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Peer Victimization and Child Physical Health: The Moderating Role of Pessimism

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Abstract

Objective—Involvement in peer victimization has been associated with numerous negative consequences, including poor physical health. The purpose of this study is to improve on previous research evaluating the victimization–health relationship by examining the health (i.e., health-related quality of life [HRQoL], medical service utilization) of both victims and aggressors and examining individual variation in this relationship through the moderating effect of pessimism.

Method—Sample included 125 ethnically diverse youth aged 8–11 years recruited from a low-income medical practice. Child-report of involvement in peer victimization and pessimism was assessed along with parent-report of HRQoL. 2-year medical service utilization was extracted from medical records.

Results—Although not all hypotheses were supported, victims and aggressors were found to be at increased risk for certain poor health outcomes, which were exacerbated by high levels of pessimism.

Conclusion—Findings expand on research into peer victimization and health and provide important implications for identification, prevention, and intervention strategies with at-risk youth.

Keywords: aggression, peer victimization, pessimism, physical health

Introduction

Research has identified peer victimization as a prevalent childhood stressor with significant consequences (Juvonen, Graham, & Schuster, 2003). Estimates on the prevalence of involvement in victimization vary considerably, ranging from 20 to 30% (Juvonen et al., 2003) up to a staggering 75% (Glover, Gough, Johnson, & Cartwright, 2000) of youth involved as victims, aggressors or both in any given year. These rates are particularly alarming considering the multiple negative consequences associated with involvement in aggressor–victim interactions, including poor mental health, academic, and social correlates (Card & Hodges, 2008). More recently, research has found peer victimization to be associated with poor physical health (Fekkes, Pijers, Fredriks, Vogels, & Verloove Vanhorick, 2006; Nishina, Juvonen, & Witkow, 2005; Vernberg,

Nelson, Fonagy, & Twemlow, 2011); however, most of these studies have methodological (e.g., self-report measures of health) and conceptual (e.g., exclusion of aggressors, failure to explain individual variation) limitations and thus require further examination. This study expands on the existing literature examining physical health consequences of peer victimization by using both subjective and objective measures of youth physical health, including both victimization and aggression as risk factors, and examining pessimism as a possible moderator of this relationship.

The theoretical context underlying the current examination is based on the broader stress–health model presented in previous research (McEwen, 1998). Involvement in peer victimization is a common childhood stressor (Juvonen et al., 2003) and research suggests that negative peer relations are a source of significant stress for youth (Flack, Salmivalli, & Idsoe, 2011;

Hawker & Boulton, 2000; Rose & Rudolph, 2006). Broadly, the stress-health model indicates that stress is associated with various negative health outcomes (Caserta et al., 2008; McEwen, 1998; Segerstrom, Taylor, Kemeny, & Fahey, 1998). More specific to the present study, peer victimization has been associated with poor health (e.g., Nishina et al., 2005). However, the relationship between peer-related stress and health is complicated as perceptions of exposure to stressful events may be influenced by individual characteristics (e.g., cognitive appraisal; Rose & Rudolph, 2006). Therefore, the present study uses the stress-health model as a theoretical guide to examine the relationship between involvement in peer victimization (a child-specific stressor) and health and to explain individual differences within this model.

Research has found involvement in peer victimization, as either a victim, aggressor or both, to be related to negative emotional, behavioral, and physical health outcomes (Biebl, DiLalla, Davis, Lynch, & Shinn, 2011; Juvonen et al., 2003; Knack, Jensen-Campbell, & Baum, 2011; Nishina et al., 2005). In general, research on victims is more prevalent than studies examining aggressors, particularly in relation to physical health. Victimization research has been found to predict an increase in physical health problems over a 2-year period even after controlling for medical conditions and depression (Brendgen & Vitaro, 2008) and, relatedly, has predicted somatic complaints, illness, injury (Vernberg et al., 2011), and new health-related symptoms (Fekkes et al., 2006; Nishina et al., 2005) over the course of the school year.

Aggressors are an often overlooked population in the peer victimization literature, potentially owing to their higher social standing among peers (Juvonen et al., 2003); yet, research suggests that these youth often suffer from both emotional (Saluja et al., 2004) and physical health detriments (Forero, McLellan, Rissel, & Bauman, 1999; Gini & Pozzoli, 2009; Juvonen et al., 2003). Research has consistently indicated that aggressors have poor psychosocial adjustment (e.g., Juvonen et al., 2003; Nansel et al., 2001) and are at increased risk for serious psychiatric dysfunction in adulthood (Sourander et al., 2007). Similar to victims, youth aggressors have been found to be at increased risk for having psychosomatic symptoms (Gini & Pozzoli, 2009) and also demonstrate illness and injury complaints during the school year (Vernberg et al., 2011). However, research regarding the physical health of aggressors is limited to only a few studies and further examination of this at-risk population of youth is needed.

Despite the contributions of previous research examining involvement in peer victimization and health (e.g., Vernberg et al., 2011), significant limitations exist. First, most research uses only self-report measures of physical health (e.g., Fekkes et al., 2006), and many studies focus solely on somatic

complaints, raising questions of validity and breadth in assessing physical health. Second, despite emerging research suggesting aggressors also have poor outcomes (Vernberg et al., 2011), these youth are often overlooked. Finally, research examining moderators of this relationship is lacking despite the fact the peer victimization interactions likely do not have the same effect on all youth. Consistent with the stress-health model and the broader literature in this area, the relationship between peer victimization and negative health outcomes appears to be complicated. Small effect sizes and weak associations suggest that personality characteristics may exacerbate poor health. The influence of individual characteristics on related constructs such as peer rejection has been demonstrated (Brendgen & Vitaro, 2008) but, to our knowledge, there is no research exploring the moderating effect of individual characteristics on the peer victimization–health relationship.

In considering the victimization–health relationship, pessimism is a good candidate for examination as a moderating factor. Pessimism is the expectation that events in the future will be negative (Ey et al., 2005); therefore, in the context of involvement in peer victimization, theoretically, pessimistic youth would perceive negative peer interactions as likely to continue to occur in the future and thus may have an augmented stress response. Additionally, pessimism has been tied to both stress (Iwanaga, Yokoyama, & Seiwa, 2004) and negative health outcomes (Maruta, Colligan, Malinchoc, & Offord, 2002) in previous research, suggesting it may play a more sophisticated role as a mechanism of the stress–health relationship. In fact, research has examined pessimism as a moderator between stress and health in adults, finding that pessimistic explanatory style interacts with stress to predict augmented physical illness symptoms (Jackson, Sellers, & Peterson, 2002). Seligman's (1991) theory of explanatory styles and "learned optimism" poses that there are differences in the way individuals respond to stressful events. For example, optimists tend to have positive appraisals of stressful events, use positive coping strategies (e.g., increased sense of control; Klein & Helweg-Larson, 2002) and thus have better outcomes (e.g., improved mood, superior immune functioning; Segerstrom et al., 1998). Therefore, it is expected that pessimistic youth would have an augmented negative experience to involvement in peer victimization and, thus, would be at greater risk for poor health outcomes.

The examination of involvement in peer victimization as a childhood stressor, pessimism, and negative health outcomes is important for all youth. However, because exposure to stress (Bradley & Corwyn, 2002), pessimism (Finkelstein, Kubzansky, Capitman, & Goodman, 2007), and poor health (Case, Lubotsky, & Paxson, 2002) have all individually been found to be more prevalent in youth from low-income families, the

examination of these variables within a population of youth from lower socioeconomic status (SES) families may be particularly interesting. Although this study did not intend to evaluate differences in the relationship between victimization and health across socioeconomic categories, understanding the relationship of these factors, which are relevant to youth from lower-SES families, is important.

This study examined the role of pessimism in moderating the relationship between involvement in peer victimization and poor health. Results will contribute to the literature and the stress-health model in important ways. First, involvement in peer victimization is examined as a specific and prevalent pediatric stressor in relation to health problems within a low-income population of youth. Second, in contrast to previous research, both victimization and aggression are explored. Third, diverse measures of health were used, including both subjective (i.e., health-related quality of life [HRQoL]) and objective (i.e., medical service utilization) child health indicators. Fourth, to overcome limitations of common-method variance, results were derived using data from multiple sources (i.e., child, parent, objective medical records). Finally, results from this study provide a first examination of pessimism as a moderator of the victimization–health relationship. Consistent with previous research, it was hypothesized that those more frequently victimized or those engaging more often in aggressive behavior toward peers would have worse health based on both subjective and objective measures. We also expected that pessimism would moderate this relationship, with higher levels of pessimism amplifying the negative health effects of victimization or aggression. This hypothesis was based on the theory that pessimistic youth may view stressful events more negatively, thus enhancing their detrimental impact.

Materials and Methods

Participants

Participants were 125 child patients and their parents recruited from a primary care medical practice. Youth were aged 8–11 years ($M = 9.48$, $SD = 1.17$) and 53.3% were girls. The sample was ethnically diverse with 50.8% reported as European American, 12.9% as African American, 12.1% as Hispanic American, 3.2% as American Indian, and 21% as multiracial. Participants were recruited from a clinic that serves predominantly low-income families. A review of a subset of the sample ($N = 98$) that consented to the release of medical records, including insurance data, indicated that 85.7% of youth were on Medicaid and 7.1% did not have insurance, reflecting the predominantly low-income status of the sample. Additionally,

of this subset, 52% of youth had at least one health condition recorded in their medical records.

Procedure

Participants were recruited between March 2010 and July 2011 as a part of a larger, cross-sectional data collection study to better understand the physical, emotional, and behavioral health of youth. Inclusion criteria were (1) child age between 8 and 11 years; (2) child was accompanied by a participating legal guardian; and (3) participants were able to speak and understand English. This age range was chosen as it is a prevalent time for victimization (Griffin & Gross, 2004), children at this age are old enough to recognize and report instances of peer victimization, and this is an age where early intervention is relevant and important (Smith, Schneider, Smith, & Ananiadou, 2004). During recruitment, 200 eligible families were approached, 127 (63.5%) families agreed to participate, and 125 (98.4% of the sample) provided sufficient data to be included in analyses. After explanation of the study, consent was obtained from the legal guardian and assent was obtained from the child. Participants were given the option to separately consent to the release of child medical records, resulting in a subset of the sample used in analyses involving information obtained from medical records (i.e., insurance provider, medical service utilization). This subset included 98 of the 125 participants (78.4%) and was representative of the larger sample, as youth did not differ on age, gender, ethnicity, or other study variables (i.e., involvement in peer victimization, pessimism, HRQoL). The guardian and the child independently filled out measures and were compensated \$25 for participation. Medical records at the primary care facility were contained in an electronic database and were systematically extracted and transferred to the researcher's database to be coded. Procedures were approved by the University of Nebraska–Lincoln institutional review board.

Materials

Involvement in Peer Victimization

The Victimization of Self Scale (VS) and the Victimization of Others Scale (VO), taken from the Peer Experiences Questionnaire (Vernberg, Jacobs, & Hershberger, 1999), were used to assess victim and aggressor behavior. The VS is a 10-item scale assessing behaviors in which the reporter is victimized. Children were asked to report the frequency of being victimized over the past 3 months using a 5-point Likert scale. The VO is also a 10-item scale assessing aggressive behavior, or victimization of others, over the past 3 months using the same 5-point Likert scale. Both overt and relational forms

of victimization and aggression were sampled in the VS and VO. Both scales showed good internal consistency in previous research ($\alpha = .85$ and $.78$, respectively; Vernberg et al., 1999), and in the current study ($\alpha = .89$ and $.87$, respectively). The mean score on the VO in our sample was 12.6, which, although statistically different, $t(1153) = 2.73$, $p = .006$, is comparable with previously published data from Vernberg et al. (1999), which found a mean score of 13.8. However, our sample reported a somewhat higher level of peer victimization (mean score of 18.4 compared with 14.0, $t(1154) = 9.35$, $p < .001$), indicating our sample experienced a higher level of peer stress.

Pessimism

The Youth Life Orientation Test (YLOT; Ey et al., 2005) was used to assess levels of child pessimism. The YLOT is a 12-item child-report scale with strong psychometric properties (Ey et al., 2005). Items reflect both positive (e.g., I usually expect to have a good day) and negative expectations (e.g., Things usually go wrong for me). For each item, children rate each statement, ranging from 0 (not true for me) to 4 (true for me). For this study, we used the pessimism scale score, as research indicates that optimism and pessimism are distinct constructs and are differentially related to health outcomes, with pessimism more often directly related to poor health (Taylor et al., 2004; Williams, Davis, Hancock, & Phipps, 2010). The internal consistency of the pessimism scale in this sample was fair ($\alpha = .67$). The mean pessimism score on this scale in our sample was 6.0, which was comparable with previously published data with this measure from Ey et al. (2005), which found a mean score of 5.9, $t(326) = 0.21$, $p = .83$.

Indicators of Child Health

Health-Related Quality of Life

The parent-report version of the Pediatric Quality of Life Inventory Generic Core Scales (PedsQL™ 4.0; Varni, Seid, & Kurtin, 2001) was used to assess the HRQoL of the participants. The PedsQL™ is a well-established measure of child HRQoL (Varni et al., 2001) that has consistently been found to be reliable and valid for use among healthy and clinical pediatric populations (Limbers, Newman, & Varni, 2008). The parent-report version of the PedsQL™ was used to avoid problems of common-method variance in analyses with child-report victimization and pessimism. The measure contains 23-items that assess functioning in four areas (physical, emotional, social, and school). To avoid redundancy across measures of different constructs, three items on

the social scale related to victimization (i.e., getting along with other children, other kids not wanting to be his or her friend, getting teased by other children) were dropped. The Total Scale Score of the 20 items included was used to assess overall functioning and HRQoL. The internal consistency of this scale with the three items removed was good ($\alpha = .87$). The mean score in our sample was 77.4, which is slightly lower than norms established by Varni et al. ($M = 80.9$; 2001), $t(1745) = 2.28$, $p = .02$.

Two-Year Medical Service Utilization

Records for each medical visit were obtained from an electronic database at the primary care facility. Trained research assistants systematically reviewed medical records and coded the type of each visit made by the youth as either related to medical or mental health needs. The total number of visits in the past 2 years was then tallied. To maintain the focus on physical health, mental health visits were not counted in total medical service utilization. Inter-rater reliability data for the medical review of 2-year service utilization was collected for 20 of the 98 participants consenting to the release of their medical records (20.4%) and resulted in excellent agreement (ICC = .90; Cicchetti, 1994).

Analysis Plan

A series of linear regression analyses were used, with involvement in negative peer interactions as predictors of health (i.e., HRQoL, 2-year medical service utilization), using a separate regression for each outcome variable. To improve interpretation of analyses, predictors were mean-centered (Jaccard, Wan, & Turrissi, 1990). When predicting health, either victimization or aggression was added to the first step to examine the main effects of involvement in peer victimization. These variables were examined in separate models to provide a direct test of each construct, without requiring victimization and aggression to “compete” for variance. Because our inclusion of aggression is relatively new in this area, this strategy allows for a more straightforward and interpretable examination of this construct. Next, pessimism was added on the second step, and the pessimism \times victimization/aggression interaction was entered on the third step. All significant interactions were probed at high (+1 *SD*), moderate (mean) and low (−1 *SD*) levels of pessimism, according to procedures outlined by Aiken and Gensler (1996). Using an a priori power analysis for multiple regression, our power was $\sim .5$ for the full sample ($N = 125$) and $.4$ for the subset with medical records ($N = 98$).

Results

Preliminary Analyses

Descriptive statistics for all key variables are provided in Table I. Bivariate correlations of variables are provided in Table II. First, analyses were conducted to determine if demographic variables should be included in regressions as covariates. HRQoL and medical service utilization did not differ as a function of gender, age, or ethnicity and were therefore not included in subsequent models. Lastly, recognizing that previous research has found bully victims to have particularly negative outcomes (Vernberg et al., 2011), we examined the potential interaction between victimization and aggression in predicting both HRQoL and medical service utilization. There was not a significant victimization \times aggression interaction in predicting HRQoL, $F(3, 117) = 1.92, p = .13$, or medical service utilization, $F(3, 90) = 1.54, p = .21$, and therefore victimization–aggression interactions were not examined in further analyses.

Health-Related Quality of Life

Results from all regression analyses are presented in Table III. HRQoL ($n = 125, M = 77.38, SD = 14.20$) was first examined in relation to involvement in peer victimization and pessimism. As hypothesized, victimization entered on the first step accounted for a significant amount of variance, $F(1, 121) = 5.19, p = .02, R^2 = .04$, with youth victimized more having lower (i.e., worse) HRQoL, $\beta = -0.20, p = .02$. Pessimism was entered on the second step but was not significantly predictive. The pessimism \times victimization interaction term ($\beta = -0.25,$

$p = .004$) was then entered on the third step and, as hypothesized, accounted for a unique amount of variance in HRQoL, $F(3, 119) = 4.80, p = .004, \Delta R^2 = .06$. Post hoc probing revealed that among children reporting high levels of pessimism (simple slope = $-.67, t = -1.70, p < .001$), those who reported higher levels of victimization had worse HRQoL. For those reporting moderate (simple slope = $-.25, t = -1.70, p > .05$) to low (simple slope = $.17, t = 0.77, p > .05$) levels of pessimism, higher levels of victimization did not significantly predict worse HRQoL (Figure 1).

In the second analysis with HRQoL as the dependent variable, contrary to hypotheses, neither aggression nor pessimism on the first two steps was significant. However, the pessimism \times aggression interaction term ($\beta = -0.26, p = .007$) accounted for a unique amount of variance in HRQoL, $F(3, 118) = 3.01, p = .03, R^2 = .07$. Post hoc probing revealed that for children reporting high levels of pessimism (simple slope = $-0.88, t = -2.34, p = .02$), those reporting higher levels of aggressive behavior had worse HRQoL. For children reporting moderate (simple slope = $0.04, t = 0.13, p > .05$) to low levels (simple slope = $.96, t = 1.90, p > .05$), higher levels of victimization did not predict worse HRQoL (Figure 2).

Medical Service Utilization

Next, 2-year medical service utilization ($n = 96, M = 4.92, SD = 3.90$) was examined as an outcome of involvement in peer victimization and pessimism. In the first analysis with service utilization as the dependent variable, victimization, pessimism, and the pessimism \times victimization interaction were not predictive on any step of the analysis, $F(3, 92) = 1.23, p = .30$,

Table I. Descriptive Statistics for Variables Included in Regression Analyses

Variable	N	Mean	SD	Min	Max	Possible range ^a
Peer victimization	123	18.4	8.6	10	50	10–50
Aggression	122	12.6	4.4	10	32	10–50
Pessimism	124	6.0	3.5	0	18	0–18
HRQoL ^b	125	77.4	14.2	41.3	100	0–100
Two-year medical service utilization	96	4.9	3.9	0	18	N/A

a. Possible range of scores for each measure.

b. HRQoL score excludes the three items related to peer victimization.

Table II. Bivariate Correlations of Primary Variables

Variable	Peer victimization	Aggression	Pessimism	HRQoL
Aggression	.282**	—		
Pessimism	.218*	.146	—	
HRQoL	-.203*	-.074	-.081	—
Two-year medical service utilization	.066	.220*	.062	-.232*

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

Table III. Summary of Regression Results

Variable	B	SE B	β	ΔR^2
HRQoL models				
Victimization and pessimism				
Step 1				.041*
Victimization	-.33*	.15	-.20	
Step 2				.004
Victimization	-.31	.15	-.19	
Pessimism	-.25	.37	-.06	
Step 3				.063**
Victimization	-.25	.15	-.15	
Pessimism	-.29	.36	-.07	
Victimization \times pessimism	-.12**	.04	-.25	
Aggression and pessimism				
Step 1				.005
Aggression	-.24	.29	-.07	
Step 2				.006
Aggression	-.20	.30	-.06	
Pessimism	-.30	.37	-.08	
Step 3				.060**
Aggression	.04	.30	.01	
Pessimism	-.34	.36	-.10	
Aggression \times pessimism	-.26**	.09	-.26	
Two-year medical service utilization models				
Victimization and pessimism				
Step 1				.004
Victimization	.03	.05	.07	
Step 2				.003
Victimization	.03	.05	.06	
Pessimism	.06	.12	.05	
Step 3				.032
Victimization	.03	.05	.07	
Pessimism	.08	.12	.07	
Victimization \times pessimism	.03	.02	.18	
Aggression and pessimism				
Step 1				.048*
Aggression	.22*	.10	.22	
Step 2				.001
Aggression	.21*	.10	.21	
Pessimism	.03	.12	.03	
Step 3				.074**
Aggression	.11	.12	.12	
Pessimism	.07	.11	.06	
Aggression \times pessimism	.08*	.03	.29	

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

$R^2 = .04$. In the second analysis, aggression was entered on the first step and, as hypothesized, accounted for a significant amount of variance, $F(1, 92) = 4.66$, $p = .03$, $R^2 = .05$, with

youth reporting more aggression having more medical visits, $b = .22$, $p = .03$. Pessimism was not significant when entered on the second step. Finally, the pessimism \times aggression interaction term ($\beta = .29$, $p = .007$) accounted for a unique amount of variance in medical service utilization, $F(3, 90) = 4.21$, $p = .008$, $R^2\Delta = .07$. Post hoc probing revealed that, as hypothesized, among youth reporting high levels of pessimism, those who reported higher levels of aggressive behavior had a greater number of medical visits in the past 2 years (simple slope = .39, $t = 3.31$, $p = .001$). For youth reporting moderate (simple slope = .11, $t = 1.08$, $p > .05$) to low (simple slope = -0.16 , $t = -0.97$, $p > .05$) levels of pessimism, higher levels of aggressive behavior did not significantly predict more service utilization (Figure 3).

Discussion

The current study examined the relationship between involvement in youth peer victimization, pessimism, and health. Results support the stress-health model and indicate that both victimization and aggression were associated with different health outcomes as main effects. Specifically, victimization was found to predict HRQoL, whereas aggression was found to predict 2-year medical service utilization. Additionally, pessimism, specifically at high levels, was found to moderate the relationship between involvement in peer victimization and health. Results indicate that high levels of pessimism significantly exacerbate the relationship of victimization with HRQoL, and of aggression with HRQoL and medical service utilization. In these cases, youth involved in victimization or aggression who were also highly pessimistic tended to have worse health than their less pessimistic peers.

These findings contribute to the understanding of the victimization–health relationship in important ways. First, results replicated existing research on involvement in peer victimization as a unique child stressor that predicts poor physical health (Knack et al., 2011). Additionally, this study expanded on health outcomes by examining the impact of peer victimization on HRQoL in a general population of youth. Previous research has found victimization to be related to HRQoL in specific populations such as obese youth (Janicke et al., 2007) and youth with tic disorders (Zinner, Conelea, Glew, Woods, & Budman, 2012) but has not examined this relationship in a broader pediatric population. This study also examines the victimization–health relationship by using both subjective (i.e., parent-reported HRQoL) and objective (i.e., medical service utilization) measures of physical health. By using multiple reporters and objective medical data, errors of common-method variance are limited and findings are strengthened.

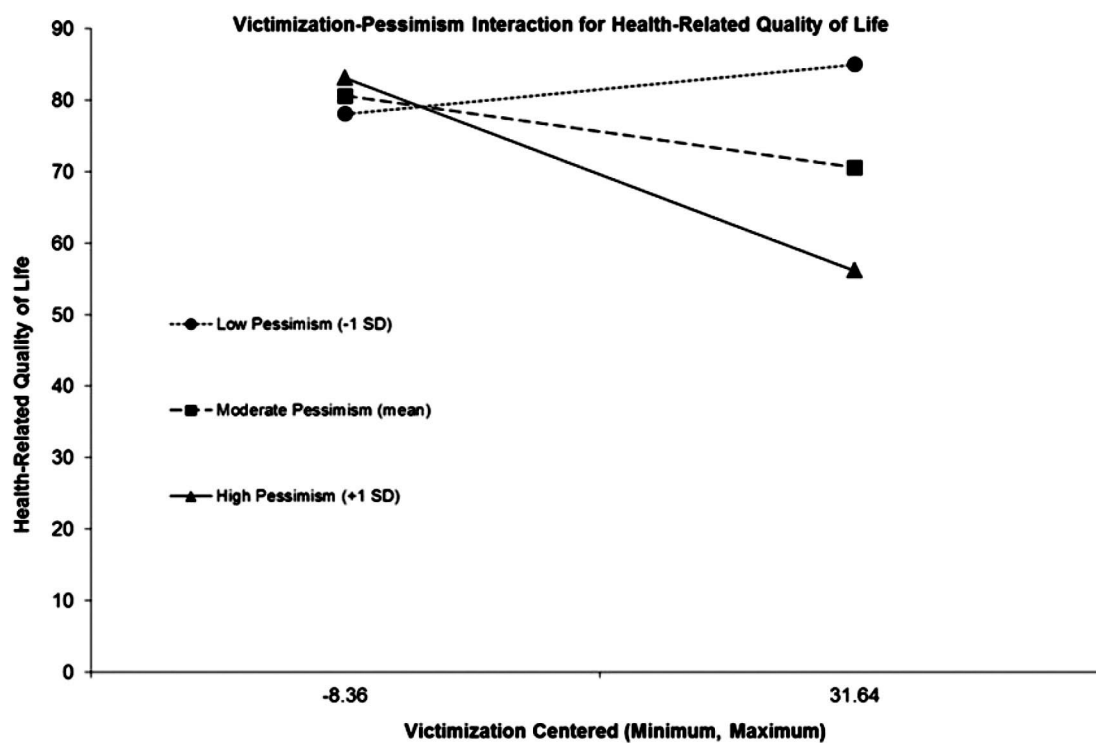


Figure 1. Graphical depiction of the moderating effect of pessimism on the relationship between victimization and HRQoL.

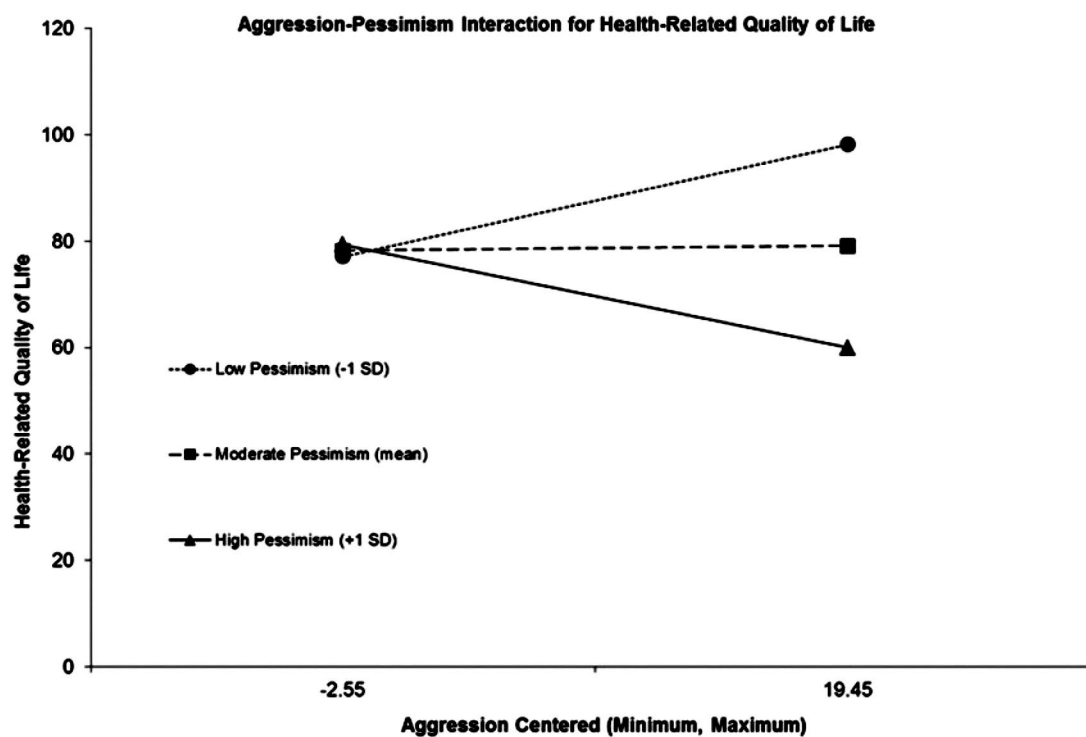


Figure 2. Graphical depiction of the moderating effect of pessimism on the relationship between aggression and HRQoL.

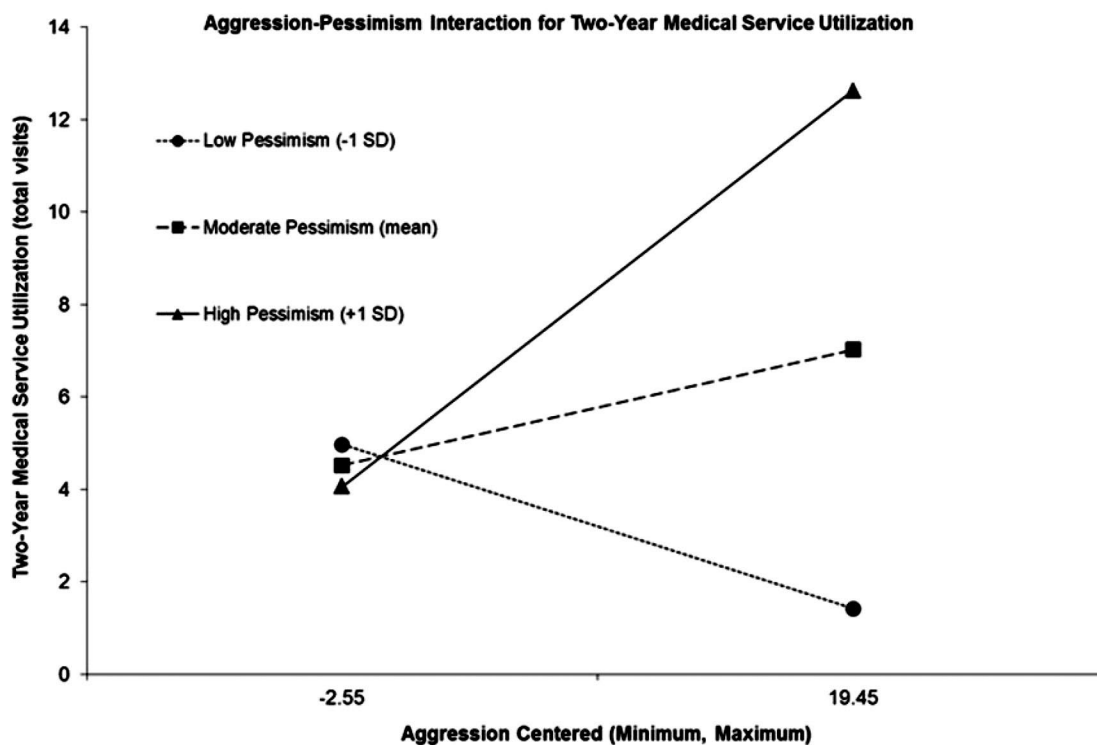


Figure 3. Graphical depiction of the moderating effect of pessimism on the relationship between aggression and 2-year medical service utilization.

Second, this study included aggressors as an often overlooked, but at-risk population for poor health and negative outcomes (Juvonen et al., 2003; Sourander et al., 2007). Third, this study extended previous research by examining a low-income ethnically diverse population. Because youth from low-income families experience a great amount of stress (Bradley & Corwyn, 2002), understanding the effects of a childhood stressor like involvement in peer victimization in this population is crucial. Of note, the present findings do not compare this relationship between lower and higher socioeconomic groups, but instead describe the relationship in a population where these factors are particularly relevant. Future research should compare these findings across socioeconomic levels, as it is possible this relationship is augmented in youth from lower SES families. Finally, this study makes a significant contribution in explicating potential mechanisms of the stress–health relationship by examining pessimism as a risk factor for exacerbated physical health issues in youth involved in victim–aggressor interactions. Understanding how personality constructs affect the way aggression and victimization influence health is important in identifying youth at increased risk for poor health.

Clinical and Research Implications

This study has important implications for future directions in clinical practice and research. Results suggest that youth involved in peer victimization have increased risk for health problems. Further, those who are more pessimistic may have an augmented risk for poor health. Results inform clinicians, pediatric psychologists, medical care providers, and school officials in identifying youth at risk for poor health due to involvement in peer victimization and accompanying personality characteristics. For mental health providers, this suggests that effective assessment of youth involved in peer victimization should include not only mental health issues but those related to personality styles (i.e., levels of pessimism) and physical health. Finally, pediatric primary care providers can help identify high medical care utilizers as being involved in peer victimization, particularly as aggressors.

Results indicate there may be different opportunities to intervene with children involved in peer victimization. For example, interventions may be targeted at preventing or reducing the occurrence of peer victimization using school-wide interventions (e.g., Fonagy et al., 2009). As the findings indicate there are negative outcomes for both victims and aggressors,

interventions should be focused on all parties involved. To this end, recent research supports the effectiveness of school-based intervention programs, which target both sides of aggressor–victim interactions by not only reducing aggressive behavior, but also increasing helpful bystanding and decreasing victimization (Fonagy et al., 2009; Williford et al., 2012). However, while informative, previous research in this area has focused almost exclusively on mental health and psychosocial outcomes, and the effect of interventions in improving physical health is lacking and needed.

Additionally, interventions targeted at personality factors may be beneficial in buffering the negative effects of involvement in peer victimization. Specifically, cognitive-based training programs focused on Seligman's (1991) "learned optimism" may assist children in learning to recognize and dispute pessimistic thoughts (Seligman, 2002). Research indicates that prevention programs that teach youth to identify pessimistic thoughts and challenge them with optimistic alternatives are effective in increasing optimistic explanatory styles up to 2 years after training (Gillham, Reivich, Jaycox, & Seligman, 1995). Similar interventions targeting pessimistic cognitive errors may be beneficial in buffering the negative health outcomes associated with peer victimization. Finally, children may express differing views than adults on ways to handle bullying; therefore, incorporating child perspectives on intervention strategies, including those with a cognitive component, could be beneficial (Oliver & Candappa, 2007). For all approaches, future research on effectiveness should focus on both victims and aggressors and should include an examination of health benefits associated with successful implementation.

Limitations and Future Directions

Although this study significantly adds to and expands on the existing literature examining child stressors and physical health, some limitations should be noted. First, our ability to make causal conclusions is limited by the cross-sectional nature of the study design. While it is inferred that involvement in peer victimization contributes to poor health, it is possible that the reverse relationship or a bidirectional relationship exists. For example, some research suggests that children with special health care needs may be victimized more frequently (Van Cleave & Davis, 2006) and it is possible that poor health leads to peer aggression. However, the idea that victimization leads to poorer child health over time is supported by longitudinal studies finding victimization preceding the development of health problems (Fekkes et al., 2006; Nishina et al., 2005). Future longitudinal research studies, including possible

moderators like pessimism, are needed to better explicate this relationship. Relatedly, it should be noted that clinical records suggested 52% of our sample has some kind of health condition. This rate may be high for typical outpatient medical clinics, but could reflect the lower socioeconomic status of our sample (Case et al., 2002). This characteristic should be noted when interpreting results as it is possible youth with health problems are more likely to be victimized (Van Cleave & Davis, 2006) and/or have a lower HRQoL (Varni et al., 2001). Second, the retrospective measurement of predictors (e.g., involvement in peer victimization) and outcomes (e.g., service utilization) is a relative weakness. Although ample research suggests involvement in peer victimization (e.g., Nishina et al., 2005; Scholte, Engels, Overbeck, de Kemp, & Haselager, 2007) and medical service utilization (e.g., Shenkman, Knapp, Sappington, Vogel, & Schatz, 2007) are stable constructs in youth (improving interpretability and generalization) future research examining constructs prospectively is a great need. Third, although this study used multiple reporters and objective measurement, future research should look to further improve on construct measurement. More specifically, when measuring aggressive behavior, a peer nomination procedure may be more appropriate to reduce underreporting due to social desirability. Relatedly, medical service utilization is a solid measure of help-seeking behavior but only a proxy of actual health. It is recommended future research examine more descriptive measures of health (e.g., chronic medical conditions, body mass index, acute illness, injury). Additionally, for medical service utilization, research suggests that insurance status influences service utilization in youth, with privately insured children more likely to have office visits and publicly insured children more likely to be hospitalized and use emergency services (McCormick et al., 2001). Therefore, because our sample was primarily insured publicly, the ability to generalize results regarding service utilization may be limited by this discrepancy. There is a need for replication of the finding in broader socioeconomic samples. Lastly, although effects were significant, the amount of variance accounted for was relatively small. This suggests that involvement in peer victimization and pessimism are just two of many variables contributing to health in youth, emphasizing the importance of continued research in the area.

Conclusions

Being involved in peer victimization, as either a victim or bully, is associated with greater risk for poor physical health. Further, this relationship is exacerbated by pessimism, such

that those involved in peer victimization who are more pessimistic tend to have even worse health. This study helps explicate the relationship between involvement in peer victimization and poor health while also increasing understanding about individual differences in this relationship.

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