

# The Protective Role of Optimism and Self-esteem on Depressive Symptom Pathways Among Canadian Aboriginal Youth

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**Abstract** Aboriginal youth are at disproportionate risk for depression and substance use problems. Increasingly, developmental theories have shifted from focusing on vulnerabilities to protective factors for adolescent depression. In particular, theories emphasizing protective factors are relevant when understanding the mental health of Aboriginal youth. However, it is unclear which factors protect against depressive symptomatology among Aboriginal adolescents to promote optimal development. Using multilevel growth curve modeling, the present study had three main objectives. First, we aimed to model the developmental trajectory of depressive symptoms using a sample of off-reserve Aboriginal youth from a national Canadian dataset (ages 12–23). Second, we sought to examine the relationship between alcohol use behaviors, self-esteem, optimism, and the trajectories of depressive symptoms. Lastly, we investigated whether self-esteem and optimism mediated the relationship between alcohol use and depressive symptoms. Gender differences were also examined within each of the study objectives. A sample of off-reserve Aboriginal youth ( $N = 283$ ; 48.3 % male) was selected from cycles 4–7 of the National Longitudinal Survey of Children and Youth. Heavy drinking was a risk factor for depressive symptoms, while self-esteem and optimism were key protective factors for depressive symptoms among early adolescent Aboriginal youth. Further, the developmental trajectory of depressive symptoms among Canadian Aboriginal youth differed for boys and girls once accounting for risk and protective factors. Thus, it is valuable to integrate the protective role of self-esteem

and optimism into developmental theories of depression and mental health intervention programs for early adolescent Aboriginal youth.

**Keywords** Adolescent development · Depression · Substance use · Protective factors · Resilience · Indigenous populations · Developmental trajectories

## Introduction

The mental health of Aboriginal youth is a global concern among practitioners, educators, and Aboriginal communities. Related to a historical context of forced colonization and socioeconomic disadvantage, the mental health indicators of Aboriginal children and youth tend to be worse compared to their non-Aboriginal counterparts, particularly emotional and substance use issues (Costello et al. 2010; Kirmeyer et al. 2003; Lehti et al. 2009). For example, Costello et al. (2010) followed a longitudinal sample of American Indian adolescents to investigate the emergence of mental health issues. The authors found that about 30–40 % of youth met criteria for a psychiatric disorder and 5–6 % for an emotional disorder; rates that are commensurate with estimates found by other researchers (Lemstra et al. 2011; Whitbeck et al. 2008). Recently, researchers have shifted from focusing on assessing the prevalence and risk factors of mental health issues among Aboriginal youth to a more holistic and positive psychology approach to understanding Aboriginal mental health (Chenhall and Senior 2009). It has also been deemed beneficial to further explicate the developmental pathways of mental health issues among Aboriginal youth using rigorous methodologies and broad samples that can strengthen the generalizability of the results (Chenhall and

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Senior 2009; Gone and Trimble 2012). Moreover, despite reports indicating that the majority of Canada's Aboriginal population lives off-reserve, the bulk of Aboriginal research has involved on-reserve populations (Sibbald 2002; Statistics Canada 2008; Tjepkema 2002). There is even less research on the health of Aboriginal children and youth in off-reserve populations (Young 2003). Thus, the current body of research is not representative of the demographic make-up of Aboriginal people in Canada, making future investigations into off-reserve Aboriginal mental health particularly warranted.

An overarching objective of the present study was to describe the pathways of depressive symptoms across adolescence into young adulthood using growth curve modeling and a sample of off-reserve Aboriginal youth in Canada. Additional objectives of our study were to examine the relationship between alcohol use behaviors, self-esteem, and optimism and the pathways of depressive symptoms over time, as well as whether the protective factors of self-esteem and optimism were related to the relationship between alcohol use and depressive symptoms. Self-esteem and optimism have been conceptualized as unique individual predictors of depressive symptoms within research using community-based samples (e.g., Hernández and Carrillo 2010; MacPhee and Andrews 2006; Patton et al. 2011); however, further research among special populations is warranted, including among Aboriginal off-reserve youth. Gender differences among these relationships were also explored.

### Alcohol Use and Depressive Symptoms

Comorbid mental health and dual-diagnostic issues are critical to examine among Aboriginal youth. Of note, adolescent substance use is often associated with depression (Armstrong and Costello 2002; Fleming et al. 2008; Marmorstein 2009). For instance, Armstrong and Costello (2002) found the concurrent comorbidity between substance use disorders and depression within adolescence to range from 11.1 to 32.0 %. Although there is evidence to support the existence of this relationship, the temporal order and underlying mechanisms affecting this relationship are unclear (Rohde 2009). Thus, the first aim of the present study was to understand how two constructs of alcohol use (i.e., frequency of use and heavy drinking) may be associated with the development of depressive symptoms across adolescence.

Aboriginal youth are at disproportionate risk for misusing substances, particularly alcohol, compared to their non-Aboriginal counterparts (Beauvais et al. 2004; Canadian Centre on Substance Use 2007; Friese and Grube 2008). Abbott (2006) reviewed studies involving adolescent American Indian and Alaska Native samples that

examined comorbid substance use and psychiatric disorders. Several studies within the review found evidence of prevalent comorbid substance use disorders and depression, including one study with a prevalence rate as high as 35 % for alcohol and depression for adolescents aged 14–18 (Dinges and Duong-Tran 1993, as cited in Abbott 2006). In the present study, the longitudinal relationships between frequencies of alcohol use, heavy drinking, and depressive symptoms were examined to gain insight into this relationship.

While there are few articles investigating the differences in health between on- and off-reserve Aboriginal people in Canada (Curtis 2007), the Aboriginal Peoples Survey (APS; Statistics Canada 2003) provides information comparing these two groups. According to this survey, not only are Aboriginals living on-reserve 42 % more likely to report good health status compared to those living off-reserve, but they are also less likely to consume alcohol (rates of drinking more than two drinks per day: 8 % on-reserve versus 12 % off-reserve). Furthermore, according to the Canadian Community Health Survey, Aboriginal Canadians living off-reserve are not only significantly more likely to be heavy drinkers compared to non-Aboriginal Canadians, but are also 1.8 times more likely to have experienced major depressive episodes in the past year (Tjepkema 2002). Thus, mental health and alcohol use issues among Aboriginals living off-reserve are important issues for researchers to address.

### Conceptual Framework

As previously noted, researchers are transitioning to a more holistic understanding of Aboriginal mental health issues in the context of historical and socioeconomic disadvantage (Chenhall and Senior 2009). Furthermore, research that highlights resilience and aspects of positive youth development among this population is warranted (Gone and Trimble 2012; Scott and Langhorne 2012; Teufel-Shone et al. 2006). For example, Chandler and colleagues (2003) seminal epidemiological studies among First Nation communities in Canada highlighted community well-being and support, as well as individual and cultural persistence as key factors in protecting against adolescent suicide. Following this influential work, there is a growing body of research on cultural-specific protective factors that affect outcomes among Aboriginal youth, including cultural identification, assertiveness, and connection to traditional ways of knowing (Flanagan et al. 2011; Fryberg et al. 2013; Ypinazar et al. 2007). Researchers have also examined broad developmental factors that may influence mental health outcomes among Aboriginal youth, including developmental assets (internal and external assets, such as honesty and support, respectively; Filbert and Flynn 2010),

as well as living with biological parents and participation in organized sports (Ypinazar et al. 2007). The present study was intended to contribute to the growing body of research focused on resilience- and strength-based perspectives in addressing mental health issues among Aboriginal youth (Rawana et al. 2011) by utilizing rigorous longitudinal methodologies (i.e., growth curve modeling).

The developmental psychopathology perspective presumes that various factors work dynamically to promote or negate negative mental health consequences, conceptualized as risk and protective factors (Cicchetti and Cohen 1995). Using this framework, we conceptualize alcohol use as a risk factor for depressive symptoms across adolescence. Furthermore, adopting a framework of emphasizing protective factors that promote mental health aligns with recent guidelines and strategies to support the success of Aboriginal communities (Goodkind et al. 2010; Kirmeyer et al. 2003). It is important to examine how protective factors relate to the relationship between alcohol use and depressive symptoms in order to guide mental health practices.

Throughout the adolescent depression literature, several risk and some protective factors have been described. At the demographic level, age and gender (De Boo and Spiering 2010; Essau et al. 2010) have been indicated as important factors to consider when examining the development of depressive symptoms throughout adolescence. For example, research demonstrates that age at onset for depressive symptoms is a significant predictor for later depressive symptoms (Lewinsohn et al. 2003). Gender has also been shown to predict depressive symptoms during adolescence, with adolescent girls being more likely to develop depressive symptoms than adolescent boys (Galambos et al. 2004; Zarate 2010). For example, in a Canadian study of adolescents aged 12–19, Galambos et al. (2004) found that girls were at greater risk for depressive symptoms and had higher prevalence rates of major depressive episodes than boys. Thus, gender was included as a predictor within the present models.

With regard to the present study, two important hypothesized individual-level protective factors were examined, namely self-esteem and optimism. Both of these factors have been consistently shown to relate to depressive symptoms (Hernández and Carrillo 2010; MacPhee and Andrews 2006) and function to ameliorate a range of health problems in normative samples (Carver et al. 2010; Dumont and Provost 1999; Patton et al. 2011). First, there is ample evidence for the relationship between self-esteem and depression within the adolescent literature (Dumont and Provost 1999; MacPhee and Andrews 2006). For example, MacPhee and Andrews (2006) examined nine factors relating to depressive symptoms in a sample of 12 and 13 year olds from the National Longitudinal Survey of

Children and Youth (NLSCY). The authors found self-esteem to be the strongest predictor of depressive symptoms for both girls and boys. They also found that self-esteem partially mediated the relationship between parental nurturance and rejection and depressive symptoms (MacPhee and Andrews 2006). Although existing research suggests some overlap between self-esteem and depression constructs, particularly given the moderate correlations between the variables (Watson et al. 2002), there is substantial evidence that self-esteem and depression are separate concepts (see Orth et al. 2008 for a review). For example, some studies have shown that self-esteem and depression are prospectively related to one another (i.e., self-esteem significantly predicted subsequent levels of depression using longitudinal data), which suggests that self-esteem and depression are unique constructs (Orth et al. 2008). Building upon this evidence, expanded research into the relationship between these concepts is needed, especially within diverse samples and during dynamic developmental stages such as adolescence and young adulthood.

Second, optimism is characterized by positive expectations regarding future events and also has been shown to be related to depressive symptoms as well as to potentially improve a range of negative outcomes (Carver et al. 2010; Hernández and Carrillo 2010; Patton et al. 2011; Rawana and Ames 2012). Optimism is distinct from depression as it is distinguished by positive expectancies (i.e., goals and motivation), rather than negative affect, cognitions, and attributions (Carver et al. 2010). It is theorized that optimists attribute negative life events to external, temporary, or specific contexts, and may be more likely to adopt positive and healthy lifestyles than pessimistic individuals, thus protecting an individual against emotional and physical health issues over the long term (Hernández and Carrillo 2010; Patton et al. 2011). In addition, fostering an optimistic outlook has been shown to play a role in the treatment of depression (see Carver et al. 2010 for a brief review). Longitudinal analyses examining these two important factors, namely self-esteem and optimism, can facilitate understanding of how these traits may protect against depressive symptomatology over time. Furthermore, it is important to assess which protective factors may confer against the risk of mental health issues, in particular depressive symptoms, for Aboriginal youth in order to inform effective prevention and intervention policies (Goodkind et al. 2010; Kirmeyer et al. 2003).

## Objectives and Hypotheses

The purpose of the current study was threefold. First, the overarching objective was to describe the developmental

trajectory of depressive symptoms among a Canadian sample of Aboriginal youth with the additional goal of identifying gender differences in depressive symptoms. It was hypothesized that depressive symptoms would increase until mid-adolescence and then decrease over time, consistent with existing literature (Garber et al. 2002; Nguyen et al. 2011). Given the literature on gender differences in depressive symptoms, it was expected that adolescent girls would have higher initial levels of depressive symptoms and steeper increases in symptoms over time than adolescent boys (Galambos et al. 2004; Zarate 2010). The second objective was to examine the relationship between alcohol use behaviors, self-esteem, optimism, and the trajectories of depressive symptoms. It was expected that higher alcohol use would be associated with steeper increases and less steep declines in depressive symptoms over time compared to lower alcohol use. The third objective of the study was to determine whether self-esteem and optimism mediated the relationship between alcohol use and subsequent depressive symptoms. It was expected that higher levels of these protective factors would be associated with less steep increases or more steep declines over time in depressive symptoms compared to low levels of these factors.

## Method

### Data Set and Participants

#### Data Set

The data for the present study were a subsample of Statistics Canada's NLSCY, a longitudinal, representative sample of Canadian children and youth who were randomly selected from the Statistics Canada Labour Force Survey (LFS; Statistics Canada 2007). The purpose of the NLSCY was to collect longitudinal and cross-sectional data on the various demographic, economic, biological, behavioral, and psychological factors that have the potential to impact a child's development. To obtain a holistic perspective of the youth's development, data were collected from the person most knowledgeable (PMK) about the child, teachers, and the children and youth themselves. The original wave (cycle 1) of participants, collected in 1994, surveyed children aged 0–11 (approximately 25,000 children). Participants were subsequently surveyed biennially into adulthood. Due to the multi-stage sampling of the NLSCY survey, it was possible to include individuals who turned 12 or older in later cycles. Further information about the NLSCY can be found in the user guides (cf., Statistics Canada 2007). The present research was reviewed by Statistics Canada and the Social Sciences and

Humanities Research Council ensuring that federal research ethics requirements were followed.

#### Aboriginal Status

Off-reserve Aboriginal youth ( $N = 283$ ; 48.3 % male) were selected from cycles 4–7 of the NLSCY. Participants of Aboriginal status were selected through the use of the child ethnic origin variable within the demographics portion of the survey. More specifically, PMKs who identified their child, or youth who self-identified, as North American Indian, Métis, or other (e.g., Inuit) were included in the present analyses (refer to Table 1 for additional demographics). The current study includes only Aboriginal youth residing off-reserve.

#### Measures

##### Depressive Symptoms

Depressive symptoms were measured with an abbreviated 12-item NLSCY version of the Centre for Epidemiologic Studies Depression Scale (CES-D; Poulin et al. 2005). Participants were instructed to rate on a 4-point Likert scale how each item best described their mood ranging from 0 (*rarely or none of the time*) to 3 (*most or all of the time*), with higher scores indicating higher levels of depressive symptoms. Sample items include, "I felt I could not shake off the blues even with help from my family and friends" and "I felt depressed." Following cycle 4, the CES-D was only measured among participants 16 and older. Thus, in the present sample CES-D scores were not available for participants aged 14 and 15. However, multilevel growth curve modeling estimates the intercept and slope of the modeled trajectory using all the available data (Singer and Willett 2003); thus, the missing data at these age points were interpolated (Gelman and Hill 2007). Cronbach's alphas for the present sample ranged from .82 to .86 across cycles 4–7.

##### Alcohol Use

Two important constructs of alcohol use (i.e., frequency of alcohol use and frequency of heavy drinking) were assessed using two items from the World Health Organization (WHO) Survey of Health Behaviors in School-Aged Children (WHO 1985). Frequency of alcohol use was assessed using an item that asked participants how often they drink alcohol. Frequency of heavy drinking was assessed by an item asking participants to indicate how often they get drunk or, for older adolescents, how often they had more than five drinks. Responses of frequency were categorized into a 5-point Likert scale for each item ranging from 1 (*does not drink*

**Table 1** Characteristics of the study sample ( $N = 283$ ) at baseline (age 12)

Characteristic	$M$ ( $SD$ ) or % of categorical variables
Demographic variables	
Age	12 (0.0)
Gender	
Male	48.3
Female	51.7
Family structure	
Two biological parents (intact)	44.1
Two-parent non-traditional <sup>a</sup>	13.2
Single-parent/other	42.7
Household income	
Under \$20,000	14.4
Between \$20,000 and \$40,000	28.9
Over \$40,000	56.6
Ethnic origin	
North American Indian	67.6
Métis	23.9
Other (e.g., Inuit)	8.5
Type of setting	
Large urban <sup>b</sup> centre	32.0
Medium-sized <sup>c</sup> urban centre	15.2
Small urban <sup>d</sup> centre	35.2
Rural area	17.6
Outcome variable	
Depressive symptoms	7.65 (4.54)
Predictor variables	
Frequency of alcohol use	1.08 (0.31)
Frequency of heavy drinking (baseline at age 13)	2.55 (0.74)
Self-esteem	12.64 (2.53)
Optimism	6.22 (0.92)

<sup>a</sup> Step, adoptive, foster

<sup>b</sup> Population of 500,000 or more

<sup>c</sup> Population between 100,000 and 499,999

<sup>d</sup> Under 100,000 people

*alcohol*) to 5 (*more than 1–2 days a week*; see Rawana and Ames 2012 for more information).

### Self-esteem

Self-esteem was measured with five items from the General-Self Scale of the Marsh Self-Description Questionnaire (SDQ; Marsh et al. 1984). Participants rated on a 5-point Likert scale how much each statement applied to them ranging from 0 (*false*) to 4 (*true*). Total scores ranged from 0 to 26, with higher scores indicating higher levels of self-esteem. Sample items include, “In general, I like the way I am” and “A lot of things about me are good.” In the

present sample, Cronbach’s alphas ranged from .75 to .82 across cycles 4–7.

### Optimism

Consistent with the theoretical basis of the construct of optimism (Carver et al. 2010), optimism was measured with two items assessing expectations regarding the future (i.e., “The next 5 years look good to me” and “I feel optimistic about the future”). Participants indicated how much each statement was true for them on a 4-point Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Total scores ranged from 2 to 8, with higher scores indicating higher levels of optimism. Bivariate correlations using the two optimism items for the present sample ranged from .44 to .62 ( $p$ 's < .001) across the four cycles.

### Analysis

Multilevel growth curve modeling was used as the primary method of data analysis. This type of analysis is capable of investigating the influence of predictors while creating a unified trajectory (i.e., intercept and slope) for the entire sample (Singer and Willett 2003). Multilevel growth curve modeling was utilized to estimate changes in the trajectory of depressive symptoms from early adolescence to young adulthood while investigating the associations of selected risk and protective factors. Model building within this type of analyses followed guidelines suggested by Singer and Willett (2003) and closely resembles those of a related study (see Rawana and Ames 2012).

Rescaled individual longitudinal post-stratification weights were applied to the data to adjust for survey non-response, the stratification of sample design, and to protect against inflation of sample size (for more information see Rawana and Ames 2012 and NLSCY user guides, cf., Statistics Canada 2007). Age (in years) was used to indicate time and was centered at age 12 to make the intercept of the predictors more meaningful (i.e., intercepts represent initial status for children at the baseline age of 12). The predictors were also centered to improve the meaningfulness of parameters. Each predictor was centered on the grand mean of the entire sample across cycles; therefore, the intercept represents the estimated initial level (at age 12) of a predictor of individuals reporting an average value of such predictor.

## Results

### Relationships Among the Variables

Table 2 provides a correlation matrix of the relationships among the continuous predictor variables for boys and girls

at baseline. Caution is warranted in the interpretation of the observed correlations given that at baseline some of the correlations were based on small sample sizes ( $n$ 's < 30). Further, the heavy drinking variable and depressive symptoms correlation could not be computed, as heavy drinking had a low frequency of responses at age 13 (baseline for the frequency of heavy drinking variable was at age 13). Of note, the small sample size was not an issue for the multilevel growth curve modeling analyses, as these results are estimated by interpolation (Gelman and Hill 2007), in a similar manner to the way depressive symptoms at ages 14 and 15 were modeled.

Given that boys and girls were examined together within the present models, the potential overlap between the two protective factors of self-esteem and optimism with the dependent variable, depressive symptoms, was investigated using the full sample at baseline. For the full sample, the correlations among the variables were moderate (i.e., self-esteem and depressive symptoms,  $r = -.523$ ,  $p < .001$ ; optimism and depressive symptoms,  $r = -.586$ ,  $p < .001$ ). However, the correlations were less than .70 for the full sample; therefore, the overlap between the constructs was not deemed a collinearity issue for the current models (Tabachnick and Fidell 2001).

#### Trajectory of Depressive Symptoms Across Adolescence

Table 3 summarizes the multilevel growth curve modeling results with depressive symptoms as the outcome variable. Figure 1 demonstrates the prototypical trajectory of depressive symptoms from the unconditional quadratic growth model (including only age and age<sup>2</sup> as predictors). In the present sample, depressive symptom scores began to increase after age 12, peaked in severity at age 16, and then decreased into young adulthood (age 23).

The grand mean depressive score for all participants within the model, provided by the unconditional means model, was 7.92 with a standard error of .29, suggesting that off-reserve Canadian Aboriginal youth aged 12–23 were, on average, experiencing a low rate of depressive symptoms (Radloff 1977). There was evidence of significant variability within the sample for depressive symptoms;  $\sigma_e^2 = 21.91$ ,  $SE = 1.272$ ,  $p < .001$ . The unconditional quadratic model that included age<sup>2</sup> ( $D = 6,001.2$ ) fit the data significantly better than the unconditional linear model ( $D = 6,030.2$ ),  $\Delta D = 29$ ,  $df = 1$ ,  $p < .001$ . Therefore, the quadratic function of the growth model (i.e., age<sup>2</sup>) was included in the remaining models for analysis. The estimated linear slope of the unconditional quadratic model (i.e., age) was .81 with a standard error of .22,  $p < .001$ , which indicated that frequency of depressive symptoms increased at age 12. Moreover, the estimated quadratic

slope of the unconditional quadratic model (i.e., age<sup>2</sup>) was significant,  $\gamma_{20} = -.10$ ,  $SE = .02$ ,  $p < .001$ , indicating that the rate of change of the quadratic component of the model declined around age 17 or 18 (see Fig. 1).

Model A examined the association between gender and the initial level (intercept) and rate of change (slope) of depressive symptoms over time. Within this model, the gender coefficient was not significant,  $\gamma_{01} = .07$ ,  $SE = 1.31$ ,  $p = .958$ , indicating that gender was not significantly related to the initial levels of depressive symptoms at age 12. Furthermore, gender was not significantly related to the rate of change of the trajectory,  $\gamma_{11} = -.75$ ,  $SE = .43$ ,  $p = .078$  and  $\gamma_{12} = .04$ ,  $SE = .04$ ,  $p = .255$ . However, including gender resulted in the overall model better fitting the data,  $\Delta D = 29.4$ ,  $df = 3$ ,  $p < .001$ . Given the better overall fit of Model A, the existing literature indicating gender as an important predictor of depression (Galambos et al. 2004; Zarate 2010), and the objectives of the present study, gender was retained within the analysis of subsequent models. Model B, while controlling for gender, assessed the associations between the hypothesized risk factors (i.e., frequency of alcohol use and frequency of heavy drinking) and the initial levels of depressive symptom scores. Analyses indicated that Model B fit the data significantly better than Model A,  $\Delta D = 1,314.9$ ,  $df = 2$ ,  $p < .001$ . However, only frequency of heavy drinking was significantly related to the initial reporting of depressive symptoms,  $\gamma_{03} = .75$ ,  $SE = .24$ ,  $p = .002$ , such that higher frequencies of heavy drinking were associated with higher levels of depressive symptoms at age 12. Several intermediary models were fit to the data to assess whether each individual predictor significantly interacted with the rate of change (i.e., slope) of the trajectory of depressive symptoms. Each predictor was included in a separate model, along with the interaction of the predictor with age and age<sup>2</sup>. Neither of the intermediary models for the two alcohol use variables represented a significantly better fit to the data. Thus, these interactions were not included in Model C. Model C included both the alcohol risk factor variables and the protective factors of self-esteem and optimism. Model C fit the data significantly better than Model B,  $\Delta D = 2,691.1$ ,  $df = 2$ ,  $p < .001$ . The intermediary models for the protective factors did not significantly better fit the data, and, therefore, Model C was retained as the final model for interpretation.

For Model C, the results indicated that frequency of heavy drinking was no longer related to the initial levels of depressive symptoms,  $\gamma_{03} = -.36$ ,  $SE = .36$ ,  $p = .519$ . After controlling for gender and the alcohol risk factors, initial levels of depressive symptoms were lower for individuals with higher levels of self-esteem,  $\gamma_{04} = -.79$ ,  $SE = .12$ ,  $p < .001$ , and higher levels of optimism,  $\gamma_{05} = -1.57$ ,  $SE = .28$ ,  $p < .001$ . There was a significant interaction between gender and the quadratic component of time

**Table 2** Intercorrelations among the study variables at baseline (age 12) as a function of gender

	1.	2.	3.	4.	5.
1. Frequency of alcohol use	–	.890***	–.204*	–.188*	.018
2. Frequency of heavy drinking <sup>a</sup>	.526	–	.573**	.105	<sup>b</sup>
3. Self-esteem	.115	.137	–	.494***	–.708***
4. Optimism	–.039	.043	.593***	–	–.631**
5. Depressive symptoms	–.290	<sup>b</sup>	–.405	–.576*	–

Correlations for boys are presented below the diagonal and correlations for girls are presented above the diagonal

<sup>a</sup> Correlations related to the frequency of heavy drinking variable are provided at age 13 (baseline for this variable)

<sup>b</sup> The correlation between heavy drinking and depressive symptoms could not be computed, as heavy drinking had a low frequency of responses at age 13

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

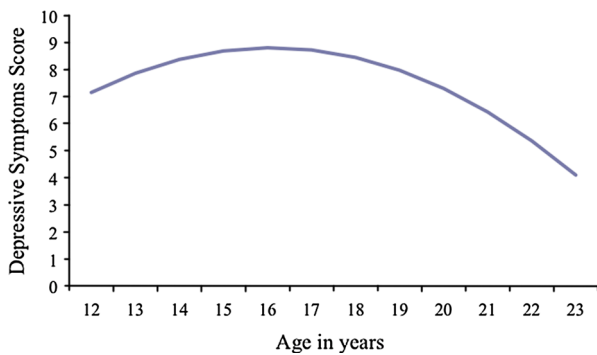
**Table 3** Multilevel models of depressive symptoms based on risk and protective predictors

		UMM	UGM linear	UGM quadratic	Model A	Model B	Model C	
Fixed effects	Intercept	$\gamma_{00}$	7.92*** (.29)	9.74*** (.47)	7.14*** (.66)	7.15*** (.89)	15.34*** (3.11)	14.48 (9.95)
Initial status, $\pi_{0i}$	Gender	$\gamma_{01}$			.07 (1.31)	.24 (4.27)	–30.79* (13.43)	
	Frequency of alcohol use	$\gamma_{02}$				–.34 (.28)	–.36 (.36)	
	Frequency of heavy drinking	$\gamma_{03}$				.748** (.241)	.25 (.38)	
	Self-esteem	$\gamma_{04}$					–.79*** (.12)	
	Optimism	$\gamma_{05}$					–1.57*** (.28)	
Rate of change, $\pi_{1i}$	Age	$\gamma_{10}$	–.31*** (.06)	.81*** (.22)	1.15*** (.30)	–1.20 (.94)	–1.36 (3.84)	
Rate of change, $\pi_{2i}$	Age <sup>2</sup>	$\gamma_{20}$		–.10*** (.02)	–.12*** (.03)	.05 (.07)	.11 (.36)	
	Age × Gender	$\gamma_{11}$			–.75 <sup>+</sup> (.43)	–.59 (1.26)	10.95* (5.10)	
	Age <sup>2</sup> × Gender	$\gamma_{21}$			.04 (.04)	.01 (.09)	–.99* (.47)	
Variance components								
Level 1	Within-person	$\sigma_{\epsilon}^2$	21.91*** (1.27)	21.08*** (1.23)	20.13*** (1.17)	19.85*** (1.15)	19.77*** (1.39)	7.20*** (1.13)
Goodness-of-fit	Deviance statistic		6,054.4	6,030.2	6,001.2	5,971.8	4,656.9	1,965.8
	$\Delta D$			24.2***	29***	29.4***	1,314.9***	2,691.1***
	( $\Delta df$ )			(1)	(1)	(3)	(2)	(2)
	BIC		6,074.8	6,057.4	6,035.1	6,026.2	4,718.8	2,037.8
Pseudo R <sup>2</sup>	R <sup>2</sup> $_{\epsilon}$		.04	.05	.01	.004 <sup>a</sup>	.64 <sup>a</sup>	

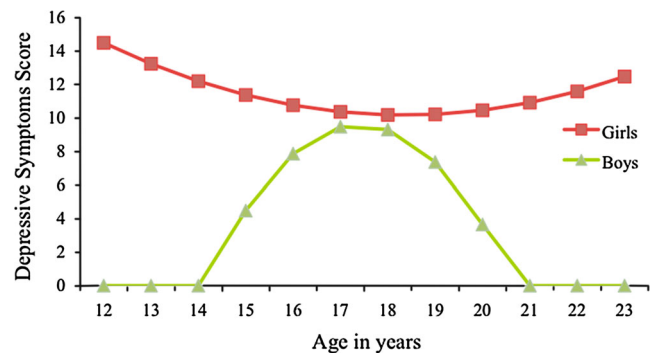
$N = 283$ . UMM unconditional means model, UGM unconditional growth model

<sup>a</sup> The pseudo R<sup>2</sup> value for models B and C used Model A as a comparison and represents the percentage of variance explained over and above the effect of gender

<sup>+</sup>  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$



**Fig. 1** Prototypical trajectory of depressive symptoms among Aboriginal youth across adolescence and into young adulthood



**Fig. 2** Prototypical trajectories of depressive symptoms by gender. Aboriginal girls have higher levels of depressive symptoms at age 12 and this trend continues across development, when compared to Aboriginal boys

(i.e.,  $age^2$ ),  $\gamma_{21} = -.99$ ,  $SE = .47$ ,  $p = .045$  (see Fig. 2). Whereas Fig. 1 (using parameter estimates from the unconditional quadratic model) demonstrates the prototypical trajectory of depressive symptoms for the sample as a whole, Fig. 2 (using parameter estimates from Model C) separates the trajectory by gender illustrating that girls have higher levels of depressive symptoms than boys across adolescence. More specifically, girls' initial intercepts are higher, suggesting higher depressive symptom scores during early adolescence, and their levels of depressive symptoms remained elevated throughout adolescence and into young adulthood. In contrast, adolescent boys demonstrated extremely low levels of depressive symptoms until age 14 after which a sharp increase in depressive symptoms that peaked around late adolescence (i.e., ages 17–18) was observed, followed by a sharp decrease into young adulthood (i.e., ages 21–23; see Fig. 2).

**Mediation of Heavy Drinking**

Given that heavy drinking was no longer significant in Model C, it was hypothesized a posteriori that one or both of the protective factors were mediators of the relationship between the frequency of heavy drinking and depressive symptoms. Thus, mediation multilevel growth curve modeling (Bauer et al. 2006) was conducted for each of the protective factors separately. For self-esteem, the indirect and total effects were not significant, indirect effect = .17,  $p = .700$ , total effect = .15,  $p = .487$ . Unfortunately, optimism could not be modeled using this approach (i.e., the models would not run), potentially due to the response pattern over time and missing data.

**Discussion**

In accordance with the growing importance of adopting a positive psychology approach to understanding the mental

health issues of Aboriginal youth (Gone and Trimble 2012), the purpose of the current study was threefold. First, the overarching objective was to describe the developmental trajectory of depressive symptoms among a Canadian sample of off-reserve Aboriginal youth. Second, the current study examined the longitudinal relationships between two alcohol use variables (i.e., frequency of alcohol use and heavy drinking) and depressive symptoms. Third, the study explored whether self-esteem and optimism mediated the relationship between alcohol use and subsequent depressive symptoms. Gender differences were examined within each of the study objectives. Overall, the findings highlight the potential usefulness of fostering self-esteem and optimism among early adolescent Aboriginal youth to guard against the development of depressive symptoms and promote positive youth development.

**Development of Depressive Symptoms Among Canadian Aboriginal Youth**

With respect to the first goal of the study, the average trajectory of depressive symptoms in the current sample of Canadian Aboriginal youth was consistent with previous research on the course of depressive symptoms across adolescence (e.g., Garber et al. 2002; Ge et al. 2006; Natsuaki et al. 2009). Specifically, in the present sample of off-reserve Aboriginal youth, depressive symptoms began to increase after age 12, peaked in severity at age 16, and then decreased into young adulthood (age 23). With regard to gender, the present findings are similar to those found in community samples of boys and girls (e.g., Natsuaki et al. 2009). For example, in Model A when only gender is included, no significant results were noted. This finding is consistent with another Canadian population-based study that found no statistically significant gender difference in early adolescence, although girls had elevated depressive symptoms scores over the four-year period of the study



(Galambos et al. 2004). In the final model (Model C), gender differences were found. Aboriginal girls had persistently higher levels of depressive symptoms across time, whereas boys only experienced an increase in depressive symptoms after age 14, which subsequently decreased again into young adulthood (i.e., ages 21–23), consistent with previous research (Zarate 2010). However, the trajectory of Aboriginal girls' depressive symptoms followed a slight U-shape (see Fig. 2), a different pattern than is typically seen (e.g., Natsuaki et al. 2009). When key protective factors are accounted for, this differential pattern in boys' and girls' depressive symptoms suggests that there may be interactions between gender and the protective factors related to the trajectory of depressive symptoms for Aboriginal girls, particularly during mid- to late-adolescence.

### Predictors of Depressive Symptom Pathways

The longitudinal relationships between frequency of alcohol use and heavy drinking and depressive symptoms were examined. Before accounting for protective factors (Model B), heavy drinking was significantly associated with initial levels of depressive symptoms at age 12, such that increased frequency of heavy drinking was associated with higher levels of depressive symptoms. This finding is in line with previous research involving large samples of multi-ethnic adolescents and relatively small samples of Aboriginal youth (e.g., Abbott 2006; Fleming et al. 2008; Marmorstein 2009). Contrary to expectation, heavy drinking was not significantly related to the rate of change of depressive symptoms (i.e., the interaction between heavy drinking and age and age<sup>2</sup> was not significant). This null finding suggests that the relationship between heavy drinking and depressive symptoms among off-reserve Canadian Aboriginal youth remains constant over time. It may be that youth who engage in heavier drinking in early adolescence continue to experience higher levels of depressive symptoms throughout adolescence into early adulthood compared to those youth who engage less in heavy drinking. Another possible explanation for the null finding may be related to measurement issues, including the single-item indicators of alcohol use, although these are typically used by the WHO (Graham et al. 2007). Furthermore, frequency of alcohol use was not significantly related to the trajectory of depressive symptoms; however, this result is consistent with literature suggesting that amount or volume of drinking is more predictive of depression than frequency (Graham et al. 2007).

With regard to the final goal of the present study, high levels of self-esteem and optimism were protective against initial levels of depressive symptoms at age 12 among both Aboriginal boys and girls. These findings are consistent

with previous research that suggests self-esteem is a universal protective factor against adolescent depressive symptoms (e.g., MacPhee and Andrews 2006; Nguyen et al. 2011). Optimism has been found to be protective against mental health and also physical health problems (Carver et al. 2010; Hernández and Carrillo 2010; Patton et al. 2011). The findings of the current study expand upon the existing literature demonstrating the protective role of high self-esteem and optimism in an off-reserve Canadian sample of Aboriginal youth.

The significant association between heavy drinking and depressive symptoms was no longer significant when the protective factors (i.e., self-esteem and optimism) were added to the model, suggesting a possible mediating effect. Self-esteem was not a significant mediator of the relation between alcohol use and depressive symptoms, and optimism could not be analysed within a multilevel growth curve mediation model. The non-significant mediation results, coupled with the change in the relation between heavy drinking and depressive symptoms in Model C, suggest that self-esteem and optimism may work together in multiple mediation of this relationship (Preacher and Hayes 2008). Further investigation into the relationship between alcohol use, depressive symptoms, and protective factors is needed. Future research could test the indirect effects of self-esteem and optimism on depressive symptoms in the context of studying alcohol use.

### Strengths and Limitations

The study's methodological strengths include its sample of off-reserve Aboriginal youth from a national dataset, the longitudinal nature of the data, and the use of advanced statistical modeling. Some limitations should be noted. First, due to the use of a population-based dataset, some of the variables selected were limited to one or two items (i.e., frequency of alcohol use and heavy drinking and optimism). Although this is a common limitation when using population-based datasets (e.g., Galambos et al. 2004), studies that use these short measures can provide the basis for future research involving broader measures, particularly of alcohol use and optimism. Second, as the project was longitudinal in nature and employed a small subset of off-reserve Aboriginal youth from the NLSCY, only two key individual-level protective factors (e.g., self-esteem and optimism) were examined. Null findings with regard to the mediation model may be partially attributable to response patterns and missing data within the relatively small sample of Aboriginal participants compared to the larger NLSCY dataset. Future research would benefit from examining a larger array of protective factors, including other contextual factors (e.g., familial, societal, cultural), given the existing literature regarding protective factors of

mental health outcomes for Aboriginal populations (Chandler et al. 2003; Goodkind et al. 2010; Kirmeyer et al. 2003; Rawana and Ames 2012; Ypinazar et al. 2007). Finally, as the present study utilized a normative sample of Aboriginal youth, clinical samples may provide further information about the protective factors related to alcohol abuse and dependence and depression in hopes of better servicing youth with concurrent disorders. Given the reviewed limitations, the present findings provide a springboard for future research regarding the risk and protective factors related to depressive symptoms for Aboriginal youth. Further investigation is encouraged to replicate the present findings with a larger sample.

### Implications

The current study was initiated in the midst of the growing awareness of the importance of studying risk and resilience in the development of Aboriginal youth. Overall, the findings of the study show two key patterns. First, the findings show that among a sample of Canadian Aboriginal youth derived from a nationally representative group, depressive symptoms begin to increase around age 12, peak around age 16, and then decrease into early adulthood. In particular, similar to non-Aboriginal youth, Aboriginal girls report higher levels of depressive symptoms both in early adolescence and across time. Second, the findings show that early adolescence is a clinically significant time for understanding risk and protective factors that are associated with depressive symptoms. Given the paucity of research on the mental health of off-reserve Aboriginal populations (Tjepkema 2002; Young 2003), the present study demonstrated an association between heavy drinking and depressive symptoms among early adolescent off-reserve Aboriginal youth, lending support to previous findings in the literature (Abbott 2006). Furthermore, self-esteem and optimism were identified as potential mechanisms of action within mental health prevention and intervention programs for Aboriginal youth. The findings underscore the need to ensure mental health prevention and promotion strategies target off-reserve Aboriginal communities. Similarly, a major related area of work is the ongoing development of culturally sensitive mental health services that address the specific needs of Aboriginal youth (e.g., the relation between heavy drinking and depressive symptoms in early adolescence observed in the current study; Bennett et al. 2010).

In terms of implications for health care professionals, the study's findings indicate that high self-esteem and an optimistic outlook are protective factors for depressive symptoms in early adolescent Aboriginal youth. These results are consistent with previous findings in the literature. For example, a recent study conducted with

Aboriginal youth in care suggested that developmental assets (e.g., caregiver love and support; school engagement) were associated with self-esteem (Filbert and Flynn 2010). An association between Aboriginal youth engagement and optimism within an educational context has also been identified (Crooks et al. 2010). Thus, it is important for health care professionals to adopt a strengths-based approach to their clinical work, in particular when working within this developmental period. This approach may involve encouraging community members, educators, and youth themselves to foster self-esteem and positive orientations towards the future among Aboriginal early adolescents, which may include facilitating opportunities for cultural pride, educational success, and youth leadership, to name a few. Finally, in addition to the implications for service providers working with Aboriginal youth, the study's results contribute to the broader adolescent development literature. The findings are relevant to developmental researchers, as the current study identified a developmental trajectory of depressive symptoms and key risk and protective factors in a sample of Aboriginal youth. Future research should continue to examine both unique and established protective factors in diverse groups of Aboriginal youth to identify cross-cultural similarities and differences.

### Conclusion

The current study identified the depressive symptoms trajectory of Aboriginal youth and investigated the role of two key protective factors (i.e., self-esteem and optimism) in the relationship between alcohol use and depressive symptoms. The results of the study contribute to the growing literature demonstrating the importance of promoting self-esteem and optimism among Aboriginal youth in order to achieve optimal mental health. Further research is needed to determine the most effective ways of fostering the development of self-esteem and optimism and protecting against engagement in alcohol use and the development of depressive symptoms.

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**Author Contributions** M.A. contributed to the development of the study, participated in its design, performed the statistical analyses, contributed to the interpretation of the statistical results, and presided over the study and manuscript preparation process. J.R. contributed to the development and implementation of the study, participated in its design, and contributed to the interpretation of the statistical results, and writing of the manuscript. P.G. contributed to the interpretation of the statistical results, writing of the manuscript, and preparation of the manuscript draft. A.M. contributed to and interpreted the statistical

analyses and contributed to the writing of the manuscript. All authors read and approved the final manuscript.

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