CONCEPTUALIZING SCHOOL BELONGINGNESS IN NATIVE YOUTH: FACTOR ANALYSIS OF THE PSYCHOLOGICAL SENSE OF SCHOOL MEMBERSHIP SCALE

Shadab Fatima Hussain, BS, Benjamin W. Domingue, PhD, Teresa LaFromboise, PhD, and Nidia Ruedas-Gracia, MA

Abstract: The Psychological Sense of School Membership (PSSM) scale is widely used to measure school belongingness among adolescents. However, previous studies identify inconsistencies in factor structures across different populations. The factor structure of the PSSM has yet to be examined with American Indian/Alaska Native (AI/AN) youth, a population of keen interest given reports of their educational and health disparities, and the potential of belongingness as a protective factor against risk behaviors. Thus, this study examined the factor structure of the PSSM in two samples of AI adolescents (N = 349). The two main aims of this study were to 1) determine if a comparable factor structure exists between the two AI groups and 2) examine the factor structure of the PSSM for use in AI/AN populations. Randomization analysis was used to test research aim one, and exploratory factor analysis was used to test research aim two. Analyses revealed that comparable factor structures existed based on responses from the two AI groups. Analyses also identified two factors: school identification/peer support and connection with teachers. Moreover, negatively worded statements were found to be unreliable and were removed from the final scale, reducing the PSSM to 13 items. Findings from this study will assist researchers and clinicians with assessing sense of school belongingness in AI/AN adolescents and with appropriately interpreting aspects of belongingness for this population.

INTRODUCTION

In recent years, a number of articles have emerged showing the positive association of belongingness with academic engagement and psychological well-being. Many of these articles draw from influential theories in psychology. For example, according to Bronfenbrenner's model of ecological development, the individual is influenced by and interacts with many different "systems" of the environment, including family, friends, schools, and society (Bronfenbrenner,

1977). This model emphasizes connectedness and engagement with others as important facets of human development. A number of additional psychological theories link connectedness to identity development as well. For example, Ryan and Deci (2000) theorize autonomy, competence, and relatedness as three fundamental psychological needs contributing to one's motivation and increased psychological well-being. Additionally, biculturalism theory proposes certain skills, such as social groundedness (appreciation for one's place within an ecological environment in order to effectively transition between and operate within two cultures), to promote positive psychological development (LaFromboise, Coleman, & Gerton, 1993).

For children and adolescents, the school setting is an important context in which to experience connectedness with others – particularly peers and teachers. Previous research has conceptualized the ideal school as a community of caring that fosters students' sense of belongingness – having positive and supportive interpersonal relationships – and commitment to others in their community (Battistich, Solomon, Watson, & Schaps, 1997; Noddings, 1988; Osterman, 2000). Caring communities are those that meet students' necessary psychological needs of autonomy, competence, and relatedness. Such communities also uphold values such as fairness, equality, and responsibility for others – values related to belongingness (Battistich et al., 1997; Johnson, 2009; Ryan & Deci, 2000). Schools that promote a sense of belongingness in students are more likely to have students who are committed to their studies and who do not drop out of school. Additionally, students with a high sense of belongingness are more likely to exhibit fewer emotional and behavioral problems and less likely to be involved in risky behaviors, such as bullying or substance use (Bond et al., 2007; Georgiades, Boyle, & Fife, 2012). Previous research has reviewed the benefits of school belongingness for different cultural groups in the United States and similarly found that belongingness was positively related to educational outcomes such as academic motivation, academic engagement, and educational aspirations (e.g., Anderman & Anderman, 1999; Davis, Chang, Andrzejewski, & Poirier, 2014; Reyes, Brackett, Rivers, White, & Salovey, 2012; Uwah, McMahon, & Furlow, 2008).

Cultivating school belongingness can be beneficial to address the current overall academic performance of American Indian/Alaska Native (AI/AN) students. According to the National Center for Education Statistics, eighth grade AI/AN students have the highest rates of absenteeism among racial/ethnic minority students in the United States (Freeman & Fox, 2005). Additionally, these students are disproportionately placed in special education programs and lag behind White and Asian/Pacific Islander students in reading skills (Brayboy & Makka, 2015). Considering the

positive relation between school belongingness and educational outcomes, and the relatively low educational performance of many AI/AN youth, it is important to examine belongingness in this population. However, to our knowledge there has only been one study examining this construct in Native American youth (Covarrubias & Fryberg, 2015). Thus, more information about the benefits of sense of school belongingness with AI/AN youth is needed.

Administering the Psychological Sense of School Membership (PSSM) scale may aid in understanding experiences of school belongingness with AI/AN populations. The PSSM is used frequently in research with adolescents measuring school belongingness. However, this scale has not yet been used with AI/AN youth populations. As illustrated by previous research, it is important to validate a psychological scale if distributed to a different cultural group than the one upon which it was developed. Results from a scale that has differential validity between groups can produce biased and incorrect interpretations. So, validating scales with different cultural groups through examination of its factor structure is integral in the measurement of the same underlying constructs with distinct populations. Understanding the factor structure – the correlation between the survey items − of the PSSM will help reveal which latent constructs of belongingness within the PSSM are important to address in this population.

Thus, utilizing data from two reservation schools, this study aimed to determine the factor structure of the PSSM when administered to AI youth within these settings. As there is variability among the 562 federally recognized tribes in the United States in traditions, customs, and organization of social and ecological relationships, we aimed to test for measurement invariance between the two AI populations before conducting an exploratory factor analysis of the PSSM for both populations together. We believe that results from this preliminary investigation will determine whether previous factor structures found for the PSSM can be applicable to AI/AN youth or if there is a unique factor structure to consider.

Culturally Specific Risk Factors in AI/AN Adolescents

Given the relational orientation of most AI/AN communities (e.g., close ties within extended families), research focusing on belongingness is especially warranted for AI/AN adolescents. Community connectedness – or belongingness – is emphasized as an important cultural value among AI/AN groups (Smith, Cech, Metz, Huntoon, & Moyer, 2014) and has been found to be a protective factor against substance use and suicide for AI/AN populations, particularly youth (Hill, 2009; Mohatt, Fok, Burket, Henry, & Allen, 2011; Napoli, Marsiglia, &

Kulis, 2003). Examining the impact of belongingness in AI/AN individuals is integral to the development of effective recommendations for schools (Covarrubias & Fryberg, 2015) and mental health services (O'Keefe et al., 2014; Schultz et al., 2016) dedicated to serving AI/AN populations.

Although the aspirations of AI/AN adolescents to attend college have increased over the years, college-going goals are not reflected in their performance. AI/AN adolescents have a much lower graduation rate from high school (44.1%) than the graduation rate from high school (69%) of all students in the United States (Faircloth & Tippeconic, 2010). This incongruity between intent and performance can be attributed to inadequate funding for school programs, biased standardized testing, barriers to culturally-sustaining pedagogy, and low expectations from teachers and counselors (Brayboy & Makka, 2015; Wilcox, 2015). Additionally, AI/AN adolescents face increased risk factors detrimental to their health and psychological development, particularly historical trauma, which other adolescents in the United States may not encounter (Brockie, Dana-Sacco, Wallen, Wilcox, & Campbell, 2015; Sarche & Spicer, 2008; Whitbeck, Yu, Johnson, Hoyt, & Walls, 2008). Historical trauma is conceptualized as "a collective complex trauma inflicted on a group of people who share a specific group identity or affiliation − ethnicity, nationality, and religious affiliation" (Evans-Campbell, 2008, p. 320). This trauma – initiated by numerous destructive assaults on AI/AN communities throughout past centuries – is experienced by the community as a whole and is transmitted across generations. Examples of contemporary events exacerbating historical trauma in AI/AN communities include assaults on the individual, such as racial slurs, iconic sports mascots, and other limited contemporary identity representations (Fryberg, Covarrubias, & Burack, 2018), and assaults on the community, such as inaccurate coverage of AI/ANs in U.S. history textbooks (Loewen, 2007).

The most known assault on the individual in terms of school belongingness was the forced relocation of AI/AN children into boarding schools designed to assimilate them into mainstream American society (Archuleta, Child, & Lomawaima, 2000). Other incidents associated with schooling include teachers interrogating children about their families' engagement in traditional spiritual practices prior to passage of the Indian Religious Freedom Act (P.L. 95-341) which did not occur until 1978. Such discovery led to children being removed from their families and parents being displaced onto other reservations or settlements far from their own. Today AI/AN parents and scholars are increasingly concerned about the colonization of AI/AN children's minds in schools that abide by national, rather than AI/AN, standards of knowledge acquisition (Medin &

Bang, 2017). These cases illustrate how historical trauma is transmitted through schooling, which can play a role in students' sense of belongingness within their school communities.

Research has revealed that detrimental effects of trauma occur at individual (e.g., psychological symptoms, guilt, post-traumatic stress disorder [PTSD]), family (e.g., impaired family communication), and community (e.g., loss of language, loss of cultural traditions) levels (Evans-Campbell, 2008). Although there is no direct linkage made to community-level effects, AI/AN scholars suggest that there is indeed a connection between historical trauma and social malfunctions that occur in their communities (Evans-Campbell, 2008; Walls & Whitbeck, 2012). For example, children raised by AI/AN individuals who were forced to attend residential schools away from their communities were more likely to exhibit symptoms of general anxiety disorder, PTSD, and suicidal thoughts (Brave Heart & DeBruyn, 1998; Evans-Campbell, Walters, Pearson, & Campbell, 2012).

According to Brave Heart and DeBruyn (1998), survivor child's complex is experienced by many children whose parents attended government or mission-run AI/AN boarding schools. Those who attended boarding school were deprived of ongoing socialization within an extended family based upon community connectedness and belongingness and thus, were denied the ability to raise their children with AI/AN traditional values and child rearing practices. Furthermore, children of boarding school survivors who may be affected by depression or suicidal thoughts feel they cannot share these struggles with their parents, as their pain is incomparable to their parents' suffering due to the intergenerational effects of historical trauma. Thus, children of boarding school survivors feel guilt that can lead to a decreased sense of belongingness, which could impact academic motivation and achievement. Given the low graduation rates of AI/AN high school students in the United States compared to the national average, research on belongingness is crucial. To this end, psychometrically and culturally valid measures of belongingness with AI/AN populations need to be determined.

Psychological Sense of School Membership Scale

While belongingness was previously defined as generally having positive and supportive interpersonal relationships, Goodenow defines a students' sense of belongingness as "the extent to which students feel personally accepted, respected, included, and supported by others in the school social environment" (Goodenow, 1993b, p. 80). Belongingness encompasses the relationships that peers, teachers, and schools have with students, emphasizing the importance of belongingness on

students' development. Recent studies provide support for aspects of sense of belongingness in school that can be linked to numerous positive educational and psychological outcomes such as achievement motivation (Goodenow, 1993a; Nelson & DeBacker, 2008), cognitive engagement (Walker & Greene, 2009), self-efficacy (Kia-Keating & Ellis, 2007), and psychological well-being (Van Ryzin, Gravely, & Roseth, 2009). Moreover, students with a high sense of school belongingness and high perceived teacher support report a greater interest in learning and greater ease in communicating with teachers (Johnson, 2009). Thus, the reliable positive effect of sense of belongingness on primary and secondary students' educational, psychological, and social outcomes emphasizes its integral role in a student's development. Vaz et al. (2015) recommend that schools begin to foster a sense of belongingness in primary school, as it could influence the sense of belongingness a student feels in secondary school.

Goodenow (1993b) developed the PSSM scale in order to address then-recent recommendations of education advisory boards (Carnegie Council Task Force on the Education of Young Adolescents, 1989), emphasizing the importance of caring in an educational context. Items were developed based on previous research focusing on belongingness and school membership. Originally 42 items, the PSSM was shortened to 28 items and administered to students in both urban and suburban schools to determine applicability in diverse settings. After testing the items in three different middle/junior high schools, the scale was shortened to 18 items. Results revealed high internal consistency variability across the three studies (ranging from .77 to .88) and positive significant correlations with other psychological and educational measures, such as academic motivation and expectancy to succeed in school.

Following the development of the PSSM, the scale has been widely used in research measuring sense of belongingness in schools. In a 2011 study examining the latent structure of the PSSM, it was found that only 4 out of 27 studies examined the latent factor structure of the PSSM with primary and secondary school students (You, Ritchey, Furlong, Shochet, & Boman, 2011). In the first factor analysis study of the PSSM, Hagborg (1994) administered the scale to a small group of White, middle-class students from one middle school and one high school. A principal-components analysis revealed that the PSSM consisted of three factors: *belongingness, rejection,* and *acceptance*. However, only a small number of items loaded on the *rejection* and *acceptance* factors, with 11 of the items loading on the *belongingness* factor. Thus, Hagborg concluded that the multidimensional model of the PSSM is limited in its application.

Subsequent research painted a more complex picture of the measurement properties of the PSSM. The multidimensional model of a Chinese-translated version of the PSSM was tested by Cheung and Hui (2003) with a large group of Mainland Chinese immigrant and local Hong Kong primary school students. Two factors were extracted from a principal components analysis: *school belonging* and *feeling of rejection*. Similar to Hagborg (1994), a majority of the items loaded onto the *school belonging* factor, while five of the items, which consisted of the reverse-coded questions, loaded onto the *feeling of rejection* factor. However, contrary to Hagborg (1994), there were no cross-loadings of items in this two-factor model, supporting the multidimensionality of the scale. Although the negatively worded items consisted of their own factor, the authors attributed this finding to the conceptual differences between feelings of belongingness and feelings of rejection.

The first of the factor analysis studies to closely examine the latent structure of the PSSM through both exploratory and confirmatory factor analysis was conducted by You et al. (2011) with a large group of Australian high school students. Confirmatory factor analysis revealed that the best fit was a three-factor model, similar to Hagborg (1994), wherein only 12 of the original 18 items remained due to measurement error. The three factors were *caring relationships, acceptance,* and *rejection.* Thus, this study supported the PSSM's use as a multidimensional instrument.

Following You et al. (2011), an in-depth examination of possible method effects regarding the negatively worded items was examined. Ye and Wallace (2014) conducted an exploratory and confirmatory factor analysis of the PSSM on a large group of ethnically diverse high school students in Pennsylvania. Results revealed a method effect occurring as a result of the negatively worded items, which influenced the results of the factor analysis to place the negatively worded items into its own factor. This method effect could explain similar findings in past studies in which the negatively worded items were placed in a factor measuring feelings of rejection (Cheung & Hui, 2003; You et al., 2011). Previous research suggests that this effect could be caused by dispositional factors such as personality and response style set (DiStefano & Motl, 2006; Motl & DiStefano, 2002; Wong, Rindfleisch, & Burroughs, 2003). After controlling for these method effects, a 15-item scale was retained and supported a multidimensional, three-factor model consisting of the following factors: *identification and participation in school*, *perception of fitting in among peers,* and *generalized connection to teachers.*

Notably, these studies have been inconsistent in identifying a similar factor structure for the PSSM, suggesting that latent factors loaded from one group of participants cannot be generalized

to another group, thus not achieving measurement invariance (Milfont & Fischer, 2015). However, the majority of studies supported the PSSM as a multidimensional instrument and emphasized that survey items with measurement error should not be distributed to participants.

The PSSM has been used to assess a student's perception of belonging in their school environment in a number of cultural groups other than AI/ANs (Goodenow, 1993b). Recent studies have found belongingness to be related to positive outcomes for adolescents from a variety of different cultural backgrounds, such as Hong Kong and Mainland Chinese primary school students, Latino secondary school students in the United States, and African American secondary school students (Adelabu, 2007; Cheung & Hui, 2003; Sánchez, Colón, & Esparza, 2005; Uwah et al., 2008). Results from these studies reveal belongingness to be associated with feeling encouraged to participate in class, motivation, effort, and academic achievement. Due to the unique cultural context of AI/AN communities, it is not immediately obvious if the PSSM would have the same validity with this sample. One study examined this issue (Malik & LaFromboise, 2014) and found that belongingness was negatively correlated with suicidal ideation. However, an examination of the latent structure of the PSSM has not been conducted with AI/AN adolescents. The current examination of the factor structure will extend upon past research with the PSSM and determine whether a unidimensional model or multidimensional model of belongingness is appropriate for this population.

Study Aims and Hypothesis

Research suggests that a sense of belongingness in secondary schools is crucial (Osterman, 2000), yet measurements of such belonging may depend upon cultural context. This study aimed to further examine the factor structure of the PSSM (Goodenow, 1993b) and test the conditions for validity of this scale in AI secondary school students. The present study will extend upon previous analyses of the factor structure of the PSSM by conducting an exploratory factor analysis (EFA) in two samples of AI adolescents. As research on the PSSM with AI/AN populations is sparse, we decided that an EFA would be a more appropriate analysis than a confirmatory factor analysis. The aims of this study are to determine if measurement invariance holds in the PSSM across the two groups (Aim 1) in order to examine the factor structure of the PSSM for use in AI/AN adolescent populations through EFA (Aim 2). If measurement invariance holds, then the two groups will be examined together for Aim 2. Based on differential findings from previous studies analyzing the factor structure of the PSSM in middle school and high school students across different cultural

groups, we hypothesize that 1) the PSSM will have a common multidimensional structure for the two AI groups, but 2) the factor structure of the PSSM will be different for the study sample compared to groups studied previously with the PSSM (e.g., Cheung & Hui, 2003; Hagborg, 1994; Ye & Wallace, 2014).

METHODS

The participants in this study consist of middle school, reservation-dwelling students from one tribe (Group 1) and high school, reservation-dwelling students from two tribes that reside together in a different reservation community (Group 2). Data collection occurred in each school at separate times. The analysis for this study is based on students' responses to the Psychological Sense of School Membership (PSSM) scale. Before conducting the exploratory factor analysis, we conducted a measurement invariance test to determine whether the two groups could be analyzed together. The test determined no significant difference in underlying factor structure between the two student groups, so we conducted an exploratory factor analysis combining the two groups.

Participants and Procedures

Group 1

A total of 129 middle school students (68.1% participation rate) attending a tribally-controlled school in a Southwestern reservation participated in the study. The reservation holds a population of 6,343 and is located approximately 150 miles away from a major metropolitan area. Participants were between the ages of 11-16 years ($M = 12.9$, $SD = 1.24$) and were 52% female. In terms of grade level, 55 (44%) were in sixth grade, 17 (14%) were in seventh grade, and 53 (42%) were in eighth grade. Participants were not asked to identify their ethnicity since all students responding to the survey were tribal members.

All students attending the school were invited to participate in the study through letters sent home to parents/guardians, and recruitment was continued through personal outreach to parents/guardians by school staff and designated community substance abuse prevention service providers, all of whom were tribal members. To ensure quality of recruitment, all outreach recruiters met with the principal investigator to understand the purpose of the study and to collectively determine the proper protocol for requesting parent/guardian consent during home visits. Students who assented and their parent/guardian consented were compensated $10 for

completing a 30-45-minute paper and pencil survey. The survey was administered in the school cafeteria and the school library. Prior to responding, students received instructions from survey administrators. The survey consisted of the PSSM, Mastery Resilience Scale for Children and Adolescents (Prince-Embry, 2007), Hopelessness Scale for Children (Spirito, Williams, Stark, & Hart, 1988), Reynolds Adolescent Depression Scale-2 (Reynolds, 2008), Suicidal Ideation Questionnaire (Reynolds, 1988), and Historical Life Events Inventory (Novins, Beals, Roberts, & Manson, 1999). The University Institutional Review Board approved all procedures, and the Tribal Council passed a resolution supporting the study.

Group 2

A total of 220 high school students attending a tribally-controlled school in a Northern reservation participated in the study. The reservation holds a population of approximately 5,815 people and is located approximately 170 miles away from a metropolitan area. Participants were between the ages of 14-19 years ($M = 15.9$, $SD = 1.36$) and were 52% female. In terms of grade level, 64 (30%) were in ninth grade, 39 (18%) were in tenth grade, 55 (25%) were in eleventh grade, 60 (27%) were in twelfth grade, and two participants did not report their grade level. Students were able to check more than one ethnicity for their ethnic identification. Of the students participating, 213 (97%) identified as AI/AN, 20 (9%) identified as White, 12 (5%) identified as African American, 4 (2%) identified as Native Hawaiian/Pacific Islander, 3 (1%) identified as Hispanic, and 7 (3%) identified as "Other." Most students (99%) reported English was spoken in their home.

All students attending the school were invited to participate in the study through letters sent home and through notices placed in the tribal newspaper. Teachers taking part in an advisory program at the school distributed information about the study to students during their advisory class period. These advisory teachers also served as survey administrators. Students who assented were entered in a lottery for $5 and $10 gift cards for participating in the study. To ensure quality data collection, the school guidance counselor explained the purpose of the survey to teacher advisers, distributed survey administration guidelines, and followed up with advisers to make sure that the survey had been administered successfully. Prior to responding, students were read instructions by survey administrators. The paper and pencil survey took between 40-45 minutes to complete and consisted of the PSSM and the *High School Survey of Student Engagement by the Center for Evaluation and Education Policy* (HSSSE; Yazzie-Mintz, 2007).

The University Institutional Review Board and the Tribal Research Committee approved all procedures.

Psychological Sense of School Membership Scale (PSSM)

The PSSM is an 18-item measure designed to assess sense of school belongingness in adolescents (Goodenow, 1993b). Participants were asked to read each item and indicate how much the item describes what they think on a 5-point Likert scale from 1 *(Not at all true)* to 5 *(Completely true).* Example items include, "I feel like a real part of this school," "I am included in a lot of activities at school," and "Teachers here respect me." Five of these items are negatively worded, so the items were reverse-coded to indicate a stronger sense of belongingness. See Table 1 for descriptive statistics of PSSM items for both AI groups and for both groups' data combined. The alpha coefficient for the PSSM in this study for both groups was .81.

Table 1
Item Descriptive Statistics

Item Number	Group 1		Group 2		Both Groups	
	M	*SD*	*M*	*SD*	*M*	*SD*
PSSM1	3.30	1.11	2.96	1.15	3.16	1.13
PSSM2	3.40	1.12	3.10	1.42	3.27	1.33
PSSM3 (RC)	2.12	1.14	2.21	1.15	2.83	1.42
PSSM4	2.73	1.07	2.59	1.04	2.67	1.08
PSSM5	2.90	1.14	2.85	1.04	2.92	1.11
PSSM6 (RC)	2.23	1.46	2.30	1.30	2.86	1.51
PSSM7	3.30	1.46	3.57	1.36	3.52	1.39
PSSM8	3.57	1.12	3.56	1.09	3.59	1.13
PSSM9 (RC)	1.87	1.06	2.01	1.11	2.75	1.49
PSSM10	2.91	1.40	2.84	1.34	2.88	1.37
PSSM11	3.48	1.20	3.30	1.23	3.36	1.25
PSSM12 (RC)	2.78	1.31	2.81	1.32	2.96	1.34
PSSM13	3.55	1.31	3.26	1.22	3.33	1.27
PSSM14	3.67	1.22	3.48	1.13	3.54	1.22
PSSM15	3.83	1.22	3.78	1.04	3.82	1.09
PSSM16 (RC)	2.50	1.50	2.24	1.34	2.71	1.52
PSSM17	3.22	1.31	3.30	1.21	3.33	1.26
PSSM18	3.59	1.18	3.63	1.07	3.63	1.14
Total	54.93	9.19	60.47	11.96	58.83	11.43

Note. PSSM = Psychological Sense of School Membership; RC = reverse-coded; Group 1 *N* = 120; Group 2 *N* = 229; Both groups *N* = 349.

Analysis Strategy

Missing data for students in Group 1 were addressed through listwise deletion – data from four students were removed from the sample. Of the responses we received, there was no missing data for students in Group 2. In order to examine whether measurement invariance holds across the two groups, we computed unrotated factor analyses separately in each group (based on three factors). We computed correlations between the factor loadings for the two groups across all three factors. We then computed similar correlations produced from 5,000 random assignments of student to either group and considered the percentile of the true correlations in the distribution formed by the correlations resulting from random assignment. This is a version of a Fischer exact test (Athey & Imbens, 2017) to assess whether there were systematic differences in the factor loadings between the two groups as compared to hypothetical groups wherein assignment is truly random.

In order to examine Aim 2, we considered correlational analyses to examine relations between each item of the PSSM. Exploratory factor analysis (EFA) using principal-components factor analysis (method used to extract underlying factors) followed by oblimin oblique rotation was used in order to examine the factor structure of the PSSM. This rotation method was used in previous studies conducting factor analysis on the PSSM and allows for underlying factors to be correlated (Ye & Wallace, 2014). For examination of the method effect associated with the negatively worded items, average inter-item correlations were conducted. While results support the multidimensionality of the PSSM, Clark and Watson (1995) explain that examination of reliability indicators of the unidimensional model of the scale does not establish the scale as only unidimensional, and these analyses can instead provide valuable information regarding the internal consistency of a multidimensional scale.
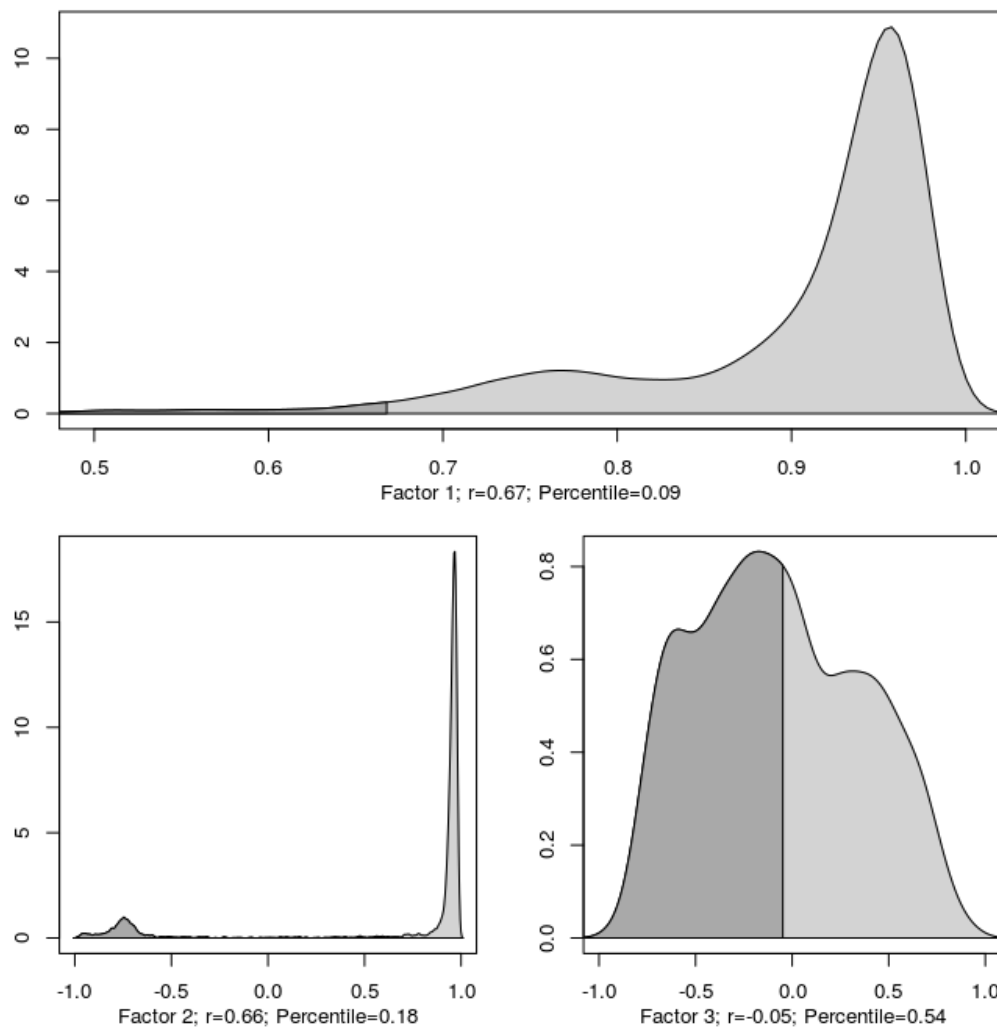
RESULTS

Aim 1

Evidence from the randomization analysis suggests that measurement is roughly invariant across the two groups (Figure 1). Correlations on the first factor were somewhat lower than the typical correlation produced from random group assignment, but nearly a tenth of the random group assignments produced smaller correlations. We observed some instability in the correlations of the second factor in random group assignment (the distribution is

bimodal) which challenged simple interpretation of the observed coefficient. For the third factor, the observed correlation was entirely consistent with random assignment. Given the limited sample size, we were underpowered to detect small variations in measurement across the two groups. However, our findings did not suggest that there are large variations in measurement across the two groups.

Figure 1. Correlations from true group assignment (vertical line) compared to estimated distribution of 5,000 random group assignments. Percentile shows proportion of distribution to left of vertical line.

Factor 1; r=0.67; Percentile=0.09

Factor 2; r=0.66; Percentile=0.18

Factor 3; r=-0.05; Percentile=0.54

Aim 2

Exploratory Factor Analysis (EFA)

After combining the two groups into one sample, an EFA was performed using principal-component factor analysis followed by an oblimin rotation to extract latent factors. See Table 2 for EFA results. Based on statistical criteria, three factors were extracted with the

following eigenvalues (and percentage of variance explained): 5.23 (29.1%), 2.88 (16%), and 2.88 (16%). All of the items loaded onto one of the three factors with a value above .30. Based on previous theoretical analysis, we identified the three factors *school identification/peer support* (Factor 1), *negative perception* (Factor 2), and *connection to teachers* (Factor 3). Table 3 displays the correlations among the three factors. Notably, all five of the reverse-coded items (PSSM3, PSSM6, PSSM9, PSSM12, PSSM16) loaded strongly onto Factor 2. This analysis also revealed a poor model fit, χ^2 (153) = 2351.71, *p* <. 001.

Table 2
Factor Loadings of the Three-Factor Measurement Model in EFA

Item	Description	Factor 1	Factor 2	Factor 3
PSSM1	I feel like a real part of this school.	**0.66**	-0.08	0.05
PSSM2	People here notice when I am good at something.	**0.70**	-0.12	-0.04
PSSM3	It is hard for people like me to be accepted here. (RC)	-0.003	**0.79**	0.05
PSSM4	Other students in this school take my opinion seriously.	**0.51**	-0.03	0.21
PSSM5	Most teachers at this school are interested in me.	0.29	-0.06	**0.65**
PSSM6	Sometimes I feel as if I don't belong here. (RC)	-0.02	**0.87**	0.02
PSSM7	There's at least one teacher or adult in this school I can talk to if I have a problem.	-0.11	0.05	**0.81**
PSSM8	People at this school are friendly to me.	**0.65**	0.09	0.11
PSSM9	Teachers here are not interested in people like me. (RC)	0.08	**0.79**	-0.13
PSSM10	I am included in lots of activities at this school.	**0.62**	0.01	0.02
PSSM11	I am treated with as much respect as other students.	**0.61**	0.02	0.17
PSSM12	I feel very different from most other students here. (RC)	0.11	**0.66**	-0.02
PSSM13	I can really be myself at this school.	**0.68**	0.02	0.17
PSSM14	The teachers here respect me.	**0.32**	-0.02	**0.62**
PSSM15	People here know I can do work.	**0.64**	0,01	0,02
PSSM16	I wish I were in a different school. (RC)	-0.16	**0.64**	0.12
PSSM17	I feel proud of belonging to this school.	**0.61**	0.02	0.17
PSSM18	Other students here like me the way I am.	**0.83**	0.04	-0.19

Note. PSSM = Psychological Sense of School Membership; RC = reverse-coded; Factor loadings > 0.30 are bolded.

This finding is similar to results of factor analyses examined in previous studies which conceptualize negative perception of belongingness, or rejection, as a distinct construct separate from school identification or acceptance (Cheung & Hui, 2003; Hagborg, 1994; You et al., 2011). However, recent findings by Ye and Wallace (2014) suggested that there may be a method effect associated with the negatively worded items in the PSSM. Unlike previous studies, where the negatively worded items cross-loaded onto multiple factors, the factor

loadings of the negatively worded items loaded highly solely onto the method effect factor. Thus, further analysis of this possible method effect was conducted through examination of the Cronbach's alpha coefficient and average inter-item correlations between the three factors extracted, all 18 items of the PSSM, and the 13 positively worded items of the PSSM.

Table 3
Correlations Among Latent Factors in Three-Factor Model of EFA

Factors	1. School identification/peer support	2. Method effect	3. Connection to teachers
1	---		
2	-0.04	---	
3	0.57***	0.07	---

Note. N = 349.
***p* < .001.

As revealed in Table 3, the *negative perception* factor was not correlated with the other factors, which is suggestive of a method effect. See Table 4 for alpha coefficients and average inter-item correlations for each factor and the full scale. The sub-scales and two different models of the total scale demonstrated moderate to high reliability. Of particular interest are the average inter-item correlation value of the method effect factor and the change in the alpha coefficients and average inter-item correlation value from the 18-item model to the 13-item model with the positively worded items only. According to Clark and Watson (1995), the value of the average inter-item correlation should be around .15 – .50. If the value is too high, an "attenuation paradox" may occur, suggesting the redundancy of the items and a possible negative impact on the validity of the scale. Based on this attenuation effect, the items in Factor 2 were not reliable for meaningful analyses. Additionally, when removing the negatively worded items, the alpha coefficient for the whole scale increased from .81 to .88, and the inter-item correlation value increased from .32 to .55.

Table 4
Alpha Coefficient and Average Inter-Item Correlations for each Factor, and the 18-Item and 13-Item Unidimensional Model of the PSSM

Factor/Model	α	Average Inter-Item Correlation
Factor 1 (identification/peer support)	.88	.58
Factor 2 (negative perception/method effect)	.81	.98
Factor 3 (connection to teachers)	.65	.60
18-item model	.81	.32
13-item model (positively worded items only)	.88	.55

Note. PSSM = Psychological Sense of School Membership.

Based on the analyses of the reliability indicators, the negatively worded items were removed from the sample, and an additional EFA was performed with the remaining 13 items. There were two items (PSSM5 and PSSM14) that cross-loaded onto both factors but loaded highly on the second factor, so the items were kept in the final model. Results revealed that two factors were extracted with the following values (and percentage of variance explained): 5.31 (41%) and 2.82 (22%), and the model revealed a relatively better fit to the study data than the previous three-factor model including the reverse coded items, χ^2 (78) = 1699.62, $p <$ .001. See Table 5 for factor loadings of the two-factor model. We identify the factors as *school identification/peer support* (Factor 1) and *connection to teachers* (Factor 2).

Table 5
Factor Loadings of the Two-Factor Measurement Model in EFA Excluding Reverse Coded Items

Item	Description	Factor 1	Factor 2
PSSM1	I feel like a real part of this school.	**0.72**	-0.03
PSSM2	People here notice when I am good at something.	**0.74**	-0.10
PSSM4	Other students in this school take my opinion seriously.	**0.53**	0.19
PSSM5	Most teachers at this school are interested in me.	**0.31**	**0.62**
PSSM7	There's at least one teacher or adult in this school I can talk to if I have a problem.	-0.13	**0.85**
PSSM8	People at this school are friendly to me.	**0.63**	0.13
PSSM10	I am included in lots of activities at this school.	**0.63**	-0.003
PSSM11	I am treated with as much respect as other students.	**0.62**	0.15
PSSM13	I can really be myself at this school.	**0.68**	0.06
PSSM14	The teachers here respect me.	**0.32**	**0.56**
PSSM15	People here know I can do work.	**0.62**	0,04
PSSM17	I feel proud of belonging to this school.	**0.62**	0.13
PSSM18	Other students here like me the way I am.	**0.79**	-0.15

Note. PSSM = Psychological Sense of School Membership; Factor loadings > 0.30 are bolded.

DISCUSSION

The aims of the present study were to test for measurement invariance between two AI groups and analyze the factor structure of the Psychological Sense of School Membership (PSSM) scale in these two groups. This study was the first to examine the factor structure of the PSSM of two AI adolescent groups, a population of interest due to educational and health disparities and their cultural emphasis on collective values and balanced relationships as a potential protective factor against these problems. Based on our analyses, measurement

invariance holds in the PSSM between the two AI groups. As in previous work, the identified latent factors align with past research supporting a multidimensional model of sense of school belongingness (e.g., Cheung & Hui, 2003; Ye & Wallace, 2014; You et al., 2011), supporting the study hypotheses. Exploratory factor analysis also revealed a method effect occurring due to the negatively worded items, a finding replicated from Ye and Wallace (2014). Removal of items in the factor caused by the method effect resulted in a better model fit to the data and a clear, 13-item, two-factor solution of the PSSM for the AI groups. The two factors are *school identification/peer support* and *connection to teachers.*

The resulting factor structure is partially similar to previous studies. Findings from this study will be compared with Ye and Wallace (2014), as the method effect of the negatively worded items was also examined. The *connection to teachers* factor is similar to the *generalized connection to teachers* factor in Ye and Wallace (2014) except for the exclusion of the negatively worded item in this study (PSSM9 "Teachers here are not interested in people like me"). In Ye and Wallace (2014), PSSM9 loaded on the *generalized connection to teachers* factor more than the method effect factor. Here, it only loaded highly on the method effect factor. All negatively worded items had this same characteristic; thus, we removed all of the five negatively worded items from the final 13-item pool because they did not cross-load onto any other factors.

The second factor in the current study, *school identification/peer support* is a combination of the *identification and participation in school* factor and the *perception of fitting in among peers* factor in Ye and Wallace (2014). This finding makes intuitive sense in regards to AI adolescents because of cultural values emphasizing social inclusion. The perception of acceptance by teachers and peers including receiving attention from them has been found to foster resilience and support academic engagement and school belonging in adolescents (Kiefer, Alley, & Ellerbrock, 2015; Osterman, 2000). Thus, for AI adolescents who value social inclusion, forming relationships in school may play a key role in developing connections with others.

Results from this study support findings from previous literature asserting that the PSSM is a multidimensional measure and should be interpreted based on different factors, rather than the sum of the total items. Additionally, study findings further emphasize the importance of verifying factor structures of measures before interpretation, particularly in cultural groups different from groups in the initial scale development procedures. The PSSM is a useful measure for teachers and administrators who serve AI/AN students. Along with acting as a tool to assess

potential mental health issues or academic disengagement in students, it could also increase educators' understanding of students' relational engagement with their peers and teachers. This understanding will facilitate teacher effectiveness in managing the socioemotional needs of students, potentially benefitting students' academic engagement and performance.

Limitations and Future Directions

There is one main limitation to note for this study. We were underpowered to detect small amounts of measurement variation between the two AI groups. Our analysis revealed that there were not large variations of the factor structure between the two groups, but we were unable to rule out the possibility of small variations. Future research can examine this question of measurement invariance by verifying the factor structure of the PSSM in AI/AN groups with larger samples to increase power and opportunity for finer analyses. Another path for future research in the examination of the occurrence of method effects due to negatively worded items could be to assess whether the selection of these items vary across different ethnic groups or primary language of participants. DiStefano and Motl (2006) suggest that certain aspects of personality and response style may be associated with method effects related to negatively worded items. Thus, future research can examine other possible dispositional factors of this method effect that may be related to cultural orientation (Wong et al., 2003).

Lastly, previous research has recommended alternatives to utilizing negatively worded items. Typically, these items have been included in surveys to control for *acquiescence bias*, the tendency for a respondent to agree with most of the items. In his examination of negative word stems and response options, Barnette (2000) suggests that usage of negatively worded items has a minimal effect on controlling for acquiescence bias and can instead pose problems for internal consistency and factor structure. In his study, one version of a survey using both positively and negatively worded items resulted in a lower alpha coefficient as compared to another version of a survey using only positively worded items. This result has also been replicated in recent studies examining effects of negatively worded items (Roszkowski & Soven, 2010; Sliter & Zickar, 2014).

Barnette (2000) goes on to note that the usage of bidirectional response options ("strongly agree" to "strongly disagree" and "strongly disagree" to "strongly agree") increased the alpha coefficient and was a reliable marker of acquiescence bias. Thus, in surveys using Likert-response scales, altering the directionality of half of the responses of the survey, and

distributing the survey with only positively worded items can best improve the overall reliability of the scale while controlling for acquiescence bias. This method may also improve measurement invariance of a scale across different cultural groups (Wong et al., 2003), which is particularly important if the construct measured may have significant social, educational, and clinical significance for a particular population, such as sense of school belongingness for AI/AN adolescents.

CONCLUSION

This study aimed to examine the factor structure of the Psychological Sense of School Membership (PSSM) Scale in two groups of AI adolescents. Considering the unique situational and environmental factors to which AI/AN adolescents are exposed, interventions and recommendations developed for this population should be culturally relevant. For example, the American Indian Life Skills (AILS) curriculum is a culturally supported intervention developed to reduce suicidal ideation in AI/AN adolescents through targeting of factors most relevant to this population, such as self-regulation, communication skills, and peer and community support (LaFromboise, 1996). Interventions that target variables specific to certain populations are needed to address group-specific concerns (Goldston et al., 2008; LaFromboise & Hussain, 2015); however, reliable measurement is needed to ensure reasonable inference. As emphasized previously, AI/AN adolescents highly value sense of belongingness. Aspects of belongingness are found to be negatively correlated with suicidal ideation and attempts (Whitlock, Wyman, & Moore, 2014) and directly and indirectly influence academic performance (Wang & Holcombe, 2010). Thus, a measure of belongingness that has reasonable measurement properties in this group is desirable. Based on these preliminary results, future research on belongingness with AI/AN youth should utilize the recommended 13-item version of the PSSM found in this study. However, it would be important to verify the factor structure of the PSSM in future research with AI/AN youth. Interpreting the PSSM using the factor structure discovered in this study will be useful for targeting which aspects of belongingness are related to positive psychological outcomes. Additionally, information obtained from this psychometrically valid measure can guide the development of interventions that promote the positive development of AI/AN adolescents.

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AUTHOR INFORMATION

Shadab Fatima Hussain is 5th year PhD candidate at the Stanford Graduate School of Education in Stanford, CA. Dr. Benjamin W. Domingue is an assistant professor at the Stanford Graduate School of Education. Dr. Teresa LaFromboise is a professor at the Stanford Graduate School of Education. Nidia Ruedas-Gracia is a 4th year PhD candidate at the Stanford Graduate School of Education.