

Childhood Predictors of Violent Victimization at Age 17 Years: The Role of Early Social Behavioral Tendencies

Margit Averdijk, PhD¹, Denis Ribeaud, PhD¹, and Manuel Eisner, PhD^{1,2}

Objective To assess the relation between early social behavioral tendencies and the risk of violent victimization in late adolescence.

Study design We analyzed 5 waves of data from the Zurich Project on the Social Development from Childhood into Adulthood (z-proso), a longitudinal sample of Swiss first graders (N = 1138). Early social behavioral tendencies were measured at age 7 years and included internalizing problems, externalizing behavior, prosocial behavior, negative peer relations, competent problem solving, dominance, and sensation seeking. Path analyses were conducted of the association between these tendencies and violent victimization at age 17 years, and mediation through intermediate victimization at ages 11, 13, and 15 years was examined.

Results Several childhood social behavioral tendencies predicted victimization 10 years later. Though this was the case for both sexes, the number and type of significant risk factors differed. For male children, sensation seeking, externalizing behavior, high prosociality, and negative peer relations at age 7 years increased later victimization, whereas for female children, dominance and externalizing behavior were predictive. In addition, results showed that the relation between early risk factors and age 17 years victimization was mediated by intermediate victimization, showing that differences in victimization risk in early adolescence are carried forward into late adolescence.

Conclusions Childhood social behavioral tendencies predict victimization 10 years later. Incorporating this finding into early prevention programs could reduce victimization over the life course. (*J Pediatr* 2019; ■:1-8).

Evidence consistently suggests that adolescents face a comparatively high risk of violent victimization^{1,2} and that violence against adolescents can have detrimental consequences, including mental health problems, substance use, and low educational attainment.³ To predict victimization and determine where to focus prevention efforts, most prior research has focused on situational factors, such as the places and people potential victims encounter.⁴ Newer research has pointed toward the importance of nonsituational characteristics, notably a victim's sociopsychological characteristics, which may unwillingly predispose some people to victimization.⁵ For example, research has shown that low self-control is associated with victimization.⁶ Developmental studies indicate that internalizing problems, lacking social competencies, and heightened reassurance seeking disturb interpersonal and peer relationships,^{7,8} thereby unwillingly putting youths at risk for bullying.⁹ In addition, social isolation and lacking social support may reinforce the label of being an easy prey.^{10,11} Finally, externalizing behavior may increase victimization, either because of shared psychological, biological, or environmental conditions or because it sets processes, such as disturbed social relationships in motion that increase victimization risk.¹²

In this report, we draw from developmental perspectives and victimization research to ask whether social behavioral characteristics during childhood predict violent victimization in late adolescence. Although the answer to this question is unclear, due to a lack of longitudinal data, several findings support a potential relationship.¹³ For example, prior research has shown considerable stability in youths' social behavioral profiles,¹⁴ suggesting that the short-term relation between such profiles and victimization may extend over time. In addition, the notion of developmental cascades posits that early risks may accumulate and escalate over time.¹⁵ Furthermore, research has shown that there is considerable stability in violent victimization over time.¹⁶

We investigated 3 related issues. The first assessed whether early social behavioral tendencies are associated with violent victimization risk. Second, we examined possible pathways through which early predictors affect victimization risk.¹⁷ Based on the simple and straightforward proposition that differences in victimization risk in early adolescence may be carried forward, we examined whether the relation between childhood social behavioral tendencies and victimization in late adolescence is mediated by victimization in early and middle adolescence. Third, we explored whether results differed between male and female children because analyses have attested to the gendered nature of victimization.¹⁸ These issues are not only of theoretical import, but may also have implications for prevention purposes, as they may suggest that early social interventions can reduce the long-term risk of victimization.¹⁹

From the ¹Jacobs Center for Productive Youth Development, University of Zurich, Zurich, Switzerland; and the ²Institute of Criminology/Violence Research Center, University of Cambridge, Cambridge, United Kingdom

Supported by the Swiss National Science Foundation, the Jacobs Foundation, the Swiss Federal Office of Public Health, the Canton of Zurich Ministry of Education, and the Julius Baer Foundation. The study sponsors were not involved in the study design; the collection, analysis, and interpretation of data; the writing of the report; or the decision to submit the manuscript for publication. The authors declare no conflicts of interest.

0022-3476/\$ - see front matter. © 2018 Elsevier Inc. All rights reserved.
<https://doi.org/10.1016/j.jpeds.2018.12.056>

Methods

Data were drawn from 5 waves of a combined longitudinal and intervention study: the Zurich Project on the Social Development from Childhood into Adulthood.²⁰ A sample of 56 schools was drawn in Zurich, Switzerland, after stratification by enrollment size and socioeconomic background. The final target sample was all 1675 first graders. The interventions had little effect on social behavior.^{21,22} The participation rate in the first data collection (2004/2005, Mean (M)_{age} = 7.45; SD = 0.39) was 81% for the children (N = 1361), 74% for the parents (N = 1240), and 81% for the teachers (N = 1350). Participation of the original target sample in the later waves used in this paper was as follows: 68.5% at wave 4 (N = 1148; M _{age} = 11.33; SD = 0.37), 81.6% at wave 5 (N = 1366; M _{age} = 13.67; SD = 0.37), 86.4% at wave 6 (N = 1447; M _{age} = 15.44; SD = 0.36), and 78.0% at wave 7 (N = 1306; M _{age} = 17.45; SD = 0.37).

In line with local data protection regulations, active parental consent was obtained before wave 1 and again before wave 4. In waves 5 and 6, the parents provided passive consent. In wave 1, 45-minute computer-assisted personal child interviews were conducted by trained interviewers at school. Starting with wave 4, the youths completed a written questionnaire of approximately 90 minutes duration. Computer-assisted parent interviews were conducted at the parents' home. Teachers completed a questionnaire and returned it by mail.

Measure of Violent Victimization

Six types of self-reported violent victimization in the preceding 12 months were measured at wave 7: robbery, assault with injury with a weapon or object, assault with injury without a weapon or object, sexual assault, simple assault, and sexual harassment. The first 4 were measured on a count scale; the last 2 were part of a peer victimization questionnaire using a frequency scale.²³ Items were recoded into a dichotomy of 0 (did not experience violence) and 1 (experienced violence), then summed into a variety score. Nine hundred ten youths said they had not been victimized, 307 had experienced one type of victimization, 67 two types, 19 three types, and 1 person four types. To avoid a disproportionate influence of the latter person, prevalence was capped at 3. Capping did not affect results.

Similar instruments were used at waves 4, 5, and 6, though there were 2 differences with wave 7. First, in waves 4, 5, and 6, all types of victimization were asked in reference to violence by peers. This was not considered problematic as research suggests that the vast majority of physical and sexual violence at that age is inflicted by peers.²⁴ Furthermore, at wave 4, sexual victimization was not included due to the increasing prevalence as adolescence progresses and ethical considerations regarding asking about sexual victimization at age 11 years.

Measures of Social Behavior and Relationships

The teachers, children, and parents completed the Social Behavior Questionnaire at wave 1.²⁵ Items for the parents and teachers included 5-point Likert scales. The children were shown drawings of a child carrying out 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.²⁶ Seven to 9 Social Behavior Questionnaire items per informant measured internalizing symptoms (ie, anxiety and depression; eg, "The child seems nervous and tense"). Externalizing behavior included 11-12 items per informant for aggression (eg, "The child physically attacks others"), 8-9 for attention deficit hyperactivity disorder (eg, "The child cannot sit still, is restless, or overactive"), and 6-9 for nonaggressive externalizing behavior (eg, "The child tells lies and cheats"). Seven to 10 items per informant measured prosocial behavior (eg, "The child comforts other children when they are crying or upset").

Scores were z-standardized and averaged. Internal consistencies ranged from 0.68 to 0.79 for the parent, 0.81 to 0.94 for the teacher, and 0.58 to 0.72 for the child. As usual for multi-informant behavioral assessment,²⁷ cross-informant correlations yielded low scale reliability at 0.22 (internalizing problems), 0.38 (externalizing problems), and 0.38 (prosocial behavior). Because each informant provides incrementally valuable, nonoverlapping information²⁸ and combining scores of all informants is thought to yield the most valid and reliable estimates,²⁹ the cross-informant measures were used.

Negative Peer Relations. At wave 1, 3 items from the teacher questionnaire measured peer relations: "The child is popular," "The child is bullied," and "The child is avoided and isolated." Answer categories ranged from 1 ("does not apply at all") to 5 ("very much applies"). We reverse-coded the first item and computed a composite scale (Cronbach α = 0.73).

Competent Problem Solving. At wave 1, the children responded to 4 hypothetical vignettes, which were adapted from prior research³⁰: playing on a swing, participating in a game, laughing at someone, and stealing a ball. The scenarios were presented as 3-frame sequences of sex-matched cartoons. For the first vignette, the child was read the following text: "Pretend that this is you and that this is another child. The other child has been on the swing for a long time and doesn't seem to want to share the swing with you. You would really like to play on the swing. What could you say or do so that you could play on the swing?"

Responses were audiotaped and coded into aggressive strategy (eg, "I'd just push him off the swing"), socially competent strategy (eg, "I'll ask to take turns"), and other strategy (authority-oriented, irrelevant). Because we were interested in social behavior in general, we used the socially competent strategies. Two coders rated all transcripts. Interrater agreement (Krippendorff alpha) averaged at 0.79. Categorical answers were dichotomized and the matched pairs

averaged across both coders, after which a mean score was calculated.

Dominance. One item from the teacher survey measured dominance at wave 1: “The child dominates others.” Answer categories ranged from 1 (“does not apply at all”) to 5 (“very much applies”). Although single-item measures are less encompassing compared with multi-item measures, studies have found single-item psychological measures to be acceptable.^{31,32}

Sensation Seeking. Sensation seeking³³ was included as an aspect of self-control deficits because it has been identified as a core component of low self-control. It was measured at wave 1 through a board game³⁴ where the children passed through several stops and chose between adventuresome (eg, starting the trip with a fast motorbike) and secure options (eg, taking a funny locomotive) (9 items, Cronbach $\alpha = 0.68$).

Control Variables. These included ethnicity (“0” for 2 non-Swiss parents and “1” for at least 1 Swiss parent) and socioeconomic status. Socioeconomic status was based on an International Socio-Economic Index of occupational status derived from the caregivers’ professions.³⁵

Statistical Analyses

We included youths who participated at wave 1 and 7, when the central predictors and outcomes were measured ($N = 1138$; 67.9% of the target sample). Across all data-points, 4.3% was missing. Attrition was higher for some immigrant background groups.³⁶ We used robust full information maximum likelihood estimation to handle the missing data.

We performed path models in Mplus³⁷ to examine 3 issues. First, we assessed direct relations between social behavioral characteristics and victimization at age 17 years. Second, we examined pathway models where intermediate victimization mediated the relation between early characteristics and later victimization. Third, we conducted analyses by sex. We used maximum likelihood estimation with robust SEs to account for deviations from multivariate normality. We corrected for clustering within classes to control bias. Because of dispersion in the regressions on victimization among all youths and male adolescents, we modeled these outcomes using a negative binomial model. For victimization among female adolescents, there was no dispersion; we modelled this outcome using Poisson regression. Mplus does not provide absolute fit statistics for this model. **Table I** (available at www.jpeds.com) displays available fit indices.

Results

Descriptive Statistics

Table II presents the prevalence of violent victimization at age 17 years. Overall, 31% of participants experienced

Table II. Prevalence of violent victimization at age 17 years (N = 1138)

Victimization	All	Male	Female
Violent victimization	31%	23%	39%
Per crime-type			
Robbery	3%	4%	2%
Assault with weapon	2%	3%	1%
Assault without weapon	4%	6%	3%
Sexual assault	1%	0%	1%
Simple assault	10%	13%	6%
Sexual harassment	20%	6%	33%

violent victimization. Sexual harassment and simple assault were the most common, the former more among female adolescents and the latter among male adolescents. Sexual assault, assault with weapon, robbery, and assault without weapon were less often reported but still affected parts of the sample. **Table III** describes the sample and displays basic statistics for the study variables, for all youths and by sex. **Table IV** displays bivariate correlations.

Substantive Analyses: Pathway Models

Results of the pathway models are displayed in **Table V**. As our model required (**Figure**; available at www.jpeds.com), we included both the direct pathways of early social behavioral tendencies to victimization at ages 11 and 17 years, as well as direct relations between victimization at age 11, 13, 15, and 17 years.

The upper part of **Table V** (1A) shows the direct relations between early tendencies and age 17-year victimization. The results for all youths, male adolescents, and female adolescents are displayed separately. For all youths, low internalizing problems, high sensation seeking, being female, and prior victimization increased victimization risk. Sensation seeking affected victimization for boys only, whereas for girls, dominance towards others increased victimization risk at age 17 years.

Table V (1B and 1C) shows that prior victimization had a highly significant effect on later victimization: having experienced victimization at age 11 years increased victimization risk at age 13 years. In turn, victimization at age 13 years increased the likelihood of victimization at age 15 years.

Table V (1D) assessed the relation between early characteristics and age 11-year victimization. For male youths, externalizing behavior, high prosocial behavior, and negative peer relations increased victimization at age 11 years. For female youths, early externalizing behavior did.

Next, we identified the pathways through which early tendencies affected later victimization (**Table V**, 2). The relation between externalizing behavior and age 17-year victimization was mediated by victimization at ages 11, 13, and 15 years for both sexes. For male youths, there was a mediation pathway from higher prosocial behavior at age 7- to age 17-year victimization, through victimization at ages 11, 13, and 15 years. Victimization at ages 11, 13, and 15 years also

Table III. Descriptive statistics

Variables	Mean (SD)			Range
	All (N = 1138)	Male (n = 575)	Female (n = 563)	
Outcome (age 17 y)				
Victimization	0.39 (0.67)	0.32 (0.66)	0.47 (0.67)	0-3
Predictors (age 7 y)				
Social behavior and relationships				
Internalizing problems	0.00 (0.61)	-0.03 (0.62)	0.03 (0.60)	-1.47 to 2.07
Externalizing behavior	0.00 (0.69)	0.20 (0.72)	-0.21 (0.60)	-1.42 to 3.00
Prosocial behavior	0.01 (0.65)	-0.18 (0.67)	0.21 (0.57)	-2.96 to 1.55
Negative peer relations	1.72 (0.70)	1.75 (0.70)	1.70 (0.71)	1-5
Competent problem solving	0.72 (0.27)	0.67 (0.29)	0.76 (0.24)	0-1
Dominance	1.54 (0.94)	1.51 (0.91)	1.57 (0.97)	1-5
Sensation seeking	0.57 (0.25)	0.68 (0.22)	0.47 (0.23)	0-1
At least 1 Swiss parent	0.55 (0.50)	0.58 (0.49)	0.53 (0.50)	0-1
SES	49.87 (19.05)	50.76 (19.65)	49.0 (18.39)	16-88
Mediators				
Age 11 y, victimization	0.86 (1.05)	1.02 (1.11)	0.70 (0.97)	0-4
Age 13 y, victimization	0.73 (0.97)	0.81 (1.03)	0.64 (0.90)	0-4
Age 15 y, victimization	0.59 (0.85)	0.55 (0.88)	0.62 (0.81)	0-4

SES, socioeconomic status.

mediated the pathway from negative peer relations to age 17-year victimization.

As a robustness check, we estimated separate models with uniform measures of victimization across all waves (ie, excluding sexual victimization) (Table VI; available at www.jpeds.com). Compared with Table V, evidence for direct relations between early tendencies and age 17-year victimization was somewhat stronger and relations with age 11-year victimization were similar. Indirect relations were also similar, except for the relation between negative peer relations and victimization for all youths and the effect of externalizing behavior for male youths, which were only significant at the $P < .10$ level with these measures.

In sum, the results demonstrate that several social behavioral tendencies at age 7 years predicted victimization 10 years later. Competent problem solving was the only predictor that did not predict victimization directly or indirectly across the 3 models. Early tendencies predicted later victimization for

both sexes, but there were some differences between male and female youths. Whereas sensation seeking, externalizing behavior, high prosociality, and negative peer relations at age 7 years predicted age 17-year victimization for male youths either directly or indirectly via intermediate victimization, it was dominance and externalizing that were predictive for female youths.

Discussion

Prior research has shown that social behavior is associated with the likelihood of victimization. We have extended this line of research in a number of important ways. First, we addressed the long-term relation between social behavioral tendencies and victimization risk by asking whether early social behavioral tendencies measured at age 7 years affected victimization at age 17 years. Second, we examined whether

Table IV. Bivariate associations

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Age 17-y victimization														
2 Internalizing problems	-.027													
3 Externalizing problems	.019	.399*												
4 Prosocial behavior	.047	-.090*	-.313*											
5 Negative peer relations	.046	.298*	.325*	-.250*										
6 Competent problem solving	-.018	-.032	-.141*	.153*	-.055†									
7 Dominance	.084*	.087*	.350*	-.060†	.272*	-.012								
8 Sensation seeking	.038	-.001	.269*	-.150*	.031	-.121*	.091*							
9 Swiss	.013	-.073†	.095*	.020	-.148*	.022	-.002	.047						
10 Sex (female)	.115*	.050†	-.298*	.300*	-.036	.165*	.032	-.412*	-.050					
11 SES	-.024	-.046	.002	.026	-.115*	-.006	-.011	-.044	.417*	-.048				
12 Age 11-y victimization	.147*	.088*	.177*	-.008	.101*	-.025	.030	.095*	.028	-.148*	.048			
13 Age 13-y victimization	.183*	.063†	.126*	-.058†	.020	-.061†	.009	.100*	.025	-.087*	-.071†	.270*		
14 Age 15-y victimization	.287*	.072†	.096*	.028	.033	-.008	.040	.029	.038	.042	-.024	.206*	.324*	

SES, socioeconomic status.

* $P < .01$.

† $P < .05$.

‡ $P < .10$.

Table V. Pathways model of age 17-year victimization on age 7-year predictors and prior victimization

Variables	All (N = 1138)		Male (n = 575)		Female (n = 563)	
	B (SE)	STD	B (SE)	STD	B (SE)	STD
1. Direct effects						
1A. Effects on age 17-y victimization						
Internalizing problems	-0.216 [†] (0.090)	-0.261	-0.246 (0.161)	-0.260	-0.183 [‡] (0.106)	-0.252
Externalizing behavior	0.069 (0.089)	0.094	0.030 (0.147)	0.036	0.036 (0.114)	0.049
Prosocial behavior	0.087 (0.079)	0.112	-0.001 (0.110)	-0.001	0.164 (0.109)	0.212
Negative peer relations	0.096 (0.074)	0.133	0.260 [‡] (0.143)	0.308	0.050 (0.086)	0.081
Competent problem solving	-0.191 (0.180)	-0.101	-0.502 [‡] (0.263)	-0.246	0.207 (0.247)	0.113
Dominance	0.079 (0.051)	0.145	-0.083 (0.102)	-0.129	0.178* (0.055)	0.394
Sensation seeking	0.588* (0.216)	0.289	1.284* (0.424)	0.485	0.295 (0.261)	0.156
Sex (female)	0.531* (0.111)	0.523	n.a.	n.a.	n.a.	n.a.
Swiss	0.040 (0.108)	0.039	0.139 (0.190)	0.116	-0.090 (0.126)	-0.103
SES	-0.001 (0.003)	-0.040	-0.006 (0.005)	-0.214	0.004 (0.004)	0.152
Age 15-y victimization	0.425* (0.041)	0.711	0.455* (0.062)	0.680	0.434* (0.054)	0.808
1B. Effects on age 15-y victimization						
Age 13-y victimization	0.282* (0.033)	0.322	0.228* (0.044)	0.265	0.367* (0.045)	0.405
1C. Effects on age 13-y victimization						
Age 11-y victimization	0.253* (0.034)	0.275	0.245* (0.047)	0.265	0.249* (0.051)	0.268
1D. Effects on age 11-y victimization						
Internalizing problems	0.056 (0.056)	0.032	0.102 (0.086)	0.057	0.026 (0.075)	0.016
Externalizing behavior	0.213* (0.060)	0.140	0.231* (0.090)	0.149	0.191 [†] (0.081)	0.117
Prosocial behavior	0.143* (0.055)	0.088	0.228* (0.069)	0.138	0.021 (0.088)	0.012
Negative peer relations	0.110 [†] (0.052)	0.074	0.162 [†] (0.078)	0.102	0.043 (0.070)	0.031
Competent problem solving	-0.004 (0.130)	-0.001	-0.061 (0.187)	-0.016	0.101 (0.170)	0.025
Dominance	-0.032 (0.037)	-0.028	-0.048 (0.060)	-0.040	-0.010 (0.046)	-0.010
Sensation seeking	0.124 (0.146)	0.029	0.053 (0.223)	0.011	0.182 (0.200)	0.044
Sex (female)	-0.249* (0.077)	-0.118	n.a.	n.a.	n.a.	n.a.
Swiss	0.011 (0.079)	0.005	0.134 (0.117)	0.059	-0.118 (0.107)	-0.061
SES	0.003 (0.002)	0.051	0.006 [†] (0.003)	0.112	-0.001 (0.003)	-0.018
2. Indirect effects						
Internalizing problems >age 11-y vict >age 13-y vict >age 15-y vict >age 17-y vict	0.002 (0.002)	n.a.	0.003 (0.002)	n.a.	0.001 (0.003)	n.a.
Externalizing behavior >age 11-y vict >age 13-y vict >age 15-y vict >age 17-y vict	0.006* (0.002)	n.a.	0.006 [†] (0.003)	n.a.	0.008 [†] (0.004)	n.a.
Prosocial behavior >age 11-y Vict >age 13-y vict >age 15-y vict >age 17-y vict	0.004 [†] (0.002)	n.a.	0.006 [†] (0.003)	n.a.	0.001 (0.003)	n.a.
Negative peer relations >age 11-y vict >age 13-y vict >age 15-y vict >age 17-y vict	0.003 [†] (0.002)	n.a.	0.004 [†] (0.002)	n.a.	0.002 (0.003)	n.a.
Competent problem solving >age 11-y vict >age 13-y vict >age 15-y vict >age 17-y vict	0.000 (0.004)	n.a.	-0.002 (0.005)	n.a.	0.004 (0.007)	n.a.
Dominance >age 11-y vict >age 13-y vict >age 15-y vict >age 17-y vict	-0.001 (0.001)	n.a.	-0.001 (0.002)	n.a.	0.000 (0.002)	n.a.
Sensation seeking >age 11-y vict >age 13-y vict >age 15-y vict >age 17-y vict	0.004 (0.005)	n.a.	0.001 (0.006)	n.a.	0.007 (0.008)	n.a.

B, unstandardized regression coefficient; n.a., not applicable; SES, socioeconomic status; STD, standardized coefficient; vict, victimization.

* $P < .01$.

[†] $P < .05$.

[‡] $P < .10$.

the relation between social behavioral tendencies and victimization in late adolescence was mediated by victimization in early and middle adolescence. Third, we examined all relations for male and female youths separately.

Taken together, the results show that several early tendencies are related to victimization risk 10 years later. Given the more dominant situational perspective in research on criminal victimization, these findings are remarkable because they suggest the potential importance of person-specific factors in unwillingly contributing to variance in victimization risk. In recent decades, most criminological victimization research has had a situational focus, explaining victimization risk through situational and structural variables. In contrast, developmental perspectives emphasize early risks and developmental processes. We drew from these perspectives by focusing on the role of victims' early social behavioral char-

acteristics and thereby providing a novel lens on criminal victimization. The results confirm the fruitfulness of this approach, by showing that early risks help explain criminal victimization 10 years later, suggesting that the sole focus on situational variables provides an incomplete understanding of criminal victimization. Thus, traditional situational perspectives need to be supplemented and combined with developmental perspectives.

In addition, the results suggest support for a life course model of criminal victimization in which the increased victimization risk of children associated with social behavioral tendencies is carried forward into late adolescence. Thus, the relation between early social behavioral tendencies and later victimization is partly due to the maintenance over time of the association between early risks and victimization in early adolescence. These risks may be early indicators for a

long-term pattern of victimization. This is consistent with developmental theory positing that children's skills and abilities condition later development³⁸ and with work on stress proliferation,³⁹ where initial stressors give rise to additional stressors, multiplying over the life course. Ultimately, these can create patterns of cumulative disadvantage with systematic inequalities in early risks compiling and compounding over the life course and promoting widening gaps and disparities in adverse life outcomes in the long run.

Although these overall findings were true for both sexes, the number and types of risk factors and pathways associated with criminal victimization were somewhat different for male and female youths. For female youths, the profile of those who were most at risk for victimization was that of displaying social dominance or externalizing behavior. The profile for male youths was somewhat different. On one hand, higher levels of sensation seeking increased victimization risk measured 10 years later, which is in line with research that has shown a robust relation between low self-control and victimization,⁶ although this literature has only examined short-term relations. Sensation seeking is generally interpreted as implying risky behavior, predisposing individuals to involvement in risky environments and situations in which victimization risk is high. The findings also suggest that boys with high levels of prosocial behavior, and those who are bullied, isolated, and unpopular at age 7 have an increased risk of victimization in early adolescence.

To some extent, our findings suggest that behaviors that deviate from gender norms may increase victimization. In social interaction, these gender-norm deviations may be seen as threatening and provocative, potentially leading to conflict. Developmental research suggests that gender atypicality may be perceived as norm violation, increasing vulnerability for bullying and peer victimization.^{40,41} Our findings suggest that the same may be the case for criminal violence. For girls, externalizing behavior and dominance may fall into this category. For boys, the same may include prosocial behavior. Prosocial behavior includes voluntary behavior intended to benefit another,⁴² such as sharing, helping, and comforting, and related emotional responses such as empathy. Compared with girls, boys are expected to be independent and achievement oriented rather than responsive and empathic.⁴³ Combined with problematic social relations, this may increase vulnerability especially in adolescent peer groups where masculinity norms are important and a lack of strong image or protection by friends may leave one vulnerable. These are speculations, however, that should be further examined.

Regardless of sex, prior victimization was consistently related to later victimization. Although it was beyond our purpose to explicitly study repeat victimization, there are 2 potentially complementary ways in which prior and later victimization are related.⁴⁴ First, a general propensity for victimization may underlie both prior and later victimization. Second, prior victimization may directly exacerbate the risk of later victimization by instigating a process of increased vulnerability. For example, victims may use maladaptive coping strategies, including substance use,²⁶ which

in turn increases the risk of repeat victimization. Both of these mechanisms may lead to vicious cycles of victimization that can extend into the long term.

One unexpected finding was that lower levels of internalizing problems were related to increased victimization. This finding is in contrast to prior research on depression.^{45,46} This may be an isolated finding, as bivariate results show that the association between internalizing problems and victimization at ages 11, 13, and 15 years is positive. It is also possible that early anxiety sets children on a pathway toward displaying less risky lifestyles later in life, as it is well-established in criminology that risky lifestyles increase victimization risk.⁴

An important question is what our study means for prevention. Our results suggest the importance of individual factors in the etiology of victimization. Traditionally, crime prevention has either focused on risk factors for delinquency or on situational interventions, such as neighborhood- or place-based programs, whereas programs to reduce people's risk of victimization have been relatively rare.⁴⁷ Our results suggest that the latter programs hold much promise and are necessary within a comprehensive prevention framework. Especially the integration of individual programs focused on early risks with situational ones seems essential for effective community-based interventions to prevent criminal victimization among adolescents.

If early childhood characteristics affect later victimization during adolescence, programs that mitigate or reduce early risks have the potential to reduce victimization. Although a number of randomized controlled trials of interventions targeting behavior problems during childhood have shown positive results, the 2 programs studied in this study cohort were of only limited success.^{21,22} To prevent victimization, our study results suggest that it might be necessary to include intervention elements that address gender role biases and reduce gender stereotyping.^{48,49} However, trials with long-term follow-up periods are rare, and few if any have been related to criminal victimization. We encourage future research to evaluate interventions that address childhood social behaviors, including the long-term impact on criminal victimization.

Finally, our findings suggest that intermediate victimization may mediate the pathway between early risk factors and later victimization—informing questions about how cycles of victimization can be broken. Prior studies have shown that helping victims increase their resilience, such as through psychosocial treatment programs, can increase well-being.⁵⁰ In addition, programs that target repeat victimization can reduce crime, although their effects on violence remain under-studied.⁵¹

This study was limited in several ways. First, we studied a limited set of predictors that has received most support in the literature. However, future research on other predictors is encouraged, including impulsivity, intelligence, callous-unemotional traits, or hostile attribution bias, which were not available in our study at age 7 years. Second, although our results suggested more similarities than differences between the early predictors of nonsexual and sexual

victimization, we did not perform explicit tests, and questions regarding differences in the etiology of non-sexual and sexual victimization remain an issue for future research. Finally, our sample came from Switzerland, where rates of violent victimization among adolescents are relatively low, although rates of assault are comparable with some other Western countries, such as the US,⁵² and rates of sexual victimization are similar to other countries.²⁵ Although research does not necessarily suggest that predictors of victimization in Switzerland are different than elsewhere,⁵³ it is unclear whether our results are generalizable beyond Switzerland. Replication in other countries is, therefore, recommended.

Notwithstanding these limitations, our results suggest that there is merit in a life-course perspective on violent victimization, inclusive of childhood behavioral risk factors. Our study suggests that such childhood factors may predict victimization more than 10 years later. Future work that replicates our results, includes additional early predictors, and teases out the responsible mechanisms is highly desirable. ■

We thank the youths, parents, and teachers participating in the study. We are grateful to the interviewers and undergraduate students for their help in data collection and coding and to the editor and reviewers for their helpful comments.

Submitted for publication Sep 17, 2018; last revision received Dec 17, 2018; accepted Dec 28, 2018.

Reprint requests: Margit Averdijk, PhD, Jacobs Center for Productive Youth Development, University of Zurich, Andreasstrasse 15, 8050 Zurich, Switzerland. E-mail: margit.averdijk@jacobscenter.uzh.ch

References

- Finkelhor D. Childhood victimization: violence, crime, and abuse in the lives of young people. Oxford: Oxford University Press; 2008.
- Truman J, Morgan R. Criminal victimization, 2015. Washington, DC: US Department of Justice, Office of Justice Programs, Bureau of Justice Statistics. NCJ 2016. p. 250180.
- Turanovic JJ, Pratt TC. Longitudinal effects of violent victimization during adolescence on adverse outcomes in adulthood: a focus on prosocial attachments. *J Pediatr* 2015;166:1062-9.
- Averdijk M, Bernasco W. Testing the situational explanation of victimization among adolescents. *J Res Crime Delinquency* 2015;52:151-80.
- Van Gelder JL, Averdijk M, Eisner M, Ribeaud D. Unpacking the victim-offender overlap: on role differentiation and socio-psychological characteristics. *J Quant Criminol* 2015;31:653-75.
- Pratt TC, Turanovic JJ, Fox KA, Wright KA. Self-control and victimization: a meta-analysis. *Criminology* 2014;52:87-116.
- Rudolph KD, Flynn M, Abaied JL. A developmental perspective on interpersonal theories of youth depression. *Handbook of Depression in Children and Adolescents*. New York, NY: Guilford Press; 2008. p. 79-102.
- Storch EA, Masia-Warner C, Crisp H, Klein RG. Peer victimization and social anxiety in adolescence: A prospective study. *Aggressive Behavior* 2005;31:437-52.
- Kochel KP, Ladd GW, Rudolph KD. Longitudinal associations among youth depressive symptoms, peer victimization, and low peer acceptance: a interpersonal process perspective. *Child Develop* 2012;83:637-50.
- Boulton MJ, Trueman M, Chau CA, Whitehand C, Amatya K. Concurrent and longitudinal links between friendship and peer victimization: implications for befriending interventions. *J Adolesc* 1999;22:461-6.
- Kendrick K, Jutengren G, Stattin H. The protective role of supportive friends against bullying perpetration and victimization. *J Adolesc* 2012;35:1069-80.
- Card NA, Stucky BD, Sawalani GM, Little TD. Direct and indirect aggression during childhood and adolescence: a meta-analytic review of gender differences, intercorrelations, and relations to maladjustment. *Child Develop* 2008;79:1185-229.
- Woodward LJ, Fergusson DM. Childhood and adolescent predictors of physical assault: a prospective longitudinal study. *Criminology* 2000;38:233-62.
- Piquero AR, Carriaga ML, Diamond B, Kazemian L, Farrington DP. Stability in aggression revisited. *Aggression Violent Behav* 2012;17:365-72.
- Masten AS, Cicchetti D. Developmental cascades. *Develop Psychopathol* 2010;22:491-5.
- Turanovic JJ, Pratt TC. "Can't stop, won't stop": Self-control, risky lifestyles, and repeat victimization. *J Quantitative Criminol* 2014;30:29-56.
- Vandell DL, Belsky J, Burchinal M, Steinberg L, Vandergrift N, NICHD Early Child Care Research Network. Do effects of early child care extend to age 15 years? Results from the NICHD study of early child care and youth development. *Child Develop* 2010;81:737-56.
- Lauritsen JL, Heimer K. The gender gap in violent victimization, 1973-2004. *J Quant Criminol* 2008;24:125-47.
- Tfofi MM, Farrington DP. Effectiveness of school-based programs to reduce bullying: a systematic and meta-analytic review. *J Exp Criminol* 2011;7:27-56.
- Eisner MP, Malti T, Ribeaud D. Large-scale criminological field experiments. *Sage handbook of criminological research methods*. London, UK: Sage; 2011. p. 410-24.
- Averdijk M, Zirk-Sadowski J, Ribeaud D, Eisner M. Long-term effects of two childhood psychosocial interventions on adolescent delinquency, substance use, and antisocial behavior: a cluster randomized controlled trial. *J Exp Criminol* 2016;12:21-47.
- Malti T, Ribeaud D, Eisner MP. The effectiveness of two universal preventive interventions in reducing children's externalizing behavior: a cluster randomized controlled trial. *J Clin Child Adolesc Psychol* 2011;40:677-92.
- Olweus D. *Bullying at school: what we know and what can we do*. Malden, MA: Blackwell; 1993.
- Averdijk M, Mueller-Johnson K, Eisner M. Sexual victimization of children and adolescents in Switzerland. Final report for the UBS Optimus Foundation. Zurich, Switzerland: UBS Optimus Foundation; 2012.
- Tremblay RE, Loeber R, Gagnon C, Charlebois P, Larivee S, LeBlanc M. Disruptive boys with stable and unstable high fighting behavior patterns during junior elementary school. *J Abnormal Child Psychol* 1991;19:285-300.
- Scott TJ, Short EJ, Singer LT, Russ SW, Minnes S. Psychometric properties of the Dominic interactive assessment: a computerized self-report for children. *Assessment* 2006;13:16-26.
- Achenbach TM, McConaughy SH, Howell CT. Child/adolescent behavioral and emotional problems: implications of cross-informant correlations for situational specificity. *Psychol Bull* 1987;101:213.
- De Los Reyes A, Ohannessian CM. Introduction to the special issue: discrepancies in adolescent-parent perceptions of the family and adolescent adjustment. *J Youth Adolesc* 2016;45:1957-72.
- Bank L, Dishion T, Skinner M, Patterson GR. Method variance in structural equation modeling: living with "glop." In: Patterson GR, ed. *Depression and aggression in family interaction*. Hillsdale, NJ: Lawrence Erlbaum Associates; 1990. p. 247-79.
- Crick NR, Dodge KA. Social information-processing mechanisms in reactive and proactive aggression. *Child Develop* 1996;67:993-1002.
- Elo A, Leppänen A, Jahkola A. Validity of a single-item measure of stress symptoms. *Scand J Work Environ Health* 2003;29:444-51.
- Hoepfner B, Kelly JF, Urbanoski KA, Slaymaker V. Comparative utility of a single-item versus multiple-item measure of self-efficacy in predicting relapse among young adults. *J Substance Abuse Treatment* 2011;41:305-12.
- Jensen-Campbell LA, Knack JM, Waldrip A, Ramirez MA. The importance of personality and effortful control processes in victimization. *Bullying, Rejection, & Peer Victimization* 2009 May 11:103-24.

34. Alsaker F, Gutzwiller-Helfenfinger E. Social behavior and peer relationships of victims, bully-victims, and bullies in kindergarten. In Jimerson SR, Swearer SM, & Espelage DL, eds. *The handbook of school bullying. An International Perspective*; 2009. p. 87-99. Mahwah, NJ: Lawrence Erlbaum Associates.
35. Ganzeboom HB, De Graaf PM, Treiman DJ. A standard international socio-economic index of occupational status. *Soc Sci Res* 1992;21:1-56.
36. Eisner NL, Murray AL, Eisner M, Ribeaud D. A practical guide to the analysis of non-response and attrition in longitudinal research using a real data example. *Int J Behav Develop* 2019;43:24-34.
37. Muthén LK, Muthén B. *Mplus. The comprehensive modelling program for applied researchers: user's guide*. Los Angeles, CA: Muthén & Muthén; 2015.
38. Bronfenbrenner U, Morris PA. The bioecological model of human development. In: Damon W, Lerner RM, eds. *Handbook of child psychology. Theoretical models of human development, Vol. 1*. Hoboken, NJ: John Wiley & Sons; 2006. p. 793-828.
39. Thoits PA. Stress and health: major findings and policy implications. *J Health Soc Behav* 2010;5:S41-53.
40. Egan SK, Perry DG. Gender identity: a multidimensional analysis with implications for psychosocial adjustment. *Develop Psychol* 2001;37:451.
41. Zosuls KM, Andrews NC, Martin CL, England DE, Field RD. Developmental changes in the link between gender typicality and peer victimization and exclusion. *Sex Roles* 2016;75:243-56.
42. Eisenberg N, Spinrad TL, Knafo-Noam A. Prosocial development. *Handbook of child psychology and developmental science*. Hoboken, NJ: John Wiley & Sons Inc; 2015. p. 1-47.
43. Eisenberg N, Fabes RA. Prosocial development. In: Damon W, Eisenberg N, eds. *Handbook of child psychology: Social, emotional, and personality development*; Vol. 3. Hoboken, NJ: John Wiley & Sons Inc; 2000. p. 701-78.
44. Lauritsen JL, Quinet KF. Repeat victimization among adolescents and young adults. *J Quant Criminol* 1995;11:143-66.
45. Burke T, Sticca F, Perren S. Everything's gonna be alright! The longitudinal interplay among social support, peer victimization, and depressive symptoms. *J Youth Adolesc* 2017;46:1999-2014.
46. Perren S, Alsaker FD. Depressive symptoms from kindergarten to early school age: Longitudinal associations with social skills deficits and peer victimization. *Child Adolesc Psychiatry Ment Health* 2009;3:28.
47. Lauritsen JL, Archakova E. Advancing the usefulness of research for victims of crime. *J Contemp Criminal Justice* 2008;24:92-102.
48. Bigler RS, Liben LS. Cognitive mechanisms in children's gender stereotyping: Theoretical and educational implications of a cognitive-based intervention. *Child Develop* 1992;63:1351-63.
49. Rainey AB, Rust JO. Reducing gender stereotyping in kindergartners. *Early Child Develop Care* 1999;150:33-42.
50. Taylor JE, Harvey ST. Effects of psychotherapy with people who have been sexually assaulted: a meta-analysis. *Aggression Violent Behav* 2009;14:273-85.
51. Farrell G. Progress and prospects in the prevention of repeat victimization. In: Tilley, N, ed. *Handbook of crime prevention and community safety*. Collumpton, Devon: Willan; 2005. p. 145-72.
52. Enzmann D, Kivivuori J, Marshall IH, Steketee M, Hough M, Killias M. A global perspective on young people as offenders and victims. First results from the ISRD3 study. New York, NY: Springer; 2018.
53. Gruszczynska B, Lucia S, Killias M. Juvenile victimization from an international perspective. In: Junger-Tas J, Marshall IH, Enzmann D, Killias M, Steketee M, Gruszczynska B, eds. *The many faces of youth crime*. New York, NY: Springer; 2012. p. 95-116.

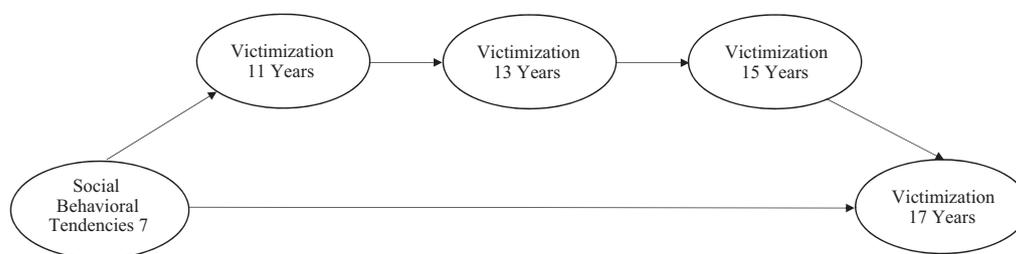


Figure. Pathways between early social behavioral tendencies and victimization at age 17 years through prior victimization.

Table I. Fit statistics reported in Mplus for pathways model

Fit statistic	All participants	Male	Female
Log likelihood	-16 012.618	-8150.658	-7554.298
Scaling correction factor for MLR	1.102	1.058	1.075
AIC	32 123.235	16 395.317	15 200.596
BIC	32 370.050	16 599.972	15 399.927
Sample-size adjusted BIC	32 214.411	16 450.767	15 253.900

AIC, Akaike information criterion; BIC, Bayesian information criterion; MLR, Maximum likelihood estimation with robust standard errors.

Table VI. Pathways model of age 17-year victimization on age 7-year predictors and prior victimization for nonsexual violent victimization

Variables	All (N = 1138)	Male (n = 575)	Female (n = 563)
1. Direct effects			
1A. Effects on age 17- y victimization			
Internalizing problems	-0.377 [†]	-0.360 [‡]	-0.335
Externalizing behavior	0.242 [‡]	0.135	0.481 [†]
Prosocial behavior	-0.013	-0.030	0.090
Negative peer relations	0.302 [†]	0.324 [†]	0.244
Competent problem solving	-0.478 [‡]	-0.534 [‡]	-0.255
Dominance	0.016	-0.077	0.190
Sensation seeking	0.875 [†]	1.297 [*]	0.185
Sex (female)	-0.237		
Swiss	-0.024	0.217	-0.500
SES	-0.006	-0.008	-0.002
Age 15-y victimization	0.478 [*]	0.410 [*]	0.645 [*]
1B. Effects on age 15-y victimization			
Age 13-y victimization	0.258 [*]	0.206 [*]	0.300 [*]
1C. Effects on age 13-y victimization			
Age 11-y victimization	0.211 [*]	0.205 [*]	0.166 [*]
1D. Effects on age 11-y victimization			
Internalizing problems	0.053	0.099	0.024
Externalizing behavior	0.213 [*]	0.234 [*]	0.185 [†]
Prosocial behavior	0.145 [*]	0.231 [*]	0.022
Negative peer relations	0.112 [†]	0.162 [†]	0.048
Competent problem solving	0.003	-0.058	0.118
Dominance	-0.032	-0.047	-0.013
Sensation seeking	0.139	0.060	0.198
Sex (female)	-0.256 [*]		
Swiss	0.007	0.130	-0.117
SES	0.003	0.006 [†]	-0.001
2. Indirect effects			
Internalizing problems- >age 11-y vict > age 13-y vict >age 15-y vict >age 17-y vict	0.001	0.002	0.001
Externalizing behavior >age 11 vict >age 13 vict >age 15-y vict >age 17-y vict	0.006 [*]	0.004 [‡]	0.006 [†]
Prosocial behavior >age 11-y vict >age 13-y vict >age 15-y vict >age 17-y vict	0.004 [†]	0.004 [†]	0.001
Negative peer relations >age 11-y vict > age 13-y vict >age 15-y vict >age 17-y vict	0.003 [‡]	0.003 [‡]	0.002
Competent problem solving >age 11-y vict >age 13-y vict >age 15-y vict >age 17-y vict	0.000	-0.001	0.004
Dominance >age 11-y vict > age 13-y vict >age 15-y vict >age 17-y vict	-0.001	-0.001	0.000
Sensation seeking >age 11-y vict > age 13-y vict >age 15-y vict >age 17-y vict	0.004	0.001	0.006

SES, socioeconomic status; vict, victimization.

* $P < .01$.

† $P < .05$.

‡ $P < .10$.