

A Vicious Cycle of Peer Victimization? Problem Behavior Mediates Stability in Peer Victimization Over Time

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Abstract

Purpose The aim of this study is to investigate the mediating role of children's internalizing symptoms and aggressive behavior in cycles of peer victimization. We hypothesized that victimization increases internalizing problems, reactive, and indirect aggression, which in turn were expected to increase the likelihood of later peer victimization.

Methods Data from four waves of a longitudinal study among a culturally diverse sample of 7- to 11-year-olds were used. Peer victimization was assessed via children's self-reports. Parents and children rated internalizing symptoms. Teachers provided information about proactive, reactive, and indirect aggression. We tested our hypotheses using path models with maximum likelihood estimation. Multiple imputation was used to treat the missing values.

Results Path analyses revealed that peer victimization increased later internalizing symptoms and reactive and indirect aggression when controlled for previous problem behavior. In contrast, proactive aggression was not affected by peer victimization. Reactive aggression and internalizing symptoms mediated the effect of prior on later peer victimization.

Conclusions Our findings indicate that children's problem behavior may contribute to an escalating cycle of peer victimization.

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Developmental research indicates that peer victimization is characterized by both change and stability over time: While victimization remains a rare or transitory experience for many children, some are victimized over and over again (e.g., [22, 14, 33, 44]). This finding is in line with the broader criminological literature, which has demonstrated that certain persons are at increased risk for repeat victimization, sometimes across long periods of time ([51, 72]). However, despite the body of research that has documented this fact, our understanding of why some continue to be victimized while others are not is still limited [76]. Two explanations can be offered [59, 73]: The first is that the victim has high-stable risk factors, such as affiliations with aggressive peers or immersion in a high-risk environment ([36, 42]), which influence both his/her risk of prior and later victimization, making the relation between prior and later victimization noncausal. The second is that victimization itself sets processes in motion that increase later victimization risk. Here, we investigated the latter explanation because it still remains empirically unclear how victimization exacerbates itself. Although prior research has indeed shown that victimization itself increases the risk of subsequent victimization ([51, 73, 80]), it is unclear which processes are responsible for this, as studies that treat responses to earlier victimization as dynamic processes that, in turn, affect later victimization are rare [76].

In the current paper, we hypothesized that one important process behind the link between prior and later victimization is that victimization can increase a victim's problem behavior, in turn increasing future victimization risk. Specifically, we tested whether the link between prior and later victimization can be explained through the victim's increased internalizing symptoms and aggression caused by the victimization. Although theory and previous research suggest indirect support for this by showing links between internalizing symptoms and aggression with peer victimization (e.g., [8, 34]), it is less clear whether internalizing problems and aggression *mediate* the effect of prior on later victimization.

We focused on peer victimization, because this is a form of victimization that is particularly salient in the childhood and adolescent years, as a substantial part of experienced aggression and violence in this age category occurs between peers ([78]). This is not surprising given that children spend a large part of their time in school and among peers, so that this particular social environment has high potential significance for their behavioral development. Research has demonstrated that peer victimization and rejection are associated with potentially serious consequences, whereas positive peer relationships and acceptance have been related to healthy and adaptive child development as well as protection against negative behavioral and psychological outcomes ([30, 35]).

These issues are of import for developmental and life-course criminology for several reasons. First, studying victimization reveals essential information about the nature of crime and antisocial behavior as well as its consequences to victims, which is why it has been termed “an indispensable core of criminological research” ([50], p. 501). Even though the life-course paradigm has not often been applied to victimization within criminology (although there are exceptions, e.g., [72, 80]), developmental research has demonstrated its merit by exploring the factors

associated with stability and change in (peer) victimization trajectories over time (e.g., [33]). Second, victimization among those of young age, especially repeat peer aggression and bullying, can be particularly detrimental as it may set the stage for later malfunctioning, decreased mental health, and criminal involvement [12, 29, 77]. Thus, a better understanding of which mechanisms are responsible for repeat victimization is crucial for interrupting its continuity over time. As a case in point, examining how reciprocal cycles of victimization and perpetration are broken or exacerbated has been termed “one of the most useful directions for individual-level research” ([50], p. 507) because it has the potential to reduce both victimization and perpetration.

We used data from a Swiss longitudinal sample of 7- to 11-year-olds. We deliberately focused on these ages, because victimization stabilizes around late elementary to middle school, but is less stable in early elementary school [13, 47]. We tested our hypotheses using path analyses. In order to increase the robustness of our results and reduce the possibility that they are due to preexisting differences in problem behavior between children, we controlled for several covariates, including prior internalizing problems and aggression. In addition, because they have been shown to be conceptually distinct in the literature and are likely differentially related to victimization, we tested the relations of different forms of aggression (i.e., reactive, proactive, and indirect) with peer victimization ([54]).

Peer Victimization and Problem Behavior

Peer victimization occurs when a child experiences intentional hurtful behavior by a (group of) peer(s) [35]. We investigated the relations of peer victimization with two major domains of problem behavior, namely internalizing problems and aggression, because research clearly indicates that these domains are related to victimization ([15, 20, 34, 62]) and comorbid ([32]). It is therefore important to investigate them simultaneously. Specifically, we tested two subsequent effects: (1) the effect of victimization on problem behavior and (2) the effect of problem behavior on victimization (Fig. 1). Although few if any studies have investigated this specific mediating mechanism by problem behavior in cycles of repeated victimization over time, various studies shed light on both effects separately, suggesting indirect support for the plausibility of our mediation hypotheses. We discuss these studies in the following.

Peer Victimization and Internalizing Problems

Theoretically, peer victimization is expected to be associated with internalizing symptoms since being victimized is typically an expression of social exclusion ([46]). Social exclusion, in turn, interferes with humans’ fundamental need to belong to social groups, which is required for well-being and positive emotions [8]. Although longitudinal studies have provided mixed results, with some finding an effect of peer victimization on internalizing symptoms (e.g., [28, 37]), but others not (e.g., [43, 52]), these discrepancies are likely in large part due to differences in

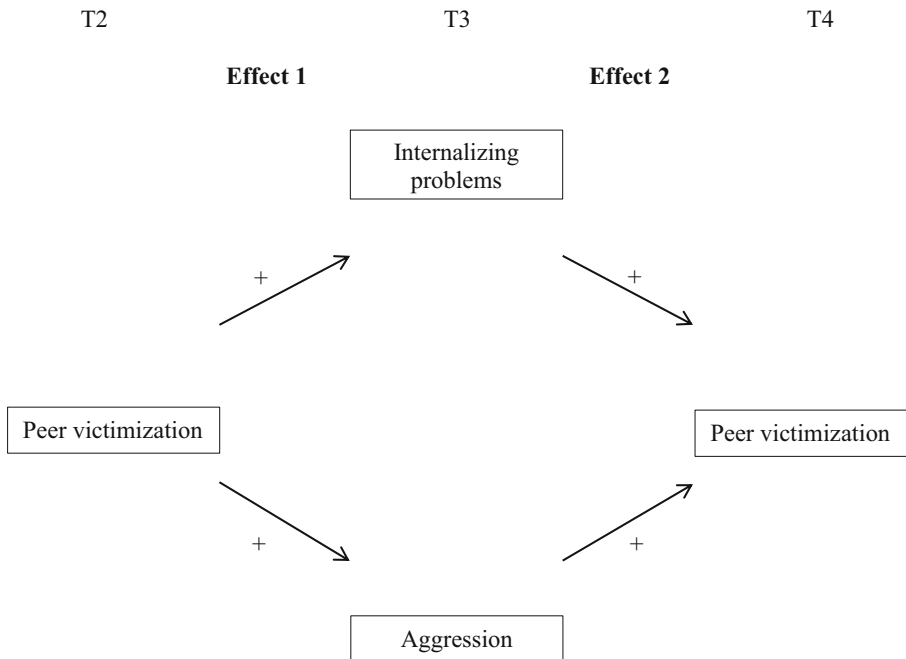


Fig. 1 Mediation model. Hypothesized effects are controlled for prior aggression, prior internalizing problems, ADHD, SES, parental conflict, and sensation seeking measured at T1

research design [74]. A meta-analysis showed that the odds of later internalizing problems for victims were 1.74 times higher than for nonvictims, suggesting considerable negative psychological effects of peer victimization for its victims ([74]).

The effect of internalizing problems on victimization has received much less attention. This is surprising given that this assumption is supported theoretically by an individual differences perspective grounded in the idea of aggression as social interaction [78]. According to this perspective, most instances of aggression imply social interaction and, in turn, social interaction and interpersonal behavior are influenced by the psychological characteristics of the participants in the aggressive interaction. As such, it has been hypothesized that victim's emotional states and behavior, which include their internalizing problems in particular, influence their victimization risk. Specifically, children with internalizing problems display a lack of social competencies and heightened reassurance seeking, which disturb interpersonal relationships ([66]) and likely put them at risk for peer victimization. Longitudinal research on the latter link is inconsistent, however (e.g., [28, 43, 52]). In fact, a meta-analysis reported only a small effect ($r=0.08$) ([63]).

Thus, longitudinal studies provide mixed evidence for reciprocal effects between victimization and internalizing problems. However, our hypothesis that internalizing behavior *mediates* stability in victimization has gone almost entirely unstudied except for two studies. In the first, Leadbeater and Hoglund [52] found no prospective relations in a four-wave cross-lagged model. However, Kochel

and colleagues [43] used a three-wave cross-lagged model and found that peer victimization did not precede depression, but that depression did precede peer victimization. However, both studies controlled for internalizing problems measured at the same time as victimization and thus only tested whether T1 victimization was related to *increases* in internalizing problems between T1 and T2. A better procedure, which has not been used in previous studies, is to control for problem behavior *before* victimization because victimization and internalizing problems are contemporaneously already associated.

Peer Victimization and Aggression

Although studies have documented that peer victimization is followed by increases in overt aggression (e.g., [67]) and that overt aggression and externalizing behavior are followed by increases in peer victimization (e.g., [48, 79]), few studies have investigated the mediating role of aggression in stability in peer victimization [52]. Furthermore, studies have not acknowledged the multidimensional nature of aggression. We therefore separated proactive overt aggression, reactive overt aggression, and indirect aggression ([16, 24]). Proactive aggression is “cold-headed,” instrumental aggression motivated by an anticipated self-serving outcome [54]. In contrast, reactive aggression is a defensive, frustrated, or angry response to provocation and perceived threat [11]. Because peer victimization is likely to be perceived as a threat and provocation, it should lead to reactive, but not proactive, aggression by the victim. Importantly, the association extends beyond the concurrent situational context. Specifically, prior experiences of victimization are likely to influence the perception of future similar situations, yielding a readiness to perceive further real or imagined threats and corresponding behavioral responses to such situations, which may result in prolonged patterns of hostile responses to provocation [11]. As such, learning may influence reactively aggressive behavioral tendencies. In turn, reactive aggression may cause further peer victimization, because it is a sign of frustration and powerlessness that aggressors find rewarding. Indeed, Salmivalli et al. [69] found that victims’ counterattacks were perceived to provoke aggressors into further peer aggression.

However, longitudinal studies are mixed and have not examined mediation ([19, 49]) except for one study. Salmivalli and Helteenvuori [68] examined mediation among 10- to 13-year-olds. For boys, T1 reactive aggression increased levels of victimization at T2, but proactive aggression at T1 *decreased* victimization at T2. Furthermore, T1 victimization decreased proactive aggression at T2. However, the relations between T1 and T2 were not controlled for victimization and aggression prior to T1. Interestingly, no relations were present between the T2 and T3 variables, when T1 measures of these variables were included, suggesting that controlling for levels of the dependent variables *prior* to the predictor may render the relations spurious.

Overall, these studies suggest that peer victimization is linked to reactive aggression, especially for boys. However, less overt forms of aggression remain understudied. Here, we focused on indirect aggression, which is nonconfrontational behavior aimed at damaging the target’s social relationships ([21]). Few if any longitudinal studies on the relation between victimization and indirect aggression

have been conducted, and it is unknown whether indirect aggression mediates stability in peer victimization. However, some related studies have shown that victimization is associated with other covert forms of aggression (i.e., relational aggression; [67, 81]). It is plausible that victimization affects covert forms of aggression because covert provocations may elicit hostile attributional biases, which in turn lead to retaliatory aggressive responses. There is some empirical evidence that supports this hypothesized pathway, as one study showed that hostile attribution bias partially mediated the victimization-perpetration overlap for covert forms of aggression [81]. According to the authors, victims may interpret covert provocations as intentional and subsequently retaliate either to harm the perpetrator or to defend themselves.

In summary, we expected that peer victimization increases internalizing problems, reactive, and indirect aggression, which in turn increase later victimization risk. The effect on reactive aggression was hypothesized to be primarily present for boys, which is in line with the empirical findings cited above as well as with theoretical expectations for at least two reasons. First, physical aggression holds more significance in male peer groups as it is a sign of strength and avoids one being labeled an “easy target” (e.g., [10]). Second, according to gender specific socialization practices and stereotypes, it is socially more acceptable for boys to express physical aggression after victimization than for girls [17].

Method

Participants

Data were drawn from a combined longitudinal and intervention study, the Zurich Project on the Social Development of Children and Youths (*z-proso*). A stratified sample of 56 schools was drawn after classification by enrollment size and socioeconomic background; the final sample was all 1675 first graders. The implemented interventions did not affect aggression, internalizing problems, or peer victimization [5, 25, 56].

Data were collected from the primary caregiver, the child, and the teacher. The mean age of the children was 7.45 years ($SD=0.39$) at T1, 8.11 years ($SD=0.38$) at T2, 9.10 years ($SD=0.38$) at T3, and 11.33 years ($SD=0.37$) at T4. At T1, the response rate was 81 % for the children ($N=1361$) and the teachers ($N=1350$) and 74 % for the parents ($N=1240$). At T2, the retention rate was 97 % for the children, 96 % for the teachers, and 95 % for the parents; at T3, the retention rate was 96 % for the children, 93 % for the teachers, and 94 % for the parents; at T4, the retention rate was 83 % for the children, 72 % for the teachers, and 85 % for the parents.

The sample was 52 % male. In 46 % of all cases, both parents were born outside of Switzerland and moved to Switzerland later in life. In total, the parents come from over 80 different countries, with relatively high proportions from Serbia-Montenegro, Germany, Portugal, the Middle/Far East, Sri Lanka, and Turkey. Compared to Swiss parents, non-Swiss parents had a lower level of education, higher rates of unemployment, were less integrated into their neighborhood, and

participated less in their children's school ([26]). Of the parents, 23 % had little to no secondary education, 27 % had vocational training, 29 % had attended full-time vocational school or had earned a baccalaureate degree or advanced vocational diploma, and 20 % had a university degree.

Parental consent was obtained for each participant. In the first three waves, computer-assisted 45-min child interviews were conducted at school. The children and the interviewers sat down together, both facing the laptop screen. The interviewers asked each question aloud and entered the given answer. For the Social Behavior Questionnaire (see below), the children were given the laptop and entered the answers themselves, which was facilitated by a special child-friendly format in which a computer mouse was used to click on either of two large buttons (for "yes" and "no") on the laptop screen. At T4, the children completed a paper-and-pencil questionnaire due to their increased cognitive capabilities. Computer-assisted parent interviews were conducted at the respondent's home. The interviewers read each question aloud. The parents were given a booklet with the answer categories and gave their answer verbally. The interviewers then entered the answer given by the parent on a laptop. All contact letters and parent interviews were translated into the nine languages most frequently spoken by the immigrant minorities. The teachers completed a questionnaire at all waves. The temporal order of the interviews and measurements is clarified in Table 1.

Measures

Peer Victimization

Peer victimization was assessed through self-report. The scale was derived from Olweus [60] and has shown consistency and predictive validity with cross-informant behavioral measures [6]. At T2, the items were illustrated by drawings showing different forms of peer victimization and specifically designed for use with 5- to 8-year-olds [61]. Four types of victimization were included: teasing in a mean and hurtful way, stealing and destroying possessions, physical violence, and rejection/exclusion since the school year had started (about 3 months earlier). The answer categories ranged from 0 to 4. At T4, the reference period was the past year due to the increased cognitive capacities of the children; the answer categories ranged from 0 to 5 this time ($\alpha=0.65$ at T2; $\alpha=0.72$ at T4). The responses were summed (T2: $M=3.34$, $SD=2.98$; T4: $M=3.12$, $SD=3.16$). We created quintiles for the path analyses to make

Table 1 Temporal order of measurements

Time point	Variables measured
T1	Control variables (i.e., prior internalizing problems, prior aggression, SES, parental conflict, ADHD)
T2	Peer victimization
T3	Mediators (i.e., internalizing problems, aggression)
T4	Peer victimization

the scales comparable across the waves because a ranking of the values of the scale and inspection of the number of cases in each resulting category revealed that there was sufficient variation to create five (but not more) categories.

Aggression and Internalizing Problems

Problem behavior was assessed at T1 and T3 by the teachers, the children, and the parents using the Social Behavior Questionnaire (SBQ; [75]). Tremblay et al. [75] reported internal consistency, test-retest reliability, stability over time, and concurrent and predictive validity. Responses from the parents and teachers were recorded on a five-point Likert scale. The children were shown drawings of a child's specific acts and asked whether they sometimes do what is shown. A for children easily understandable yes/no format with good reliability and validity was used ([53]).

Four SBQ items measured proactive aggression (e.g., "threatens others"); three items measured reactive aggression (e.g., "reacts aggressively when someone contradicts him/her"); three items measured indirect aggression (e.g., "When angry at another child, (s)he makes other people exclude this child"). We averaged these items. Our choice for the specific informant was informed by theory and prior research and not by empirical exploration. Teachers are supposed to be stronger raters than parents whereas young children's ability to report adequately and consistently on their externalizing behavior is limited ([55]). We therefore used teacher reports to assess aggression. Cronbach's alphas were as follows: 0.87 (T1 and T3) for proactive, 0.92 (T1) and 0.93 (T3) for reactive, and 0.94 (T1) and 0.95 (T3) for indirect aggression. The mean levels were 0.41 ($SD=0.64$) at T1 and 0.43 ($SD=0.64$) at T3 for proactive aggression; 0.94 ($SD=0.96$) at T1 and 0.95 ($SD=0.93$) at T3 for reactive aggression, and 0.66 ($SD=0.88$) at T1 and 0.72 ($SD=0.89$) at T3 for indirect aggression. To reduce the skewness of the aggression variables, we examined their empirical distribution and, based on a ranking of the values and the number of cases in each resulting category, created quartiles for reactive and proactive aggression, and tertiles for indirect aggression, which comprises a normalization strategy to eliminate skew ([23]).

Nine SBQ items measured internalizing symptoms, i.e., anxiety and depression [45] (e.g., "The child cries a lot"). Along with parents, children are perceived as more useful informants than teachers for internalizing symptoms (e.g., [40]). We therefore used the children's and parents' accounts. Cronbach's alphas were as follows: parents $\alpha=0.71$ (T1), $\alpha=0.75$ (T3); children $\alpha=0.62$ (T1), $\alpha=0.71$ (T3). As expected ([1]), the correlation between the parents and the children was low (0.08 at T1 and 0.09 at T3, both $p<0.01$). The mean levels of internalizing problems were 0.70 ($SD=0.46$) at T1 and 0.85 ($SD=0.49$) at T3 for the parents and 0.41 ($SD=0.24$) at T1 and 0.38 ($SD=0.24$) at T3 for the children.

Control Variables

To reduce the possibility that the empirical relations were due to third factors, we conducted a literature review to identify risk factors that predicted both victimization and child problem behavior. Based on this, the following control variables were

included. *Socio-economic status* ([9, 57, 70]) was based on coding the caregivers' current professions ([27]) and transforming the codes into an International Socio-Economic Index of occupational status (ISEI) score [31]. *Parental conflict* ([18, 64, 70]) was measured as extended periods of serious conflict between cohabitating partners or between a caregiver and a noncohabitating partner. It was reported using an event history calendar, which was especially designed to capture the most important events in the child's life from birth to age 7 (see [7]). Attention deficit hyperactivity disorder (ADHD; [21]) was measured through eight teacher-reported items on the SBQ. *Sensation seeking* ([39, 41, 65]) was included as an aspect of self-control deficits and measured through a board game where the children chose between adventuresome and secure options. We also included *prior aggression* and *internalizing problems* to ensure that the influence of victimization on problem behavior was due to victimization itself and not to preexisting differences in levels of problem behavior.

Measurement Scheme

Our temporal measurement scheme was as follows. The predictor of interest (i.e., peer victimization) were measured at T2 and preceded the measurement of the mediators (internalizing problems and aggression), which were measured at T3. These, in turn, preceded the dependent variable (i.e., later peer victimization), which was measured at T4. Thus, the time order of the variables was unambiguous. In accordance with the Cambridge Quality Checklists ([58]), T1 measures were used only for the control variables (i.e., prior internalizing problems, prior aggression, SES, parental conflict, ADHD) to avoid that they might act as mediators.

Missing Data

Child attrition between T1 and T4 was related to T1 aggression (proactive: odds ratio (OR)=1.40, $p < 0.01$; reactive: OR=1.28, $p < 0.01$; indirect: OR=1.23, $p < 0.01$), but not to child- (OR=1.29, $p > 0.05$) or parent-reported (OR=.79, $p > 0.05$) internalizing problems. Child attrition between T2 and T4 was weakly related to T2 peer victimization (OR=1.06, $p < 0.05$). The missing values were not distributed randomly (Little's MCAR test, $\chi^2(267)=355.19$, $p < 0.01$). For those children who participated in all waves, 597 of all 19,142 data points (3.12 %) were missing. We therefore used multiple imputation using fully conditional specification in SPSS; the number of imputations was 10. The final sample size for the path models was $N=1126$. We conducted the path analyses for each imputation separately in Stata and calculated the overall estimates [3].

Data Analysis

We used path models to test our hypotheses. Probability plots indicated some deviations from multivariate normality; we therefore used maximum likelihood (ML) under conditional normality [71]. In ML, the recommended fit statistics are the standardized root mean square residual (SRMR) supplemented by one of the following: The Tucker Lewis index (TLI), the comparative fit index (CFI), or the

root mean square error of approximation (RMSEA). We inspected all four, with cutoffs of close to SRMR <0.08, TLI >0.95, CFI >0.95, and RMSEA <0.06 [38]. All models were re-estimated using quasi-maximum likelihood with the Huber/White/sandwich robust variance estimator, which gives accurate estimates even when the model is miss-specified; results were similar.

Results

Descriptive Statistics

Many children experienced peer victimization at least once or twice (Table 2). A substantial minority of the children was victimized regularly. Boys reported more peer victimization than girls, $t(1326)=-2.669$, $p<0.01$, Cohen's $d=0.15$ at T2; $t(1144)=-3.168$, $p<0.01$, Cohen's $d=0.19$ at T4.

Next, zero-order correlations between the study variables were computed. The findings showed substantial correlations between victimization and problem behavior (Table 3). Victimization was more strongly correlated with reactive than with proactive aggression; in fact, T3 proactive aggression was not significantly correlated with T4 victimization. Indirect aggression was only related to T2, not T4, peer victimization. For internalizing problems, victimization was more strongly correlated with child-reported than with parent-reported internalizing problems. There were strong correlations between the aggression measures within the waves.

Table 2 Frequencies (%) of peer victimization at T2 and T4

	Teasing	Stealing and destroying	Physical violence	Rejection
T2				
Never	680 (52 %)	777 (59 %)	710 (54 %)	628 (47 %)
Once or twice	203 (15 %)	348 (26 %)	270 (21 %)	355 (27 %)
More than twice	252 (19 %)	143 (11 %)	224 (17 %)	251 (19 %)
At least once per week	107 (8 %)	43 (3 %)	73 (6 %)	60 (5 %)
(Almost) every day	72 (6 %)	11 (1 %)	43 (3 %)	32 (2 %)
Total	1314 (100 %)	1322 (100 %)	1320 (100 %)	1326 (100 %)
T4				
Never	452 (40 %)	679 (60 %)	669 (59 %)	556 (49 %)
Once or twice	400 (35 %)	318 (28 %)	298 (26 %)	396 (35 %)
Three to ten times	156 (14 %)	99 (9 %)	108 (10 %)	105 (9 %)
About every week	58 (5 %)	21 (2 %)	22 (2 %)	24 (2 %)
About every month	37 (3 %)	11 (1 %)	27 (2 %)	30 (3 %)
(Almost) every day	34 (3 %)	8 (1 %)	13 (1 %)	26 (2 %)
Total	1137 (100 %)	1136 (100 %)	1137 (100 %)	1137 (100 %)

Table 3 Pearson's correlations between study variables

	1	2	3	4	5	6	7	8	9	10	11	12
1. T1 proactive aggression												
2. T1 reactive aggression	0.60**											
3. T1 indirect aggression	0.78**	0.56**										
4. T1 internalizing problems (child report)	0.06*	0.00	0.08**									
5. T1 internalizing problems (parent report)	0.00	0.05	0.00	0.08**								
6. T2 victimization	0.17**	0.19**	0.18**	0.15**	0.10**							
7. T3 proactive aggression	0.45**	0.33**	0.40**	0.01	-0.04	0.11**						
8. T3 reactive aggression	0.36**	0.48**	0.32**	0.03	0.03	0.18**	0.61**					
9. T3 indirect aggression	0.40**	0.28**	0.43**	0.04	0.00	0.12**	0.79**	0.58**				
10. T3 internalizing problems (child report)	0.03	0.01	0.04	0.42**	0.07*	0.16**	0.05	0.05	0.08**			
11. T3 internalizing problems (parent report)	0.05	0.04	0.06	0.09**	0.55**	0.09**	0.02	0.03	0.04	0.09**		
12. T4 victimization	0.08*	0.09**	0.06	0.09**	0.09**	0.18**	0.05	0.13**	0.05	0.14**	0.11**	

* $p < 0.05$; ** $p < 0.01$

Factor Structure Aggression

To investigate evidence for a three-factor structure, the ten aggression items were analyzed using confirmatory factor analysis in Stata. Two models were estimated: A one-factor model with all ten items, and a three-factor model with four items for proactive aggression, three items for reactive aggression, and three items for indirect aggression. The fit indices for the three-factor, but not the one-factor, model indicated mostly satisfactory fit (SRMR = 0.04; CFI = 0.97; TLI = 0.96), but the RMSEA was suboptimal (0.09). Modification indices suggested improved fit when a covariance between the error terms of the items “aggressive when teased” and “aggressive when something taken” and between the error terms of the items “threatens” and “intimidates” was added (Table 4). This made substantive sense since the first two both referred to an underlying reaction to provocation and the second two to proactive nonphysical coercion. The covariances were added, leading to slightly improved fit (SRMR = 0.03; CFI = 0.98; TLI = 0.97). The RMSEA was 0.08 (CI = 0.07–0.09) and strictly speaking still not “close to 0.06” [37]. However, since three of the four fit indices were very good, this satisfied the criteria for a satisfactory model fit [37]. The three-factor model showed better fit than the one-factor model (LR $\chi^2(5) = 2635.51, p < 0.001$).

Victimization and Problem Behavior

We next estimated a path model to test the hypothesized relations between victimization and problem behavior. All models were controlled for the covariates

Table 4 Standardized estimates one- and three factor model for T3 proactive and reactive aggression

Items	One-factor model	Three-factor model		
	Aggression	Proactive aggression	Reactive aggression	Indirect aggression
Threatens	0.66** (0.02)	0.70** (0.02)		
Encourages to harass	0.79** (0.01)	0.84** (0.01)		
Tries to dominate	0.79** (0.01)	0.84** (0.01)		
Intimidates	0.72** (0.01)	0.79** (0.01)		
Aggressive when teased	0.63** (0.02)		0.85** (0.01)	
Aggressive when contradicted	0.66** (0.02)		0.92** (0.01)	
Aggressive when something taken	0.63** (0.02)		0.87** (0.01)	
Gets others to dislike a person	0.92** (0.01)			0.94** (0.01)
Tells mean things behind back	0.92** (0.01)			0.94** (0.00)
Makes others exclude child	0.90** (0.01)			0.92** (0.01)
Fit statistics				
SRMR	0.10	0.03		
RMSEA	0.26	0.08		
CFI	0.75	0.98		
TLI	0.68	0.97		

** $p < 0.01$.

measured at T1 (i.e., prior internalizing problems, prior aggression, ADHD, SES, parental conflict, and sensation seeking). The residual variances between aggression and internalizing problems were allowed to covary. The first model used child-reported internalizing behavior; the second used parent-reported internalizing behavior (Table 5). Victimization increased reactive and indirect, but not proactive aggression. Victimization affected internalizing problems, but only the child reports. Reactive aggression and internalizing problems (but not proactive and indirect aggression) increased subsequent victimization. The statistical significance of the indirect effect shows that the effect of prior victimization on subsequent victimization was mediated by problem behavior, i.e., reactive aggression and internalizing problems [2]. In total, 7 % (0.01/0.15) to 14 % (0.02/0.14) of the total effect of prior on later victimization was mediated. There was a strong remaining direct effect of prior victimization.

Finally, we tested a multigroup model in which the parameters were allowed to vary by gender. This model fits the data better than the single-group model (model with child-reported internalizing problems: range of LR $\chi^2(48) = 570.88$, $p < 0.001$

Table 5 Path models ($N = 1126$) (unstandardized coefficients, SE)

	Teacher-reported aggression	
	Model 1. Child-reported internalizing problems	Model 2. Parent-reported internalizing problems
T2 vic → T3 proaggr	0.04 (0.02)	0.04 (0.02)
T2 vic → T3 reaggr	0.07** (0.02)	0.07** (0.02)
T2 vic → T3 indaggr	0.04* (0.03)	0.04* (0.02)
T2 vic → T3 anxdep	0.02** (0.02)	0.01 (0.01)
T3 proaggr → T4 vic	0.04 (0.05)	0.04 (0.05)
T3 reaggr → T4 vic	0.17** (0.04)	0.16** (0.04)
T3 indaggr → T4 vic	-0.13 (0.07)	-0.12 (0.07)
T3 anxdep → T4 vic	0.71** (0.17)	0.24** (0.09)
T2 vic → T4 vic		
Direct effect	0.13** (0.03)	0.14** (0.03)
Indirect effect	0.02** (0.01)	0.01* (0.01)
Total effect	0.14** (0.03)	0.15** (0.03)
Fit statistics		
RMSEA	0.06	0.06
CFI	0.97	0.97
TLI	0.91	0.91
SRMR	0.03	0.03

Models controlled for SES, parental conflict, sensation seeking, ADHD, and T1 internalizing problems and aggression. "Indirect effect" involves overall mediation effect through proaggr, reaggr, indaggr, and anxdep vic victimization, proaggr proactive aggression, reaggr reactive aggression, indaggr indirect aggression, anxdep anxiety and depression

* $p < 0.05$; ** $p < 0.01$

to LR $\chi^2(48)=584.58$, $p<0.001$ across imputations; model with parent-reported internalizing problems: range of LR $\chi^2(48)=508.25$, $p<0.001$ to LR $\chi^2(48)=529.06$, $p<0.001$ across imputations). The only fit statistics that are reported by Stata for the group-specific models are the SRMR and the coefficient of determination (Table 6). Contrary to our hypothesis, the effect of victimization on reactive aggression did not differ by gender: Wald test, range of $\chi^2(1)=0.03$, $p>0.05$ to $\chi^2(1)=0.34$, $p>0.05$ across imputations. The effect of indirect aggression on victimization also did not differ by gender: Wald test, range of $\chi^2(1)=1.02$, $p>0.05$ to $\chi^2(1)=2.45$, $p>0.05$ across imputations. The effect of peer victimization on indirect aggression did not remain in the gender-specific models. The indirect effects were not significant in the models using parent-reported internalizing problems (model 2 in Table 6), but they were in the models using child-reported internalizing problems (model 1 in Table 6). In the latter case, 13 % (0.02/0.14) of the total effect of prior and later victimization for boys and 23 % (0.03/0.13) of the total effect for girls was mediated by internalizing problems and aggressive behavior.

Table 6 Gender-specific path models (unstandardized coefficients, SE)

	Teacher-reported aggression			
	Model 1. Child-reported internalizing problems		Model 2. Parent-reported internalizing problems	
	Girls	Boys	Girls	Boys
T2 vic → T3 proaggr	0.03 (0.03)	0.05 (0.03)	0.03 (0.03)	0.05 (0.03)
T2 vic → T3 reaggr	0.06 (0.03)	0.08* (0.03)	0.06 (0.03)	0.08* (0.03)
T2 vic → T3 indaggr	0.04 (0.03)	0.04 (0.03)	0.04 (0.03)	0.04 (0.03)
T2 vic → T3 anxdep	0.02** (0.01)	0.02* (0.01)	0.02 (0.01)	0.00 (0.01)
T3 proaggr → T4 vic	0.09 (0.07)	-0.01 (0.07)	0.10 (0.07)	-0.01 (0.07)
T3 reaggr → T4 vic	0.14* (0.06)	0.15* (0.07)	0.15* (0.06)	0.14* (0.07)
T3 indaggr → T4 vic	-0.17 (0.09)	-0.03 (0.10)	-0.19* (0.09)	-0.02 (0.10)
T3 anxdep → T4 vic	1.12** (0.22)	0.50* (0.25)	0.31** (0.12)	0.20 (0.13)
T2 vic → T4 vic				
Direct effect	0.10* (0.04)	0.14** (0.04)	0.12** (0.04)	0.15** (0.04)
Indirect effect	0.03* (0.01)	0.02* (0.01)	0.01 (0.01)	0.01 (0.01)
Total effect	0.13** (0.04)	0.16** (0.04)	0.13** (0.04)	0.16** (0.04)
Fit statistics				
SRMR	0.03	0.04	0.03	0.03
CD	0.45	0.47	0.55	0.54

Models controlled for SES, parental conflict, sensation seeking, ADHD, and T1 internalizing problems and aggression. "Indirect effect" involves overall mediation effect through proaggr, reaggr, indaggr, and anxdep vic victimization, proaggr proactive aggression, reaggr reactive aggression, indaggr indirect aggression, anxdep anxiety and depression.

* $p<0.05$; ** $p<0.01$

Discussion

Developmental scientists have argued that stability in peer victimization over time can partly be explained by stable risk factors that make some children vulnerable to repeat victimization, such as affiliations with aggressive peers or difficulties with emotion regulation [42]. It has also been argued and shown that prior victimization itself causes later victimization ([51, 59]). It remains unclear, however, which processes are responsible for the latter association. We argued that one likely explanation for stability in peer victimization is that victimization leads to problem behavior in the victim, which in turn leads to an increased future victimization risk. Our study examined this mechanism by testing the mediation effects of both internalizing problems and aggression in repeat victimization over time in four-wave longitudinal data. In doing so, we used a Swiss longitudinal sample of 7- to 11-year-olds.

Our findings were threefold. First, reactive, but not proactive, aggression mediated stability in peer victimization. This supports the idea that reactive aggression is a “hot-headed” response to provocation while the development of proactive aggression is unrelated to provocation ([4]). The effects on reactive aggression were still present 1 year later, confirming the theoretical assumption that victimization is related to later aggression beyond the direct situational context of the victimization. In contrast to our hypothesis, we did not find gender differences in the effect of victimization on reactive aggression. Although the effects were stronger for boys than for girls, the difference was not significant, suggesting no support for evolutionary or socialization hypotheses favoring gender differences [10, 17]. Instead, our results suggest that there are few differences in the ways in which boys and girls respond to victimization. Furthermore, our results show that reactive aggression is indeed followed by further victimization. Reactive aggression may make children a particularly rewarding target for aggressors [69]. These reciprocal effects of reactive aggression and victimization held even when controlling for prior levels of aggression.

Our second finding was that victimization was associated with increased indirect aggression. Contrary to our hypothesis, however, this effect did not remain significant in the gender-specific models. Although the effect sizes in the gender-specific models remained of similar magnitude as in the combined models, the p values increased. This suggests that the association between victimization and later indirect aggression is relatively weak and that it only upholds in large samples. Because indirect aggression is covert, victims may see it as a less apt response to experienced victimization compared to more direct and overt forms of aggression, as the harmful effects of covert aggression may (in their eyes) be less obvious and less instantly gratifying.

Third, internalizing problems mediated stability in victimization. These results support the theoretical assumption that not only do experiences of peer victimization and social exclusion thwart happiness and adaptive functioning [8], internalizing symptoms in turn undermine interpersonal functioning and thereby put children at risk for further victimization. The effect was observed for child-reported internalizing problems only. On one hand, the effect is likely partly due to shared method variance, since children provided the information for both victimization and internalizing problems. On the other hand, parents may not be fully aware of their children’s emotional symptoms and changes therein.

We focused our analysis on 7- to 11-year-olds because this is the age when victimization starts to stabilize. Although it is currently unclear how our findings generalize to older age ranges, it is possible that the mediation effects are even larger for older children given that victimization rates decrease with age and stability increases. On the other hand, it is also possible that victims of older ages respond differently (less aggressive) to victimization, in which case the size of these mediation effects may decrease.

Taken together, our findings provide evidence for a “vicious cycle of peer victimization” where victimization leads to subsequent victimization, partly through its effects on children’s coping strategies, namely internalizing symptoms and aggression. Depending on the model and gender of the child, 7 to 23 % of the total effect of prior on later victimization was mediated. The effects were independent of covariates including prior problem behavior. We note that these effects surfaced even though the measures included in the current inquiry were collected across relatively long intervals. Thus, it is important to reduce the long-term negative consequences of peer victimization in order to prevent re-victimization. Helping victims manage their problem behavior may contribute to this. However, since there remains a strong direct effect of victimization on later victimization, preventing peer victimization requires that victim-level interventions are built into encompassing school-wide programs.

There are several ways in which future research could extend our work. First, we did not consider indirect victimization. Given that this may be an important form of victimization, future research should include this. Second, our measure for reactive aggression implies some degree of overlap with victimization, as the items refer to victimization situations. This may have led to somewhat increased effect sizes. Third, our measure for indirect aggression was mostly attuned to reactive forms of aggression, although this may not be a serious limitation, as victimization was only related to reactive, and not proactive, aggression. Fourth, although we regarded the multicultural makeup of our sample as a strength, it is possible that it affects the generalizability of our findings, as immigrant youths may face increased risk of victimization. Fifth, the results may differ according to subtype of victimization, a possibility that we did not address as we included a summative scale of victimization in our analyses. Future work that investigates potential differences by victimization type is encouraged. Finally, victimization was measured at only two time points. Future studies that include multiple measures with short time distances in between are encouraged to see whether our findings are generalizable.

Despite these limitations, this study contributes to the literature by simultaneously investigating the relations between peer victimization and internalizing symptoms as well as different forms of aggression. While controlling for preexisting differences between victims and nonvictims, our findings showed that reactive aggression and internalizing symptoms partly mediate stability in victimization. These findings highlight the importance of children’s problem behavior in understanding peer victimization. This is not only important theoretically but also points to the need for preventative strategies to reduce the maladaptive consequences of victimization.

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