

The View From the Bottom: Relative Deprivation and Bullying Victimization in Canadian Adolescents

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Abstract

We investigated the relation between relative deprivation (RD)—disparity in affluence between adolescents and their more affluent schoolmates—and involvement in bullying among 23,383 students (aged 9–19) in 413 schools that participated in the 2010 Canadian Health Behavior in School-Aged Children survey. Students reported family affluence and frequency of bullying victimization and perpetration during the previous 2 months. Using the Yitzhaki index of RD and multinomial logistic regression analysis, we found that RD positively related to three types of bullying victimization (physical, relational, and cyberbullying) and to two types of perpetration (relational and cyberbullying) after differences in absolute affluence were held constant. These findings suggest that RD uniquely contributes to risk of bullying involvement.

Keywords

bullying, mental health and violence, youth violence

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Introduction

School bullying involves repeated aggressive acts that have hostile intent and involve a power differential between aggressors and their victims (Olweus, 1999). Moreover, it constitutes the most widespread form of violence that children and adolescents encounter on a daily basis (Anthony, Wessler, & Sebian, 2010; Elgar, Pickett, et al., 2013). The consequences of bullying include social problems (e.g., peer rejection), academic problems (e.g., school absenteeism), and physical and psychological health problems (e.g., abdominal pain, hyperactivity, depression; Bauman, Toomey, & Walker, 2013; Boulton & Smith, 1994; Glew, Fan, Katon, Rivara, & Kernic, 2005; Klomek, Marrocco, Kleinman, Schonfeld, & Gould, 2007; Williams, Chambers, Logan, & Robinson, 1996). Longitudinal studies have found that involvement in bullying either as a perpetrator or victim uniquely contributes to the development and maintenance of these problems over time (Klomek et al., 2008; Marrocco et al., 2013; Reijntjes, Kamphuis, Prinzie, & Telch, 2010; Rigby, 1999).

Given the negative consequences of bullying for youths, research has tried to identify contextual and socioeconomic factors that place certain adolescents at risk for victimization. Some of this work focuses on socioeconomic status (SES), but unlike various health and behavioral problems that are more common in lower socioeconomic groups (Chen, 2004), bullying does not consistently relate to individual or family SES (Craig et al., 2009; Elgar, Craig, Boyce, Morgan, & Vella-Zarb, 2009). Jansen et al. (2012) found that although parental education relates to victimization, other dimensions of SES do not. However, research in Britain and Germany found that students at lower SES were at higher risk of bullying others and being victimized by bullying (Wolke, Woods, Stanford, & Schulz, 2001). No such relation was found between SES and bullying in studies conducted in New Zealand (Lind & Maxwell, 1996), Scotland (Mellor, 1999), and Scandinavia (Olweus, 1994).

The inconsistencies in the research linking SES to bullying have prompted other studies to examine the role of income inequality (i.e., the gap between the rich and poor) rather than individual SES, arguing that income inequality exerts a contextual influence on peer relations that makes bullying more likely to occur (Elgar et al., 2009). A study by Menzer and Torney-Purta (2012) found higher levels of bullying in schools with greater socioeconomic diversity. As well, greater socioeconomic inequality positively related to bullying victimization among adolescents in Colombian municipalities (Chaux, Molano, & Podlesky, 2009). Due et al. (2009) also found that socioeconomic inequality positively relates to bullying victimization among adolescents. Furthermore, in examinations of cross-national differences in income

inequality and school bullying, Elgar et al. (2009), and Elgar, Pickett, et al. (2013) found four- to five-fold differences in the prevalence of bullying across the observed range of income inequality.

The prevailing explanation of links between income inequality and various health and social problems such as bullying is based on Wilkinson and Pickett's (2009) *income inequality hypothesis*. They suggest that independent of absolute poverty, poverty amid plenty intensifies social rank, erodes social capital, and contributes to ill health and social problems. With more inequality, problems that relate to SES become more common, including interpersonal violence (e.g., homicides, burglaries, assaults, hostility, racism; Wilkinson & Pickett, 2006, 2007, 2009). Moreover, the income inequality hypothesis has a dual interpretation of income (i.e., absolute vs. relative) and draws parallels to absolute versus relative poverty. Absolute poverty can be considered absolute deprivation in terms of the inability to purchase basic goods and services to maintain health (World Health Organization, 2008). The alternative mechanism is relative resource deprivation, which represents the inability to access additional material goods and services that are part of functioning as a member of society (i.e., access to a telephone or the Internet; Adjaye-Gbewonyo & Kawachi, 2012).

The income inequality hypothesis suggests that as the gap between rich and poor widens, relative poverty (i.e., relative resource deprivation) increases for those at the bottom of the social hierarchy, as does a sense of relative deprivation (RD; Wilkinson & Pickett, 2009). RD is a plausible mechanism for the association between income inequality and bullying because it determines individual status and social distance (Wilkinson, 1996). Accordingly, individuals in societies with greater inequality are more likely to draw comparisons of relative position, which can elicit status anxiety or stress and erode social resources that inhibit violence (Wilkinson & Pickett, 2009). Therefore, although income inequality is a contextual characteristic that describes variation of incomes within a group, RD is a measure of individual's income or resources in comparison with others in a social reference group (Adjaye-Gbewonyo & Kawachi, 2012; Kawachi, Subramanian, & Almeida-Filho, 2002). Although previous studies have examined contextual effects of income inequality, the context in which social position is established has not yet been explored. More specifically, the contribution of RD to bullying has not yet been studied at an individual level.

The emotion an individual feels when making negatively discrepant comparisons with others in their social reference group is referred to as RD, and this emotion is likely to intensify with greater income inequality (Crosby, 1976). However, the general theory of RD originated from Runciman (1966) and states that an individual feels deprived when the following criteria are met:

(i) he does not have X, (ii) he sees some other person or persons, which may include himself at some previous or expected time, as having X, (iii) he wants X, and (iv) he sees it as feasible that he should have X. (Runciman, 1966, p. 10)

Because RD explicitly involves a reference group in relation to the distribution of wealth within that group, it differs from other SES markers such as absolute affluence in that RD is felt across all strata of society (Eibner, Sturm, & Gresenz, 2004). The individual measure of RD bases itself on upward social comparisons that are not limited to individuals at the bottom of the social hierarchy, but rather to whomever constitutes the reference group. Therefore, it is plausible that RD has similar effects among individuals with average or even high incomes who compare themselves with their “better-off” peers (Eibner et al., 2004).

The present study examined RD within schools and absolute affluence in relation to adolescents’ involvement in bullying. Analyzing the problem of school bullying through the lens of RD may help clarify the apparent contradictions in the research literature regarding the relation between socioeconomic factors and bullying involvement. We propose that the role of RD in schools reflects psychosocial processes contingent on social status or social comparisons made within schools (Wilkinson, 2005). Nonetheless, it remains important to consider differences in absolute affluence when examining RD within schools due to its confounding effect. By including absolute affluence as an independent variable, we isolate the psychosocial path and examine the residual effect of relative socioeconomic position within schools after differences in absolute affluence are controlled. Although absolute affluence might also contribute to bullying behavior, we posit that social contextual factors (e.g., relative social position among peers) govern how SES relates to victimization of or aggression toward others. Thus, examination of RD in schools allows us to test the income inequality hypothesis in relation to the power differential that is unique to bullying. Psychosocial processes drive RD, in that inequality within schools contributes to feelings of deprivation and shapes perceptions of social rank and dominance (Elstad, 1998; Wilkinson & Pickett, 2006, 2007, 2009). We investigated the unique contribution of RD to various forms of school bullying using data from the 2010 Canadian Health Behavior in School-Aged Children (HBSC) survey. The HBSC study is a World Health Organization study carried out in 43 countries in Europe and North America (www.hbsc.org). Adolescent victimization and perpetration for direct (i.e., physical and verbal) and non-direct (i.e., relational and cyberbullying) forms of bullying were examined because the effects of RD may differ across bullying outcomes. RD is not always noticeable or evident, and the psychosocial effects that may result from unfavorable social comparisons can increase the

likelihood of bullying because it often produces anger, frustration, and a weak commitment to social norms (Runciman, 1966). Accordingly, higher levels of RD within schools may make social status differentiation more apparent and increase adolescents' risk for bullying victimization.

We calculated RD in students within their schools using a mathematical expression of Runciman's theory, developed by Yitzhaki (1979), and then analyzed the extent to which RD relates to involvement in school bullying. Specifically, we examined whether RD related to various forms of bullying (physical, verbal, relational, and cyberbullying). We hypothesized that RD positively associates with various forms of bullying, with a closer relation to victimization than perpetration, as increased economic and social disparity among peer groups render students of lower status more vulnerable to being bullied than aggressing others. Accordingly, differences in social rank attributed to RD within schools may complement aggressive bullying behaviors among higher-ranking peers, whereas producing anxiety and stress in the lower-ranking adolescents.

Method

Participants

The 2010 Canadian HBSC survey is a school-based survey of a nationally representative sample of students in all Canadian provinces and territories except New Brunswick and Prince Edward Island (Currie et al., 2008; Elgar, Craig, & Trites, 2013; Elgar, Craig, et al., 2013). A clustered sample consisted of 26,078 students (48.13% male, 51.87% female) from 436 schools in 1,294 classrooms. The sample ranged in age from 9.67 to 19.17 years ($M = 13.83$, $SD = 1.52$), and school grade was treated as a continuous variable ranging from "Grade 6" to "Grade 10." Weighted probability methods were applied to ensure a balanced representation of school characteristics (i.e., language of instruction, province or territory, public or catholic school, and community size). The HBSC survey excluded students attending private schools, special needs schools, or schools specifically for adolescents in custody.

Active or passive consent was obtained depending on the schools and school jurisdictions. Approximately 59% of participating schools chose passive consent and the remaining 41% chose active consent. Among the total Canadian HBSC sample of 33,868 students, 26,078 (77.0%) students, 436 of 765 (57.0%) schools, and 11 of 13 (85%) of Canada's provinces and territories responded to the survey. Non-participation was most commonly attributed to failure to return consent forms, inability to receive parental consent, or absenteeism on the day of survey administration. Cases with missing data on school

geocodes or key variables (gender, age, family affluence) were also excluded from our analyses. Given our focus on RD within schools, schools with fewer than 10 respondents were additionally excluded. These exclusion criteria reduced the sample by 10.3% to 23,383 students in 413 schools.

Procedures and Measures

The HBSC survey was administered by teachers or trained interviewers in classroom settings. Students completed the self-administered questionnaire measuring sociodemographic information and frequency of involvement in school bullying over the past couple of months (as a perpetrator, victim, or bully-victim). Student participation was voluntary, and the survey took approximately 45 min to complete. Approval to conduct the survey in Canada was obtained by a university research ethics board.

Outcome Variables

Bullying involvement. The HBSC survey provides respondents with the following definition of bullying, customized from Olweus's (1996) Bully-Victim Questionnaire:

We say a student is being bullied when another student, or a group of students, say or do nasty and unpleasant things to him or her. It is also bullying when a student is teased repeatedly in a way he or she does not like or when he or she is deliberately left out of things. But it is not bullying when two students of about the same strength or power argue or fight. It is also not bullying when the teasing is done in a friendly and playful way.

Participants were then asked the questions, "How often have you been bullied at school in the past couple of months?" and "How often have you bullied others at school in the past couple of months?" Response options were as follows: not at all, once or twice, two or three times per month, once a week, and several times a week. Participants were coded as "victims" or "aggressors" of bullying if they responded at least "two or three times per month." This cut-off point has been suggested in earlier studies (Solberg & Olweus, 2003) and by the HBSC international report (Currie et al., 2008). Members of the "bully-victim" group were identified as participants who responded at least "two or three times per month" to both of the previous questions. The reliability and validity of these measures have been reported in previous studies (Solberg & Olweus, 2003; Wang, Iannotti, & Luk, 2010; Wang, Iannotti, & Nansel, 2009).

Forms of bullying. Separate analyses were conducted on specific forms of bullying victimization and perpetration: (a) physical bullying, (b) verbal bullying, (c) relational bullying, and (d) cyberbullying. The HBSC survey also based these measures of bullying on the revised Olweus Bully-Victim Questionnaire (Olweus, 1996). The ordinal scale for each of the four bullying categories were trichotomized to “never,” “once or twice per month,” and “two or three times or more per month” to maintain a consistency across outcome variables. Parallel questions were asked for each item, which assessed the frequency of each specific form of bullying (bullying others) and victimization (being bullied) in the past couple of months.

Physical bullying. Occurrences of physical bullying were measured with a single item “I was hit, I was kicked, I was pushed, I was shoved around, or I was locked indoors.”

Verbal bullying. We grouped eight items from the HBSC questionnaire into two equal groups to measure occurrences of verbal bullying victimization ($\alpha = .71$) and perpetration ($\alpha = .76$). The items used were “I was called mean names, was made fun of, or teased in a hurtful way,” “I was bullied with mean names and comments about my race or color,” “I was bullied with mean names and comments about my religion,” and “Other students made sexual jokes, comments, or gestures to me.”

Relational bullying. We grouped four items from the HBSC questionnaire into two equal groups to measure occurrences of relational bullying. The items measuring victimization ($\alpha = .69$) and perpetration ($\alpha = .64$) were “Other students left me out of things on purpose, excluded me from their group of friends, or completely ignored me,” and “Other students told lies or spread false rumors about me and tried to make others dislike me.”

Cyberbullying. We grouped eight items from the HBSC questionnaire into two equal groups to measure occurrences of cyberbullying victimization ($\alpha = .85$) and perpetration ($\alpha = .92$). The items used were: “Someone sent mean instant messages, wall postings, emails and text messages, or created a web site that made fun of me,” “Someone took unflattering or inappropriate pictures of me without permission and posted them online,” “My username and password was stolen and used by someone to send mean messages using my name,” and “Someone tricked me into sharing personal information in an email or text message and forwarded that information to others.”

Independent Variables

Absolute affluence. Absolute affluence was measured using the HBSC Family Affluence Scale (FAS), which is a 4-item index that addresses family assets or conditions indicating wealth (Currie, Elton, Todd, & Platt, 1997; Wardle, Robb, & Johnson, 2002). The four items included in this index are (a) “Does your family have a car or a van?” (*no* = 0, *yes, one* = 1, *yes, two or more* = 2); (b) “Do you have your own bedroom for yourself?” (*no* = 0, *yes* = 1); (c) “During the past 12 months, how many times did you travel away on holiday or vacation with your family?” (*not at all* = 0, *once* = 1, *twice* = 2, *more than twice* = 3); and (d) “How many computers does your family own?” (*none* = 0, *one* = 1, *two* = 2, *more than two* = 3). Absolute affluence was a summation of responses to these four items. In accordance with the methods of previous HBSC studies, the two highest response categories (“2” and “3 or more”) in the last two items (holidays and computers) were combined. The composite FAS score consisted of a 3-point ordinal scale for the analysis, in which FAS 1 (score = 0-3) indicated low affluence, FAS 2 (score = 4, 5) indicated middle affluence, FAS 3 (score = 6, 7) indicated high affluence (Currie et al., 2008). The criterion validity of the FAS is less affected by non-response bias when compared with longer socioeconomic assessments that use child reports of household income or parental occupation (Boyce, Torsheim, Currie, & Zambon, 2006; Torsheim et al., 2004).

RD. RD was calculated for each student within his or her school using the Yitzhaki Index (Yitzhaki, 1979). For an individual adolescent i with affluence score of y_i who is a member of a reference group of N individuals,

$$RD_i = \frac{1}{N} \sum_j (y_j - y_i), \forall (y_j > y_i)$$

whereby the amount of deprivation is operationalized as the average difference in affluence between the individual (i) and all other members of the group (j) who have greater affluence. Accordingly, the Yitzhaki is an “upward looking” index of deprivation. A single estimate of RD was calculated for each individual student using his or her school as the reference group, with higher scores indicating more RD.

Sociodemographic variables. To ensure that the associations between RD and student bullying involvement were not biased owing to gender, grade level, and absolute affluence, we controlled these four sociodemographic variables in the analysis.

Data Analysis

Statistical analyses were conducted using the *svy* command set in Stata Version 12.1 (StataCorp, 2011, College Station, Texas), which adjusted standard errors according to the sampling design effects of classroom and school clustering. Multinomial logistic regression equations were used to model the associations between covariates and frequency of each form of bullying involvement. The categories “never been victimized” and “never bullied” were the reference groups in these analyses. Post-stratification data weights were applied to the sample data to provide accurate results reflecting the population of students in all Canadian provinces and territories represented in the study.

Results

Descriptive Statistics

Descriptive information on the study variables and sample characteristics are presented in Table 1. Mean RD varied significantly ($p < .001$) across the different types of bullying involvement. RD was greater among bully-victims ($M = 0.96$; 95% confidence interval [CI] = [0.93, 0.99]) than it was among victims ($M = 0.95$, 95% CI = [0.92, 0.99]), aggressors ($M = 0.90$, 95% CI = [0.85, 0.95]), and adolescents who were uninvolved in bullying ($M = 0.91$, 95% CI = [0.88, 0.94]).

The prevalence of bullying perpetrators, victims of bullying, and bully-victims among Canadian adolescents is represented by the sample of students in this study. More than one third (41.71%, 95% CI = [40.65, 42.78]) of the sample reported that they both bullied and were victimized in the previous 2 months. Reported victimization was more common than reported perpetration (21.79%, 95% CI = [20.94, 22.67] vs. 12.44%, 95% CI = [11.75, 13.17]). Females reported being victimized significantly ($p < .001$) more than males by verbal bullying (80.95% vs. 75.5%), relational bullying (73.4% vs. 54.25%), and cyberbullying (29.59% vs. 23.17%); however, physical victimization was significantly ($p < .001$) more prevalent in males than females (31.71% vs. 17.87%). For bullying perpetration, male respondents reported statistically ($p < .001$) higher rates by all four forms of bullying.

Multinomial Logistic Regression Analyses

We conducted a series of multiple logistic regression models to determine whether RD related to physical, verbal, relational, and cyberbullying victimization and perpetration, after controlling for dichotomous perpetration and

Table 1. Description of the Study Variables and Sample Characteristics.

Variable	<i>M</i>	<i>SD</i>	α	Range	95% CI	
Relative deprivation	0.94	0.99	—	0.00-7.58	0.92	0.96
Absolute affluence	2.49	0.64	—	1.00-3.00	2.44	2.49
School grade	8.01	1.41	—	6.00-10.00	7.94	8.08
Victimization						
Physical	0.27	0.60	—	0.00-2.00	0.23	0.26
Verbal	0.80	0.88	0.71	0.00-2.00	0.76	0.81
Relational	0.69	0.69	0.69	0.00-2.00	0.61	0.67
Cyber	0.30	0.30	0.85	0.00-2.00	0.25	0.28
Perpetration						
Physical	0.22	0.22	—	0.00-2.00	0.23	0.26
Verbal	0.58	0.58	0.76	0.00-2.00	0.56	0.60
Relational	0.34	0.34	0.64	0.00-2.00	0.30	0.33
Cyber	0.17	0.17	0.92	0.00-2.00	0.14	0.16

Note. CI = confidence interval.

victimization variables, absolute affluence, gender, and grade level. The dichotomous perpetration and victimization variables were entered into the multinomial models so that data on adolescents who both bullied and were victims of bullying (“bully-victims”) would not be included in analyses of those adolescents who were uniquely involved as perpetrators or victims.

The analyses were conducted separately for each form of victimization and perpetration. The resulting odds ratios (ORs) and confidence intervals are presented in Tables 2 and 3, respectively. As shown in Table 2, RD positively related to being victimized more than two or three times a month by physical bullying (OR = 1.23, 95% CI = [1.05, 1.43]). Similarly, the analyses indicate that for every 1-point increase in RD and while holding differences in absolute affluence, gender, and school grade constant, the ORs of being victimized by relational bullying and cyberbullying increased by 17% (OR = 1.17, 95% CI = [1.06, 1.29]), and by 22% (OR = 1.22, 95% CI = [1.08, 1.39]), respectively. Relative to low-family affluence and holding all other variables constant, the ORs of being victimized by relational bullying once or twice a month significantly increased by 16% (OR = 1.16, 95% CI = [1.01, 1.33]) See Table 2.

As for perpetration, Table 3 indicates that for each 1-point increase in RD score, the ORs of an adolescent reporting involvement in relational bullying and cyberbullying more than two or three times a month, both increased by 19%. One the other hand, absolute affluence negatively related to verbal bullying (OR = 0.87, 95% CI = [0.76, 0.99]) once or twice a month (Table 3).

Table 2. Multinomial Logistic Regressions for the Association Between Relative Deprivation and Victimization Variables.

Variable	Only Once or Twice				More Than Two or Three Times Per Month			
	OR	95% CI	t	p	OR	95% CI	t	p
Physical								
Relative deprivation	1.13	[1.00, 1.28]	1.99	.047	1.23	[1.05, 1.43]	2.56	.01
Absolute affluence	1.14	[0.93, 1.39]	1.26	.207	1.11	[0.88, 1.41]	0.87	.39
Gender	0.58	[0.51, 0.65]	-8.98	<.01	0.48	[0.41, 0.56]	-8.98	<.01
School grade	0.82	[0.77, 0.87]	-6.85	<.01	0.75	[0.70, 0.80]	-9.23	<.01
Perpetrator	2.67	[2.34, 3.04]	14.56	<.01	3.24	[2.73, 3.83]	13.68	<.01
Verbal								
Relative deprivation	1.02	[0.93, 1.11]	0.32	.75	1.05	[0.96, 1.15]	1.16	.25
Absolute affluence	0.99	[0.84, 1.17]	-0.08	.93	0.93	[0.80, 1.07]	-1.03	.30
Gender	1.34	[1.21, 1.48]	5.57	<.01	1.27	[1.17, 1.39]	5.47	<.01
School grade	0.92	[0.88, 0.96]	-4.68	<.01	0.88	[0.84, 0.91]	-6.16	<.01
Perpetrator	2.35	[2.34, 2.90]	17.67	<.01	4.70	[4.25, 5.18]	30.59	<.01
Relational								
Relative deprivation	1.07	[0.97, 1.17]	1.39	.17	1.17	[1.06, 1.29]	3.17	<.01
Absolute affluence	1.16	[1.01, 1.33]	2.06	.04*	1.12	[0.95, 1.31]	1.38	.167
Gender	2.05	[1.85, 2.28]	13.34	<.01	1.87	[1.69, 2.06]	12.49	<.01
School grade	0.92	[0.88, 0.96]	-4.04	<.01	0.80	[0.76, 0.84]	-9.01	<.01
Perpetrator	2.35	[2.12, 2.61]	16.40	<.01	3.47	[3.13, 3.84]	23.71	<.01
Cyber								
Relative deprivation	0.98	[0.86, 1.11]	-0.33	.74	1.22	[1.08, 1.39]	3.11	.00**
Absolute affluence	1.00	[0.82, 1.22]	0.02	.99	1.17	[0.95, 1.45]	1.46	.145
Gender	1.68	[1.49, 1.90]	8.38	<.01	1.43	[1.26, 1.63]	5.44	<.01
School grade	0.99	[0.94, 1.04]	-0.42	.68	0.91	[0.86, 0.97]	-3.17	<.01
Perpetrator	2.45	[2.13, 2.81]	12.73	<.01	4.06	[3.41, 4.84]	15.65	<.01

Note. CI = confidence interval. Perpetrator = aggressed others in the past 2 months. Odds ratios (OR) for bullying outcomes (physical, verbal, relational, and cyberbullying) in relation to non-victimized group.
 *p < .05. **p < .01.

Table 4 summarizes the effect sizes of RD on the four types of bullying involvement. Results indicate a larger effect size for involvement in bullying more than two or three times per month compared with only once or twice a month. The strongest effects existed in victimization by cyberbullying and physical bullying of 0.11. For perpetration, however the RD effect on bullying varied from -0.01 to 0.10 (Table 4).

The analyses also revealed significant differences in the risk of victimization and perpetration of bullying as a function of gender, school grade, and previous bullying involvement. With other differences in bullying held constant, the ORs of females being victimized more than two or three times a month by verbal bullying increased by 27% (OR = 1.27, 95% CI = [1.17, 1.39]). Likewise, the

Table 3. Multinomial Logistic Regressions for the Association Between Relative Deprivation and Perpetration Variables.

Variable	Only Once or Twice				More Than Two or Three Times Per Month			
	OR	95% CI	t	p	OR	95% CI	t	p
Physical								
Relative deprivation	0.98	[0.87, 1.11]	-0.27	.79	1.11	[0.95, 1.31]	1.34	.18
Absolute affluence	0.92	[0.76, 1.12]	-0.84	.40	0.97	[0.75, 1.26]	-0.22	.83
Gender	0.39	[0.34, 0.45]	-13.48	<.01	0.37	[0.31, 0.45]	-10.48	.01
School grade	0.96	[0.91, 1.01]	-1.55	.12	1.01	[0.95, 1.08]	0.45	.66
Victim	3.20	[2.73, 3.76]	14.14	<.01	2.40	[1.96, 2.94]	8.51	<.01
Verbal								
Relative deprivation	0.92	[0.85, 1.00]	-1.78	.08	0.98	[0.88, 1.09]	-0.32	.75
Absolute affluence	0.87	[0.76, 0.99]	-2.06	.04	0.89	[0.75, 1.05]	-1.38	.17
Gender	0.81	[0.74, 0.89]	-4.44	<.01	0.48	[0.43, 0.54]	-13.07	<.01
School grade	1.11	[1.07, 1.16]	4.94	<.01	1.23	[1.17, 1.28]	8.46	<.01
Victim	2.76	[2.47, 3.08]	17.95	<.01	4.13	[3.64, 4.69]	22.09	<.01
Relational								
Relative deprivation	1.06	[0.95, 1.17]	1.02	.31	1.19	[1.03, 1.36]	2.43	.01
Absolute affluence	1.10	[0.93, 1.30]	1.14	.25	1.13	[0.91, 1.40]	1.08	.28
Gender	1.22	[1.09, 1.36]	3.38	.01	0.72	[0.63, 0.82]	-4.70	<.01
School grade	1.03	[0.99, 1.08]	1.55	.12	1.03	[0.97, 1.09]	1.05	.29
Victim	3.30	[2.86, 3.82]	16.16	.01	3.03	[2.53, 3.63]	12.06	.00
Cyber								
Relative deprivation	0.91	[0.76, 1.09]	-1.06	.29	1.19	[1.02, 1.38]	2.21	.03
Absolute affluence	1.05	[0.80, 1.37]	0.35	.73	1.04	[0.82, 1.33]	0.32	.75
Gender	1.37	[1.15, 1.62]	3.61	<.01	0.59	[0.50, 0.71]	-5.92	<.01
School grade	1.17	[1.07, 1.28]	3.50	<.01	1.10	[1.03, 1.18]	2.66	<.01
Victim	3.66	[2.88, 4.64]	10.66	<.01	2.28	[1.81, 2.88]	7.02	<.01

Note. Odds ratios (OR) for bullying outcomes (physical, verbal, relational, and cyberbullying) in relation to non-victimized group. CI = confidence interval. Perpetrator = aggressed others in the past 2 months.

odds were greater for females than for males to be victimized by relational bullying (OR = 1.87, 95% CI = [1.69, 2.06]) and by cyberbullying (OR = 1.43, 95% CI = [1.26, 1.63]) (see Table 2). The opposite effect was observed regarding perpetration for most forms of bullying. The odds for females to be involved in perpetrating others significantly decreased by 63% (OR = 0.37, 95% CI = [0.31, 0.45]) for physical bullying, by 28% (OR = 0.72, 95% CI = [0.63, 0.82]) for relational bullying, and by 41% (OR = 0.59, 95% CI = [0.50, 0.71]) for cyberbullying (Table 3).

With increasing school grade, the odds of being victimized significantly decreased for all forms bullying, with the exception of cyberbullying once or twice a month, which had no significant relationship (Table 2). On the other hand, the association between school grade and perpetration varied by the

Table 4. Relative Deprivation Effect Sizes on Four Types of Bullying Involvement.

Variable	Only Once or Twice		More Than Two or Three Times Per Month	
	Effect Size	95% CI	Effect Size	95% CI
Victimization				
Physical	0.07	[0.00, 0.14]	0.11	[0.03, 0.20]
Verbal	0.01	[-0.04, 0.06]	0.03	[-0.02, 0.08]
Relational	0.04	[-0.02, 0.09]	0.09	[0.03, 0.14]
Cyber	-0.01	[-0.08, 0.06]	0.11	[0.04, 0.18]
Perpetration				
Physical	-0.01	[-0.08, 0.06]	0.06	[-0.03, 0.15]
Verbal	-0.05	[-0.09, 0.00]	-0.01	[-0.07, 0.05]
Relational	0.03	[-0.03, 0.09]	0.10	[0.02, 0.17]
Cyber	-0.05	[-0.15, 0.05]	0.10	[0.01, 0.18]

form of bullying. With increasing school grade, the odds of perpetrating by verbal bullying and cyberbullying more than two or three times per month increased by factors of 1.23 (95% CI = [1.17, 1.28]) and 1.10 (95% CI = [1.03, 1.18]), respectively (Table 3).

Previous bullying involvement, whether as a victim or a perpetrator, exhibited the most robust association with all forms of victimization and perpetration. ORs strikingly increased by two- to fourfold for victims who reported perpetrating bullying in the past couple of months and for aggressors who reported being victimized in the past couple of months.

Discussion

The present study used data on a large sample of Canadian adolescents to analyze the impact of RD on adolescents' involvement in school bullying. The primary objective of this study was to test the hypothesis that RD positively relates to all forms of victimization and perpetration of school bullying after differences in absolute affluence are held constant. We investigated upward social comparisons within schools, using schoolmates as the social reference group. The results supported this hypothesis. RD positively related to three of the four types of victimization—physical, relational, and cyberbullying—and to two of the four types of perpetration—relational and cyberbullying. Moreover, our findings offer support to the psychosocial hypothesis of SES differences in bullying.

We found that links between family SES (measured by family assets or conditions indicating wealth) and bullying relate to both the material and psychosocial paths of income disparity and are not merely the result of having low income. These findings suggest that the contextual influence of social position is related to victimization and perpetration of bullying by the psychosocial processes of RD and social rank, in addition to an uneven distribution of material assets. Therefore, the positive associations between RD and school bullying improve our understanding of how psychosocial over material factors influence the interactions between high- and low-ranking schoolmates. Negative social comparisons that result from RD indeed matter in adolescents' aggressive behaviors and further compliment evolutionary perspectives of social rank in animal-ranking systems (Sapolsky, 2005).

RD related to more forms of victimization than forms of perpetration in this study. These findings are consistent with epidemiological evidence of links between income inequality and international differences in the prevalence of bullying victimization and perpetration (Elgar, Pickett, et al., 2013). The idea that violence and aggressive behaviors are more prominent in higher status individuals may reflect inequalities in human society that reinforce hierarchical human relationships in which the use of violence is more common. An observational and experimental study by Piff, Stancato, Côté, Mendoza-Denton, and Keltner (2012) supports this rationale by demonstrating that upper-class individuals are more likely to behave unethically relative to lower-class individuals. They are more prone to deception and more likely to cut-off pedestrians at a crosswalk while driving (Piff et al., 2012). Beyond feelings of entitlement and paying less attention to consequences of one's actions toward others, higher ranking individuals maintain their social status by exhibiting superiority to those below them (Piff et al., 2012; Wilkinson, 2005). These findings are at par with higher-ranking adolescents who bully their subordinately ranked schoolmates.

Wilkinson's (2005) concept of the "bicycling reaction" is an additional and robust indicator that increasing gaps of material wealth in unequal societies emphasize status differences in individuals and fosters downward social prejudices from those at the top of the hierarchy. Our results suggest that adolescents who victimize their peers by bullying conform to Wilkinson's concept of the "bicycling reaction." Emerging social hierarchies and ranking systems among peers exacerbate RD and foster negative social comparisons that subject adolescents, especially those at the lower end of the wealth-distribution, to harsher social conditions at school. The presence of high RD may therefore contribute to the power imbalance that is characteristic of bullying behavior and help explain why some students are more prone to being victimized. RD may confer power to more affluent students, while

making those students of lower social status looking up feel more vulnerable as they compare themselves with more affluent peers.

Our study also observed that a greater level of inequality reinforces deprivation and uneven statuses among students. This consequently cultivates a harsh social environment and increases the likelihood for bullying to be tolerated. A previous study demonstrated that adolescents' status within their social peer group acts as a motivator for aggressive behavior, especially during times of transition (Pellegrini & Long, 2002). As well, a review of qualitative studies concluded that students' status was influenced by their inability to keep up with fashionable trends at school, which led to the fear of peer victimization by exclusion from classmates (Attree, 2006). These previous investigations of social status within peer groups support the rationalization that disparities in affluence are an important contributing factor toward schoolmates' interactions. With higher levels of RD and wider differences in SES between peers, it may be plausible that these violent dynamics are more pronounced.

We also found that there is a prominent overlap between bullying and victimization behaviors. That is, students who perpetrated bullying against others were more likely than their uninvolved peers to be victimized by all forms of bullying, and they were more likely than uninvolved students to perpetrate all forms of bullying. Noticeably, the bully-victim group had the highest mean RD score of any group (i.e., perpetrators, victims, uninvolved students). As the negative feelings brought about by RD such as insecurity, anxiety, depression, social isolation, and overall lack of control over one's life exacerbate other social and behavioral problems (Marmot & Wilkinson, 2001), it is understandable why individuals with higher levels of RD are more likely than their peers to become engaged in both perpetrating bullying and being victimized. Differences in RD that emerged across bully groups may be valuable for future researchers and policy makers developing interventions targeting the issues of inequality within schools. Our results suggest that bullying relates to socioeconomic stratification within schools, and therefore, anti-bullying programs should focus on perceptions of social class differences, which are modifiable adolescent characteristics.

This study strengthens the idea that measures of absolute affluence are unable to effectively explain the experiences and consequences of social inequalities among schoolmates unless the effects of absolute affluence are really an effect of SES relative to a broader reference group (i.e., schoolmates). The association between RD and adolescent bullying behaviors revealed a high level of consistency with previous literature relating RD to a variety of negative outcomes including mental health problems (Eibner et al., 2004; Elgar, Baranek, Saul, & Napoletano, 2013), psychosomatic symptoms

(Elgar, De Clercq, et al., 2013), and other measures of poor health (Adjaye-Gbewonyo & Kawachi, 2012). Our findings also align logically with a previous study of Columbian 5th and 9th graders that examined economic inequality at the school-level by the distribution of land property, which associated greater levels of inequality with school bullying (Chaux et al., 2009). Collectively, these studies emphasize the important role that social contextual factors play when relating SES to negative socio-emotional outcomes. Furthermore, they suggest that a closer examination of the psychosocial mechanisms underlying the links between SES disparities and reduced well-being may enhance prevention and intervention efforts.

Although this study has its strengths, including the large sample size and assessments of multiple forms of school bullying (i.e., physical, verbal, relational, and cyberbullying), several limitations should be noted. First, the proportion of explained variance is small due to high degree of granularity in the data. Second, the scale used to measure relational bullying contained only two items, which explains why its internal consistency fell below a recommended threshold of 0.7 (Nunnally, 1978). Because Cronbach's alpha is sensitive to the number of items in short scales, Nunnally (1978) suggests that psychometric measures comprise of at least three items. Therefore, the two-item measure for relational bullying did not meet the criteria commonly used in bullying assessments. Third, data from the HBSC 2010 survey are cross-sectional; therefore, the direction of relationships between variables remains undetermined. Fourth, students may have under-reported their involvement in perpetration of bullying, which could have attenuated the associations between RD and bullying perpetration found in this study.

Furthermore, response-bias could not be dismissed for the data on measurements of family affluence, bullying victimization, bullying perpetration, and other sociodemographic variables, as they were all self-reported. Although self-report surveys are a commonly used tool for assessing bullying, future research should include other methodologies such as teacher reports and peer-nomination reports. Finally, the socioeconomic data used in this study could be supplemented with other standard measures of SES (e.g., parental occupation or household income) to gain improved estimates of SES and RD.

Given these limitations, the present study makes a unique and important contribution to the RD and bullying literature for Canadian adolescents. Its results contribute to our understanding of the effects of social comparisons that adolescents make between themselves and their more affluent peers by examining both RD and absolute affluence simultaneously. By isolating psychosocial paths and examining the residual effects of relative socioeconomic position within schools, we show that contextual factors of inequality are

closely related to adolescent bullying relationships. Accordingly, the results suggest that the psychosocial pathways of RD that relate to various forms of victimization and perpetration, best explain nation-wide occurrences and persistence of bullying. Effective prevention strategies and policies must therefore be established at the community level. Policy makers designing interventions to reduce violence among youth must carefully consider levels of economic inequality, rather than mere poverty rates, to identify individuals, schools, and communities that are most at risk.

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