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The Rutgers Alcohol Problem Index (RAPI): A Comparison of Cut-Points in First Nations Mi'kmaq and Non-Aboriginal Adolescents in Rural Nova Scotia

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Abstract Important to the assessment of adolescent alcohol misuse is examination of alcohol-related problems. However, most measurement tools have only been validated among Euro-American cultures. The present study assessed the ability of the Rutgers Alcohol Problem Index (RAPI) to identify problem drinkers among groups of First Nations Mi'kmaq and non-Aboriginal adolescents from rural Nova Scotia and compared cut-point scores across cultural groups. Receiver Operating Characteristic (ROC) curve analyses revealed that the RAPI adequately distinguished between problem and non-problem drinkers in both groups with similar levels of precision. Cut-points were lower for First Nations Mi'kmaq as compared to non-Aboriginal adolescents. Results support the use of the RAPI with First Nations Mi'kmaq and non-Aboriginal adolescents and suggest that cut-points may need to be lowered for use with First Nations Mi'kmaq adolescents. Findings highlight the need for empirical examination of the cross-cultural psychometric applicability of alcohol assessment tools and cut-points among First Nations adolescents.

Keywords Rutgers Alcohol Problem Index (RAPI) · Adolescence · Binge drinking · First Nations · Mi'kmaq · Cross-cultural · Cut-point scores · Assessment

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It is well established that alcohol use in adolescence is a widespread reality. Drinking tends to begin at early ages and when adolescents drink, they tend to drink heavily in comparison to adults (Substance Abuse and Mental Health Services Administration, [SAMHSA] 2003). The very high prevalence of underage alcohol use (e.g., 52% of adolescents in Nova Scotia; Poulin and McDonald 2007) represents an important public health issue (Spoth et al. 2008). Of utmost concern are levels of problematic alcohol use. For example, drunkenness is reported to occur in 8th, 10th, and 12th graders at rates of 6.0%, 17.6 %, and 30.2%, respectively (Johnson et al. 2006). Similar rates of heavy alcohol use by adolescents are found worldwide (Hawks et al. 2002). Such patterns of early alcohol use represent an important risk to development. Earlier onset and heavier alcohol use has been linked to adverse outcomes including later substance abuse, deviant behaviour, and school failure (Baumrind 1991). Individuals who report having first used alcohol by age 15 were four times more likely to have a diagnosis of alcohol dependence as adults than individuals who report having first used alcohol after age 20 (Grant and Dawson 1997). Therefore, the assessment of problem alcohol use in adolescence is deserving of clinical and research attention.

Alcohol Use Among Canadian First Nations Adolescents

Alcohol-related problems in First Nations adolescents are an increasing concern (Kirmayer et al. 2000). First Nations adolescents are reported to have high levels of alcohol abuse and associated problems (Kirmayer et al. 2000) and many First Nations communities consider alcohol abuse to be a major problem affecting their members' lives (Health Canada 2003). Although assessment tools designed to measure alcohol misuse in adolescence could potentially be useful among First Nations adolescents, their psychometric properties for use in these cultures are largely unknown. It is important to carefully assess psychometric issues related to cross-cultural measurement (e.g., reliability and validity) when applying measures to cultures in which the measures were not designed or validated (Mushquash and Bova 2007). Although specific item-content may not be particularly culturally-loaded, the underlying constructs that are being measured may not behave in the same way across cultures. For example, high-risk motives for alcohol use include coping, conformity, and enhancement (Cooper 1994). These reasons for drinking are related to riskier drinking behaviours and more adverse outcomes related to alcohol use relative to social motives for use (Cooper 1994; Cooper et al. 2000; Kuntsche et al. 2005). The structure of motives for alcohol use may be different among some First Nations groups when compared to majority culture. Although high-risk motives for using alcohol (i.e. coping, conformity and enhancement) were found among First Nations Mi'kmaq and non-Aboriginal adolescents, the low-risk drinking motive (i.e. social) was not found among First Nations Mi'kmaq adolescents. Instead, a factor analysis revealed that this normally protective motive actually represented enhancement rather than social affiliation (Mushquash et al. 2008).

Demographic and Socio-Economic Predictors of Alcohol-Risk

First Nations adolescents are more likely than non-Aboriginal adolescents to have demographic profiles that are related to heavier patterns of alcohol use and adverse outcomes related to use. For example, the rates of poverty among Canadian First Nations people are significantly greater than the rest of the Canadian population (Stout and Kipling

2002; Southern Alberta Child and Youth Network 2005). Furthermore, although First Nations women are more likely to reach a higher level of educational attainment than their male counterparts, the overall level of educational attainment among Canadian First Nations people is far behind the rest of the Canadian population (Statistics Canada 2000).

These two demographic factors, low socioeconomic status (SES) and low educational attainment, which are found at high rates in First Nations populations, are both well established risk factors for heavy patterns of alcohol use in adolescence. The relationship between SES and alcohol consumption patterns has been explained in terms of a higher prevalence of predictors of heavy alcohol consumption in low versus high SES groups, such as familial alcohol problems, peers who condone alcohol consumption, and lower parental attachment (Droomers et al. 2003). Therefore, SES is thought to affect alcohol consumption through the host of associated risk factors that often accompany it. The relationship between low academic achievement and heavy alcohol use (Kestilä et al. 2008) may be affected by financial deprivation, a commonly used marker of SES (Droomers et al. 1999). As well, individuals who reach high levels of education are likely to have better health and health enhancing lifestyles than those who only reach low levels of education, and thus may be less inclined to misuse alcohol (Koivusilta et al. 1999). Accordingly, it is the unequal distribution of risk factors associated with heavy drinking that distinguishes these groups on alcohol misuse.

In sum, adolescents who are from low SES backgrounds and who have low levels of academic achievement are at high risk for pathological alcohol use. There is a high prevalence of alcohol abuse and associated risk factors among many Canadian First Nations communities and high-risk drinking motives have been found among these adolescents. As such, it is possible that there are different patterns of drinking and related outcomes among First Nations adolescents as compared to the general Canadian population where these risk factors are less prevalent. Therefore, it is important to examine the cross-cultural psychometric applicability of assessment tools, which are designed to tap into drinking patterns and associated outcomes, among Canadian First Nations adolescents.

The Assessment of Alcohol Misuse in Adolescence

The current standard for diagnosing alcohol use disorders is defined in the *Diagnostic Statistical Manual of Mental Disorders, Fourth Edition, Text Revised* (DSM-IV-TR; American Psychiatric Association 2000). This approach to the classification of alcohol use disorders has advantages over other assessment methods because it provides objective and behaviorally-based criteria and increases consistency in diagnosing across clinicians and researchers. Although the DSM-IV-TR is ideal for the assessment of alcohol use disorders in adults, its utility and relevance for use with adolescents is questionable (Martin and Winters 1998). Drinking status and the presence of alcohol- related problems can change dramatically over the course of early development and many of the defining features of alcohol use disorders as outlined in the DSM-IV-TR are not typically experienced by adolescent problem drinkers. For example, tolerance, which is a defining feature of alcohol dependence in adults, is a normal developmental phenomenon for adolescent drinkers with and without alcohol dependence (Martin and Winters 1998).

Similarly, withdrawal, another symptom of the disorder of alcohol dependence, is unlikely to be present in individuals until they have engaged in several years of use. This critical duration does not apply to adolescents who have only recently begun to engage in frequent and problematic alcohol use. Simply put, the symptoms used to classify alcohol

use disorders according to the DSM-IV-TR are often not applicable to adolescents. Despite considerable evidence demonstrating the high prevalence of heavy drinking among adolescents, there is a low prevalence of formal alcohol use disorder diagnoses (Martin and Winters 1998). This suggests a limitation of the existing diagnostic system for use in adolescence, particularly for identifying those who are misusing alcohol. Furthermore, formal diagnoses at this age may be less important than identifying which individuals are misusing alcohol and, perhaps most importantly, having alcohol-related problems.

Assessing the level of interference that alcohol causes in adolescents' lives may be particularly useful for identifying pathological alcohol use in this age demographic. There is support for applying a multidimensional model of adolescent alcohol misuse that incorporates measures of adverse consequences arising from alcohol use, in addition to measures of alcohol use levels (Bailey and Rachal 1993; White and Labouvie 1989). This multidimensional approach is thought to capture the complexity of adolescent alcohol use that unidimensional and traditional diagnostic approaches do not. Traditional measures of frequency, quantity, and variability of alcohol use alone are insufficient for distinguishing between problem and non-problem drinkers because the effects of alcohol can vary greatly between individuals. Therefore, assessment of the negative consequences arising from alcohol use, in addition to measures of alcohol use consumption levels, allow for a more accurate distinction between problem and non-problem drinkers (White 1987).

One commonly used assessment tool for measuring problems caused by alcohol use in adolescence is the Rutgers Alcohol Problem Index (RAPI; White and Labouvie 1989). Although there is considerable support for the RAPI's clinical utility and validity for use with adolescents from the majority culture (i.e., Euro-American), its applicability and validity for use with adolescents who are not from the majority culture is unknown. Given that alcohol misuse among adolescents is a worldwide problem that spans across many cultures (Hawks et al. 2002), it is important to investigate the utility of assessment tools for use with non-majority culture populations, like Canadian First Nations adolescents. It is possible that the meaning of certain RAPI items may hold different significance for First Nations versus non-Aboriginal adolescents. Euro-American individuals tend to hold egocentric or individualistic notions of the person whereas many First Nations individuals define the person in terms of a web of relationships that includes family and ancestors (Battiste 2000). As such, RAPI items assessing problems associated with family conflict (i.e., "relatives avoided you") might be indicative of a greater severity of impairment among First Nations adolescents since their cultural teachings place a strong emphasis on family cohesion. Therefore, the RAPI's utility for the assessment of problematic alcohol use in non-majority cultures needs to be formally assessed.

Despite the acknowledged importance of using assessment tools in a culturally appropriate way, most of the existing measures were developed within the majority culture for use with majority culture adolescents. Nearly all of the validation studies include homogeneous groups of Euro-American adolescents. Therefore, the validity of measures for non-majority culture populations is unknown. The RAPI is no exception. Developed by White and Labouvie (1989) in an attempt to provide a useful and efficient tool for the assessment of problem drinking in adolescence, the RAPI has only been validated for use with predominantly Euro-American adolescents. Using tools that were created for, and only validated with, adolescents from the majority culture may further marginalize non-majority culture populations. Given that one's experiences and perceptions are intricately tied to culture, caution must be taken when utilizing tools with First Nations populations that have only been developed and validated within the majority culture because the relevance of items, as well as underlying constructs, may differ across cultural groups (Mushquash and

Bova 2007). Unfortunately, little research attention has been paid to the validation of assessment tools for use with First Nations adolescents, despite the need for this empirical research.

Current Study

The present study aimed to provide criterion validity for use of the RAPI in a group of First Nations Mi'kmaq adolescents when the criterion is defined as frequent binge drinking. Given that there is no "gold standard" for diagnosing alcohol misuse in adolescents, frequent binge drinking provided a proxy gold standard because of its relationship to alcohol misuse among adolescents (Chassin et al. 2002). Identifying cut-point scores that can differentiate between problem and non-problem drinkers can be useful in the identification of adolescents who are engaging in pathological alcohol use, however, the cross-cultural applicability of cut-point scores should not be assumed. Therefore, another important aim was to make cross-cultural comparisons of RAPI cut-point scores between groups of First Nations Mi'kmaq adolescents and non-Aboriginal adolescents, matched on demographic variables (i.e. age, family income [as a proxy for SES], gender, grade [as a proxy for educational attainment]) as well as binge drinking status.

Matching non-Aboriginal adolescents was important because the demographic variables of interest have been shown to affect patterns of alcohol use (Cleveland et al. 2008; Karvonen and Rimpelä 1996; Murphy et al. 2005; Bryant et al. 2003). Moreover, these variables were significantly different between the First Nations Mi'kmaq and larger unmatched non-Aboriginal adolescents in the current study[1]. As such, a comparison of the First Nations Mi'kmaq adolescents and an unmatched non-Aboriginal group precluded examination of whether potential cut-point score differences were due to cultural group membership or to demographic variables. Therefore, the two adolescent groups were matched on these four important demographic variables in order to minimize the variance associated with these variables on potential differences in cut-point scores. They were also matched on binge drinking status in order to isolate the influence of the RAPI on the criterion by ensuring that there were sufficient numbers of adolescents at each level of the criterion in each group. This allowed for examination of the RAPI's ability to discriminate between problem and non-problem drinkers in each cultural group.

Method

Participants

Participants included a group of First Nations Mi'kmaq adolescents and a matched group of non-Aboriginal adolescents who came from schools in rural communities about equidistant

[1] Independent samples t-tests and chi-square statistics were conducted between the unmatched non-Aboriginal (N=1400) and the First Nations Mi'kmaq (N=78) groups on the demographic variables of interest. Results revealed that adolescents in the First Nations Mi'kmaq group was significantly older (t (1476)=5.12, p<.001), came from families from a lower income bracket (t (1397)=-4.30, p<.001), contained a higher proportion of females (χ^2 (1, N=1478)=4.65, p<.05), and were in earlier grades than adolescents in the larger non-Aboriginal group (t (1476)=-2.63, p<.01).

from a city in Nova Scotia, Canada. All categorical demographic variables (age, grade, and income) for both adolescent groups were converted to continuous variables[2]. The First Nations Mi'kmaq group included 78 adolescents (48 females, 30 males) who were recruited from four high schools in two First Nations Mi'kmaq communities. On average, the First Nations Mi'kmaq adolescents were 16.75 years of age (*SD*=1.58 years), had an annual family income of $39,676.72 (*SD*=$18,734.00), and were between the 10th and 11th grade (*M*=10.36, *SD*=1.15). The matched non-Aboriginal adolescents were extracted from a larger group consisting of 1,400 adolescents (686 females, 714 males) from four secondary (junior and senior high) public schools. On average, the larger unmatched non-Aboriginal adolescents were 15.93 years of age (*SD*=1.36 years), had an annual family income of $49,502.24 (*SD*=$17,092.72), and were between the 10th and 11th grade (*M*=10.68, *SD*=1.07). The non-Aboriginal adolescents were matched with the First Nations Mi'kmaq adolescents on variables in the following order of priority: age, income, gender, grade, and binge drinking status. The demographic variables were theoretically prioritized based on empirical support for the relative influence of each variable in adolescent alcohol misuse. After matching, the non-Aboriginal group included 78 adolescents (48 females, 30 males) who on average were 16.74 years of age (*SD*=1.59 years), had an annual family income of $39,855.77 (*SD*=$15,972.25), and were between the 10th and 11th grade (*M*=10.56, *SD*=1.13). Only adolescents who endorsed ever drinking in the past 4 months were included in both of the adolescent groups. This was necessary because non-drinkers did not complete the RAPI, which was central to this study. Both the First Nations Mi'kmaq and non-Aboriginal groups were recruited as part of larger intervention studies for adolescent alcohol misuse (Mushquash et al. 2007, and Conrod et al. 2006, respectively). All of the measures presented herein were completed at the baseline phase as a screening for the interventions.

Measures

Rutgers Alcohol Problem Index (RAPI; White and Labouvie 1989) Participants completed the RAPI which includes 23 items that were rated on the basis of how many times each problem has happened during the last 4 months while drinking alcohol or as the result of alcohol use (e.g., "went to work or school high or drunk"; "noticed a change in your personality"). Although the RAPI was initially validated using time frames of lifetime and 3 years, the developers (White and Labouvie 1989) and others (cf. Winters 1999) suggest that shorter time frames may be used for more recent alcohol-related consequences. Shorter time frames of 4 months have been used in previous research (e.g., Conrod et al. 2006). Similar to previous research (e.g., Conrod et al. 2006), the anchors of the response options from the original questionnaire were changed from 0 (*never*) and 4 (*more than 10 times*) to 0 (*never*) and 4 (*more than 6 times*). The domains of interference that the RAPI assesses include delinquency, family life, physical problems, social relationships,

[2] The demographic categorical variables grade (A=8th; B=9th; C=10th; D=11th; E=12th), age (A=14 or younger; B=15; C=16; D=17; E=18 or older), and income (A=less than $25,000; B=$25,000-$40,000; C=$40,000-$55,000; D=$55,000-$70,000; E=more than $70,000) were converted to continuous variables. For categories expressed in numerical ranges, the midpoints of categories were used. To calculate continuous values for the upper and lower anchors of age and income, the value that corresponded to half the range of the numerical value included in the anchor to the midpoint of the adjacent category was added to each anchor (Wicki et al. 2006). Therefore, the upper and lower anchors for age were 13.5 and 18.5 and for income were $21,250 and $73,750.

psychological functioning, and neuropsychological functioning (Winters et al. 2002). The RAPI has been well validated for use with both community and clinical groups of adolescents (White and Labouvie 1989, 2000; Winters 1999). Consistent with the scoring method that is most commonly cited in the literature, the RAPI was scored continuously (sum of the total number of problems indicated across items) with total summed scores ranging from 0 to 92. The RAPI showed high internal consistency for both the First Nations Mi'kmaq (Cronbach's alpha=.91) and the matched non-Aboriginal (Cronbach's alpha=.96) groups.

Frequency of Binge Drinking Status Participants provided self-reports of their frequency of binge drinking status (e.g., "How often do you have six (five if you are female) or more drinks on one occasion?") with responses ranging from 1 *(never)* to 5 *(daily or almost daily)*. For the purposes of the present study, responses indicating that an individual had consumed 5–6 drinks per occasion at least once a week or greater were scored as a 1, indicating problem drinking (*frequent binge drinkers*). Conversely, responses indicating that an individual had consumed 5–6 drinks per occasion less than once a week were scored as a 0, indicating non-problem drinking (*controls*). "Controls" also included individuals who were non-binge drinkers (i.e., indicated *never* having 5–6 drinks per occasion). The present study employed a conservative definition of frequent binge drinking (5–6 drinks per occasion at least once a week) in contrast to the more liberal definition of frequent binge drinking that has been used in the literature (4–5 drinks per occasion more than 2 times in the last year; Wechsler and Austin 1998). The use of this conservative definition of binge drinking was supported by an analysis of data from the 1999 Harvard School of Public Health Alcohol Study that found that most college students defined binge drinking as 5 drinks for women and 6 drinks for men (Wechsler and Kuo 2000). Furthermore, extant research has used similar conservative definitions of frequent binge drinking (2 or more binges in the past 2 weeks; Keller et al. 2007; 5 or more drinks in a row in the past 2 weeks; Schulenberg et al. 1996).

Procedure

The data used in the current study was from the initial screening phase of larger intervention studies for adolescent alcohol misuse (Conrod et al. 2006; Mushquash et al. 2007). Parents and guardians of students in participating schools were sent letters informing them of the school-wide screenings and asking them to contact the researchers by phone or e-mail if they did not wish to have their child participate in the screening (i.e., negative consent). Prior to testing in the schools, students were given a full description of the study protocol and rationale and were provided with information about ethical issues such as confidentiality and the voluntary nature of their participation. Students were also informed about the nature of the study and that their responses might be used to examine relations between the various questionnaires that they completed. Interested participants signed consent forms. During survey administration, students who chose not to participate in the study were given the option of going to the school library to read or do homework under librarian supervision. Very few students chose not to participate in the survey data collection (approximately 8–12 students across both groups). Data was collected on a class-by-class basis. As part of a large battery of questionnaires, the measures of interest to the current study were administered in the following order: demographics questionnaire, frequency of binge drinking, and RAPI. Participants were permitted to ask the researchers questions for clarification during questionnaire completion.

Results

Examination of the descriptive statistics revealed that for both the First Nations Mi'kmaq and matched non-Aboriginal adolescents, 19.2% were frequent binge drinkers and 80.8% were a mixture of non-frequent binge drinkers and non-binge drinkers. The mean RAPI score for First Nations Mi'kmaq adolescents was 19.13 (SD=16.01) and for matched non-Aboriginal adolescents was 19.77 (SD=20.33). The mean RAPI scores did not significantly differ between groups (t (154)=-0.22, p>.05).

ROC curve analyses were used to determine whether the RAPI could adequately distinguish between problem (frequent binge drinkers) and non-problem (controls) drinkers and to identify cut-point scores that differentiate between problem and non-problem drinkers. The area under the curve (AUC) value was used as the criteria to determine whether the RAPI could adequately distinguish between frequent binge drinkers and controls. Separate ROC curve analyses were conducted for the First Nations Mi'kmaq and the matched non-Aboriginal groups. Next, cut-point scores that distinguished between problem and non-problem drinkers were identified within each group, and then comparisons of these cut-point scores were made across groups. Cut-point scores are chosen at rates that place a preference on either sensitivity (the proportion of positive cases [i.e., frequent binge drinkers] correctly identified as such) or specificity (the proportion of negative cases [i.e., controls] correctly identified as such).

In selecting the cut-point scores for each group in the present study, a false positives rate (equal to 1 – specificity) of 25% was selected. Therefore, of the frequent binge drinkers indicated by the RAPI, it can be assumed that 25% of them were false positives (i.e., controls misidentified as frequent binge drinkers) at the selected cut-point scores. Cut-point scores were chosen at a low false positives rate of 25% because the aim of the present study was to determine how well the RAPI performed at identifying frequent binge drinkers. Therefore, accurate identification of problem drinkers (i.e., choosing a high specificity rate/ low false positives rate) was considered to be more important relative to identifying all of the cases of frequent binge drinkers (i.e., choosing a high sensitivity rate).

Table 1 displays the performance of the various cut-points of the total RAPI scores against the proxy gold standard of frequent binge drinking for both groups, based on the ROC curve analyses. The AUC for frequent binge drinking for the First Nations Mi'kmaq adolescents was .81 (SE=.066), meaning that the RAPI adequately discriminated between problem and non-problem drinkers among the First Nations Mi'kmaq group. The estimated probability that a randomly chosen frequent binge drinker would have a higher RAPI score than a randomly chosen control was 81%. At a cut-point score of 21 for the First Nations Mi'kmaq adolescents, the RAPI was able to detect about 80% of positive cases of frequent binge drinkers with 76.2% specificity for the negative cases detected. That is, at a cut-point score of 21, the RAPI correctly identified 80% of frequent binge drinkers with a false positives rate of approximately 24%.

The AUC for frequent binge drinking for the matched non-Aboriginal adolescents was .72 (SE=.078), meaning that the RAPI was able to adequately distinguish between problem and non-problem drinkers among the matched non-Aboriginal group. The estimated probability that a randomly chosen frequent binge drinker would have a higher RAPI score than a randomly chosen control was 72%. At a cut-point score of 27 for the matched non-Aboriginal adolescents, the RAPI was able to detect about 53% of positive cases of frequent binge drinkers with 74.6% specificity for the negative cases detected. That is, at a cut-point score of 27, the RAPI correctly identified 53% of frequent binge drinkers with a false positives rate of approximately 25%.

Table 1 Results of ROC Analysis for First Nations Mi'kmaq Adolescents and a Demographic-Matched non-Aboriginal Group of Adolescents: RAPI Scores Distinguishing Frequent Binge Drinkers and Controls

Cut-point	First Nations Mi'kmaq (N=78)		Matched non-Aboriginal (N=78)	
	Sensitivity %	Specificity %	Sensitivity %	Specificity %
0	100.0	0.0	100.0	0.0
1	100.0	4.8	93.3	7.9
2	100.0	12.7	93.3	11.1
3	93.3	14.3	93.3	15.9
4			93.3	19.0
5	93.3	20.6	93.3	28.6
6	93.3	23.8	93.3	36.5
7			86.7	38.1
8	93.3	30.2	86.7	42.9
9	93.3	36.5	80.0	46.0
10	93.3	39.7	73.3	52.4
11	86.7	44.4	66.7	55.6
12			66.7	57.1
13	86.7	47.6	66.7	60.3
14	86.7	50.8		
15	86.7	52.4	66.7	61.9
16	86.7	60.3		
17	80.0	65.1	66.7	65.1
18	80.0	66.7	60.0	65.1
19	80.0	71.4		
20	80.0	73.0	60.0	66.7
21	80.0	76.2	60.0	68.3
22				
23	80.0	77.8		
24	73.3	77.8		
25	73.3	79.4		
26	73.3	81.0		
27	73.3	82.5	53.3	74.6
28	73.3	84.1		
29	66.7	84.1		
30				
31			53.3	76.2
32			53.3	77.8
33	66.7	87.3	53.3	81.0
34	66.7	88.9		
35	46.7	88.9	46.7	82.5
36	40.0	88.9		
37				
38	40.0	90.5	46.7	85.7

False positives rate=(1 – specificity)

In order to compare the AUC's across the First Nations Mi'kmaq and non-Aboriginal adolescent groups, the StAR software (Vergara et al. 2008) was used. Results revealed that there was no difference between the AUC's for the adolescent groups. The difference between the two AUC's was .0841 with an associated p value of .38. These findings support that the RAPI performed with similar levels of precision in both adolescent groups. The StAR software analyzes the difference between AUC's using the nonparametric approach based on the Mann-Whitney U-statistic for comparing distributions of values from the two groups recommended by DeLong et al. (1988).

Discussion

The present study supports the utility of the RAPI for identifying consequences associated with frequent binge drinking in rural First Nations Mi'kmaq and non-Aboriginal adolescents in the Canadian province of Nova Scotia. For *both* of these groups, the RAPI is a useful assessment tool for adolescents in that it can identify, with good accuracy, which adolescents are engaging in potentially harmful drinking behaviours (i.e., frequent binge drinking). Furthermore, the RAPI was able to distinguish between problem and non-problem drinkers in both First Nations Mi'kmaq and non-Aboriginal groups with similar levels of precision, as evidenced by similar AUC values. When First Nations Mi'kmaq adolescents were compared with non-Aboriginal adolescents, differences in cut-point scores emerged. Specifically, RAPI cut-point scores were lower for First Nations Mi'kmaq as compared to non-Aboriginal adolescents (21 vs. 27, respectively). This suggests that for First Nations Mi'kmaq adolescents, a lower RAPI score (indicative of a lower level of impairment caused by alcohol) is indicative of problematic alcohol use. Accordingly, RAPI cut-point scores used to identify problem drinkers may need to be lowered for use with these adolescents.

The finding that the RAPI is valid for use with non-Aboriginal adolescents from the majority culture is consistent with previous validation studies (White and Labouvie 1989, 2000; Winters 1999). However, unlike previous research, the present study demonstrated that the RAPI is valid in terms of distinguishing between problem and non-problem drinkers specifically when problem drinking is defined as frequent binge drinking. Furthermore, previous validation studies with the RAPI have only examined adolescents from predominantly Euro-American, middle class backgrounds. To our knowledge, the present study is the first to empirically examine the criterion validity of the RAPI for use with non-majority culture adolescents (i.e., First Nations Mi'kmaq) and non-Aboriginal adolescents from the majority culture who are from lower SES backgrounds. The results suggest that the RAPI is a valid measure for identifying problem and non-problem drinkers among rural First Nations Mi'kmaq adolescents and rural non-Aboriginal adolescents from low SES backgrounds.

Cross-cultural comparisons of cut-point scores revealed that lower RAPI cut-point scores were required to identify problem drinkers among First Nations Mi'kmaq adolescents as compared to non-Aboriginal adolescents. This finding can be interpreted in several different ways. Lower cut-point scores may suggest that among First Nations Mi'kmaq adolescents, fewer negative consequences are indicative of problematic alcohol use as compared to non-Aboriginal adolescents. Although high-risk motives for using alcohol (i.e. coping, conformity and enhancement) were found among First Nations Mi'kmaq and non-Aboriginal adolescents in previous research, the low-risk drinking motive (i.e. social) was not found among First Nations Mi'kmaq adolescents (Mushquash et al. 2008). Therefore, it is possible that there was

less heterogeneity in drinking motives among the First Nations Mi'kmaq as compared to the non-Aboriginal adolescents because the primary reasons that the First Nations Mi'kmaq adolescents were consuming alcohol were related to heavy and problematic patterns of use. This explanation could account for the differences in cut-point scores and may suggest that alcohol might be more pathological for First Nations Mi'kmaq adolescents.

Alternatively, the finding that higher cut-point scores were indicative of problematic alcohol use for non-Aboriginal adolescents may suggest that frequent binge drinking is associated with *more* negative consequences among non-Aboriginal as compared to First Nations Mi'kmaq adolescents. That is, frequent binge drinking may be more pathological for non-Aboriginal adolescents from the majority culture as compared to First Nations Mi'kmaq adolescents. Finally, differences in cut-point scores may be the result of differences in the meaning of RAPI items for First Nations Mi'kmaq as compared to non-Aboriginal adolescents. For example, it is possible that RAPI items that assessed social consequences may be indicative of a greater severity of impairment among First Nations Mi'kmaq adolescents who might hold less individualistic and egocentric notions of the person but rather view themselves as existing within an interconnected web of family and ancestors (Battiste 2000). Given that the RAPI is fairly heavily loaded with items assessing social consequences associated with alcohol use (e.g., problems involving family life and social relationships), this could explain why lower cut-point scores were indicative of problematic alcohol use among the First Nations Mi'kmaq group. Simply put, absolute RAPI scores might not be comparable across cultural groups. A lower score might be indicative of a greater severity of impairment for First Nations Mi'kmaq as compared to non-Aboriginal adolescents. Given that there are different and opposing explanations for the cross-cultural differences in cut-point scores, the present study highlights the need for further examination of these hypotheses. Furthermore, caution should be used when concluding that alcohol is more or less pathological for one cultural group versus another. It is important to consider the wide-range of interacting community and demographic variables (many of which were not measured in the present study) that affect how alcohol use manifests in adolescents' lives. Focusing on the *context* in which adolescents use alcohol is important for the development of meaningful interventions to address problem use.

The problematic nature of adolescent alcohol use among Canadian First Nations adolescents is well documented (Kirmayer et al. 2000) and acknowledged by community members themselves (Health Canada 2003). Furthermore, problems related to alcohol use for First Nations adolescents exist within a unique context of other health and social inequities that continue to marginalize First Nations people from the general Canadian population (Waldrum et al. 1995). Adolescent alcohol problems manifest within this unique context, and this context likely influences the relationship between alcohol use and problems found among First Nations adolescents. The fact that differences in cut-point scores emerged between First Nations Mi'kmaq and non-Aboriginal adolescents, even after matching the groups, implies that alcohol is affecting First Nations Mi'kmaq adolescents in a unique way. As such, the present study reinforces the importance of investigating the cross-cultural psychometric applicability of alcohol assessment tools, which have only been validated for use within the majority culture, among First Nations adolescents.

An important strength of the present study is that it provided a cross-cultural analysis of RAPI cut-point scores between groups that were matched on demographic variables shown to influence patterns of alcohol use. By selecting a non-Aboriginal group of adolescents that was equivalent to the First Nations Mi'kmaq group in terms of demographic variables, we were better able to determine whether differences in cut-point scores were somehow

inherent to membership in one group versus the other or to community and demographic variables. The present study highlights the importance of using this methodological approach when conducting cross-cultural research. Had cut-point scores among the First Nations Mi'kmaq adolescents only been compared with those among an unmatched non-Aboriginal group, very different conclusions about the RAPI and alcohol use in these cultural groups might have been reached. Using matched adolescent groups provided greater control over important risk factors related to pathological alcohol use and allowed for a closer examination of whether differences in cut-point scores were due to demographic and community variables or to cultural group membership.

Although the present study offers methodological advantages over previous studies, there are certain limitations that need to be addressed. The cross-cultural analysis of cut-point scores was strengthened by matching the cultural groups on demographic variables shown to affect patterns of alcohol use. However, there were other important socio-demographic and individual variables that were not measured or used to equate the groups and that could have contributed to differences between groups. For example, adverse life events (Dube et al. 2002), psychiatric disorders (O'Donnell et al. 2006), parental divorce (Anda et al. 2002), poor family functioning (Engels et al. 2005), and risky motives for alcohol use (Kuntsche et al. 2005) are all associated with heavy alcohol consumption and associated impairment. Given that many important variables were not used to equate the adolescent groups, it is unrealistic to conclude that we isolated the effect of "culture". It is also possible that by attempting to disentangle community and demographic variables from culture as a construct, many of the defining features of culture were lost. For many cultural groups, economic marginalization and lower academic achievement is a reality and is much more prevalent than in the majority culture. It is well documented that these social inequities are a reality for many First Nations communities in Canada (Stout and Kipling 2002; Southern Alberta Child and Youth Network 2005; Statistics Canada 2000).

It is also important to recognize that within any cultural group, there is considerable individual and community variation. This is certainly the case for the Canadian First Nations people who show great diversity both within and between bands and reserves (Kirmayer et al. 2003). Therefore, caution should be taken when generalizing results from a specific group of rural adolescents to other First Nations communities. Another important consideration is the choice and definition of the criterion against which the performance of the RAPI was judged. The present study employed a conservative definition of frequent binge drinking to define "problem drinkers". This conservative definition of problem drinking allowed us to isolate a more pathological type of young drinker who engages in binge drinking more frequently. However, the definition of problem drinking may have influenced the cut-point scores that were derived from the ROC curve analyses. Although problems associated with alcohol use are related to frequency/quantity of use, the RAPI was not designed to directly measure frequency of binge drinking. As a result, the discriminability of the RAPI to detect frequent binge drinkers was lowered. In addition, for reasons related to the intervention studies to which the present study was attached (i.e., Conrod et al. 2006; Mushquash et al. 2007), the present study used a different timeframe, response scale and anchors on the RAPI than are typically used which prevented comparisons with previously published means and cut-point scores. Similarly, it is difficult to compare extant findings to the present findings because of the different response scales and the specific criterion selected for problem drinkers (i.e., frequent binge drinking). As such, it cannot be determined whether differences in cut-point scores in the present study and previous research are attributable to the chosen criterion, response scale, or demographic profile of the adolescent groups.

It should also be noted that although the RAPI offers an efficient and practical assessment tool to measure the level of impairment caused by adolescent alcohol use, it is a screening tool and does not yield diagnostic information. Furthermore, the identified cut-point scores should be used with caution. For example, although cut-point scores of 21 and 27 emerged as scores capable of distinguishing between frequent and non-frequent binge drinkers among First Nations Mi'kmaq and non-Aboriginal adolescents living in rural Nova Scotia, respectively, this does not necessarily mean that alcohol is not causing problems for individuals who fall below these cut-points. Although it is reasonable to assume that frequent binge drinking is likely to be indicative of pathological alcohol use, this might not be the case for all adolescents who meet this definition. Binge drinking is not always associated with problems which speak to the variation that exists between adolescents in terms of the impact that drinking alcohol has on their lives. Furthermore, adolescents may experience alcohol-related problems even if they do not engage in frequent binge drinking. For example, adolescents who are motivated to drink alcohol for conformity reasons may not frequently consume large quantities of alcohol but nevertheless experience alcohol-related impairment (Cooper 1994). Finally, a purely quantitative method of inquiry precluded examination of the meaningfulness of the RAPI items for First Nations Mi'kmaq adolescents. Future research should examine the subjective meaningfulness of items on the RAPI using a qualitative approach in order to better discern whether the RAPI is tapping the problems caused by alcohol use that matter most to First Nations Mi'kmaq adolescents.

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