | .45** | .08   |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 5 FC2 Expressiveness         | .22** | .47** | .11*  | .56** |       |       |       |       |       |       |       |       |       |       |       |       |
| 6 FC3 Conflict               | .09** | .36** | .02   | .51** | .45** |       |       |       |       |       |       |       |       |       |       |       |
| 7 CC1 Support                | .19** | .32** | .30** | .38** | .39** | .25** |       |       |       |       |       |       |       |       |       |       |
| 8 CC2 Opportunities          | .03   | .22** | .13** | .24** | .28** | .26** | .55** |       |       |       |       |       |       |       |       |       |
| 9 PI1 Discourage             | -.04  | .11*  | .03   | .02   | .03   | .07   | .04   | .14** |       |       |       |       |       |       |       |       |
| 10 PI2 Disapproval           | .03   | .10*  | .08   | .05   | .09   | .07   | .07   | .08   | .58** |       |       |       |       |       |       |       |
| 11 RP1 Self                  | .03   | .12*  | .07   | .08   | .04   | .11*  | .05   | .10*  | .12*  | .22** |       |       |       |       |       |       |
| 12 RP2 Family                | .01   | .26** | .11*  | .24** | .25** | .27** | .23** | .27** | .10*  | .24** | .46** |       |       |       |       |       |
| 13 RP3 Way of life           | .06   | .35** | .18** | .26** | .27** | .30** | .30** | .26** | .03   | .15** | .42** | .64** |       |       |       |       |
| 14 RL1 Others assessment     | .10*  | .31** | .21** | .20** | .18** | .20** | .38** | .32** | .03   | .06   | .08   | .30** | .36** |       |       |       |
| 15 RL2 Beliefs               | -.06  | .25** | .08   | .12*  | .07   | .16** | .28** | .27** | .04   | .04   | .13** | .22** | .36** | .53** |       |       |
| 16 RL3 Efficacy              | .27** | .29** | .26** | .15** | .11*  | .14** | .31** | .28** | .06   | .08   | .14** | .21** | .29** | .65** | .48** |       |
| 17 RL4 Family responsibility | -.003 | .38** | .15** | .27** | .26** | .24** | .27** | .26** | .02   | -.004 | .16** | .34** | .46** | .54** | .51** | .47** |

IC individual characteristics, FC family characteristics, CC community characteristics, PI peer influences, RP reflective processes, RL reasons for life

\*  $p < .05$

\*\*  $p < .01$





**Fig. 2** Protective factors path model for Alaska Native Youth ( $n = 413$ ).  $\chi^2(108, N = 413) = 256.8, p < .01$ ; GFI = .93; CFI = .93; RMSEA = .06. All values displayed are significant at a

minimum  $p < .05$  level. Correlated errors between the Support and Mastery-Friends subscales and between the Mastery-Self and Efficacy subscales are not shown and described in Results

protective belief in the ability to solve problems on one’s own, and Reasons for Life-Efficacy, a belief that life problems will work out, were also allowed to co-vary.

Figure 2 presents the final *Cuqyun* protective factors path model for AN youth produced by the analysis. The second hypothesis predicted the measures would function as observable variables, each loading on one of the latent variables as defined by the measurement model. This was the case, except for Individual Characteristics, which was almost entirely defined by *Mastery-Family* ( $\lambda = .98$ ), with relatively little contribution from the *Mastery-Self* ( $\lambda = .22$ ) and *Mastery-Friends* ( $\lambda = .37$ ) subscales. Therefore, we received partial support for our second hypothesis; bifactor analysis suggested goodness fit of measures to latent variables in the model, and structural equations modeling showed the measures functioned as psychometrically sound observables that defined the six latent variables in the path analytic model, with the exception of the *Mastery-Self* and *Mastery-Friends* subscales, which only contributed limited variance in defining

the Individual Characteristics latent variable. Both these subscales functioned suboptimally as observables for the Individual Characteristics latent variable, and their error terms correlated with other, albeit theoretically linked measures. We post hoc allowed these two cases correlated errors in the belief that the model most likely to produce accurate estimates of relations among latent variables is a model that fits the data, and that this permissible only in cases where there is strong theoretical or empirical justification.

The best model, following trimming of nonsignificant paths and freeing the two error covariances as described above, produced an acceptable goodness of fit index (GFI = .93; Jöreskog and Sörbom 1989) and comparative fit index (CFI = .933; Bentler 1990). The root mean square error of approximation (RMSEA = .058; Brown and Cudeck 1993) exceeded .05, but values below .10 indicate an acceptable fit to the data (McDonald and Ho 2002). In support of our third hypotheses, there were robust bidirectional associations between Individual Characteristics

and Family Characteristics, and between Family Characteristics and Community Characteristics ( $\psi = .61$  and  $.60$  respectively,  $p < .001$ ), and Individual Characteristics and Community Characteristics displayed a more modest correlation ( $\psi = .38$ ,  $p < .01$ ).

The results also supported our fourth hypothesis that Reflective Processes and Reasons for Life would correlate. The latent variables for Reflective Processes and Reasons for Life were associated at a modest but significant level ( $\psi = .36$ ,  $p < .01$ ).

However, a number of interesting and unexpected relationships emerged during our model fitting and trimming that led to variations from our hypothesized structure proposed in Fig. 1. Our fifth hypothesis was that a model of Individual, Family, and Community Characteristic latent variables would predict scores on the latent variables of Reasons for Life and Reflective Processes, and that Family and Community Characteristics, in a second interrelated pathway, would impact Peer Influences, which would in turn predict Reflective Processes. This hypothesis was partially supported. Results in general supported our final hypothesis that Individual, Family, and Community latent variables would predict the latent variables of Reasons for Life and Reflective Processes, but the nature of these relations differed in important ways from our predictions. Individual and Community Characteristics functioned as hypothesized with these downstream latent outcome variables. A direct effect through significant path coefficients to Reflective Processes was observed for Individual ( $\beta = .24$ ,  $p < .01$ ) and for Community Characteristics ( $\beta = .30$ ,  $p < .01$ ). Similarly, a direct effect was noted on Reasons for Life for Individual ( $\beta = .18$ ,  $p < .01$ ) and Community Characteristics ( $\beta = .39$ ,  $p < .01$ ).

Employing the joint significance criterion as an acceptable compromise between power and Type I error protection (MacKinnon et al. 2002), Family Characteristics affected Reflective Processes through Peer Influences. Peer Influences is a measure of the extent to which peers disapprove of and discourage substance use. However, the nature of this effect of Family Characteristics on endogenous variables was contrary to predictions, as it was not direct. Family Characteristics affected Peer Influences ( $\beta = .11$ ,  $p < .05$ ), which in turn affected Reflective Processes ( $\beta = .20$ ,  $p < .01$ ). The association between Family Characteristics and Reasons for Life was also indirect, by way of the association between Reflective Processes and Reasons for Life. However, it should be noted that the significant covariation among the three Individual, Family, and Community Characteristics protective factors makes it possible that the common variance of these protective factors, rather than the unique variance of each, is involved in the observed indirect relation.

While elements of the predicted hypothesized pathway through Peer Influences did emerge, this pathway functioned somewhat differently than anticipated. Although consistent with predictions, Family Characteristics did have a pathway, contrary to predictions, Community Characteristics had no significant pathway to Peer Influences. Community Characteristics did emerge as the strongest predictor for Reasons for Life and Reflective Processes outcomes ( $\beta = .39$  and  $.30$ , respectively,  $p < .01$ ).

## Discussion

This study represents the first empirical test of a model of protective factors for AN people. Our original model was derived from an analysis of AN life histories; the protective factors model tested here was developed out of a knowledge base produced from this rich, qualitative life history data. It uses a measurement strategy guided by inquiry at multiple ecological levels, employing constructs and an item pool guided by this previous qualitative work. Both features of the model ground it deeply in context. All the measures were culturally adapted or developed for rural AN youth. With the exception of the Peer Influences measure, which has been used extensively in research with American Indian groups (Beauvais 1990), each of the measures appears to elaborate an element of AN enculturation in that item content emphasizes cultural values, traditions, and identity in either their formal content or the function of the behavior they assess. For example, the Reflective Processes measure is based directly in the experience of “thinking it over,” or reflecting on one’s experience and developing a personal life narrative, as described in the life history interviews of nonproblem drinker and abstinent AN people.

The model is also noteworthy for its positive, strengths-based focus, and as such, provides an empirically validated model for prevention and health promotion approaches with Yupik youth. The protective factors variables at the level of the individual, family, and community provide measures of change as intermediate variables; they provide specific, measurable prevention and health promotion program proximal intervention target variables. These include such elements as providing opportunities for youth involvement in the community, enhancing the relational supports for youth within families, and facilitating strategies to involve youth with the resources of friends and especially family to solve problems and to cope with stress. The measures tapping reasons for life and reflective processes are ultimate outcome variables for programs. In sum, this study provides both a framework for prevention,

and a system of measurement for assessing outcome in suicide and alcohol prevention efforts.

Measures that use direct questions on sensitive topics such as suicidal ideation (Gonzalez and Trickett, 2014) or illegal behavior such as alcohol consumption, at baseline and prior to establishing trust (Allen et al. 2012), can be problematic at several levels. Accurate reporting can be compromised, as can community acceptance of the program and its outcome assessment plan, if the measures are experienced as overly intrusive. Gonzales and Trickett discuss this issue as it emerged through the process in measurement development, exploring ways in which assessment approaches that reject a pathology focus and instead focus on strengths and positives are in many ways a strong cultural prerogative for Yup'ik. An assessment of strengths that are protective from suicide and substance abuse as the outcome measures for preventative intervention avoids many of these potential problems in data quality and community concerns.

### **Refining and Advancing an Understanding of Protection: Levels and Mechanisms of Protective Functions**

Results from the *Cuqyun* protective factors study also suggest important alterations to the original PA heuristic model developed with adults. One of its most prominent findings refined our understanding of the role of family characteristics as a protective factor for AN youth. In the PA heuristic model, we hypothesized the pathways of impact for family functioning on experimental substance use and eventual sobriety outcomes were direct. Through the *Cuqyun* data, we instead find the association between Family Characteristics and Reflective Processes on the consequences of drinking is indirect, and occurs through the social environment of youth as measured by Peer Influences. Parents and family members exert influence through their regulation and nurturance of the friendships their children keep. A similar relation was not found for Community Characteristics; contrary to our hypothesis based on the PA model, this variable had no impact on Peer Influences.

Another contribution from the use of structural equations modeling is through its ability to assign relative weights to the importance of different protective factors within the model. As a result, we find the role of Community Characteristics within the small, tightly organized kinship based structures of rural AN communities as prominent; this displayed the highest path loadings to the downstream latent outcome variables, when it is compared to the companion loadings produced by Family and Individual Characteristics. This directed our project to

emphasize a multilevel intervention; interventions at the level of the individual or the family alone would be expected to have less impact than prevention activities that include focus at the community level.

A culturally patterned finding with important implications for prevention also emerged at the individual level, through the composition of loadings of the observable variables forming the Individual Characteristics latent variable. The preference for problem solving using communal mastery over self-mastery strategies was not unanticipated given the collectivist orientation (Oyserman et al. 2002) often used to describe elements of Yup'ik society. However, what was unanticipated was the finding that communal strategies to achieve mastery focused on relationships in the family, with clear preference over friends during adolescence. This stands in contrast to the importance placed upon peers during this developmental transition by mainstream psychology (e.g., Savin-Williams and Berndt 1990). This points to the importance of culturally mediated kinship based patterns specific to this cultural group and potentially other culturally distinct settings. Finally, the bidirectional association in the path analytic model between Reasons for Life and Reflective Processes about alcohol use demonstrates these two downstream latent variables constitute co-occurring outcomes influenced by upstream latent variable protective factors. This provides important support for our hypotheses that the protective factors from suicide and from alcohol abuse among AN youth are shared. Protection from suicide and from alcohol risk are part of a co-occurring process.

### **Understanding the Generation of Knowledge as Interplay of Quantitative and Qualitative Methods: Strengths and Limitations of Methods**

Though the *Cuqyun* study expands our knowledge about protective factors among AN youth, with important potential implications for prevention science with other American Indian groups, a number of shortcomings and limitations also require consideration. Foremost in the limitations to the *Cuqyun* study is what has been lost in the transition from a heuristic model based in rich, qualitative data embedded in deep cultural structures, to a model based in self-report data provided by youth ages 12–17. In the qualitative to quantitative interplay, we have thus far described assets in this transition, in terms of increasing specificity and identification of the relative importance of various protective factors. However, important limitations exist by virtue of what was also lost in this interchange.

Each level of the protective factors in the original heuristic model included detailed, nuanced description of protections across a broad array of experience. Out of our

efforts to reduce burden in youth questionnaires, this comprehensiveness became reduced in the measurement instruments to only a few salient factors hypothesized as most significant and most approachable through self-report. Creation of brief measures developmentally appropriate for youth as young as age 12 required simplification in the complexity of the rich adult retrospective interview data that informed the PA heuristic model. Through this, we observed how the research question can become molded through the research methods.

In two related but discrete examples, we saw further evidence of this molding of question to methods emerge through our failed attempts to study safety as a protective variable, and to pursue understanding of ways protective factors mediated trauma exposure and its impact. The importance of safety as a variable emerged in our qualitative work as a critical determinant of successful outcome for some of the AN adults we interviewed in retrospective life history interviews. This subset of adults identified the crucial importance during their youth of some variant of an accessible community ‘safe house,’ or the home of an extended kin relative, when the environment at home was unsafe. However, assessment for the presence of safe places did not work as a measurement variable with youth: it proved unrelated to any other protective factors items despite multiple attempts at scale construction, and we dropped this variable as an observable early on in our modeling work with the Community Characteristics latent variable. We think this is related to a more general problem in nomothetic work. In this specific case, while the existence of a safe place growing up was reported retrospectively as of critical importance by a smaller at risk group, it was not an issue for the larger overall group. Therefore, when data was aggregated, safe places emerged unrelated to more general protective factors for the larger group. This highlights the potential issue of how our efforts to establish generalizability to a population can lead us to overlook something of potential critical importance to a subgroup, with enormous implications for beneficial preventive intervention.

Our experience (Gonzalez and Trickett, 2014) with community and cultural norms regarding direct questions about trauma provides an even more far-reaching example of methods moulding the research question. Trauma exposure, protection from trauma, and social network response to traumatization emerged as important elements suggested by the PA heuristic model, as derived from the qualitative analyses of adult retrospective life histories (Allen et al. 2006; Mohatt et al. 2004b). However, discussion of trauma during life history interviews occurred at the disclosure, discretion, and choice of the individual. Interviewers did ask direct questions about trauma experience as probes. Instead, interviewers asked about

important transformative events in the life histories, both positive and negative, and followed up with careful yet respectful inquiry if trauma experience was revealed.

In our work with our co-researchers developing measurement strategies, it became quickly clear that many community members were not comfortable with researchers asking youth direct questions of the type found in trauma self-report measures. This level of discomfort goes beyond simply the nature of the questions and the spotlighting of youth on these sensitive topics. Within the Yup’ik cultural context, direct questions of an individual by their very nature can themselves be culturally inappropriate, regardless of the topic, given their intrusiveness to individual autonomy. We received clear feedback regarding the inappropriateness of the types of questions appearing on most existing trauma measures; it was not possible to explore this portion of the model in our quantitative work, and trauma experience was therefore dropped from the *Cuqyun* model. The methodological shift to self-report measures limited our ability to accurately assess the place of trauma in the network of relations we wished to examine. Thus, we learned important new things through our methods of data collection and the nomothetic approach, but we also missed other equally important things. These considerations also raise additional unaddressed questions about ways in which method may be interacting with culture.

### Differentiating Populations from Communities

A second limitation in this work concerns an important distinction between populations and communities. The findings from this analysis are the result of collapsing data across communities in such a way that suggests there is one general model. Yet, these results represent an aggregation of the response to different roles across different communities. Though multi-group analyses, or some variant of nesting procedures might allow for exploration of this community level factor, statistical power considerations related to the small population sizes of each community preclude these types of analyses with current statistical techniques. Individual level variation has been historically recognized by psychology, but community level variation has been less often recognized. Nonetheless, the relative importance of various facets of the *Cuqyun* model may vary by community as well as by individual. In some communities, but not others, additional variables may come into play with prominence, while in other communities, particular variables appearing in the current model may be de-emphasized. Though the model identifies broad variables for consideration, intervention work at the level

of an individual community continues to require flexibility and openness to alternative possibilities.

### Limitations in the Measurement Model Specification

Third, there are a number of specific limitations in the current measurement model we can identify. First, mastery appears prominently in the Individual Characteristic upstream protective factor latent variable, while efficacy appears as a similar component of the Reasons for Life downstream latent variable. This can appear as a possible overlap in observables across two latent variables. However, in the Individual Characteristic latent variable, we are attempting to identify youths' preferred problem solving strategies in coping. In contrast, as part of the Reasons for Life latent variable, we are instead interested in the strength of belief that things in the end will work out, regardless of the type of strategy favored in coping. The pattern of correlations between measures of mastery with efficacy confirms their limited association. Potentially more problematic is a lack of specificity and conceptual clarity in the Community Characteristics protective factor latent variable, as distinguished from the adolescent social environment latent variable, measured through Peer Influences. We originally decided to model the adolescent social environment through peer relations. Through a process of elimination in working with various candidate measures, we arrived at various facets of Peer Influences regarding substance use as promising existing measures through which to define this latent variable. However, Peer Influences about substance use represents a vastly restricted subset of influences in contrast to the rich mapping of the adolescent social environment described in the PA heuristic model. Additionally problematic, Peer Influences were the only sets of measures used in *Cuqyun* that taken directly from the existing literature (albeit American Indian) with only limited adaptation. Strikingly, our community co-researchers had great difficulty linguistically situating the Peer Influences construct within the Yup'ik language, suggesting its limited fit with Yup'ik cultural worldviews. Perhaps ideas of peer influence may be at odds with the deep respect reserved within the culture regarding autonomy of the individual.

### Culture-Specific Models and Their Generalizability

Finally, we have chosen to situate this model linguistically within a Yup'ik framework, as most participants in the study sample (over 80 %) were Yup'ik. However, the heuristic model upon which the model we test here was based originated with a state-wide AN sample, drawing

from the breadth of AN cultural linguistic groups within the state. The original PA heuristic model was explicitly conceived as a pan-AN model of protection. Given our current focus on prevention programs for Yup'ik youth, specificity of the model to the Yup'ik cultural group was desirable. Important questions for future research are “does the current protective factors model represent a model with elements more broadly generalizable to youth from other Alaska Native and other indigenous groups,” and “would the relations in the current model be found if longitudinal data were available?” These questions gain additional importance as the PA model is applied to a prevention intervention (Rasmus et al., 2014) and if it is to be extended to other regions and cultural linguistic group in Alaska, and to groups outside of Alaska.

### Collaboration, Methods of Social Inquiry, the Generation of Knowledge, and the Construction of Meaning

In keeping with our CBPR partners' insistence on a positive focus, *Cuqyun's* testable adaptation of the PA heuristic model resulted in a strengths-based theoretical model proposing a developmental sequence of protective factors emerging in youth that serve to increase reasons for life and sobriety. The *Cuqyun* protective factors model focuses on one developmental period within the PA heuristic model, during the time of experimental substance use when the period of *Umyuangcalleinni*, or thinking it over, and the turning point of making a decision about alcohol use is occurring. In this way, *Cuqyun* represents an empirical test of an indigenous model of protection for Alaska Native people. The *Cuqyun* ultimate outcome variables are newly devised culture specific measures. Reflective Processes on alcohol abuse consequences, and of Reasons for Life, linked as a co-occurring process, explore crucial outcomes at this developmental stage. The *Cuqyun* intermediate variables of Individual, Family, and Community Characteristics protective factors hold promise as preventative intervention targets, or change variables.

However, methods in many ways determined the research questions we asked, what we measured, and what we found. One element impacting this transition from qualitative to quantitative methods involved community acceptability, as guided by our CBPR approach. Another prominent element involved the way these transitions from qualitative to quantitative methods lead to increased specificity and generalizability in the model at a cost regarding nuance, individual and community difference, and appreciation of elements of the deep structure of culture. In this way, our findings both elucidate a promising model of protection, and highlight some of the tensions

community and cultural researchers must navigate. These include the role methods play in determining what we research and their impact on the formulation of knowledge, and highlight the crucial importance of the construction of meaning in our work that resonates with, gives voice to, and facilitates a process of conscientization (Freire 1970) through an evolutionary progression of community understandings (Mohatt et al. 2004a).

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### Appendix: People Awakening (PA) Team

The People Awakening (PA) Team includes the Yup'icimta Asvairtuumallerkaa Community Planning Group, the Elluam Tungiinun Community Planning Group, the Yup'ik Regional Coordinating Council, and the Elluam Tungiinun, Yup'icimta Asvairtuumallerkaa, and Cuqyun Project Staff. The Yup'icimta Asvairtuumallerkaa Council included Sophie Agimuk, Harry Asuluk, Thomas Asuluk, T.J. Bentley, John Carl, Mary Carl, Emily Chagluk, James Charlie, Sr., Lizzie Chimiugak, Ruth Jimmie, Jolene John, Paul John, Simeon John, Aaron Moses, Phillip Moses, Harry Tulik, and Cecelia White. The Elluam Tungiinun Council includes Catherine Agayar, Fred Augustine, Mary Augustine, Paula Ayunerak, Theresa Damian, Lawrence Edmund, Sr., Barbara Joe, Lucy Joseph, Joe Joseph, Placide Joseph, Zacheus Paul, Charlotte Phillip, Henry Phillip, Joe Phillip, Penny Alstrom, Fred Augustine, Mary Augustine, Paula Ayunerak, Theresa Damian, Shelby Edmund, Flora Patrick, Dennis Sheldon, Isidore Shelton, Catherine Agayar, Theresa Damian, Freddie Edmund, Shelby Edmund, Josie Edmund, and Flora Patrick. The Yup'ik Regional Coordinating Council includes Martha Simon, Moses Tulim, Ed Adams, Tammy Aguchak, Paula Ayunerak, Sebastian Cowboy, Lawrence Edmunds, Margaret Harpak, Charles Moses, Raymond Oney. The External Advisory Group includes Walkie Charles, Richard Katz, Mary Sexton, Lisa Rey Thomas, Beti Thompson, and Edison Trickett. The project staff includes Debbie Alstrom, Carl Blackhurst, Rebekah Burkett, Diana Campbell, Arthur Chikigak, Michelle Dondanville, Gunnar Ebbesson, Aaron Fortner, John Gonzalez, Johanna Herron, Scarlett Hopkins, Nick Hubalik, Joseph Klejka, Jonghan Kim, Rebecca Koskela, Charles Moses, Dora Nicholai, Eliza Orr, Marvin

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