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Peer Relational Victimization and Somatic Complaints During Adolescence

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A B S T R A C T

Purpose: To develop effective prevention and intervention efforts that optimize adolescent health, factors must be identified that affect health outcomes. The purpose of this study was to examine the association between somatic symptomatology and experiences with relational victimization (RV).

Methods: We prospectively tested the unique role of relational peer victimization in predicting adolescents' somatic complaints (SC), while accounting for their previous physical symptoms and peer victimization experiences (i.e., relational and physical victimization), as well as concurrent experiences with physical victimization (PV). Questionnaires were administered to 1,595 students (52% females) from eight schools in one school district (grades, 5–8) in the Midwestern part of the United States during the fall and spring sessions of the academic school year. Self-reported measures included demographic characteristics, victimization experiences, and assessment of SC.

Results: RV was a unique predictor of increased somatic symptoms, even after controlling for adolescents' sex, grade level, initial SC, previous victimization experiences, and concurrent experiences with PV. Notably, RV was a stronger predictor of somatic symptoms than was PV.

Conclusions: Our findings underscore the need for a comprehensive approach when addressing adolescents' physical health symptoms. Adolescents may benefit from clinicians looking beyond the obvious and using gentle probing to uncover how unique experiences with RV may be associated with overall health.

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According to the Centers for Disease Control [1], schools have a responsibility to prevent aggressive behaviors and an obligation to provide an environment that promotes children's health and safety. Healthcare professionals have also been identified as key players in reducing peer victimization among youth [2]. In response, the majority of the empirical work to date has focused on overt forms of peer victimization (e.g., physically aggressive behaviors) to promote physical safety [3]. Although physical safety remains a vital area of concern, we cannot overlook children's perception of emotional safety, which can be compro-

mised by more nonphysical, indirect, and covert forms of victimization, such as relational victimization (RV).

RV is characterized by behaviors intended to harm through the manipulation of relationships or social standing [4]. Examples include social exclusion, rumor spreading, and threats to withdraw friendship. Widespread interest in the study of RV has developed in light of strong evidence that demonstrates significant associations between this form of victimization and psychological maladjustment in youth, including loneliness and depression [5], social anxiety [6], substance abuse [7], and suicidal ideation [8,9]. Previous work has documented RV as a unique predictor contributing to children's social-emotional functioning above and beyond that explained by physical victimization (PV) [10]. To date, however, we know very little about how RV may influence physical health. The current study attempts to

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address this gap by examining the relative contribution of RV in predicting adolescents' somatic symptoms. This is a critical next step in the research process as we begin to develop prevention and intervention efforts to reduce RV and optimize adolescent health outcomes.

Research on stress and RV supports the contention that RV may affect physical health. In their study of peer rejection and physical symptomatology, Brendgen and Vitaro [11] suggest that increased cortisol levels triggered by stress can impede healthy functioning of the immune system, which may in turn lead to physical illness. MacDonald and Leary [12] argue that social exclusion threatens children's basic need to belong, thereby triggering physiological responses similar to those elicited by physical pain. Alfvén et al [13] found that the perceived stress resulting from peer harassment was associated with an increased frequency of headaches, stomachaches, and sleep difficulties. Similarly, a recent meta-analysis demonstrated that victims of peer aggression were at a significantly higher risk for psychosomatic symptomatology as compared with their peers [14]. However, till recently, the majority of studies investigating the relationship between peer victimization and physical illness have examined victimization as one global construct that includes both RV and PV [15,16].

In the only known cross-sectional study to date examining the unique contributions of direct and indirect victimization on somatic symptoms, results demonstrated that indirect victimization (e.g., exclusion, rumor spreading) had a stronger association with somatic symptomatology than did direct victimization (e.g., name calling, hitting), although both forms of victimization were significant predictors [17]. However, this study did not control for adolescents' previous victimization experiences, which could have explained the predictive influence of current victimization experiences on somatic complaints (SC). Additionally, reliability estimates for the scales used in this study were low (i.e., indirect aggression: $\alpha = .51$; direct aggression: $\alpha = .61$). Thus, study results may have been compromised. The relationship between specific forms of victimization and adolescents' physical health symptoms has yet to be examined using a prospective design.

The Present Study

Although our knowledge base is expanding regarding RV as it relates to mental health, and general peer victimization as it relates to physical health, we still know very little about how adolescents' specific experiences with peer victimization relate to physical symptomatology. Because previous work has identified RV and PV as two separate constructs that carry different developmental trajectories and adjustment indices [4], each construct must be examined separately as it relates to physical health outcomes. The primary aim of the current investigation was to explore the relationship between RV and physical health symptoms, defined as reported SC, in an adolescent sample. The present study extends previous cross-sectional findings by using a prospective design to examine the unique role of RV in predicting subsequent SC by controlling for adolescents' previous experiences with victimization (RV and PV) and SC, as well as concurrent experiences with PV. This study was organized keeping two objectives in mind. First, we sought to explore sex and grade level effects related to RV and SC during time 1 (T1). Second, our primary objective was to examine the unique variance in children's RV time 2 (T2) in predicting average SC (T2) after control-

ling for sex, grade level, PV (T1 and T2), and initial reports of RV and SC. On the basis of previous work, we expected that both RV and PV (T2) would predict SC (T2), but that RV (T2) would be a stronger predictor than PV (T2). Because of the hypothesized cogent role of RV in predicting SC, we also expected this relationship to remain significant across sex and grade level.

Methods

Participants

The final sample included 1,595 participants (52% female) from eight schools in the Midwestern part of the United States. (A total of 1,820 adolescents participated at T1. Of those 1,820 participants, 1,595 participants completed questionnaires at both T1 and T2 [88% of total sample]). Students who did not complete surveys at both times of measurement were dropped from further analyses. Cases of attrition were most likely because of student absence at the time of survey administration). The majority of the sample was white (87%), and the percentage of students receiving free or reduced price lunches was 10%. Children were fairly evenly distributed across grades, with 26% in both fifth ($n = 412$) and sixth ($n = 419$) grades, 25% in seventh grade ($n = 397$), and 23% in eighth grade ($n = 367$). Of the six elementary schools surveyed, five included kindergarten or pre-kindergarten through fifth grade, and one included grades 3 through 5. Students in grades 6 through 8 attended one of two area middle schools. Schools were recruited as part of a larger effort initiated by the Ophelia Project, designed to create safer environments for youth.

Procedure

Self-report questionnaires were administered to students online in computer classrooms in the fall of 2007–2008 school year (T1), and approximately 5 months later (T2). Questionnaires took approximately 45 minutes to complete; teachers were present to provide assistance with reading and technology. Consistent with practices established in previous research [18], passive consent procedures were used to obtain parental consent. Approval to conduct this research was obtained from the Institutional Review Board at a Northeastern University.

Measures

Survey measures included questions about children's involvement with victimization (RV and PV) and SC. The use of self-report questionnaires was consistent with previous research that has argued for the use of self-report peer victimization measures when investigating adolescents' physical symptoms rather than relying on peer or teacher reports [19].

Assessment of relational/physical victimization

Self-reports of RV and PV were obtained using seven items adapted from a measure designed by McDonald et al [20] and revised by Werner and Nixon [21]. Adequate psychometric properties have been established. Using a 5-point scale (1 = never to 5 = daily), participants indicated how often in the past 6 weeks they were victimized by peers. Seven items made up two victimization subscales: Physical (two items, e.g., hit, kicked, or punched you; T1: $\alpha = .64$; T2: $\alpha = .70$) and relational (five items, e.g., left you out of something on purpose; T1: $\alpha = .85$; T2: $\alpha =$

Table 1
Correlations and descriptive statistics for study variables at T1 and T2
(n = 1,595)

Variables	M	SD	1	2	3	4	5
1. RV T1	1.67	.85	—				
2. PV T1	1.53	.93	.48*	—			
3. SC T1	1.95	.50	.37*	.26*	—		
4. RV T2	1.67	.85	.42*	.26*	.27*	—	
5. PV T2	1.60	.98	.25*	.43*	.22*	.53*	—
6. SC T2	1.97	.55	.29*	.21*	.59*	.39*	.28*

T1 = time 1; T2 = time 2; RV = relational victimization; PV = physical victimization; SC = somatic complaints.

* $p < .001$.

.86). Consistent with the industry standard, scores were summed separately for each form of victimization and divided by the number of corresponding items (i.e., five and two, respectively) to represent an average score for RV and PV. Higher scores represented more victimization.

Several studies have demonstrated that RV and PV are moderately related, but distinct constructs [10,22]. In the current study, correlational analyses revealed a moderate correlation between RV and PV ($r = .48, p = .000$). Therefore, PV was used as a covariate when examining the construct of RV.

Assessment of somatic complaints

Using a scale adapted from previous research [15], participants were asked how often they experienced specific SC (had headaches, felt really tired, had stomachaches, did not feel like eating, and had trouble sleeping) in the last month. A three-category response option (scores ranging from 1–3) was provided for each SC (never, sometimes, and often, respectively), with higher numbers representing increased frequency. Items were summed and averaged across SC to represent one score. Adequate reliability and validity of this scale have been established [23]. The current study demonstrated adequate reliability for the five items (T1: $\alpha = .71$; T2: $\alpha = .81$).

Results

Analyses plan

Results are organized keeping two research questions in mind. First, we explored sex and grade level effects related to RV (T1) and SC (T1). Second, to answer our primary research question, we examined the unique role of RV T2 in predicting SC T2, while controlling for sex, grade level, initial RV, PV, SC, and PV T2. Descriptive statistics for study variables are presented in Table 1.

Preliminary analyses

We first explored differences in pretest levels of RV and SC by sex and grade level (Table 2). Holm's sequential Bonferroni ap-

Table 2
Means and standard deviations for study variables T1 by grade level and gender

Variables	Grade 5		Grade 6		Grade 7		Grade 8	
	Males n = 187	Females n = 225	Males n = 203	Females n = 216	Males n = 186	Females n = 211	Males n = 191	Females n = 176
RV	1.62 (.80)	1.75 (.87)	1.71 (.95)	1.86 (.97)	1.49 (.66)	1.72 (.82)	1.55 (.83)	1.64 (.77)
PV	1.54 (.93)	1.24 (.62)	1.77 (1.05)	1.36 (.80)	1.65 (.98)	1.34 (.69)	2.03 (1.22)	1.40 (.75)
SC	1.98 (.52)	1.95 (.47)	1.90 (.50)	2.03 (.52)	1.80 (.46)	1.95 (.53)	1.92 (.47)	2.10 (.52)

T1 = time 1; RV = relational victimization; PV = physical victimization; SC = somatic complaints.

proach was used to control for family-wise error when conducting post hoc tests to explore any main effects of grade level related to adolescents' SC.

Relational victimization (T1)

A 2 (sex) \times 4 (grade level) analysis of covariance was conducted to determine the effects of sex and grade level on adolescents' T1 RV scores, while controlling for T1 PV scores. Results revealed a main effect for sex, $F(1, 1586) = 90.55, p < .001$, on pretest RV scores. Females reported more RV ($M = 1.84, SE = .03$) as compared with males ($M = 1.49, SE = .03$). Results also revealed a significant main effect for grade level on average initial RV scores, $F(3, 1586) = 11.45, p < .001$. Post hoc tests, correcting for multiple comparisons, revealed that fifth ($M = 1.76, SE = .04$) and sixth ($M = 1.77, SE = .04$) graders reported higher mean level RV scores than did eighth graders ($M = 1.50, SE = .04$), $p < .001$. Sixth-grade students also reported higher levels of RV ($M = 1.77, SE = .04$) than did seventh-grade students ($M = 1.63, SE = .04$), $p < .05$. No interactions were present between sex and grade level.

Somatic complaints (T1)

We then examined differences in SC (T1) by sex and grade level. The dependent variable was students' reports of average SC (T1). A two-way univariate analysis of variance was conducted to determine the effects of sex and grade level on reported average SC (T1). Results revealed main effects for sex ($F(1, 1587) = 17.71, p < .001$) and grade level ($F(3, 1587) = 5.09, p < .05$) on somatic symptoms during T1. However, these main effects must be interpreted in light of a sex \times grade level interaction, $F(3, 1587) = 3.34, p < .05$. Follow-up analysis of variances split by sex revealed a grade level effect for males ($F(3, 763) = 4.40, p < .01$) and females ($F(3, 824) = 3.81, p < .05$). Follow-up comparisons using the Bonferroni correction revealed a significant decrease in males' reported SC between the fifth and seventh grades ($p < .001$). By contrast, follow-up comparisons indicated a significant increase in females' reported SC between the fifth and eighth grades ($p < .05$) and between the seventh and eighth grades ($p < .05$). Descriptive statistics are presented in Table 2.

Multivariate analyses

The next set of analyses was designed to evaluate the unique effect of experiences with RV (T2) on children's individual SC (T2), while controlling for sex, grade level, initial reports of SC (T1), and involvement with RV (T1) and PV (T1 and T2). Hierarchical multiple regression was used to test this primary research question. Average SC (T2) served as the dependent variable. The following variables were entered at the first step of the model: participant sex, grade level, and initial SC scores (T1). Step 2

Table 3

Summary of stepwise hierarchical regression analyses for RV (T2) predicting individual SC (T2) among fifth- to eighth-grade students

Variables	β	t	R ²	ΔR^2
SC (T2)				
Step 1 (df = 3; 1,591)				
Sex	.03	1.69		
Grade level	.03	1.42		
SC (T1)	.58***	28.59***		
Model 1			.35	.35
Step 2 (df = 3; 1,588)				
Sex	.07**	3.32**		
Grade level	.00	.10		
SC (T1)	.53***	24.22***		
RV (T1)	.05*	2.01*		
PV (T1)	-.02	-.89		
PV (T2)	-.19***	8.13***		
Model 2			.38	.03
Step 3 (df = 1; 1,587)				
Sex	.04	1.72		
Grade level	.02	1.19		
SC (T1)	.52***	24.26***		
RV (T1)	-.02	-.68		
PV (T1)	-.01	-.33		
PV (T2)	.07**	2.67**		
RV (T2)	.23***	9.13***		
Model 3			.41	.03

T1 = time 1; T2 = time 2; RV = relational victimization; PV = physical victimization; SC = somatic complaints.

* $p < .05$, ** $p < .01$, *** $p < .001$.

included RV scores (T1). We also included T1 and T2 scores for PV at this step so that we could evaluate the unique effects of RV (T2) on somatic reports during T2. The third step examined the relative contribution of T2 scores for RV, above and beyond any involvement with sex, grade level, initial reports of SC, PV and RV scores, and PV scores during T2. Interaction effects between sex, grade level, and RV scores during T2 were included in the final step. Results indicated no significant interaction terms and thus, were not included in the final summary (Table 3). To reduce the chances of making a type I error, the significance for R^2 change was evaluated at the p value of .01.

The first model was significant, $F(3, 1591) = 280.07, p < .001$, with SC (T1) predicting SC (T2). Sex and grade level were not significant. The addition of RV (T1) and PV (T1 and T2) scores at step 2 accounted for additional variance in the dependent variable, $F\Delta(3, 1588) = 27.31, p < .001$. Importantly, the addition of RV (T2) at step 3 explained an additional 3% of the variance in SC (T2), $F\Delta(1, 1587) = 83.39, p < .001$, and the overall model remained significant, $F(7, 1587) = 156.75, p < .001$. Significant univariate predictors in the final model included SC (T1) as well as peer victimization scores during T2 (i.e., PV and RV). Individual beta weights for SC T1 indicated that students who reported more SC during T1 were more likely to report increased SC during T2. Consistent with our primary hypothesis, individual beta weights for RV T2 scores revealed that students who reported higher RV scores during T2 reported increased SC during T2, even after controlling for participant sex, grade level, initial SC, RV scores during T1, and PV scores during T1 and T2. Additionally, consistent with our hypotheses, although PV (T2) also predicted SC (T2), RV (T2) was a stronger predictor than PV (T2).

Taken together, these results suggest that students who reported being targets of RV were more likely to report SC, even after controlling for initial SC and victimization experiences (i.e., both RV and PV), and concurrent experiences with PV. Partici-

pants' sex and grade level did not moderate the relationship between RV and SC.

Discussion

Findings from the present study contribute to the growing knowledge base related to the negative sequelae associated with adolescent RV. This study extends previous work by demonstrating the unique role of RV in predicting adolescents' reported somatic symptoms. The first objective was to explore sex and grade level effects related to RV and somatic symptoms. Results indicated sex effects; females reported more RV than did males. This finding is consistent with studies documenting gender effects in RV in favor of females [24]. Grade level effects were also found for RV; fifth and sixth graders reported more RV than did eighth graders. This grade level effect is consistent with relational aggression peaking in the early middle-school years [25] because early adolescents navigate complex peer relationships, while also simultaneously experiencing educational transitions and developmental changes [26]. These findings suggest that early adolescents may benefit from prevention and/or intervention efforts targeting their unique developmental needs in an effort to decrease the prevalence and negative effects related to RV.

Main effects for SC were qualified by an interaction between sex and grade level. Although SC decreased in males between fifth and seventh grade, they increased in females between the fifth and eighth grade and between the seventh and eighth grade. This interaction effect is consistent with the asynchronous nature of physical development for males and females during adolescence [27]. The later onset of puberty for males may be a protective factor for physical health symptoms, whereas the earlier pubertal onset for females may be a risk factor. It is also possible that SC vary as a function of pubertal timing (i.e., early, late, or on-time maturation) for both sexes. Additional studies are needed to understand how gender, grade level, and pubertal timing may influence adolescents' physical health.

The second objective and primary goal of this study was to explore the relationship between RV and physical symptomatology among adolescents. Consistent with our hypotheses, adolescents who reported more RV also reported increased SC, even after controlling for sex, grade level, initial RV and PV experiences, initial SC, and PV experiences during T2. That this relationship was not moderated by sex or grade level suggests that the underlying processes influencing the relationship between RV and SC may be similar for both males and females across grades 5 through 8.

The relationship between RV and SC may be influenced by several mediating processes, including adolescents' abilities to cope with stress [28]. The covert nature of RV, compounded by the fact that aggressors could be any of their closest friends, makes coping with RV particularly challenging. Rumination (thinking about something excessively) and co-rumination (discussing something excessively with another person) are two coping strategies that have been examined in relation to peer victimization [29]. In a recent longitudinal study, co-rumination emerged as an antecedent for children's internalizing symptoms [30]. Rumination and co-rumination could underlie the relationship between RV and SC because adolescents who are preoccupied with their victimization may experience increased stress, which in turn may lead to physical illness.

The association between RV and SC may also be influenced by perceived social support. Researchers have demonstrated the important protective role of friendships [31] and of relationships with caring adults in mitigating the negative effects of peer victimization. For example, Davidson and Kilpatrick-Demaray [32] found that both teacher and parent support moderated the association between peer victimization and internalizing distress. Similarly, Baldry [17] found that a positive father-child relationship mediated SC in victimized children. Further research is needed to understand how social support and coping strategies mediate the relationship between RV and physical health.

Implications for healthcare professionals

Although peer victimization has been identified as a challenging area in pediatric practice [33], the present findings offer support by suggesting a way for healthcare professionals to look beyond the "obvious" when assessing adolescents' physical symptoms. When treating adolescents for SC—headaches, stomachaches, and fatigue—sensitive systematic probing about peer relationships may be warranted. Current data underscore the importance of developing screening tools to help identify adolescents in distress related to RV. However, recent findings suggest that mental health screenings are not routinely used in primary care contexts [34]. This may be a function of training because many pediatricians report feeling unprepared to screen children for involvement in aggression other than abuse and neglect [27]. Importantly, a recent intervention study found that training was effective in improving healthcare providers' self-efficacy in screening adolescents' risky behaviors [35]. A logical next step is research-based training of providers in the area of RV.

Strengths and limitations

Although the present study demonstrated robust findings regarding the relationship between RV and SC, results need to be interpreted in light of inherent study limitations. First, although self-report instruments are the preferred method for assessing students' perceptions of peer victimization [19], demand characteristics are still possible. For example, males may have underreported RV owing to the non-normative nature of relational aggression for boys [36]. Second, adolescents were asked only about their own victimization. Witnessing school victimization is even more prevalent for adolescents than actual victimization; estimates range from 72% to 87% [37]. As witnessing aggression may better predict subsequent behavioral problems than actual victimization [38], witnessing RV may more strongly predict SC than experiencing it firsthand. Finally, the generalizability of this study is limited because of the nature of the sample; therefore, replication should incorporate more diversity.

Strengths of the current study include a short-term longitudinal design, a large sample, and controls for several confounding variables. By including the assessments of PV (T1 and T2) and RV (T1), we were able to evaluate the unique role of concurrent RV in predicting SC. Although both forms of peer victimization contributed to increased SC, as expected, RV was a stronger predictor than PV.

This study provides initial support that the sequelae of RV may not be confined to psychological indices, as indicated by previous work, but may also be reflected in adolescents' physical

health symptoms. These results underscore the need to adopt a more comprehensive approach when assessing adolescents' somatic symptoms, so as to gain a better understanding of their overall physical and emotional health. Clinicians who work with adolescents are in a strategic leadership position to aid in the intervention and prevention of relationally aggressive behaviors. An important next step in optimizing adolescent health is to provide training for healthcare professionals to increase their knowledge base and enhance their assessment skills related to RV.

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