# Peer Victimization in School and Mental and Physical Health Problems in Young Adulthood: Examining the Role of Revictimization at the Workplace

Mara Brendgen and François Poulin
University of Quebec at Montreal

Anne-Sophie Denault
Laval University

Peer victimization during the school years can impair victims' mental and physical health even in adulthood. Moreover, some victims of school bullying may also experience revictimization at work as adults. Later revictimization at work may thus at least partly explain (i.e., mediate) the negative consequences of peer victimization in school. Revictimization at work may also exacerbate (i.e., moderate), the association between peer victimization in school and impaired mental and physical health in adulthood. These hypotheses were tested with 251 participants (61% females) followed from age 12 to 25. Participants reported about their depression symptoms and victimization experiences every year throughout adolescence, workplace victimization at age 22, and mental and physical health symptoms at age 25. Latent path analysis revealed that peer victimization during adolescence was significantly associated with lower overall mental and physical health at age 25 and a small, albeit significant part of this association was mediated by workplace victimization at age 22. These associations were mainly due to specific effects on elevated depression symptoms and paranoid ideation at age 25. In contrast, the moderation hypothesis was not supported. The findings emphasize the importance of reducing school bullying before victims become caught in a cycle of abuse and suffer lasting impairments.

*Keywords:* peer victimization, adulthood, workplace victimization, mental and physical health problems

Peer victimization in schools is an important problem in many countries, with at least 8% of girls and 12% of boys being physically attacked, shamed, ridiculed, or otherwise harassed by their peers at least once over the past couple of months (Chester et al., 2015). Among the most frequent and often co-occurring sequelae reported by bullying victims are internalizing problems, notably depression symptoms, as well as physical health complaints such as stomachaches, headaches or sleeping difficulties (for meta-analyses, see Gini & Pozzoli, 2009; Moore et al., 2017; Reijntjes, Kamphuis, Prinzie, & Telch, 2010). While most research has focused on the short-term consequences of peer victimization, recent prospective studies suggest that the negative repercussions may sometimes persist beyond the school years. Thus, in two different large population samples, children who reported being frequently bullied by peers in childhood and adolescence were more likely than others to be diagnosed with depression in young adulthood (age range 18 to 26), controlling for sex and family SES, instability, and dysfunction (Lereya, Copeland, Costello, & Wolke, 2015). Other studies found that this difference remains significant, albeit with a reduced effect size, even when controlling for previous mental health problems in childhood or adolescence in addition to family hardship (Copeland, Wolke, Angold, & Costello, 2013; Takizawa, Maughan, & Arseneault, 2014). Peer victimization has also been associated with indicators of poor physical health, such as inflammatory markers, as late as midlife, while controlling for family adversity and previous physical and mental health (Takizawa, Danese, Maughan, & Arseneault, 2015). Long-term effects of peer victimization into adulthood have not been found in all studies, however. For instance, in a population cohort followed until age 21, no bivariate association was found between frequent peer victimization at age 14 and later depression or physical health complaints (McGee et al., 2011). Similar null-findings were reported in two other studies when controlling for confounders such as family adversity and previous emotional or behavior problems (Gibb, Horwood, & Fergusson, 2011; Östberg, Modin, & Låftman, 2018).

The inconsistency of findings seems to call into question whether being bullied by peers can really have long-lasting effects on victims' mental and physical health. However, presence of an initial direct effect is not a necessary prerequisite for a significant indirect effect (i.e., mediation) to occur (Rucker, Preacher, Tormala, & Petty, 2011). In other words, it is possible that repeated bullying in school increases victims' vulnerability for other risk

factors, which in turn may contribute to impaired mental and physical health in adulthood. Both psychological and neurobiological mechanisms have been proposed to explain how bullying may have lasting effects on victims' mental and physical health. Thus, negative self- and other-related cognitions such as feelings of shame and self-disparagement as well as hostile intent attributions toward others have been found to partially mediate the link between peer victimization and the development of depression symptoms (Irwin, Li, Craig, & Hollenstein, 2019; Strøm, Aakvaag, Birkeland, Felix, & Thoresen, 2018; Troop-Gordon & Ladd, 2005). Moreover, peer victimization has been linked to higher levels of circulating inflammation proteins and alterations of hypothalamic-pituitary-adrenal (HPA) axis functioning (e.g., Brendgen et al., 2017; Takizawa et al., 2015), which are in turn associated with depression symptoms as well as physical health problems (Knack, Jensen-Campbell, & Baum, 2011; Ouellet-Morin et al., 2011; Zalli, Jovanova, Hoogendijk, Tiemeier, & Carvalho, 2016). However, an additional, as yet unexplored pathway linking peer victimization during the school years to poorer mental and physical health in adulthood may be a continued cycle of victimization that perpetuates over time and across different contexts well beyond childhood and adolescence.

## Revictimization at the Workplace During Adulthood

The "Developmental victimology framework" (Finkelhor, 2007) suggests that, in addition to environmental risk factors, personal characteristics that mark them as easy prey unable to defend themselves may render some individuals vulnerable to victimization. These victimization experiences, in turn, reinforce preexisting vulnerability factors, thus leading to revictimization in the same and other contexts (Holt, Finkelhor, & Kantor, 2007). Similarly, Gollwitzer and colleagues (Gollwitzer, Süssenbach, & Hannuschke, 2015) propose that repeated victimization experiences foster the development of views of the self as unworthy and incapable and of others as potentially malignant. Over time, this so-called "victim-schema" is believed to further stabilize and generalize across contexts through evocative person-environment transactions, by which individuals elicit negative behaviors from others that are consistent with their expectations. In line with these theoretical arguments, research shows that peer victimization may not only last over several years for some youths (Brendgen, Girard, Vitaro, Dionne, & Boivin, 2016; Geoffroy et al., 2018), but that targets of frequent peer bullying often also experience abuse from their siblings or dating partners (Espelage & Holt, 2007; Finkelhor, Ormrod, & Turner, 2007b; Holt et al., 2007; Wolke & Samara, 2004; Yahner, Dank, Zweig, & Lachman, 2015). Both retrospective and longitudinal data further indicate that peer victimization during the school years is associated with a greater risk of being bullied at work in adulthood (Brendgen & Poulin, 2018; Smith, Singer, Hoel, & Cooper, 2003). What's more, this temporal and cross-context stability of peer victimization is partially mediated by an increase in depression-related cognitions and behaviors (Brendgen & Poulin, 2018; Schacter, White, Chang, & Juvonen, 2015).

Defined as an intentional effort to harm coworkers or subordinates by inflicting psychological or physical injury (Baron & Neuman, 1996), workplace bullying is conceptually similar to peer bullying in schools. Research suggests that between 11 and 18% of the global working population is subject to bullying by colleagues or supervisors at the workplace (Nielsen, Matthiesen, & Einarsen, 2010). The consequences for victims of workplace bullying also resemble those of peer victimization. Indeed, meta-analyses of both cross-sectional and longitudinal studies found that being the target of workplace bullying is associated with more negative perceptions of the self and others as well as more frequent internalizing (e.g., depression, anxiety) and stress-induced physical health problems (e.g., aches and pains, sleep problems) (Nielsen & Einarsen, 2012; Verkuil, Atasayi, & Molendijk, 2015). Not surprisingly, victimization by colleagues or supervisors at work is the principal source of work-related illness (Nielsen & Einarsen, 2012). The mental and physical health problems of adults who were victimized by their peers in school may thus at least in part be explained (i.e., mediated) by revictimization at work. In addition, revictimization at work may not only mediate but also further exacerbate (i.e., moderate) the predictive effect of peer victimization on later mental and physical health in adulthood. In fact, as noted by several scholars, the same variable may both mediate and interact with the effect of an exposure variable on an outcome variable (Preacher, Rucker, & Hayes, 2007; Valeri & Vander-Weele, 2013). The possibility of a moderating effect of workplace victimization is predicated upon findings that frequent exposure to sexual harassment or victimization by a dating partner exacerbates the association between peer victimization and internalizing symptoms among middle and high school students (Espelage & Holt, 2007). The latter results also mirror those from the poly victimization literature that individuals who experience maltreatment in multiple contexts during childhood or adolescence show considerably more trauma symptoms such as depression than those who were victimized in a single context (e.g., Finkelhor, Ormrod, & Turner, 2007a). However, to our knowledge, no study so far has tested the potential mediating or moderating effect of revictimization at work on the longitudinal association between peer victimization and subsequent mental and physical well-being in adulthood.

## The Present Study

The present study examined whether the association between peer victimization in school and later mental and physical health in young adulthood is mediated or moderated (or both) by revictimization at the workplace. To this end, we focused on the previously mentioned and often co-occurring outcomes that are most consistently associated with both peer victimization in school and victimization at the workplace, notably depression symptoms and generalized physical health (i.e., somatic) symptoms (Gini & Pozzoli, 2009; Kroenke, Spitzer, Williams, & Löwe, 2010; Moore et al., 2017; Nielsen & Einarsen, 2012; Reijntjes et al., 2010; Verkuil et al., 2015). We also assessed negative self- and other-related cognitions (specifically, interpersonal sensitivity and paranoid ideation), which are closely related to depression and part of the cognitive schema believed to develop as a result of victimization experiences (Beck, 2008; Cukor & McGinn, 2006; Gollwitzer et al., 2015). Associations were expected to hold even when controlling for family adversity and preexisting depression symptoms, which have been found to predict victimization experiences in school and at the workplace as well as mental and physical health problems in adulthood (Brendgen & Poulin, 2018; Goodman,

Joyce, & Smith, 2011; Tran, Cole, & Weiss, 2012). Peer victimization in school was assessed each year from Grade 7 (i.e., age 13) until Grade 11 (i.e., age 17). Longitudinal data show that, while overall rates of peer victimization decrease considerably from primary to secondary school, those youths who are victimized by their peers in high school typically already suffered the same fate in primary school (Brendgen et al., 2016; Geoffroy et al., 2018). Peer victimization during adolescence may thus be indicative of a consistent harassment experience that already started during primary school. To facilitate comparability of findings, outcomes were measured in young adulthood at age 25 years, that is, when adult outcomes were assessed in most previous longitudinal studies of peer victimization (Copeland et al., 2013; Klomek, Sourander, & Elonheimo, 2015; Lereya et al., 2015; Wolke, Copeland, Angold, & Costello, 2013). Moreover, focusing on these problems in young adulthood is important, because maladjustment during this period may have profound implications for the quality of later life (Macmillan & Hagan, 2004). To avoid temporal overlap, workplace victimization was assessed preceding the assessment of outcomes, that is, at age 22 years. At that age, the majority of young people in the targeted population are employed in either full-time or part-time jobs (GOC, 2016) and thus at least some of them may experience psychological or physical harassment at the workplace.

## Method

### Participants

Participants were part of a longitudinal study initiated in 2001 involving 390 sixth graders (58% females, $M_{age} = 12.38$, $SD = 0.42$) from eight suburban elementary schools in the province of Quebec, Canada. Most (90%) were Caucasian and French-speaking and came from families that were mostly intact (68%) and had an average annual income of over CAN$50,000. Mothers and fathers had similar levels of education ($M = 13.08$ years, $SD = 2.68$ and $M = 13.20$ years, $SD = 3.20$, respectively). Participants were assessed every year from ages 12 through 25. Of the initial sample, 303 participants (78%) completed the assessment at age 22. Of the 303 participants remaining at age 22 years, 251 indicated that they currently had a paid job outside their home. T tests showed that there were no differences between those with and those without a job in terms of any of the study variables (described below). Of the 251 participants with a job at age 22, 238 (62,2% female) were still involved in the study at age 25. They form the current study sample. These 238 participants scored lower on family adversity at age 12 and were more likely to be female compared to the rest of the initial sample.

### Procedures

At age 12 (Grade 6 of elementary school), information regarding family adversity was obtained from mothers using a mail-in questionnaire and from youths during in-school assessments under the supervision of trained research assistants. Youths also answered questions on depression symptoms and on peer victimization each year from ages 13 to 17 (Grades 7 to 11 of high school) during in-school assessments. After age 17, questionnaires were administered during home visits. Active informed consent was obtained

from all participants and their parents. All instruments and procedures were in accordance with APA ethical standards and were approved by the Institutional Review Board of the University of Quebec in Montreal (project title: "Does participation in organized activities during adolescence favor a successful transition into adulthood?"; ethics certificate number 2012-S-701398).

### Measures

**Family adversity at age 12.** A cumulative family adversity score was created by aggregating four indicators: (a) mother did not complete a high school degree; (b) low family annual income according to government criteria (less than CAN$30,000); (c) parental divorce or death of a parent; (d) parental use of harsh discipline based on youths' endorsement of any of the two following items: "if I disobey, my parents . . . 1. spank me," "2. slap or hit me." A value of 1 was assigned to each indicator and an average score was computed, with a possible range of 0 to 1.

**Depression symptoms from ages 13 to 17.** Each year, participants completed the Children's Depression Inventory (Kovacs, 1992), a 27-item questionnaire assessing the severity of affective, behavioral and cognitive symptoms of depression among children and youth. The suicidal ideation item was excluded due to ethical concerns. The response scale for each item ranged from 0 (e.g., "I get sad from time to time") to 2 ("I'm always sad"). The sum across all items was calculated each year.

**Peer victimization from ages 13 to 17.** Each year, participants completed a 5-item questionnaire assessing victimization by peers in school (Bélanger, Janosz, Archambault, & Riberdy, 2010), for example, "Other students have harassed you verbally," "Other students forced you to hand over things that belong to you against your will," "Other students have attacked you physically," "Other students have threatened or attacked you with a weapon (e.g., knife or other object)"). These items closely resemble those used in other studies of peer victimization (e.g., Nansel, Haynie, & Simonsmorton, 2003; Sapouna & Wolke, 2013). Participants reported how many times during the past month an event occurred using a 6-point scale ranging from 0 (*never*), 1 (*once*), 2 (*twice*), 3 (*three or four times*), 4 (*five to 10 times*), to 5 (*ten times or more*). Because extremely few participants endorsed the two highest response options, items were recoded to a 4-point scale by collapsing response options 3, 4, and 5. Individual item scores were then averaged to calculate a global victimization score, separately at each time point.

**Workplace victimization at age 22.** The 20-item Generalized Workplace Harassment Scale (Raver & Nishii, 2010) was used to assess workplace victimization in young adulthood. Participants were asked "How often have your supervisors or coworkers engaged in this behavior and you were the target?," for example, "Swore at you," "Made threats against you," "Physically assaulted you," "Belittled your opinions in front of others," "Insulted you," "Deliberately damaged your property," "Sabotaged your work." The response scale ranged from 0 (*never*), 1 (*rarely*), 2 (*sometimes*), 3 (*at least once every week*) to 4 (*almost every day*). Because extremely few participants endorsed the two highest options, items were recoded to a 3-point scale by collapsing response options 2, 3, and 4. A total score was computed by averaging the 20 item scores.

**Mental and physical health at age 25.** Four indicators were used to assess mental and physical health in young adulthood. Three of these indicators were subscales from the SCL-90–R (Derogatis & Cleary, 1977). Specifically, *Interpersonal sensitivity* was measured with 9 items (e.g., "Feeling inferior to others"). This dimension focuses on feelings of personal inadequacy as well as discomfort and negative expectations during interpersonal interactions. *Paranoid ideation* was assessed with 6 items (e.g., "Feeling that most people can't be trusted"). This dimension represents projective thought, hostility and suspiciousness. *Depression symptoms* were measured with 13 items (e.g., "Feeling everything is an effort"). This dimension reflects clinical symptoms such as dysphoric mood, withdrawal, lack of energy, hopelessness, and suicide ideation. Participants indicated how much discomfort each problem caused them during the past week on a scale ranging from 0 (*not at all*) to 4 (*extremely*). A score was computed for each subscale by averaging the corresponding items. For the fourth indicator, participants completed the *Inventory of Physical Symptoms*, which assesses a host of psychosomatic symptoms (Cohen & Hoberman, 1983). The 33 items, rated on a 5-point scale from 0 (*not at all*) to 4 (*extremely*), indicate how much a specific problem bothered the individual during the past two weeks (e.g., "Back pain," "Sleep problems," "Cold or cough," "Nausea and/or vomiting"). Responses were averaged to create an overall score of physical health complaints.

## Preliminary Analyses

Descriptive statistics and bivariate associations between the study variables are presented in Tables 1 and 2, respectively. In line with findings from other studies (e.g., Copeland et al., 2013; Dempsey, Sulkowski, Nichols, & Storch, 2009; Khubchandani & Price, 2015; Raver & Nishii, 2010), rates of both peer victimization in school and workplace victimization were positively skewed and average levels of peer victimization declined over the course of adolescence. Nevertheless, at any given assessment time between ages 13 and 17 years, between 2% and 8% of participants experienced more than two incidents of peer victimization in the past month and 10% experienced more than two incidences of workplace victimization at age 22 years. These frequencies are similar to those reported in previous research, where a threshold of at least two incidents of peer victimization in the past month is often considered to indicate "frequent" exposure to bullying (e.g., Bradshaw, Sawyer, & O'Brennan, 2007; Copeland et al., 2013). Square root transformations were applied to reduce skewness and kurtosis prior to analyses.

Inspection of the bivariate correlation matrix (see Table 2) revealed that, compared to boys, girls reported more depression symptoms during adolescence and showed more negative symptoms on all four health indicators at age 25. In contrast, girls were less victimized by peers during adolescence than boys and no sex difference was found in regard to victimization at the workplace. Depression symptoms and peer victimization were positively correlated with each other at most time points between ages 13 and 17. Results also showed high temporal stability of depression symptoms. In contrast, stability of peer victimization experiences between ages 13 and 17 was low to moderate. The lower stability coefficients compared to those found in other samples (e.g., Biggs et al., 2010; Brendgen et al., 2016; Rueger, Malecki, & Demaray, 2011) may be due to the fact that participants of the present study related rather serious victimization experiences during the past month, whereas other studies typically assessed less violent incidences, used longer reference periods or reported no particular temporal reference. Moreover, there were high intercorrelations between the four health indicators at age 25. There were several significant, albeit inconsistent associations of peer victimization at any given time point from ages 13 through 17 with work victimization at age 22 and with the four health indicators at age 25. Work victimization at age 22 was consistently associated with health indicators at age 25.

## Main Analysis

To test the main hypotheses, latent path analyses were performed with Mplus Version 8 (Muthén & Muthén, 1998–2017). In these analyses, the four assessments of depression symptoms from

Table 1

*Descriptive Statistics for the Study Variables*

| Variables | Min. | Max. | Mean | Std. Dev. | Alpha | Skewness | Kurtosis |
|---|---|---|---|---|---|---|---|
| Sex | .00 | 1.00 | .61 | .49 | — | — | — |
| Family adversity | .00 | 1.00 | .19 | .23 | — | .36 | −1.46 |
| Victimization age 13 | .00 | 2.00 | .16 | .29 | .70 | 1.07 | −.12 |
| Victimization age 14 | .00 | 1.00 | .12 | .20 | .64 | 1.01 | −.55 |
| Victimization age 15 | .00 | 1.50 | .10 | .21 | .72 | 1.58 | 1.17 |
| Victimization age 16 | .00 | 1.75 | .09 | .24 | .86 | 2.14 | 4.05 |
| Victimization age 17 | .00 | 1.75 | .04 | .15 | .78 | 3.42 | 13.33 |
| Depression age 13 | .00 | 29.00 | 8.44 | 5.68 | .82 | −.17 | .10 |
| Depression age 14 | .00 | 30.00 | 8.92 | 6.26 | .86 | −.06 | −.03 |
| Depression age 15 | .00 | 42.00 | 8.73 | 6.49 | .85 | .30 | .38 |
| Depression age 16 | .00 | 39.00 | 8.87 | 6.22 | .84 | .34 | .39 |
| Depression age 17 | .00 | 36.00 | 9.21 | 6.18 | .83 | .20 | .44 |
| Work victimization | .00 | 1.25 | .19 | .25 | .95 | .50 | −.71 |
| Paranoid ideation | .00 | 1.67 | .25 | .38 | .68 | .71 | −.81 |
| Depression | .00 | 2.46 | .36 | .46 | .87 | .51 | −.23 |
| Interpersonal sensitivity | .00 | 2.89 | .29 | .39 | .78 | .53 | −.49 |
| Physical health complaints | .00 | 2.64 | .56 | .48 | .91 | .21 | .03 |

*Note.* Sex is coded as 0 (Male) and 1(Female). Family adversity represents a cumulative index of risk factors and alpha does not apply.

Table 2
*Bivariate Correlations Between the Study Variables*

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Sex (being female) | — | | | | | | | | | | | | | | | |
| 2. Family adversity | −.09 | — | | | | | | | | | | | | | | |
| 3. Victimization age 13 | −.04 | .02 | — | | | | | | | | | | | | | |
| 4. Victimization age 14 | −.15* | .10 | .13† | — | | | | | | | | | | | | |
| 5. Victimization age 15 | −.02 | −.05 | .17* | .25** | — | | | | | | | | | | | |
| 6. Victimization age 16 | −.21** | .10 | .20** | .23** | .36** | — | | | | | | | | | | |
| 7. Victimization age 17 | −.10 | .13† | .07 | .21** | .11 | .24** | — | | | | | | | | | |
| 8. Depression age 13 | .16* | .15* | .14* | .01 | .06 | .05 | .02 | — | | | | | | | | |
| 9. Depression age 14 | .20** | .09 | .10 | .12† | .11 | .12 | −.09 | .64** | — | | | | | | | |
| 10. Depression age 15 | .11 | .02 | .16* | .15* | .24** | .12† | .01 | .53** | .69** | — | | | | | | |
| 11. Depression age 16 | .08 | .11 | .20** | .23** | .14* | .14* | .05 | .52** | .62** | .66** | — | | | | | |
| 12. Depression age 17 | .14* | .03 | .13† | .18* | .24** | .15* | .10 | .44** | .59** | .65** | .63** | — | | | | |
| 13. Work victim. age 25 | .00 | .08 | .03 | .15* | .22** | .10 | .13† | .15* | .19** | .21** | .29** | .23** | — | | | |
| 14. Paranoid idea. age 25 | .06 | .03 | .14* | .13† | .15* | .10 | .07 | .22** | .25** | .42** | .26** | .33** | .34** | — | | |
| 15. Depression age 25 | .27** | .04 | .08 | .07 | .14* | −.02 | .01 | .23** | .27** | .36** | .25** | .37** | .27** | .60** | — | |
| 16. Interpers. sens. age 25 | .25** | −.03 | .08 | .17* | .09 | .04 | .09 | .21** | .26** | .34** | .31** | .35** | .25** | .58** | .76** | — |
| 17. Ph. health comp. age 25 | .35** | −.10 | .09 | .06 | .15* | .01 | .01 | .21** | .30** | .30** | .19** | .31** | .19** | .37** | .63** | .50** |

† $p < .10$.   * $p < .05$.   ** $p < .01$.

age 13 through age 17 were used as indicators of a latent factor "Depression symptoms." Similarly, the four assessments of peer victimization from age 13 through age 17 were used as indicators of a latent factor "Peer victimization." Importantly, the presence of relatively low intercorrelations between its specific temporal indicators does not preclude the reliable estimation of overall peer victimization through a latent construct that captures the commonality that does exist between the indicators, as long as overall model fit is good and factor loadings are significant (for a similar approach, see Boivin et al., 2013; Little, 2013, p. 339). Indeed, as noted by Boivin and colleagues (2013), the lower intercorrelations may create a latent peer victimization factor that particularly defines the more extreme cases (i.e., participants experiencing sustained peer victimization over the four assessed time points in the present study) versus those who were rarely or never victimized by their peers. The workplace victimization scale assessed at age 22 served as single indicator of a factor with the same name. Interpersonal sensitivity, paranoid ideation, depression symptoms and physical health complaints at age 25 served as indicators of a latent "Health problems" factor. Because latent factors represent what is common among their respective indicators (Bollen & Hoyle, 2012), this analytical approach allowed us to examine associations between consistently elevated levels of peer victimization during high school and later multisymptom health problems during young adulthood, while controlling for consistently elevated levels of depression symptoms during adolescence.

To set the scale for latent factors comprised of several indicators, one of the factor loadings was fixed to 1 and the associated latent variance was freely estimated. For latent factors comprised of single indicators, the single factor loadings were fixed to 1 and the associated latent variance was freely estimated. In addition to the factor loadings related to the measurement part of the model, the following associations among latent factors were estimated: (a) the correlation between "Peer victimization" and "Depression symptoms," (b) predictive paths from "Peer victimization" to "Workplace victimization" and to "Health problems," (c) predictive paths from "Depression symptoms" to "Workplace victimiza-

tion" and to "Health problems," (d) the predictive path from "Workplace victimization" to "Health problems," and (e) the latent indirect effect from "Peer victimization" to "Health problems" via "Workplace victimization." The tested model is depicted in Figure 1. Of note, because family adversity was not significantly related to any of the victimization or outcome variables, it was not included as a control variable in the main analyses to maximize model parsimony. A separate model also included an interaction between the two latent factors "Peer victimization" and "Workplace victimization" to test whether workplace victimization moderates the predictive effect of peer victimization on mental and physical health at age 25. In additional analyses, we also examined potential sex moderation of the aforementioned associations. Because no sex moderation was found, these results are not presented for parsimony.

These latent path analyses were conducted using Robust Full Information Maximum Likelihood (FIML-R) estimation to account for occasional missing data (5% of data points) and the moderate non-normality of the data. All model parameters were estimated based on 5000 bootstrap resamples with replacement and bias-corrected 95% confidence intervals (95% CI; Preacher & Hayes, 2004). Model fit was evaluated based on the Comparative Fit Index (CFI; ≥ .95 indicates good fit; between .95 and .90 indicates acceptable fit; Hu & Bentler, 1999) and the Root Mean Squared Error of Approximation (RMSEA; ≤ 05 indicates close approximate fit; between .05 and .08 indicates reasonable fit; Browne & Cudeck, 1993). Of note, guided by the relative fit indices and Lagrange multipliers from the initial model, we added two residual covariances between manifest variables to further improve model fit: one covariance between depression symptoms at ages 16 and 17 and another between depression symptoms and physical health complaints at age 25. After addition of these parameters, the model showed good fit to the data (see Results below).

Because all key variables were based on participants' self-reports, we followed the recommendations by Williams and Anderson (1994) and Brannick and colleagues (Brannick, Chan,
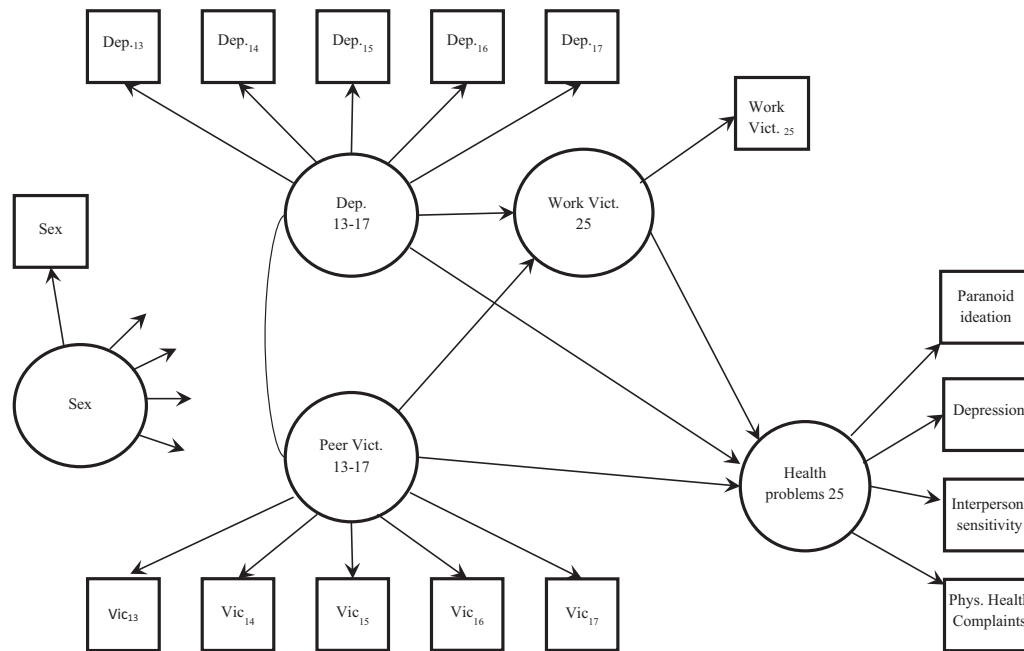
*Figure 1.* Illustration of the estimated model. Factor loadings of single-indicator factors are fixed to 1. Predictive effects of sex on all latent factors are estimated.

Conway, Lance, & Spector, 2010) to test whether at least part of the associations between all the study variables could be substantively explained by a common underlying factor representing mono-method bias. To this end, additional analyses were performed in which the previously described latent path model was extended to include an additional latent "mono-method reporting bias" factor on which all indicator variables were allowed to load. These factor loadings were fixed to be equal, as mono-method reporting bias should be a constant affecting all variables in the same way. Results showed good model fit (Yuan-Bentler scaled $\chi^2(93) = 119.77$, $p = .03$, Scaling Correction Factor = 1.09, CFI = .97, RMSEA = .03). However, inspection of the factor loadings on the latent mono-method bias factor showed that coefficients were extremely small and not significant (coefficient estimate = .04, bootstrapped CIs [−.02, .10], *mean* standardized coefficient = 0.10). Moreover, a chi-square difference test between a model with and without the latent "mono-method reporting bias" factor showed no significant difference in model fit ($\Delta\chi^2(1) = 0.15$, Scaling Correction Factor = 1.83, $p = .70$). We therefore present the results of the more parsimonious model.

## Results

Results from the main latent path analysis are presented in Table 3. Standardized and unstandardized parameter estimates as well as their respective bootstrapped 95% CIs are provided. Model fit was good, with Yuan-Bentler scaled $\chi^2(94) = 119.17$, $p = .04$, Scaling Correction Factor = 1.10, CFI = .98, RMSEA = .03 (95% CIs [.01, .05]). The measurement portion of the latent path analysis showed significant factor loadings of all indicators on their respective latent factors. Inspection of the latent path structure showed

that being female was associated with more depression symptoms at ages 13–17 (Standardized Coefficient (SC) = .17), but with lower levels of peer victimization at ages 13–17 (SC = −.21). There was also a positive association between depression symptoms at ages 13–17 and peer victimization at ages 13–17 (SC = .43). In turn, peer victimization at ages 13–17 predicted workplace victimization at age 22 (SC = .31), whereas sex and depression symptoms at ages 13–17 were not associated with workplace victimization at age 22. However, being female and higher depression symptoms at ages 13–17 were significantly associated with global health problems at age 25 (SC = .28 and SC = .27, respectively). There was also a significant total effect from peer victimization at ages 13–17 on global health problems at age 25 ($SC_{total} = .28$). However, workplace victimization at age 22 also significantly predicted global health problems at age 25 (SC = .17). Moreover, the bootstrapped indirect effect from peer victimization at ages 13–17 on global health problems at age 25 via workplace victimization at age 22, albeit small, was significant ($SC_{indirect} = .05$). Although there was still a sizable remaining direct effect of peer victimization at ages 13–17 on global health problems at age 25 ($SC_{direct} = .22$), this effect did not reach significance. Tested in an additional model, the interaction between the two latent factors "Peer victimization" and "Workplace victimization" in the prediction of global health problems at age 25 was also not significant.

In supplementary analyses, we examined whether the observed indirect effect from "Peer victimization" to "Health problems" via "Workplace victimization" would also be found for each of the health indicators separately. To this end, the latent path model was rerun with each of the four health indicators at age 25 loading on their own, separate outcome factors instead of a single overarching

Table 3
*Latent Path Analysis Results*

| Coefficient | Estimate | Lower CI | Upper CI | Std. estimate |
|---|---|---|---|---|
| Factor loadings | | | | |
| Victimization age 13–17 | | | | |
| Victimization age 13 | 1.00 | — | — | .30 |
| Victimization age 14 | 1.37 | .53 | 3.49 | .47 |
| Victimization age 15 | 1.31 | .56 | 3.32 | .49 |
| Victimization age 16 | 1.41 | .74 | 3.32 | .54 |
| Victimization age 17 | .52 | .09 | 1.77 | .29 |
| Depression age 13–17 | | | | |
| Depression age 13 | 1.00 | — | — | .61 |
| Depression age 14 | 1.31 | 1.09 | 1.60 | .77 |
| Depression age 15 | 1.43 | 1.16 | 1.79 | .84 |
| Depression age 16 | 1.29 | 1.06 | 1.61 | .80 |
| Depression age 17 | 1.26 | .98 | 1.64 | .78 |
| Work victimization age 22 | 1.00 | — | — | 1.00 |
| Health problems age 25 | | | | |
| Paranoid ideation | 1.00 | — | — | .68 |
| Depression | 1.27 | 1.08 | 1.54 | .88 |
| Interpersonal sensitivity | 1.20 | 1.02 | 1.44 | .86 |
| Phys. health complaints | 4.24 | 3.23 | 5.61 | .60 |
| Covariances | | | | |
| Victimization age 13–17 With | | | | |
| Depression age 13–17 | .03 | .01 | .06 | .43 |
| Regressions | | | | |
| Health problems age 25 On | | | | |
| Sex | .15 | .08 | .24 | .28 |
| Depression age 13–17 | .11 | .03 | .21 | .27 |
| Victimization age 13–17 | .59 | −.19 | 1.82 | .22 |
| Work victimization | .04 | .01 | .09 | .17 |
| Work victimization On | | | | |
| Sex | .09 | −.22 | .43 | .04 |
| Depression age 13–17 | .22 | −.19 | .54 | .14 |
| Victimization age 13–17 | 3.13 | .32 | 11.31 | .31 |
| Mediation | | | | |
| Indirect effect | .14 | .01 | .69 | .05 |
| Total effect | .73 | .06 | 2.05 | .28 |
| Interaction | | | | |
| Health problems age 25 On | | | | |
| Vict. age 13–17 × Work vict. | −.30 | −1.12 | .37 | — |

*Note.* Bias-corrected bootstrapped 95% Confidence Intervals (CI) based on 5000 resamples with replacement are presented. The Total effect refers to the initial direct effect of Peer victimization at ages 13–17 on Health problems at age 25. The Indirect effect is the mediated effect of Peer victimization at ages 13–17—via Work victimization at age 22—on Health problems at age 25. No standardized estimate is provided by MPlus for interaction terms involving latent variables.

"Health problems" factor, with each of these factor loadings fixed to one for model identification. The latent outcome factors were allowed to covary. The model showed good fit to the data ($\chi^2(81) = 84.71$, $p = .37$, Scaling Correction Factor = 1.11, CFI = .99, RMSEA = .01). Inspection of the latent path parameters revealed a significant total effect of peer victimization at ages 13–17 on depression symptoms at age 25 ($SC_{total} = .22$; Coefficient Estimate = .82; bootstrapped CI [.01, 2.27]), which was significantly mediated by workplace victimization at age 22 ($SC_{indirect} = .05$; Coefficient Estimate = .17; bootstrapped CI [.01, .85]). The remaining direct effect of peer victimization at ages 13–17 on depression symptoms at age 25 was not significant ($SC_{direct} = .16$; Coefficient Estimate = .65; bootstrapped CI [−.30, 2.02]). There was also a significant total effect of peer victimization at ages 13–17 on paranoid ideation at age 25 ($SC_{total} = .30$; Coefficient Estimate = 1.11; bootstrapped CI [.15, 3.24]), which was significantly mediated by workplace victimiza-

tion at age 22 ($SC_{indirect} = .07$; Coefficient Estimate = .25; bootstrapped CI [.03, 1.14]). The remaining direct effect of peer victimization at ages 13–17 on paranoid ideation at age 25 was not significant ($SC_{direct} = .23$; Coefficient Estimate = .86; bootstrapped CI [−.18, 2.95]). Specific total or indirect effects of peer victimization on interpersonal sensitivity and on physical health complaints at age 25 were also not significant.

## Discussion

This study investigated whether the association between peer victimization during adolescence and later mental and physical health in young adulthood is mediated or moderated (or both) by revictimization at the workplace. In line with previous studies (Copeland et al., 2013; Klomek et al., 2015; Lereya et al., 2015; Wolke et al., 2013), results showed that being the target of severe acts of peer victimization throughout the high

school years is associated with lower overall health in young adulthood, even when controlling for participants' level of depression symptoms during adolescence. Specifically, whereas peer victimization during the past month assessed at any given time point was only weakly and inconsistently associated with specific indicators of later mental and physical health, associations were considerably stronger between the latent factors. Because latent factors reflect consistency of problems over time (in the case of peer victimization) or across symptoms (in the case of mental and physical health symptoms), this finding suggests that repeated bullying in school may indeed have repercussions for the victims' overall mental and physical health even in adulthood. As hypothesized, a small but significant part of this association was explained (i.e., mediated) by revictimization at the workplace. In contrast, no support was found for a moderating effect of workplace victimization on the association between peer victimization during adolescence and later mental and physical well-being in young adulthood.

The continuation of victimization across time and different contexts may at least in part be due to victims' altered cognitions and behaviors as a result of their traumatic experiences. Thus, acquired characterological self-blame and other depression-related thoughts and behaviors have been found to mediate the continuation of peer victimization among early adolescents (Schacter et al., 2015). Similarly, depression symptoms were found to partly mediate the association between peer victimization in school and workplace victimization in young adulthood (Brendgen & Poulin, 2018). In the present study, individuals with higher depression symptoms during adolescence were not only more often the target of chronic peer bullying, but later victimization at the workplace predicted lower overall mental and physical health in young adulthood. Supplementary analyses showed that these predictive associations seemed to be mainly driven by effects on increased depressive symptoms at age 25. Victims of peer bullying in school and of workplace harassment in young adulthood also reported hostile attributions to others, as indicated by specific effects on greater levels of paranoid ideation at age 25. Together, these results further support the notion of a possible cyclical process, whereby elevated depressive symptoms and associated negative cognitions that result from peer victimization increase the risk of experiencing revictimization later on, which in turn may lead to further increases of depression symptoms (Gollwitzer et al., 2015; Hammen, 2005; Holt et al., 2007). Peer victimization during the school years was also related—partially via revictimization at the workplace—to interpersonal sensitivity and physical health complaints as part of global health problems in young adulthood, but not when these indicators were examined separately in supplementary analyses. These findings may be explained by the fact that especially negative self-related cognitions (as indexed by our interpersonal sensitivity items) are closely related to depression and may indeed be considered an integral part of depressive symptomatology (Beck, 2008). The results are also in line with findings that physical health impairments may themselves be triggered by co-occurring depression symptoms (Prince et al., 2007), a notion that is also supported by the strong correlation between depression symptoms and physical health complaints observed in the present study.

Nevertheless, revictimization at the workplace only explained a small proportion of the overall effect of peer victimization during adolescence on later global health problems in young adulthood. Indeed, although it failed to reach statistical significance, there was still a considerable remaining direct effect of peer victimization on global health problems at age 25. In addition to revictimization at the workplace, other possible mediating factors thus need to be considered to fully understand potential long-term effects of peer victimization during the school years on mental and physical well-being in young adulthood. For instance, around 7% of college students report being bullied at least sometimes by others and 72% of those being bullied in college indicate that they were also bullied in elementary and secondary school (Chapell et al., 2006). Similarly, around 12% of young adults report being psychologically or physically victimized by their romantic partners (Cui, Ueno, Gordon, & Fincham, 2013). Revictimization in other contexts such as college campuses or in romantic relationships should thus be examined as another potential mediator in the link between peer victimization in school and well-being in young adulthood. However, even for those who do not experience revictimization during adulthood, peer victimization during the school years may also impact mental and physical well-being in adulthood by altering underlying cognitive and neurobiological pathways (McDougall & Vaillancourt, 2015; Strøm et al., 2018; Vaillancourt, Hymel, & McDougall, 2013). Future studies examining these different mediating mechanisms simultaneously may offer a more complete picture of how peer bullying may affect victims' functioning in young adulthood. Given that the total effects of peer victimization on adult outcomes were small, it will also be important to examine potential moderating factors that may exacerbate—or mitigate—the association between peer victimization and later mental and physical health. Thus, while no evidence was found for a moderating (i.e., exacerbating) effect of victimization at the workplace, the situation may well be different when revictimization occurs across multiple contexts in adulthood (e.g., in romantic relationships or college campuses). By the same token, positive experiences at work, in college, or in romantic relationships may help offset potential long-term effects of peer victimization. Further research is clearly needed to fully understand whether, why and for whom peer victimization may have lasting effects beyond the school years.

## Strengths, Limitations, and Conclusions

This study is the first to show that—by increasing the risk of revictimization at the workplace later on—peer victimization during the school years is associated with poorer overall health in adulthood, particularly with increased depression symptoms. A main strength of this study is its longitudinal design from age 12 through age 25 years. Another strength rests on the repeated assessment of the predictor variables during adolescence. This allowed us not only to capture peer victimization experiences throughout secondary school but also to control for preexisting depression symptoms throughout that period.

Our study also has several limitations. First, the reliance on self-reports could have inflated associations between the variables. However, preliminary analyses showed no evidence that the observed associations were explained by a systematic reporting bias. It should also be noted that self-reported data are typically used

when assessing internalizing cognitions and emotions, which may not readily be observed by others. Similarly, the reliance on questionnaire-based self-reports is common practice in studies on generalized physical health problems (Gini & Pozzoli, 2009), given that self-reported physical health status discriminates well between chronically ill, acutely ill, and healthy individuals (Sapin, Simeoni, El Khammar, Antoniotti, & Auquier, 2005; Varni, Seid, & Kurtin, 2001). Self-report measures are also very common in research on peer victimization and are considered valid and reliable, showing moderate to high concordance with peer reports with increasing age (Bouman et al., 2012; Ladd & Kochenderfer-Ladd, 2002). Moreover, threat appraisal theory (Blascovich, 2013) suggests that it is individuals' perception of their experiences that shapes their cognitive, emotional and behavioral reactions, and hence also the associated mental and physical health outcomes of these experiences. In line with this notion, it has been argued that the person's own voice is needed when the research focus is on subjective symptoms of well-being (Riley, 2004). In fact, based on an empirical comparison of self-reported and peer reported data, self-reported measures of peer victimization have been recommended as both necessary and sufficient when examining internalizing problems and associated outcomes, as is the case in the present study (Bouman et al., 2012).

Another limitation is that peer victimization in school was only assessed in adolescence. As already mentioned, however, most youth who are frequently victimized by their peers in secondary school were already bullied in elementary school (Brendgen et al., 2016; Geoffroy et al., 2018). Also, while we controlled for preexisting depression symptoms throughout adolescence, equivalent controls of negative self- and other-related cognitions and physical health symptoms were not available. This limited the identification of a clear directional association between peer victimization in adolescence and health problems in adulthood (which included depression and negative cognitions as well as physical health symptoms). The observed specific total and indirect effects on later depression symptoms at age 25 in supplementary analyses—despite control for earlier depression symptoms at ages 13–17—nevertheless lend some credence to a possible long-term effect of peer victimization and a partial mediation by revictimization at work. Still, future studies should control earlier levels of all outcome variables as much as possible. Our measure of workplace victimization also did not allow us to determine whether the aggressive act was committed by a supervisor or a colleague. Due to the greater power differential, harassment from a supervisor might by more difficult to stop and thus carry more serious consequences for victims' mental and physical health than bullying from a colleague of similar rank. Future studies should thus distinguish between the different sources of workplace bullying to gain a more detailed picture of its potential consequences on victims' well-being. Finally, the sample was drawn from a low-risk, relatively well-off population, which reduced the range of family adversity and may explain why this variable was unrelated to peer victimization or the outcome variables. Replication studies with a more diverse pool of participants are thus needed to examine whether the results generalize to high-risk populations.

Despite these limitations, the present study offers new insights into the possible mechanisms linking peer victimization in school with mental and physical health problems later in life. Our data suggest that some youths may not only suffer bullying by their schoolmates over several years, but they may become again the target of harassment at work in adulthood. In turn, these renewed victimization experiences place an additional burden on individuals' already taxed stress-response system and further contribute to the development of mental and physical health problems. These results emphasize the importance of prevention programs aimed at reducing school bullying early on before victims become caught in a cycle of chronic abuse and suffer deleterious effects that might last into adulthood.

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