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SPECIAL ISSUE

Adolescent patterns of peer victimization: Concurrent and longitudinal health correlates

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Abstract

Purpose: We examined how heterogeneity in the patterns of adolescent experiences of different types and severity of peer victimization is associated with concurrent and longitudinal mental health, substance use, and physical health.

Method: Data come from a randomly recruited community-based sample of youth (T1 ages 12–18; *N* = 662; 52% female) followed biennially across 10 years (T6 ages 22–29; *n* = 478; 55% female).

Results: Using latent class analysis, we identified four classes of adolescent peer victimization: Low victimization (63%), Physical victimization only (15%), Relational victimization only (17%), and Poly-victimization (6%). Youth in the Poly-victimization class reported the most detrimental health consequences in adolescence (e.g., internalizing and externalizing symptoms, illicit drug use, physical symptoms, poor physical self-concept, physical activity) and in young adulthood (e.g., depressive symptoms, sleep problems). Youth in the Relational and Physical victimization classes also reported health problems, some of which persisted into young adulthood. Youth in the Low victimization class reported the fewest health concerns.

Conclusions: Findings add to our understanding of how different types of adolescent victimization are related to

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mental health, substance use, and physical health problems both within adolescence and long-term.

KEYWORDS
adolescence, latent class analysis, mental health, peer victimization, physical health, substance use, young adulthood

1 | ADOLESCENT PATTERNS OF PEER VICTIMIZATION: CONCURRENT AND LONGITUDINAL HEALTH CORRELATES

Considerable research demonstrates associations between physical and relational peer victimization and aspects of both mental and physical health in adolescence (see Arseneault, Bowes, & Shakoor, 2010; Card & Hodges, 2008; Casper & Card, 2017; McDougall & Vaillancourt, 2015 for reviews). Peer victimization has been conceptualized as a chronic stressor (McDougall & Vaillancourt, 2015; Vaillancourt, Hymel, & McDougall, 2013) that can negatively impact health outcomes over time (Takizawa, Maughan, & Arseneault, 2014; Wolke, Copeland, Angold, & Costello, 2013). Moreover, research examining the biological pathways relating peer victimization to physical health shows links between peer victimization and changes in physiology including elevated inflammation (Copeland, Wolke, Angold, & Costello, 2013; Takizawa, Danese, Maughan, & Arsenault, 2015), dysregulation of the hypothalamic-pituitary-adrenal axis (HPA; i.e., the body's stress response system), as well as blunted cortisol release also found in children and adolescents who experience other forms of stress or trauma (see Vaillancourt et al., 2013 for reviews). However, it is not known whether or how adolescent victimization experiences set the stage for continued health problems in young adulthood. The health effects (concurrent and across time) of different experiences of victimization (i.e., based on type and severity) are also not known. In this study, we add to the understanding of how different patterns of peer victimization affect mental health, substance use, and physical health in adolescence (ages 12–18) and 10 years later in young adulthood (ages 22–29).

2 | PEER VICTIMIZATION

Peer victimization (or bullying) is a prevalent form of aggression that is intentional and repeated (Olweus, 1993). A meta-analysis found mean prevalence rates of 35% across 80 studies including at least some youth ages 12–18 years (Modecki, Minchin, Harbaugh, Guerra, & Runions, 2014). *Physical victimization* typically encompasses overt forms of aggression (e.g., being hit, pushed or shoved, and hair pulled). Research with the present sample shows this type of peer victimization declines in the transition from adolescence to young adulthood (Leadbeater, Thompson, & Sukhawathanakul, 2014). *Relational victimization* includes aggression aimed at disrupting social relationships or status (e.g., spreading rumors, gossiping, and social exclusion; Crick & Grotpeter, 1996). In contrast to physical victimization, relational victimization remains stable among females and increases among males across the transition to young adulthood (Leadbeater et al., 2014).

3 | LATENT CLASSES OF PEER VICTIMIZATION

Research that examines heterogeneity in victimization experiences among youth suggests there may be classes (or groups) of youth who may be particularly vulnerable to distinct forms or severity of victimization (Bradshaw, Waasdorp, & O'Brennan, 2013; Nylund, Bellmore, Nishina, & Graham, 2007b). For example, Bradshaw et al. (2013)

identified latent classes of victimization in middle (n = 11,408) and high (n = 5,790) school students based on 10 forms of victimization (e.g., calling you bad names, pushing or shoving, making sexual comments or gestures, emailing or posting about you on the Internet). The authors identified four classes in the middle school sample and three classes in the high school sample which varied by the type (e.g., verbal, physical, relational) and severity (i.e., high, low) of victimization. In middle school, males were more likely than females to be in the *Verbal and Physical* class or the *High Verbal, Physical, and Relational* class, compared to the *Verbal and Relational* class. In high school, males were more likely than females to be in the *High Verbal, Physical, and Relational* class compared to the *Verbal and Rumors* class. As expected, those in the *High Verbal, Physical, and Relational* class had significantly higher concurrent internalizing and aggression scores than all other classes in both middle and high school. This study highlighted heterogeneity in victimization experiences among youth and how these experiences are related to concurrent internalizing symptoms and aggression. We expand on this study by examining how classes of adolescent victimization are related to a wide range of mental health, substance use, and physical health indicators in adolescence and in young adulthood.

4 | PEER VICTIMIZATION AND MENTAL HEALTH AND SUBSTANCE USE

Previous longitudinal research with the current sample indicates that peer physical and relational victimization persists into young adulthood (Leadbeater et al., 2014). Rates of physical victimization were low from adolescence to young adulthood; however, relational victimization increased for males after high school compared to females. Both types of victimization also predicted increases in internalizing problems over time. Past research also shows experiences of peer victimization in adolescence are associated with poorer mental health (e.g., internalizing and externalizing symptoms; Casper & Card, 2017; Reijntjes et al., 2011; Reijntjes, Kamphuis, Prinzie, & Telch, 2010; Ttofi, Farrington, Losel, & Loeber, 2011).

Findings regarding how experiences of peer victimization are related to substance use are less consistent and bullying and being victimized frequently co-occur and their effects hard to disentangle. For example, Matthews, Jennings, Lee, and Pardini (2017) examined the health behaviors of men (M_{age} = 32.3) from the Pittsburg Youth study who reported whether or not they were bullied or a bully themselves in childhood (at ages 10–12 years). Although bullying others was associated with smoking and marijuana use in this study, being the victim of bullying was not associated with these behaviors. In contrast, in a longitudinal sample of Finnish boys, Niemelä et al. (2011) found that being the victim of bullying at age eight predicted daily heavy smoking at age 18. Findings are also mixed for other forms of substance use. A review of 74 studies examining the association between adolescent peer victimization and alcohol use or misuse (Maniglio, 2017), found results were inconsistent. Furthermore, studies investigating temporal order found that victimization did not predict later alcohol use or misuse (e.g., Copeland et al., 2013; Takizawa et al., 2014). In this study, we examine how differences in adolescent experiences of victimization relate to smoking, heavy drinking, marijuana use, and illicit drug use in adolescence and young adulthood.

5 | PEER VICTIMIZATION AND PHYSICAL HEALTH

Meta-analyses (Gini & Pozzoli, 2009, 2013) documents cross-sectional and longitudinal links between peer victimization and the development of physical symptoms (e.g., headaches, backache, fatigue, dizziness) in children and adolescents. Results from 24 cross-sectional and six longitudinal studies (ranging in length from 9 months to 11 years) show children who were bullied had higher risk of physical symptoms than non-bullied peers. One longitudinal study that followed participants into young adulthood (i.e., age 21; McGee et al., 2011), shows that being bullied at age 14 was related to greater risk of somatic problems (e.g., dizziness, tiredness, headaches, and stomach problems) at age 21, among women only. These studies compared bullied and non-bullied (i.e., control) groups, but did not examine how different types of victimization relate to physical complaints.

Past research also suggests the experience of peer victimization can influence how adolescents perceive their health and abilities (Bogart et al., 2014; Frisén & Bjarnelind, 2010; Rigby, 1999; Takizawa et al., 2014). For example, Bogart et al. (2014) found peer victimization in late childhood (i.e., fifth grade) was related to poorer physical quality of life and lower self-worth 5 years later (i.e., tenth grade). One study also shows childhood peer victimization is linked to poor perceived quality of life in mid-life (i.e., at age 50; Takizawa et al., 2014). Previous research with the present sample also found associations between physical and relational victimization and physical symptoms and physical self-concept from adolescence to young adulthood (Hager & Leadbeater, 2016). Physical self-concept encompasses a youth's evaluations of their physical health, appearance, and physical development and abilities. Results show both physical and relational victimization were associated with more physical symptoms and poorer physical self-concept, as well as longitudinal associations with physical self-concept. Relational, but not physical, victimization was longitudinally associated with physical symptoms. We add to this study by examining how patterns of victimization experienced in adolescence relate to these health indicators in adolescence and 10 years later in young adulthood.

Much research on victimization and health-promoting behaviors (i.e., physical activity, healthy eating practices, and sleep) has focused on sleep. A meta-analysis of 21 studies (Van Geel, Goemans, & Vedder, 2016) confirmed a positive association between peer victimization and sleep problems (e.g., problems falling asleep, problems staying asleep, but not duration) in children and adolescents. How peer victimization is related to other health-promoting behaviors is less clear. Physical education classes can be a context in which peer victimization occurs (Bauer, Yang, & Austin, 2004; Roman & Taylor, 2013); victimization is related to lower odds of achieving 60 min of physical activity more than once per week as well as fewer days in physical education classes (Roman & Taylor, 2013).

Ample research shows youth who are overweight or obese are at heightened risk of peer victimization (see Puhl & Latner, 2007; Van Geel, Vedder, & Tanilon, 2014). For example, previous research with the present sample found that associations between overweight and obesity and victimization were age-, sex-, and victimization-type specific (Ames & Leadbeater, 2017). Females who were overweight (or obese) were more likely to experience physical victimization at ages 15–22 than non-overweight peers. Both males and females who were overweight were more likely to experience verbal victimization (i.e., "peers yell at you or call you names") at ages 15–21 and ages 25–28 than youth who were not overweight (Ames & Leadbeater, 2017). Relational victimization was not associated with being overweight or obese at any age.

Findings of research on the association of experiences of peer victimization in adolescence and indicators of metabolic syndrome are mixed (Gustafsson, Janlert, Theorell, Westerlund, & Hammarström, 2012; Matthews et al., 2017). For example, Gustafsson et al. (2012) found that each standard deviation increase in peer problems (i.e., teacher ratings of students' isolation and unpopularity) at age 16 related to 36% increased odds of metabolic syndrome at age 43, particularly among women after adjusting for covariates. Matthews et al. (2017) in a study of men only did not find an association between being a bullying to others or being bullied and biological risk factors (i.e., BMI, clinical cut-offs for metabolic syndrome). In this study, we examine how different classes of victimization relate to BMI in adolescence and to a number of non-invasive indicators of cardiometabolic risk (i.e., BMI, waist circumference, and hypertension; Ames, Leadbeater, & Macdonald, 2018) in young adulthood.

6 | THE PRESENT STUDY

We examine how heterogeneity in adolescent experiences of peer victimization impact health in adolescence and young adulthood. We include multiple indicators of mental health: internalizing symptoms (i.e., depressive and anxiety symptoms), externalizing symptoms (i.e., attention deficit hyperactivity disorder [ADHD] symptoms, oppositional defiant disorder [ODD] symptoms, and conduct problems), and substance use (i.e., smoking, heavy drinking, marijuana and illicit drug use). We also use multiple measures of physical health: subjective health (i.e., physical symptoms and physical self-concept), health-promoting behaviors (i.e., physical activity, healthy eating practices, and sleep duration and problems), and cardiometabolic risks (i.e., BMI waist circumference, and

hypertension). In examining young adult health, we directly control for earlier (i.e., baseline) symptoms in order account for stability in health over time (McDougall & Vaillancourt, 2015).

7 | METHOD

7.1 | Participants and procedure

The Victoria Healthy Youth Survey (V-HYS) is a prospective study which surveyed a randomly recruited community-based sample of youth (N = 662) biannually from 2003 (T1; ages 12–18) to 2013 (T6; ages 22–29). The V-HYS is representative of the population from which it is drawn (see Leadbeater, Thompson, & Gruppuso, 2012). A random sample of 662 youth was collected from 9,500 telephone listings wherein 1,036 households were identified with an eligible (ages 12–18) youth. Youth who agreed to participate had parental consent and received a gift certificate in exchange for their participation. Trained research assistants interviewed youth either at their home or another private location. For sensitive topics (e.g., substance use), youth responded to self-report questionnaires. The V-HYS had high rates of retention: 87% (T2), 81% (T3), 69% (T4), 70% (T5), and 72% (T6). The study was approved by the university's research ethics board.

Attrition was estimated by comparing T1 demographic and study variables between youth who participated in the final wave of the study (n = 478) and those who did not participate (n = 184). Compared to youth who did not participate in the final wave, youth who did participate were more likely to be female (χ^2 (1, 662) = 8.77, p = 0.003), had slightly higher SES (F(1, 636) = 19.39, p < 0.001), had fewer symptoms of ADHD, (F(1, 660) = 5.63, p = 0.02), were slightly less likely to be smokers (F(1, 660) = 3.82, p = 0.05), and reported healthier eating practices at T1 (F(1, 657) = 7.07, p = 0.008).

7.2 | Measures

7.2.1 | Peer victimization

Peer victimization was assessed using the Social Experiences Questionnaire (SEQ; Crick & Grotpeter, 1996). Participants rated how often they experienced *physical victimization* (five items; e.g., "How often do you get hit by your peers?") and *relational victimization* (five items; e.g., "How often do your peers say they won't like you unless you do what they want you to do?"). Responses were provided on a three-point Likert scale (0 = *never*, 1 = *sometimes*, or 2 = *almost all the time*); however, the "*sometimes*" and "*almost all the time*" categories were combined due to low rates of response to "*almost all the time*," providing item responses on a binary (0, 1) scale. Cronbach alphas at T1 were 0.62 for physical and 0.67 for relational victimization.

7.2.2 | Indicators of health

In this study, we conceptualize health using multiple measures across a number of domains including mental health (i.e., internalizing and externalizing symptoms), substance use (i.e., smoking, heavy drinking, marijuana use, and illicit drug use), and physical health (i.e., subjective health, health-promoting behaviors, and cardiometabolic risks). Table 1 provides a description of each of the health indicators including references and alphas, when appropriate.

7.3 | Analytic plan

To assess the heterogeneity in adolescent victimization we used latent class analysis in Mplus version 7.3 to identify classes of victimization (Muthén & Muthén, 1998-2012). To determine the best fitting model, we used several local indices of fit that included the Akaike Information Criteria (AIC), Bayesian Information Criterion (BIC), the Lo-Mendell-Rubin test (LMRT), the bootstrapped likelihood ratio test (BLRT), posterior class probabilities, and

TABLE 1 Summary of health indicators

Construct	Description	Measure
Internalizing symptoms		
Depressive symptoms	6 items (e.g., "Do you notice that you…get no pleasure from your usual activities?") 0 (*never*) to 2 (*often*) α = 0.80-0.86	Brief Child and Family Phone Interview (BCFPI; Cunningham, Boyle, Hong, Pettingill, & Bohaychuk, 2009)
Anxiety symptoms	6 items (e.g., "Do you notice that you…worry about your past behavior?") 0 (*never*) to 2 (*often*) α = 0.75–0.82	Brief Child and Family Phone Interview (BCFPI; Cunningham et al., 2009)
Externalizing symptoms		
Attention deficit hyperactivity disorder symptoms	6 items (e.g., "Do you notice that you… are easily distracted or have trouble sticking to activities?") 0 (*never*) to 2 (*often*) α = 0.66–0.74	Brief Child and Family Phone Interview (BCFPI; Cunningham et al., 2009)
Oppositional defiant disorder symptoms	6 items (e.g., "Do you notice that you… argue a lot with others?") 0 (*never*) to 2 (*often*) α = 0.71–0.76	Brief Child and Family Phone Interview (BCFPI; Cunningham et al., 2009)
Conduct problems	T1: 6 items from the BCFPI and 2 items reflecting diagnostic criteria for conduct disorder (e.g., "How often do you steal things at home?") 0 (*never*) to 2 (*often*) T1 α = 0.67 T6: 7 items reflecting diagnostic criteria (e.g., "In the past year, how often have taken something of value from a store without paying for it?") Recoded to 0 (*never*) or 1 (*at least once*) T6 α = 0.48	Brief Child and Family Phone Interview (BCFPI; Cunningham et al., 2009) Leadbeater and Homel (2015)
Substance use		
Smoking status	1 item assessed the number of cigarettes used in past week Recoded to 0 (*never*) or 1 (*one or more per week*)	
Heavy episodic drinking	1 item ("How often in the past 12 months have you had five or more drinks on one occasion?") 0 (*never*) to 4 (*more than once a week*)	
Marijuana use	1 item ("How often did you use marijuana in the past 12 months?") 0 (*never*) to 4 (*more than once a week*)	
Illicit drug use	1 item created based on how often participants used six illicit drugs in the past year (i.e., hallucinogens, amphetamines, club drugs, inhalants, cocaine, and heroin) Recoded as 0 (*never*) or 1 (*used at least one illicit drug in the past year*)	

(Continues)

TABLE 1 (Continued)

Construct	Description	Measure
Subjective health		
Physical symptoms	4 items assessing how often participants experienced headaches, abdominal pain, backaches, and dizziness 0 (*never*) to 5 (*about every day*) α = 0.55–0.65	Health Behavior in School-Aged Children scale (Aarø, Wold, Kannas, & Rimpelä, 1986)
Physical self-concept	14 items assessing overall physical health (1 item; "How often do you notice you are physically healthy?"), appearance (4 items; "How satisfied are you with each of the following aspects of your body?… weight"), and physical development and abilities (9 items; e.g., "I am proud of my body") Items rescaled to 0–2 scale α = 0.80–0.85	Hager and Leadbeater (2016)
Health-promoting behaviors		
Physical activity	3 items (e.g., "In an average week, I exercise 3-4 times (e.g., running, swimming, other sports)") 0 (*never*) to 2 (*always*) α = 0.74–0.83	Adolescent Lifestyle Questionnaire (ALQ; Gillis, 1997)
Healthy eating practices	5 items (e.g., "I usually limit my intake of "junk food" for snacks") 0 (*never*) to 2 (*always*) α = 0.72–0.80	Adolescent Lifestyle Questionnaire (ALQ; Gillis, 1997)
Sleep duration	1 item assessing number of hours slept on average at night	
Sleep difficulties	1 item assessing how often participants experienced sleep difficulties 0 (*never*) to 5 (*about every day*)	Health Behavior in School-Aged Children scale (Aarø et al., 1986)
Cardiometabolic risks		
Body mass index	T1: self-reported weight and height were collected T6: measurements of weight and height collected by trained interviewers	
Waist circumference	Trained interviewers collected measurements of waist circumference from a standing position Measurements were taken at the top of the hip bone, level with the belly button, and parallel to the floor	
Hypertension	Systolic (SBP) and diastolic blood pressure (DBP) were collected by trained interviewers in a rested-seated position using digital blood monitors 0 (*SBP < 130 mmHg and DBP < 80 mmHg*) or 1 (*SBP ≥ 130 mmHg or DBP ≥ 80 mmHg*)	American Heart Association recommendations for classification of hypertension (Whelton et al., 2017)

entropy (Lanza & Cooper, 2016; Lo, Mendell, & Rubin, 2001; Nylund, Asparouhov, & Muthén, 2007a). The fit indices and previous literature were used together to determine the final number of victimization classes. To assess class differences on health indicators in adolescence (T1; ages 12–18) and young adulthood (T6; ages 22–29), we used the manual three-step approach (Asparouhov & Muthén, 2014) to account for the misclassification in modal class

assignments (i.e., measurement error in the most likely class assignment). To assess concurrent (T1; ages 12–18) class differences on health indicators, we used multinomial logistic regression. To measure prospective differences on health indicators in young adulthood (T6; ages 22–29), we used linear regression. Health indicators were grouped into the following six models: internalizing symptoms, externalizing symptoms, substance use, subjective health, health-promoting behaviors, and cardiometabolic risks. All models accounted for sex, age at T1 centered, and SES (highest level of parental occupational prestige; Bornstein, Hahn, Suwalsky, & Haynes, 2003). Young adult models (T6) also included the respective T1 assessments as covariates to examine whether class differences were significant beyond adolescent associations (McDougall & Vaillancourt, 2015). Models were fit using Mplus version 7.3, using a maximum likelihood estimator with robust standard errors (MLR) for missing data (Muthén & Muthén, 1998-2012).

8 | RESULTS

8.1 | Latent classes of adolescent victimization

Results of the latent class analysis are presented in Table 2. The four-class model was chosen as the best fitting model as it demonstrated the lowest BIC and best aligned with past research that examined classes of victimization (Bradshaw et al., 2013). Although the AIC was lower and the LMRT was significant ($p = 0.044$) for the five-class model, the additional class did not add a substantively meaningful class (i.e., additional class had a high probability of endorsing the item "leave out;" see Supporting Information Figure S1). As such, we opted to proceed with the four-class model that was in line with current literature and provided better substantive utility.

Figure 1 presents the item probabilities for the 10 victimization items that were used to interpret and label the four victimization classes. The Low victimization class ($n = 414$; 63%) had the lowest probabilities of experiencing all forms of victimization. The Physical victimization class ($n = 96$; 15%) had moderate to high probabilities of endorsing physical forms of victimization including being hit (55%), pushed or shoved (76%), and called names (52%). The Relational victimization class ($n = 110$; 17%) had moderate to high probabilities of endorsing relational forms of victimization including being left out or excluded (41%, respectively), having peers tell lies about them (77%), or having mean things said about them (71%). The Poly-victimization class ($n = 42$; 6%) had the highest probability of experiencing both physical (i.e., hit-79%, pushed or shoved-79%, called names-81%) and relational (i.e., left out-73%, excluded-66%, tell lies-78%, say mean things-88%) forms of victimization.

Means (*SD*) and frequencies (percentages) of all demographic, covariate, and study variables across victimization classes are presented in Table 3. As seen in Table 4, results from the multinomial logistic regression examining adolescent (T1; ages 12–18) correlates of victimization classes show youth in the Relational victimization class were more likely to be female compared to all other classes. Youth in the Physical victimization class were also more likely to be male than those in the Low victimization class. Youth in the Poly-victimization class were younger than those in the Low and Relational classes; youth in the Physical class were also younger than those in the Low class. Youth in the Relational class were from lower SES families compared to their peers in the Low victimization class.

Results for victimization class differences in health indicators in young adulthood (T6; ages 22–29) can be found in Table 5. All models account for respective T1 assessments, as such, significant T6 findings refer to increases in each variable over and above T1 adolescent levels (McDougall & Vaillancourt, 2015). Wald tests were used to test overall model significance and pairwise group differences ($p < 0.05$).

8.2 | Concurrent (adolescent) peer victimization class differences

8.2.1 | Mental health and substance use

Compared to the Low victimization class, all other victimization classes reported higher levels of depressive symptoms in adolescence (ages 12–18). Youth in the Relational and Poly-victimization classes also reported higher levels

TABLE 2 Latent class analysis fit indices for adolescent (T1) victimization items

Class(es)	AIC	BIC	LMRT *p* value	BLRT *p* value	Entropy
1	5368.518	5413.47	–	–	–
2	4777.199	4871.6	<0.001	<0.001	0.81
3	4672.111	4815.959	0.181	<0.001	0.85
4	**4596.652**	**4789.948**	**0.024**	**<0.001**	**0.83**
5	4574.795	4817.539	0.044	<0.001	0.86
6	4567.032	4859.225	0.151	<0.001	0.88

Note. AIC: Akaike Information Criteria; BIC: Bayesian Information Criteria; BLRT: Bootstrapped Likelihood Ratio Test; LMRT: Lo-Mendell-Rubin Test. Bold indicates best fitting model.

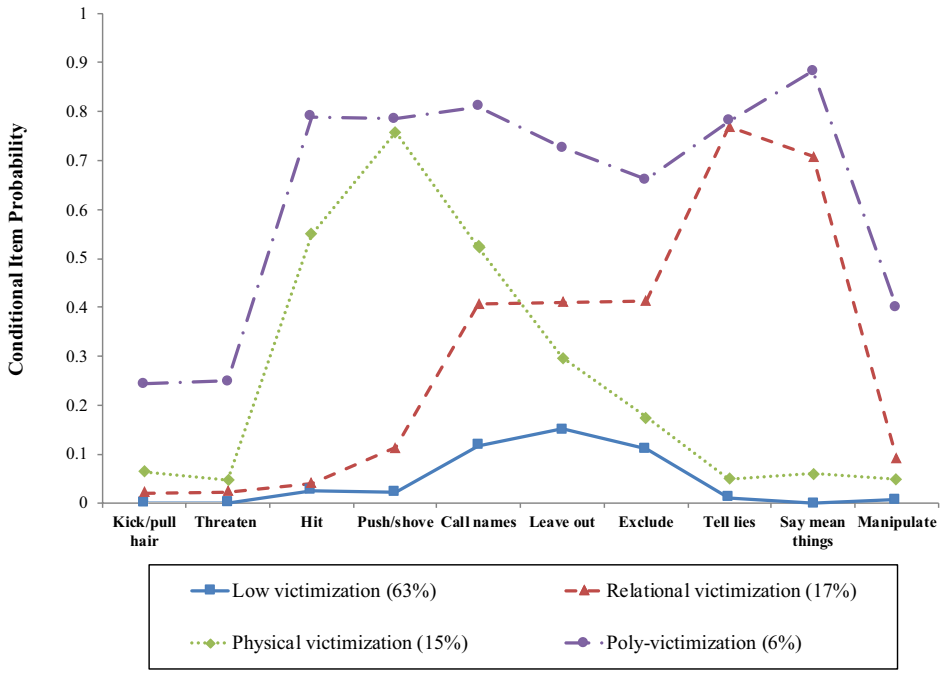

FIGURE 1 Conditional item probabilities for the 10 victimization items by class membership

of anxiety symptoms than youth in the Low and Physical classes. In adolescence, compared to the Low class, youth in the Poly-victimization class reported more symptoms of ADHD and conduct problems; the Poly-victimized class also reported more conduct problems than the Relational class. Youth in the Physical and Relational classes reported more symptoms of ODD than the Low class. In adolescence, youth in the Relational class were more likely to be smokers than those in the Low class. Youth in the Poly-victimization class were also five times more likely to use illicit drugs in the past year than those in the Low class. Class differences were not significant for heavy drinking or marijuana use.

8.2.2 | Physical health

In adolescence, youth in the Physical and Poly-victimization classes reported more physical symptoms than youth in the Low class. Youth in the Poly-victimization class also reported more physical symptoms than youth in the Relational class. With regard to adolescent levels of physical self-concept, the Poly-victimization class reported the

TABLE 3 Means and standard deviations of covariates and health indicators by victimization class

	1. Low victimization (*n* = 414; 63%)	2. Physical victimization (*n* = 96; 15%)	3. Relational victimization (*n* = 110; 17%)	4. Poly-victimization (*n* = 42; 6%)
	Mean (*SD*) or *n* (%)	Mean (*SD*) or *n* (%)	Mean (*SD*) or *n* (%)	Mean (*SD*) or *n* (%)
Covariates (T1)				
Sex				
Male	190 (46%)	70 (73%)	36 (33%)	24 (57%)
Female	224 (54%)	26 (27%)	74 (67%)	18 (43%)
Age	15.17 (1.90)	14.59 (1.80)	15.12 (2.05)	14.24 (1.74)
SES	6.69 (1.73)	6.27 (1.91)	6.31 (1.78)	6.25 (1.68)
Health in adolescence (T1; ages 12–18)				
Internalizing symptoms				
Depressive symptoms	2.31 (2.33)	3.08 (2.61)	3.68 (2.59)	4.44 (2.73)
Anxiety symptoms	5.56 (2.53)	5.55 (2.68)	6.50 (2.41)	6.98 (2.73)
Externalizing symptoms				
ADHD symptoms	4.18 (2.35)	5.33 (2.37)	5.35 (2.33)	6.12 (2.37)
ODD symptoms	3.74 (2.11)	5.16 (2.41)	5.12 (2.17)	5.40 (2.63)
Conduct problems	0.81 (1.34)	1.35 (1.52)	1.09 (1.39)	2.02 (2.50)
Substance use				
Smoking status	39 (9%)	11 (12%)	20 (18%)	6 (14%)
Heavy episodic drinking	0.57 (.95)	0.75 (1.12)	0.69 (1.15)	0.29 (.74)
Marijuana use frequency	0.69 (1.16)	0.81 (1.35)	0.79 (1.26)	0.74 (1.25)
Illicit drug use	46 (11%)	15 (16%)	17 (16%)	8 (19%)
Subjective health				
Physical symptoms	5.30 (2.90)	5.78 (3.05)	6.09 (3.08)	7.17 (2.85)
Physical self-concept	18.24 (4.02)	17.78 (3.75)	16.97 (3.99)	15.51 (4.57)
Health-promoting behaviors				
Physical activity	4.17 (1.89)	4.29 (1.75)	3.79 (1.89)	3.52 (1.73)
Healthy eating practices	5.29 (2.34)	4.48 (2.20)	5.37 (2.09)	4.62 (2.74)
Sleep duration	8.23 (1.22)	8.29 (1.36)	8.06 (1.42)	7.96 (1.78)
Sleep difficulties	1.38 (1.35)	1.59 (1.53)	1.68 (1.51)	2.00 (1.65)
Cardiometabolic risks				
Body mass index (kg/m^2)	21.46 (3.20)	21.08 (3.39)	21.42 (3.58)	20.25 (3.38)
Overweight or obese (%)	62 (15%)	14 (15%)	23 (21%)	7 (18%)

(Continues)

TABLE 3 (Continued)

	1. Low victimization (*n* = 414; 63%)	2. Physical victimization (*n* = 96; 15%)	3. Relational victimization (*n* = 110; 17%)	4. Poly-victimization (*n* = 42; 6%)
	Mean (*SD*) or *n* (%)	Mean (*SD*) or *n* (%)	Mean (*SD*) or *n* (%)	Mean (*SD*) or *n* (%)
Health in young adulthood (T6; ages 22–29)				
Internalizing symptoms				
Depressive symptoms	2.63 (2.68)	2.77 (2.19)	3.40 (2.46)	4.65 (3.10)
Anxiety	5.28 (2.79)	5.03 (2.36)	5.91 (2.80)	6.88 (3.01)
Externalizing symptoms				
ADHD symptoms	3.57 (2.39)	4.00 (2.42)	4.08 (2.21)	5.04 (2.54)
ODD symptoms	2.79 (2.13)	3.21 (2.34)	3.84 (1.97)	4.31 (2.35)
Conduct problems	1.01 (1.00)	1.11 (1.12)	1.03 (1.03)	1.42 (1.55)
Substance use				
Smoking status	63 (21%)	14 (22%)	20 (26%)	9 (35%)
Heavy episodic drinking	1.40 (1.20)	1.57 (1.25)	1.48 (1.29)	1.42 (1.02)
Marijuana use frequency	1.22 (1.46)	1.23 (1.48)	1.19 (1.48)	1.40 (1.61)
Illicit drug use	92 (30%)	23 (35%)	21 (27%)	10 (40%)
Subjective health				
Physical symptoms	5.73 (2.71)	5.95 (3.34)	6.86 (2.89)	7.58 (3.87)
Physical self-concept	19.03 (5.81)	19.88 (5.24)	18.12 (6.25)	15.77 (8.09)
Health-promoting behaviors				
Physical activity	3.10 (1.98)	2.72 (1.88)	3.38 (2.11)	2.92 (1.92)
Healthy eating practices	6.42 (2.27)	6.27 (2.04)	6.71 (2.37)	5.23 (2.58)
Sleep duration	7.13 (1.08)	6.85 (1.13)	6.88 (1.28)	7.42 (1.32)
Sleep difficulties	1.80 (1.35)	1.75 (1.36)	2.12 (1.56)	2.46 (1.61)
Cardiometabolic risks				
Body mass index (kg/m^2)	25.15 (4.73)	25.14 (5.24)	24.51 (4.65)	25.28 (5.48)
Overweight or obese (%)	134 (44%)	26 (41%)	29 (39%)	11 (42%)
Waist circumference	89.93 (10.79)	89.14 (11.92)	88.03 (14.43)	88.94 (10.12)
Above cut-off (%)	94 (33%)	7 (12%)	27 (37%)	7 (29%)
Hypertension				
Hypertensive (%)	142 (56%)	24 (49%)	24 (39%)	12 (57%)

Note. For descriptive purposes, participants were classified based on body mass index (BMI) as overweight or obese (T1 bmiz ≥85th percentile for sex and age; T6 BMI ≥25 kg/m^2). Waist circumference cut-off is ≥102 cm for males and ≥88 cm for females (Statistics Canada, 2013). Participants were classified based on systolic and diastolic blood pressure (SBP and DBP) as hypertensive (SBP ≥130 mmHg or DBP ≥80 mmHg).

TABLE 4 Victimization class differences in adolescent (T1; ages 12–18) health indicators

	2. Physical victimization (*n* = 96; 15%)		3. Relational victimization (*n* = 110; 17%)		4. Poly-victimization (*n* = 42; 6%)		Pairwise comparisons
	Est. (*SE*)	OR	Est. (*SE*)	OR	Est. (*SE*)	OR	*p* < 0.05
Demographics							
Sex (male = 0)	−1.58*** (0.37)	0.21	0.60* (0.27)	1.83	−0.54 (0.40)	0.58	3 > 1, 2, 4; 1 > 2
Age	−0.16* (0.08)	0.85	−0.03 (0.07)	0.98	−0.30** (0.10)	0.74	2, 4 < 1; 3 < 4
SES	−0.16 (0.09)	0.85	−0.14* (0.07)	0.87	−0.14 (0.10)	0.87	3 < 1
Internalizing symptoms							
Depressive symptoms	0.27** (0.08)	1.31	0.20*** (0.06)	1.22	0.38*** (0.09)	1.46	2, 3, 4 > 1
Anxiety symptoms	−0.07 (0.07)	0.94	0.11* (0.05)	1.11	0.19* (0.09)	1.21	3, 4 > 1, 2
Externalizing symptoms							
ADHD symptoms	0.09 (0.07)	1.10	0.12 (0.06)	1.13	0.30*** (0.11)	1.35	4 > 1
ODD symptoms	0.31*** (0.09)	1.36	0.27*** (0.07)	1.31	0.17 (0.14)	1.19	2, 3 > 1
Conduct problems	0.19 (0.13)	1.20	−0.01 (0.12)	0.99	0.32* (0.13)	1.38	4 > 1, 3
Substance use							
Smoking status	0.10 (0.67)	1.10	0.95* (0.41)	2.59	1.00 (0.74)	2.71	3 > 1
Heavy drinking	0.30 (0.22)	1.35	0.21 (0.19)	1.24	−0.76 (0.60)	0.47	
Marijuana use frequency	−0.02 (0.20)	0.98	−0.18 (0.17)	0.84	0.02 (0.32)	1.02	
Illicit drug use	0.68 (0.52)	1.98	0.27 (0.45)	1.31	1.61* (0.82)	5.02	4 > 1
Subjective health							
Physical symptoms	0.13* (0.06)	1.14	0.06 (0.04)	1.06	0.26*** (0.07)	1.30	2, 4 > 1; 4 > 3
Physical self-concept	−0.04 (0.04)	0.96	−0.07* (0.03)	0.93	−0.18*** (0.05)	0.83	4 < 1, 2, 3; 3 < 1
Health-promoting behaviors							
Physical activity	0.06 (0.11)	1.07	−0.13 (0.07)	0.88	−0.28** (0.09)	0.76	4 < 1, 2
Healthy eating practices	−0.13 (0.07)	0.88	0.01 (0.06)	1.01	−0.04 (0.10)	0.96	
Sleep duration	−0.19 (0.17)	0.83	−0.03 (0.14)	0.97	−0.36 (0.20)	0.70	
Sleep difficulties	0.11 (0.13)	1.11	0.15 (0.10)	1.16	0.26 (0.15)	1.29	
Cardiometabolic risks							
Body mass index	−0.05 (0.05)	0.95	0.01 (0.04)	1.01	−0.13 (0.10)	0.88	

Note. 1. Low victimization (*n* = 414; 63%) class is the reference. Models account for sex, age at T1 centered, and SES. Sample sizes for each class are based on modal assignment using the posterior probability of class membership.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

TABLE 5 Adjusted means, *SD*, and probabilities of physical health indicators by adolescent victimization class in young adulthood (T6; ages 22–29)

	1. Low victimization (*n* = 414; 63%)	2. Physical victimization (*n* = 96; 15%)	3. Relational victimization (*n* = 110; 17%)	4. Poly-victimization (*n* = 42; 6%)	Overall Wald	Pairwise comparisons
	Adjusted mean (SE)	Adjusted mean (SE)	Adjusted mean (SE)	Adjusted mean (SE)	χ^2	$p < 0.05$
Internalizing symptoms						
Depressive symptoms	2.62 (0.55)	2.50 (0.57)	2.99 (0.59)	4.34 (0.83)	7.83*	4 > 1, 2
Anxiety symptoms	3.55 (0.58)	3.41 (0.60)	3.84 (0.69)	4.98 (0.83)	5.73	
Externalizing symptoms						
ADHD symptoms	2.68 (0.53)	2.82 (0.55)	2.86 (0.60)	3.56 (0.77)	2.32	
ODD symptoms	1.99 (0.43)	1.82 (0.53)	2.65 (0.51)	3.10 (0.62)	10.13*	3, 4, >1
Conduct problems	1.09 (0.25)	1.13 (0.26)	1.10 (0.27)	1.16 (0.42)	0.08	
Substance use						
Smoking status (*Pr*)	0.31	0.12	0.36	0.44	1.15	
Heavy drinking	1.66 (0.27)	1.39 (0.33)	1.72 (0.31)	1.63 (0.32)	0.74	
Marijuana use frequency	2.30 (0.32)	1.86 (0.38)	2.30 (0.39)	2.47 (0.55)	1.77	
Illicit drug use (*Pr*)	0.50	0.34	0.46	0.57	0.54	
Subjective health						
Physical symptoms	5.33 (0.62)	5.55 (0.82)	6.20 (0.73)	6.99 (1.24)	7.87*	3 > 1
Physical self-concept	9.69 (1.94)	10.79 (1.98)	9.78 (2.04)	6.56 (2.53)	3.59	
Health-promoting behaviors						
Physical activity	0.89 (0.46)	.33 (0.45)	1.35 (0.52)	0.98 (0.52)	9.21*	2 < 1, 3
Healthy eating practices	3.35 (0.50)	3.72 (0.52)	3.64 (0.59)	2.26 (0.63)	5.84	
Sleep duration	5.17 (0.50)	4.78 (0.48)	4.95 (0.50)	5.72 (0.51)	10.40*	2, 3, <4; 3 < 1
Sleep difficulties	1.44 (0.32)	1.34 (0.34)	1.54 (0.37)	2.14 (0.47)	3.92	
Cardiometabolic risks						
Body mass index	7.69 (1.85)	6.91 (2.03)	6.96 (2.31)	11.77 (6.83)	1.20	

(Continues)

TABLE 5 (Continued)

	1. Low victimization (*n* = 414; 63%)	2. Physical victimization (*n* = 96; 15%)	3. Relational victimization (*n* = 110; 17%)	4. Poly-victimization (*n* = 42; 6%)	Overall Wald	Pairwise comparisons
	Adjusted mean (SE)	Adjusted mean (SE)	Adjusted mean (SE)	Adjusted mean (SE)	χ^2	$p < 0.05$
Waist circumference[a]	58.54 (4.90)	55.40 (5.29)	55.81 (6.15)	68.06 (17.63)	3.88	
Hypertension (*Pr*)[a]	0.09	0.05	0.05	0.18	7.47	

Notes. Models account for sex, age at T1 centered, SES, and their respective T1 assessment. *Pr* = probability of event occurrence for dichotomous outcomes (*Pr* = 1/(1 + exp (Threshold); Muthén & Muthén, 1998-2012).
[a]Waist circumference and hypertension accounted for T1 body mass index. $^*p < 0.05$.

poorest physical self-concept compared to all other classes. Youth in the Relational class also reported poorer physical self-concept than the Low class. Youth in the Poly-victimization class reported less physical activity than youth in the Low and Physical classes in adolescence. Class differences in healthy eating practices and sleep duration or difficulties were not significant in adolescence. Adolescent BMI was not a significant correlate of class membership at T1.

8.3 | Longitudinal (young adult) peer victimization class differences

8.3.1 | Mental health and substance use

In young adulthood (ages 22–29), the overall omnibus Wald test was significant for depressive, but not anxiety, symptoms. Youth in the Poly-victimization class continued to report higher levels of depressive symptoms than youth in the Low class in young adulthood (Table 5). The omnibus test of class differences in symptoms of ODD, but not ADHD or conduct problems was significant. Youth in the Relational and Poly-victimization classes reported more ODD symptoms than youth in the Low class beyond adolescent symptoms. Victimization classes did not differ on any of the substance use indicators (i.e., smoking, heavy drinking, marijuana use, and illicit drug use) in young adulthood.

8.3.2 | Physical health

In young adulthood, the overall test for class differences in physical symptoms was significant; youth in the Relational class reported more physical symptoms than youth in the Low class. Class differences in young adulthood for physical self-concept were not significant beyond adolescent levels. In young adulthood, youth in the Physical victimization class reported less physical activity than youth in the Low and Relational classes in young adulthood. Class differences on healthy eating and sleep difficulties were not significant. In young adulthood, youth in the Poly-victimization class reported sleeping longer than youth in the Physical and Relational classes. Youth in the Relational class also slept less than those in the Low class. Victimization classes did not differ on cardiometabolic risks (i.e., BMI, waist circumference, or hypertension) in young adulthood.

9 | DISCUSSION

In this study, we extend prior research by examining how heterogeneity in experiences of peer victimization (i.e., using latent class analysis) in adolescence is concurrently and prospectively related to indicators of mental health,

substance use, and physical health in adolescence and young adulthood. We found four distinct classes of youth based on 10 items of victimization (i.e., varying in type and severity). This is consistent with Bradshaw et al. (2013) who identified four victimization classes in their middle school sample and three classes of victimization in their high school sample but who also included assessments of cyberbullying and sexual harassment. The present classes were differentially related to health correlates and some associations persisted across 10 years into young adulthood even after controlling for stability over time. Most youth (63%; Low victimization class) experienced low levels of victimization in adolescence and these youth reported the fewest health problems both concurrently and longitudinally. A small portion of youth (6%; Poly-victimization class) experienced high levels across both forms of victimization (i.e., physical and relational) and these youth reported the most detrimental concurrent and long-term health problems compared to other classes. Youth who experienced moderate to high levels of relational victimization (17%; Relational victimization class) also endorsed unique adolescent health problems (i.e., internalizing symptoms, ODD symptoms, smoking, poor physical self-concept), some of which persisted into young adulthood. Finally, 15% of youth endorsed experiencing moderate to high levels of physical victimization (i.e., Physical victimization class) and reported few health problems, most of which resolved by young adulthood possibly reflecting low levels of this type of victimization across the transition to young adulthood (Leadbeater et al., 2014).

9.1 | Peer victimization and mental health

The present findings are consistent with past research showing concurrent and longitudinal negative mental health consequences of peer victimization (see Arseneault et al., 2010; Card & Hodges, 2008; Casper & Card, 2017; McDougall & Vaillancourt, 2015 for reviews). All victimization classes reported higher levels of depressive symptoms in adolescence compared to the Low victimization class, suggesting that any experience of victimization in adolescence can put an adolescent at risk of depressive symptomatology. Adolescents in both the Poly-victimization and Relational victimization classes also reported higher concurrent levels of anxiety than youth in the Low and Physical victimization classes. Some longitudinal research shows peer victimization is also linked to suicidal ideation and behaviors in adulthood (Klomek et al., 2009). Creating opportunities for victimized youth to ask for help and connecting them to supportive services may promote well-being and deter long-term mental health impairments. This may be particularly important for youth in the Poly-victimization class, who continued to report higher levels of depressive symptoms in young adulthood than youth in the Low victimization class, even after controlling for baseline class differences.

Results for the association of victimization classes and externalizing problems were also consistent with past research (see Reijntjes et al., 2011 for review). In adolescence, youth in the Poly-victimization class reported more symptoms of ADHD and conduct problems and youth in the Physical and Relational victimization classes reported more symptoms of ODD than the Low victimization class. These findings suggest that youth who exhibit externalizing problems may be easy targets for victimization. Externalizing problems and peer victimization are reciprocally related; those who behave aggressively are more likely to be socially isolated and victimized, and those who are frequently victimized by peers may be more likely to exhibit aggressive behavior. Reijntjes et al. (2011) found evidence for externalizing problems as both an antecedent and a consequence of peer victimization, demonstrating an accelerating cycle of peer victimization wherein externalizing behaviors are both perpetuated by and exacerbate peer victimization. In young adulthood, ODD symptoms persisted and worsened for youth in the Poly- and Relational victimization classes. Symptoms of ODD reflect both irritability and defiance (i.e., argues with others), which may reflect poor social skills which compound over time and result in fewer and poorer relationships with peers, as well as traits that discourage positive social interactions (Reijntjes et al., 2011).

9.2 | Peer victimization and substance use

Youth in the Poly-victimization class were five times more likely to use at least one illicit drug within the past year than those in the Low victimization class. Experimentation with illicit substances may be used as a coping strategy for

dealing with the trauma of peer victimization (Bonn-Miller, Vujanovic, Boden, & Gross, 2011; Britton, 2004). Youth in the Relational victimization class were also more likely to be smokers than those in the Low victimization class, partially consistent with past findings showing youth who are victimized are more likely to be smokers (Niemelä et al., 2011). Adolescent results were not significant for heavy drinking or marijuana use. Adolescent substance use concerns may be time-limited, as class differences did not persist into young adulthood. This is consistent with previous research showing no associations between early victimization experiences and later substance use disorders in early and mid-adulthood (Copeland et al., 2013; Takizawa et al., 2014). Problematic substance use typically emerges in late adolescence and early young adulthood (Young et al., 2002) and victimized youth may not have the necessary levels of exposure given their limited peer networks (Takizawa et al., 2014).

9.3 | Peer victimization and physical health

Compared to research documenting the negative mental health consequences associated with peer victimization, less is known about how varied experiences of peer victimization are related to physical health consequences. We hoped to expand on past research by using a comprehensive range of physical health indicators (i.e., aspects of subjective health, health-promoting behaviors, and cardiometabolic risks). Our results suggest that youth who are severely and pervasively victimized (i.e., Poly-victimization class) show the worst physical health outcomes, some of which persisted across 10 years.

Consistent with meta-analytic findings (Gini & Pozzoli, 2009, 2013), adolescents in the Poly-victimization class reported more physical symptoms than youth in Low and Relational victimization classes. Although this finding did not persist into young adulthood, these youth continued to report the highest mean and adjusted mean levels of physical symptoms at T6 (Tables 3 and 5); possibly reflecting a power issue due to decreased sample size at T6. In adolescence, youth in the Physical victimization class also reported more physical symptoms than youth in the Low victimization class. Experiences of physical symptoms may directly reflect the physical nature of this type of victimization (e.g., being hit, shoved, pushed or kicked). Although class differences in the Relational victimization class were not significant in adolescence, these youth reported higher levels of physical symptoms than the Low victimization class in young adulthood, consistent with past research using variable-centered analyses with the present sample (Hager & Leadbeater, 2016). Hager and Leadbeater (2016) showed relational, but not physical, victimization was longitudinally associated with increases in physical symptoms over time, possibly reflecting long-term physical consequences of chronic stress resulting from relational victimization. The association between poly- and relational victimization and physical symptoms may also be explained by research that has found that both physical and social pain can activate the same physiological responses in the brain, thus increasing physical discomfort (McDonald & Leary, 2005). Persistent physical symptoms may also reflect psychosomatic complaints associated with depressive symptoms among the Poly-victimization class (Kapfhammer, 2006; Masi et al., 2000). Incorporating mindfulness-based techniques into therapies for these youth may help to target depressive symptoms and physical symptoms (Grossman, Niemann, Schmidt, & Walach, 2004; Hofmann, Sawyer, Witt, & Oh, 2010).

Findings for physical self-concept are largely consistent with past research showing a negative association between peer victimization and how adolescents perceive their health (Bogart et al., 2014; Frisén & Bjarnelind, 2010; Rigby, 1999; Takizawa et al., 2014). Adolescents in the Poly-victimization class reported the poorest physical self-concept compared to all other classes. Youth in the Relational class also reported poorer physical self-concept than the Low victimization class. Persecution by one's peers can be detrimental to one's self-worth, including and extending to one's perceptions of their body and abilities. Although mean levels of physical self-concept differed in young adulthood (Table 2), class differences were not significant beyond adolescent levels in our final models, suggesting that these class differences remained stable over time.

Adolescents in the Poly-victimization class reported lower levels of physical activity in adolescence compared to the Physical and Low victimization classes, possibly related to increased depressive and anxiety symptoms, heightened experience of negative physical symptoms, and poor physical self-concept (Babic et al., 2014; Jerstad, Boutelle, Ness, & Stice, 2010; Johnson & Taliaferro, 2011). The mental and physical health problems among the Poly-victimization class

represent a number of concerns that are undoubtedly interconnected. Future research on the direction of effects or potential additive nature of these concerns would highlight the more nuanced experiences of these youth and identify the most pertinent areas for targeted interventions. Present findings suggest multi-faceted interventions targeting both mental and physical health may prove most effective. In young adulthood, youth in the Physical victimization class reported lower levels of physical activity than youth in the Relational and Low victimization classes. It is possible that these youth withdraw from physical activities (i.e., sports teams) in settings where physical victimization is likely to occur. Youth may also withdraw from physical activity as a result of injuries sustained through physical victimization.

Our concurrent findings for sleep duration and difficulties were not significant. However, in young adulthood, youth in the Poly-victimization class reported sleeping longer than youth in the Physical and Relational classes possibly reflecting their elevated depressive symptoms. Youth in the Relational class slept less in young adulthood than those in the Low victimization class. Class differences in healthy eating practices were not significant concurrently or longitudinally. Our approach of examining these health-promoting behaviors by simultaneously entering them into one model did not allow for unadjusted effects to be examined, as such, unique effects for healthy eating may have been missed. However, by modeling these behaviors together, our results suggest peer victimization is most strongly related to physical activity levels and sleep which can be used to identify critical targets for prevention and intervention.

Given research documenting the biological pathways of how peer victimization may be conceptualized as a chronic stressor to impact health (McDougall & Vaillancourt, 2015; Vaillancourt et al., 2013), we examined how peer victimization was related to indcators of cardiometabolic risks (i.e., BMI, waist circumference, and hypertension). Our research did not show adolescent BMI was a significant predictor of class membership; however, our findings may have been limited by examining females and males together (Ames & Leadbeater, 2017). Victimization classes also did not differ on cardiometabolic risks in young adulthood. Research showing cardiometabolic affects of early experiences of peer victimization in young adulthood are mixed (Matthews et al., 2017; Wolke et al., 2013) and findings may be more evident by mid-life (Gustafsson et al., 2012).

10 | LIMITATIONS

This study has several limitations that should be noted. First, the sample consisted of predominately White youth from British Columbia, Canada limiting the generalizability of the findings. Second, except for T6 cardiometabolic risks, all measures were self-reported and subject to response bias; however, all interviews were conducted individually in private locations to help reduce potential bias. Furthermore, some outcomes were measured using single item indicators (e.g., substance use measures and sleep duration and difficulties), which may not be as robust as scales or objective measurements. Third, there was no assessment of cyber victimization which has been found to have important influences on mental and physical health due to its pervasive nature (Kim, Kimber, Boyle, & Georgiades, 2018; Modecki et al., 2014). Fourth, analyses focused on peer victimization and did not consider whether youth who were victimized also perpetrated victimization (Matthews et al., 2017). Finally, due to sample size restrictions within classes, we were unable to examine sex differences to compare to other studies which show sex-specific effects (e.g., Ames & Leadbeater, 2017; McGee et al., 2011).

11 | IMPLICATIONS

We advance past cross-sectional research by showing that heterogeneity in adolescent experiences of peer victimization is related to concurrent and longitudinal health-related outcomes. Many of the concurrent associations evident in adolescence did not persist into young adulthood, possibly suggesting some of the health-related consequences of adolescent peer victimization may be time-limited. However, several associations remained significant across 10 years after accounting for baseline levels, suggesting lasting

effects. The creation, development, and evaluation of evidence-based programs to help support youth to escape or intervene in peer victimization experiences are necessary to promote the healthy development of all youth. Our findings highlight the accompanying physical health problems which may contribute to and further exacerbate mental health consequences of peer victimization. Further research into the direction and potentially additive nature of these effects is needed. Assessing and treating the physical health complaints of victimized youth may improve intervention efforts. Creating ways to improve self-concept in adolescence may also increase resilience among victimized youth. It is likely that youth who are victimized in adolescence are vulnerable to continued victimization experiences over time (Leadbeater et al., 2014). Although this study focused on adolescent experiences of victimization, future research would benefit from examining transitions in victimization experiences and how youth may be resilient or vulnerable to these negative outcomes over time.

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CONFLICT OF INTERESTS

None.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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