Journal of Adolescent Health xxx (2017) 1–8

ELSEVIER

JOURNAL OF ADOLESCENT HEALTH

www.jahonline.org

Original article

Bullying Victimization and Suicide Ideation and Behavior Among Adolescents in Europe: A 10-Country Study

Shira Barzilay, Ph.D. [a,b], Anat Brunstein Klomek, Ph.D. [a,c,*], Alan Apter, M.D. [a], Vladimir Carli, M.D., Ph.D. [d], Camilla Wasserman, Ph.D. [d,e], Gergö Hadlaczky, Ph.D. [d], Christina W. Hoven, M.P.H., Dr.P.H. [e,f], Marco Sarchiapone, M.D. [g,h], Judit Balazs, M.D., Ph.D. [i,j], Agnes Kereszteny, M.A. [j], Romuald Brunner, M.D. [k], Michael Kaess, M.D., Ph.D. [k], Julio Bobes, M.D., Ph.D. [l], Pilar Saiz, M.D., Ph.D. [l], Doina Cosman, M.D., Ph.D. [m], Christian Haring, M.D., Ph.D. [n], Raphaela Banzer, M.A. [o], Paul Corcoran, Ph.D. [p], Jean-Pierre Kahn, M.D., Ph.D. [q], Vita Postuvan, Ph.D. [r], Tina Podlogar [r], Merike Sisask, Ph.D. [s,t], Airi Varnik, M.D., Ph.D. [s,u], and Danuta Wasserman, M.D., Ph.D. [d]

[a] *Feinberg Child Study Centre, Schneider Children's Medical Centre, Tel Aviv University, Tel Aviv, Israel*
[b] *Child and Adolescent Psychiatry, Edmond and Lily Safra Children's Hospital, Sheba Medical Center, Tel Hashomer, Tel Aviv University, Tel Aviv, Israel*
[c] *Baruch Ivcher School of Psychology, Interdisciplinary Center (IDC), Herzliya, Israel*
[d] *National Centre for Suicide Research and Prevention of Mental Ill-Health (NASP), Karolinska Institute, Stockholm, Sweden*
[e] *Department of Child and Adolescent Psychiatry, New York State Psychiatric Institute, New York, New York*
[f] *Department of Epidemiology, Mailman School of Public Health, Columbia University, New York, New York*
[g] *Department of Health Sciences, University of Molise, Campobasso, Italy*
[h] *National Institute for Health, Migration and Poverty, Rome, Italy*
[i] *Vadaskert Child Psychiatry Hospital, Budapest, Hungary*
[j] *Institute of Psychology Eotvos Lorand University, Budapest, Hungary*
[k] *Clinic of Child and Adolescent Psychiatry, Centre of Psychosocial Medicine, University of Heidelberg, Heidelberg, Germany*
[l] *Department of Psychiatry, School of Medicine, Centro de Investigacion Biomedica en Red de Salud Mental, CIBERSAM, University of Oviedo, Oviedo, Spain*
[m] *Clinical Psychology Department, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania*
[n] *Research Division for Mental Health, University for Medical Information Technology (UMIT), Hall in Tirol, Austria*
[o] *Addiction help services B.I.N., Innsbruck, Austria*
[p] *National Suicide Research Foundation, Cork, Ireland*
[q] *Department of Psychiatry and Clinical Psychology, Centre Hospitalo-Universitaire (CHU) de Nancy, Universite de Lorraine, Nancy, France*
[r] *Slovene Center for Suicide Research, UP IAM, University of Primorska, Koper, Slovenia*
[s] *Estonian-Swedish Mental Health and Suicidology Institute (ERSI), Tallinn, Estonia*
[t] *School of Governance, Law and Society, Tallinn University, Tallinn, Estonia*
[u] *School of Natural Sciences and Health, Tallinn University, Tallinn, Estonia*

Article history: Received September 22, 2016; Accepted February 2, 2017
Keywords: Victimization; Bullying; Suicide; Ideation; Suicide attempt; SEYLE; Adolescence

A B S T R A C T

Purpose: To examine risk and protective factors moderating the associations between three types of bullying victimization (physical, verbal, and relational bullying) with suicide ideation/attempts in a large representative sample of European adolescents.
Methods: We analyzed cross-sectional data on 11,110 students (mean age = 14.9, standard deviation = .89) recruited from 168 schools in 10 European Union countries involved in the Saving and Empowering Young Lives in Europe study. A self-report questionnaire was used to measure

IMPLICATIONS AND CONTRIBUTION

This study contributes new information about the associations between three types of bullying victimization and suicide

Conflicts of Interest: The authors have no conflicts of interest to disclose.

* Address correspondence to: Anat Brunstein Klomek, Ph.D., Baruch Ivcher School of Psychology, Interdisciplinary Center (IDC), P.O. Box 167, Herzliya 46150, Israel.
E-mail address: bkanat@idc.ac.il (A. Brunstein Klomek).

1054-139X/
http://dx.doi.org/10.1016/j.jadohealth.2017.02.002

victimization types, depression, anxiety, parental and peer support, and suicide ideation and attempts. For each outcome, we applied hierarchical nonlinear models controlling for sociodemographics.

Results: Prevalence of victimization was 9.4% physical, 36.1% verbal, and 33.0% relational. Boys were more likely to be physically and verbally victimized, whereas girls were more prone to relational victimization. Physical victimization was associated with suicide ideation, and relational victimization was associated with suicide attempts. Other associations between victimization and suicidality (ideation/attempts) were identified through analysis of interactions with additional risk and protective factors. Specifically, verbal victimization was associated with suicide ideation among adolescents with depression who perceived low parental support. Similarly, low peer support increased the associations between verbal victimization and suicide ideation. Verbal victimization was associated with suicide attempts among adolescents with anxiety who perceived low parental support.

Conclusions: Findings support the development of prevention strategies for adolescent victims of bullying who may be at elevated risk for suicide ideation/behavior, by taking into account gender, the type of bullying, symptomatology, and availability of interpersonal support.

ideation/behaviors in the presence of risk/protective factors in a large multinational sample. Findings underscore the importance of parental support in the context of peer victimization, and therefore point to involve parents in preventive interventions.

Bullying is defined as intentionally harmful aggressive behavior that is repetitive and involves an imbalance of power between perpetrator and affected person [1]. Bullying may be physical, verbal, relational, and cyber. Suicide is one of the three leading causes of death in young people worldwide [2]. Suicide ideation and attempts have potentially serious consequences, including substantial psychological effects, increased risk of repeated suicide attempt, and death [3].

The associations between bullying victimization and suicidality (ideation and attempts) have been well established in the past two decades [4,5]. Previous studies have examined risk and protective factors in the association between victimization and negative outcomes [6,7]. Some studies have examined it with suicidality as an outcome [8–10]. Depression was found to be a moderator in the association between bullying and suicidality [11–13]. A study by Espelage and Holt [10] among 661 middle school students examined school bullying and suicidality after controlling for depression and delinquency. Results indicated that after controlling for depression and delinquency differences in suicidal thoughts and behaviors emerged only between uninvolved youth and the victims and bully-victim groups, and these differences were minimal. However, only a few studies examined other types of psychopathology, such as anxiety [14,15]. Kim, Koh, and Leventhal [14], for example, have examined other risk factors but their study included depression and anxiety as control variables rather than as a mechanism moderating the association between bullying victimization and suicidality. In the present study, we examined both depression and anxiety as moderators.

Only a few studies have identified social protective factors against suicidal ideation or suicide attempts among victims of bullying. Parental monitoring [16], connectedness (i.e., feeling like you can talk to mom/dad about problems) [17], and peer support [17,18] were identified as potential protective factors that may diminish suicidality among victims of bullying. A study by Bonanno and Hymel [8] among 399 students in grades 8–10 found that social hopelessness partially mediated the association between victimization and suicidal ideation, suggesting that one potential mechanism by which victimized students become suicidal is through victimization's impact on social hopelessness. Their findings also revealed that perceived social support buffered the association between victimization and suicidal ideation, such that victimized students with higher perceived social support from family reported lower levels of suicidal ideation than did students with lower perceived social support. However, other studies did not find significant influence of social support on victimization-suicide associations [19] or reported gender specific interactions [20]. The moderating role of gender has also produced mixed results and was found to be significant in some studies [13,20], while not in others [5,11].

Most research, to date, has focused on the overall experiences of bullying. A few previous studies have included specific types of victimization [10,16] but they have used varying measures to capture the types which makes the comparisons difficult [21]. To date, no study has examined the link between victimization and suicide in a multinational sample with the same frequency cutoffs. The study by Fleming and Jacobsen [22] examined the prevalence of bully victimization in middle school students in 19 low- and middle-income countries and explored the relationship between bullying, mental health, and health behaviors. Their results indicated that students who reported being bullied in the past month were more likely than nonbullied students to report feelings of sadness and hopelessness, loneliness, insomnia, and suicidal ideation. Their study, however, did not include suicidal behavior and did not have a unified frequency cutoff for participating countries. Given the ever-increasing multiethnic, multicultural composition of many countries, international research is essential to generate meaningful recommendations and guidelines regarding public health strategies for the prevention, intervention, and treatment of bullying-related risks [23].

The present study addresses prior research limitations by examining a three-way interaction with both risk and protective factors, which was not tested in previous studies, and by using unified variables in all countries, including suicidal behavior. The purpose of the present study in a large representative multinational sample of European adolescents was to (1) examine the associations between different types of victimization (i.e., physical, verbal, and relational) and suicidal ideation and attempts and (2) examine both risk (depression and anxiety) and protective factors (parental and peer support) and the interaction

between them. Specifically, we examined the following hypotheses: (1) each of three types of victimization (physical, verbal, and relational) is associated with suicidal ideation/attempts; (2) depression and anxiety increase the associations between victimization and suicidal ideation/attempts; (3) parental and peer support decrease the associations between victimization and suicidal ideation/attempts; and (4) the associations between victimization and suicidal ideation/attempts are strongest among those with high depression/anxiety and low parental/peer support.

Methods

Data were collected as part of the Saving and Empowering Young Lives in Europe (SEYLE) study. SEYLE is a cluster randomized controlled trial (German Clinical Trials Register, DRKS00000214) designed to evaluate the efficacy of school-based preventive interventions for suicidal behavior. Ten European Union countries took part in the SEYLE study, including Austria, Estonia, France, Germany, Hungary, Ireland, Italy, Romania, Slovenia, and Spain, with Sweden's National Centre for Suicide Research and Prevention of Mental Ill-Health at Karolinska Institute serving as coordinating center. The full protocol of the study and the characteristics of the sample have previously been published [24–26]. All sites had local ethics committee approval.

Participants

Participants in SEYLE were drawn from 168 schools, comprising 11,110 students. Schools were considered eligible if they were public, contained at least 40 15-year-old students, had more than two teachers for students aged 15 years, and no more than 60% of the students were of the same gender. Schools in the present study were from 10 study sites representative to respective countries [24]. All students in classes where the majority of students were 15-year-old were considered eligible for participation.

Measures

Participants were administered a self-report survey, which included several well-established questionnaires and items developed for SEYLE [24]. It was conducted within the classroom. As part of a larger questionnaire, the students were asked about bullying victimization, risk factors (symptoms of depression and anxiety), protective factors (parent and peer support), and suicide ideation and attempts. The primary study outcomes of interest were suicidal ideation and a lifetime history of a suicide attempt. For the purpose of this study, we analyzed baseline data.

Bullying victimization. Assessed using 10 yes/no questions from the Global School-Based Student Health Survey [27] about various types of victimization that occurred often in the last 12 months. Three variables were created indicating three different types of victimization: physical (e.g., "others pushed, hit, or kicked you"), verbal (e.g., "others called you names"), and relational (e.g., "others spread rumors about you"). For each type of bullying a total was computed, and if it was greater than one, the student was considered to be a victim of that type of bullying [28].

Risk factors. Depression was assessed by the Beck Depression Inventory (BDI-II) [29]. Anxiety was assessed using the Zung Self-Rating Anxiety Scale (Z-SAS) [30]. Internal reliability for these instruments was assessed through Cronbach's alpha, which was high or very high (BDI-II: .864; Z-SAS: .805) [24]. Scores were dichotomized according to cutoff criteria (BDI-II $\geq$ 14; Z-SAS $\geq$ 45) previously defined and established to sensitively detect at-risk students for the SEYLE study [31].

Protective factors. Social support factors were assessed using questions from the Global School-Based Student Health Survey [27]. Peer support included three items (i.e., get along with people of your own age; feel you belong to a group; and people of your age like having you in the group). Data on parental support included 7 items (i.e., parents check if homework is done; parents understand problems; parents know spending of free time; parents help making decisions; parents take time to talk about life; parents see performance, play, or sport; and parents pay attention to opinion). Mean score was calculated for each factor. Lower scores for the protective factors indicate higher support. Internal reliability by Cronbach's alpha was .76 for parent support and .65 for peer support.

Suicidality (ideation and attempts). We used two items from the Paykel Hierarchical Suicidal Ladder [32]. Pupils were identified as having suicidal ideation if they answered: "sometimes, often, very often, or always" to the question: "during the past 2 weeks, have you reached the point where you seriously considered taking your life, or perhaps made plans how you would go about doing it?". Pupils were identified as having a history of suicide attempt if they answered "yes" to the question: "have you ever made an attempt to take your own life?" [25].

Data analysis

To examine the effect of victimization (physical, verbal, and relational [yes, no]) on suicide ideation (yes, no) and attempts (yes, no) as a function of risk (depression, anxiety) and protective (parental support, peer support) factors, we conducted two hierarchical nonlinear models [33] with logit link function and full maximum likelihood estimation. Hierarchical nonlinear models were employed because participants were nested within 168 schools. The binary outcome measures were suicide ideation (yes = 1 and no = 0) and suicide attempts (yes = 1 and no = 0). Predictors were victimization (physical, verbal, and relational; yes = .5, no = −.5), risk factors (depression and anxiety; yes = .5, no = −.5), protective factors (parental support, peer support), and the interactions between them (two and three ways). Interactions were probed using the methodology by Preacher, Curran, and Bauer [34], which is an adaptation of simple slopes test [35] for Hierarchical Linear Modeling–based models, and then plotted using Dawson's method [36]. We also added the following covariates to the models [25]: gender (1 = male, 0 = female), age, not living with both biological parents (1 = yes, 0 = no), not born in country of residence (1 = yes, 0 = no), and parent lost employment in the previous year (1 = yes, 0 = no). In addition, 2.8% of the data were missing. To handle missing data, we employed Rubin's [37] multiple imputation technique. First, we conducted gender comparisons for the study variables. Next, analyses were conducted in two phases—first a full model was conducted including all main effects, two- and three-way interactions. Next, a reduced model was conducted comprising

main effects and only significant interactions (to interpret significant three-way interactions, all two-way interactions relating to it ought to be included in the model). To avoid inflation of type I error, significance level was adjusted according to familywise Bonferroni correction.

Results

Gender differences by types of bullying victimization, suicide ideation and attempt, risk and protective factors

Descriptive analyses are presented in Tables 1 and 2. Results indicate that boys were more likely than girls to report physical and verbal victimization, whereas girls were more likely than boys to report relational victimization, suicidality, and depression. Boys and girls did not differ in anxiety, parental, and peer support. Regarding multiple victimization, analyses indicated that overall, 48.4% of the pupils did not suffer from any type of victimization (N = 5,372), 29.3% suffered from one type of victimization (N = 3,251), 17.9% suffered from two types of victimization (N = 1,988), and 4.5% suffered from all types of victimization (N = 499). Boys and girls did not differ in the prevalence of suffering from multiple victimization, $t_{(11,108)} = .95$, $p = .34$.

Associations between three types of victimization and suicide ideation/attempts

Regression coefficients and odds ratios (ORs; based on the reduced model) for demographics, victimization, and risk and protective correlates of suicidality are presented in Tables 3 and 4. Physical victimization was associated with 39% increase in the likelihood for suicide ideation. Relational victimization was associated with 28% increase in the likelihood for suicide attempt.

Moderation of risk factors in the association between victimization and suicide ideation/attempts

Depression and/or anxiety were associated with increased likelihood for suicide ideation and suicide attempts (Tables 3 and 4), but depression and/or anxiety alone (regardless of protective factors) did not moderate the association between victimization and suicide ideation or attempt.

Moderation of protective factors in the association between victimization and suicide ideation/attempts

Results revealed significant moderating effects of the protective factors on the associations between victimization and suicidality. As for suicidal ideation, parental support moderated the effect of verbal victimization but not physical and relational victimization (see Table 3). In addition to the results shown in Table 3, probing of the interaction revealed that among adolescents with high parental support (+1 SD), verbal victimization was not linked with the likelihood for suicide ideation (OR = .95, 95% CI [confidence interval]: .82–1.08). Conversely, among adolescents with low parental support (−1 SD), in the presence of verbal victimization, the likelihood for suicide ideation increased by 63% (OR = 1.63, 95% CI: 1.50–1.76). The model also revealed that peer support moderated the effect of verbal victimization on the likelihood for suicide ideation but not physical or relational victimization (see Table 3). Probing of the interaction revealed that among adolescents with high peer support (+1 SD), verbal victimization was not linked with the likelihood for suicide ideation (OR = .96, 95% CI: .83–1.09). Conversely, among adolescents with low peer support (−1 SD), those who were verbally victimized had higher likelihood for suicide ideation by 48% (OR = 1.48, 95% CI: 1.35–1.61) than those who were not.

Parental support moderated the effect of verbal victimization on suicide attempt but not for physical and relational victimization (see Table 4). In addition to the results shown in Table 4, probing of the interaction revealed that among adolescents with high parental support (+1 SD), verbal victimization was not linked to a suicide attempt (OR = 1.01, 95% CI: .88–1.14). Conversely, among adolescents with low parental support (−1 SD), in the presence of verbal victimization, the likelihood for a

Table 1
Prevalence of victimization, suicidality, and risk factors by gender (N = 11,110)

	Boys (%)	Girls (%)	$\chi^2(1)$	Overall (%)
Physical victimization	13.90	6.30	182.02***	9.40
Verbal victimization	37.60	35.10	7.48*	36.10
Relational victimization	26.00	37.80	170.22***	33.00
Suicide ideation	2.80	4.30	17.65**	3.70
Suicide attempts	1.90	4.60	56.47***	3.50
Depression	6.20	14.60	191.55***	11.10
Anxiety	1.70	2.10	2.07	1.9

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

Table 2
Mean and standard deviation of protective factors by gender (N = 11,110)

	Boys		Girls		$t_{(11,108)}$
	M	SD	M	SD	
Parental support	19.46	4.18	19.56	4.26	1.16
Peer support	8.19	1.17	8.20	1.14	.68

M = mean; SD = standard deviation.

Table 3
Hierarchical nonlinear models (HNLMs) unstandardized coefficients and odd ratios for the reduced model predicting suicide ideation by victimization, risk, and protective factors (N = 11,110)

	Suicide ideation		
	OR	95% LB	95% UB
Gender (male)	.98	.77	1.25
Age	.98	.87	1.12
Not living with both biological parents	1.12	.88	1.43
Not born in the country of residence	1.31	.90	1.91
Parent lost employment	1.36*	1.01	1.84
Physical victimization	1.39*	1.06	1.96
Verbal victimization	1.06	.93	1.21
Relational victimization	.95	.86	1.05
Depression	21.56***	15.23	30.52
Anxiety	1.78**	1.03	3.10
Parental support	.68*	.61	.76
Peer support	.91	.80	1.04
Verbal victimization × depression	.99	.77	1.30
Parental support × depression	1.43*	1.13	1.80
Verbal victimization × parental support	1.11*	1.01	1.23
Verbal victimization × peer support	1.09*	1.01	1.17
Verbal victimization × depression × parental support	.81*	.67	.98

*$p < .05$, **$p < .01$, ***$p < .001$.
Depression and anxiety were assessed by BDI-II and Z-SAS, respectively. For peer and parental support factors lower scores indicate higher support.
OR = odds ratio; 95% LB = lower bound of 95% confidence interval for OR; 95% UB = upper bound of 95% confidence interval for OR.

Table 4
Hierarchical nonlinear models (HNLMs) unstandardized coefficients and odd ratios for the reduced model predicting suicide attempts by victimization, risk and protective factors (N = 11,110)

	Suicide attempts		
	OR	95% LB	95% UB
Gender (male)	.67*	.46	.97
Age	.96	.76	1.20
Not living with both biological parents	1.68**	1.19	2.38
Not born in the country of residence	2.80***	1.69	4.63
Parent lost employment	1.06	.66	1.73
Physical victimization	.89	.54	1.48
Verbal victimization	.73	.49	1.07
Relational victimization	1.26*	1.10	1.45
Depression	4.52***	3.13	6.53
Anxiety	2.11*	1.11	4.06
Parental support	.66*	.51	.84
Peer support	1.09	.94	1.27
Verbal victimization × anxiety	.69	.48	1.04
Parental support × anxiety	1.05	.64	1.72
Verbal victimization × parental support	.74**	.58	.93
Verbal victimization × anxiety × parental support	.60*	.38	.95

*$p < .05$, **$p < .01$, ***$p < .001$.
Depression and anxiety were assessed by BDI-II and Z-SAS, respectively. For peer and parental support factors lower scores indicate higher support.
OR = odds ratio; 95% LB = lower bound of 95% confidence interval for OR; 95% UB = upper bound of 95% confidence interval for OR.

suicide attempt increased by 220% (OR = 2.20, 95% CI: 2.07–2.33). There was no significant moderation effect of peer support on the associations between victimization and suicide attempt.

Interactions between victimization, risk, and protective factors

The combination of victimization, risk, and protective factors yielded a significant three-way interaction between verbal victimization, parental support, and depression. As can be seen in Figure 1, verbal victimization was associated with increased likelihood for suicide ideation only among adolescents with depression who had low parental support. There was also a significant three-way interaction between verbal victimization, parental support, and anxiety. As can be seen in Figure 2, verbal victimization was associated with increased likelihood for a suicide attempt only among adolescents with anxiety who had low parental support.

Discussion

This study contributes new information about the associations between different types of bullying victimization (physical, verbal, and relational) and suicidality (ideation and attempts), with an emphasis on the context of risk (depression, anxiety) and protective (parental and peer support) factors in a large multinational representative sample of European adolescents enrolled in the SEYLE study [25].

While we hypothesized that all three types of victimization are associated with suicidal ideation and attempts, our findings indicated that physical victimization was associated with suicidal ideation, and relational victimization was associated with suicide attempts. One possible explanation for this finding may be that physical victimization is less common among adolescents compared with other bullying types and childhood bullying [1], and therefore maybe more harmful in these years. Our results are in line with those found by Espelage and Holt [10] which indicated that physical bullying has a more negative effect on suicidality than verbal bullying.

The effect of relational victimization on suicidal behavior is in line with the findings of Jantzer et al. [16], who found that only relational bullying was significantly related to suicidal behavior among bullying types. This is emphasized in the theoretical and empirical literature documenting the importance of multiple social and interpersonal factors in adolescent suicidality, including associations with feeling of rejection or loneliness [38]. Relational victimization may be a traumatic, acute life event, which may be associated with impulsive suicide attempts among adolescents who feel they do not know how to cope more adaptively. It remains unclear why physical victimization was associated with suicidal ideation while relational victimization was associated with suicide attempts. Further research is needed to more conclusively determine the associations between

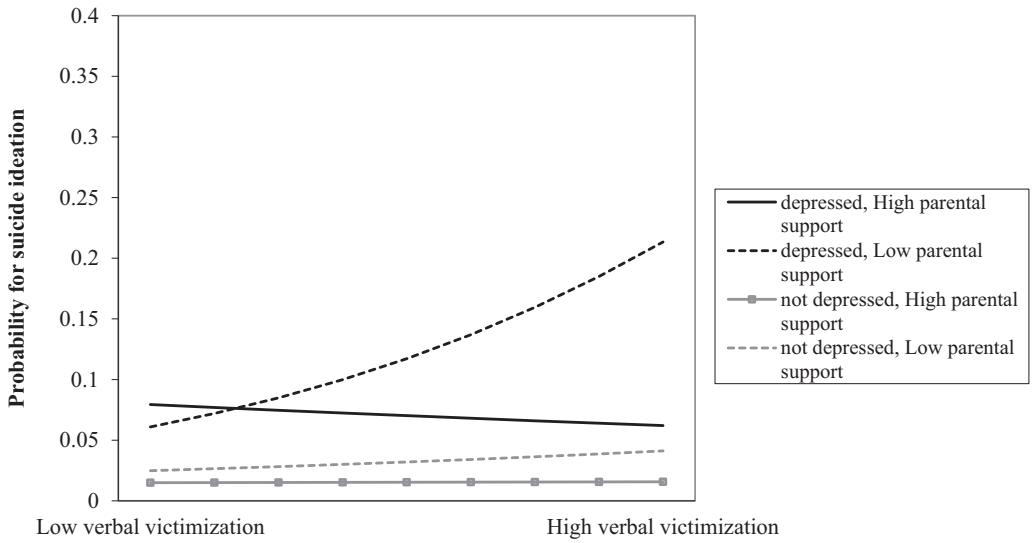

Figure 1. Likelihood for suicide ideation in association with verbal victimization, parental support, and depression.

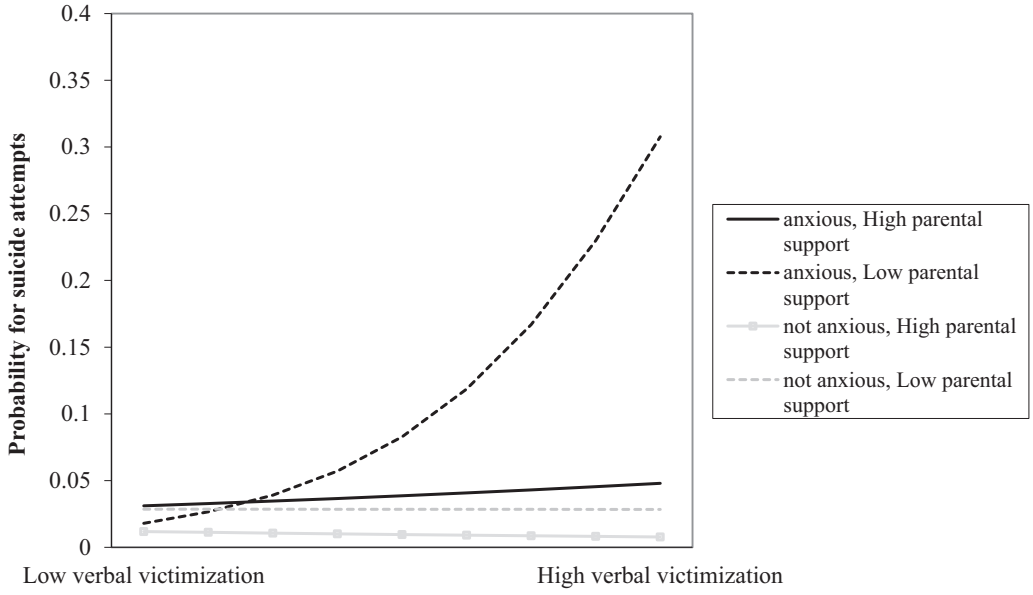

Figure 2. Likelihood for a suicide attempt in association with verbal victimization, parental support, and anxiety.

different types of victimization and suicidality among adolescents.

Our second hypothesis that depression and anxiety increase the associations between victimization and suicidal ideation and attempts was not supported by the results. The results indicated that this was evident only in the presence of low parental support. These findings are different from previous findings, which showed that bullying victimization, in combination with depression, increase risk for suicidality [11,12]. The current results therefore highlight the specific interpersonal context in which depression and anxiety may increase the link between victimization and suicidality.

In line with our third hypothesis that parental and peer support decreased the associations between victimization and suicidal ideation and attempts, the present findings clearly indicate that interpersonal protective factors are important in the link between victimization and suicidal ideation and behaviors. Parental support was found to moderate associations between verbal victimization and both suicidal ideation and attempts. Peer support moderated the associations between verbal victimization and suicidal ideation. Few previous reports suggest an interaction of parental and peer support in the associations between bullying victimization and suicidal behaviors. Parental connectedness [17], parental monitoring [16], and family social support [8] were found protective for suicidality among victimized youth. Parental involvement may have the potential to buffer the consequences of peer victimization on the mental health of adolescents. This finding is important, because many parents rely on the educational systems, while the parental role should be emphasized. In addition, the results highlight the importance of protective factors, and therefore, other protective factors beyond peer and parental support should be included in future research.

Although risk and protective factors have been identified in a few previous studies, the present study contributes by identifying the interaction effect between risk and protective factors on the link between victimization and suicide. In keeping with our fourth hypothesis, we found that victims of verbal bullying who experience depression and perceive low parental support, had higher associations with suicidal ideation, while victims of verbal bullying who had anxiety and perceive low parental support showed higher associations with suicide attempt, compared with those who perceived high parental support and with low depression/anxiety. These results demonstrate that bullying victimization does not necessarily have a main effect on suicidal behavior, but rather interacted with the type of bullying, psychopathological symptoms involved, and availability of interpersonal support. These finding are consistent with the literature addressing the association of bullying and suicide [5,13,17]. Interestingly, the results suggest different vulnerabilities related to suicide ideation versus attempts: while depression moderated the association between victimization and suicidal ideation (in the presence of low parental support), anxiety moderated the association between victimization and suicide attempts (in the presence of low parental support). These findings may relate to the study by Nock et al. [39], which suggested that, in adults, depression predicts suicide ideation but not suicide plans or attempts among those with ideation. Instead, severe anxiety/agitation predicts suicide attempts. Similar effects have not been reported among adolescents [3], and therefore, further research is needed to explain these results. Moreover, these findings also underscore the importance of parental support in the context of bullying victimization and internalizing psychopathology. Therefore, it is not only the detection and treatment of depression/anxiety that may prevent suicidality but also the environmental support provided. These findings are supportive of the psycho-social-ecological understanding of bullying which includes both individual, peer and family characteristics [40]. Interestingly, peer support was not found to be significant in the three-way interaction, which may indicate the importance of the parent-child relationship during adolescence, especially when dealing with adverse social circumstances.

Limitations

Our study is based on cross-sectional data, and therefore, we cannot conclude any causal relationship between victimization,

depression/anxiety, social support, and suicidality. Future studies should use longitudinal data to establish causal associations. Information was based on self-reported questionnaire, and we did not examine gender as a moderator, which might indicate different patterns among boys and girls. In the literature, findings on associations among bullying, suicidal behaviors, and gender are mixed. Some studies show different associations [13,20], while others determined that gender was not necessarily a significant moderator for victimization-suicide associations in traditional victimization [5,11]. To avoid an overly complex statistical model, we tested the associations regardless of gender.

Prevention implications

The findings of this study support the importance of psychoeducational intervention programs in schools to reduce and prevent victimization. In addition, they point to the need for preventive intervention activities to focus on increasing parental support, rather than only target detection of depression and suicidality among victims of bullying. This study underscores the importance of parental involvement in the context of peer victimization. Parenting programs in childhood and early adolescence targeted to bullying prevention may buffer against future risk. Teachers and mental health professionals should engage parents much more in interventions related to bullying among adolescents.

Understanding potential risk and protective factors that impact adolescents' ability to cope with bullying situations will also enable us to design more effective interventions. Prevention and intervention efforts should include a component about psychopathology, which is associated with victimization.

Acknowledgments

The SEYLE Project Leader and Principal Investigator is Danuta Wasserman, Professor in Psychiatry and Suicidology, National Center for Suicide Research and Prevention of Mental Ill-Health (NASP) Karolinska Institute, Stockholm, Sweden. The Executive Committee comprises Professor Danuta Wasserman and Senior Lecturer Vladimir Carli, both from the NASP, Sweden; Professor Marco Sarchiapone, NASP, Italy; and Professor Christina W. Hoven and Anthropologist Camilla Wasserman from Columbia University, New York, NY, USA. The SEYLE Consortium includes sites in 12 European countries. Site leaders are Danuta Wasserman (NASP, coordinating center), Christian Haring (Austria), Airi Varnik (Estonia), Jean-Pierre Kahn (France), Romuald Brunner (Germany), Judit Balazs (Hungary), Paul Corcoran (Ireland), Alan Apter (Israel), Marco Sarchiapone (Italy), Doina Cosman (Romania), Vita Postuvan (Slovenia) and Julio Bobes (Spain).

Funding Sources

The SEYLE project is supported by the European Union through the Seventh Framework Program (FP7), Grant agreement number HEALTH-F2-2009-223091. Judit Balazs was supported by the Janos Bolyai Research Scholarship of the Hungarian Academy of Sciences.

References

[1] CDC. Bullying Research. Available at: http://www.cdc.gov/violenceprevention/youthviolence/bullyingresearch/Accessed 20/06/2016.

[2] Wasserman D, Cheng Q, Jiang G-X. Global suicide rates among young people aged 15-19. World Psychiatry 2005;4:114–20.

[3] Nock MK, Green JG, Hwang I, et al. Prevalence, correlates, and treatment of lifetime suicidal behavior among Adolescents: Results from the National Comorbidity Survey Replication Adolescent Supplement. JAMA Psychiatry 2013;70:300–10.

[4] Van Geel M, Vedder P, Tanilon J. Relationship between peer victimization, cyberbullying, and suicide in children and adolescents: A meta-analysis. JAMA Pediatr 2014;168:435–42.

[5] Holt MK, Vivolo-Kantor AM, Polanin JR, et al. Bullying and suicidal ideation and behaviors: A meta-analysis. Pediatrics 2015;135:e496–509.

[6] Fitzpatrick S, Bussey K. The role of perceived friendship self-efficacy as a protective factor against the negative effects of social victimization. Social Dev 2014;23:41–60.

[7] Griese ER, Buhs ES. Prosocial behavior as a protective factor for children's peer victimization. J Youth Adolesc 2014;43:1052–65.

[8] Bonanno RA, Hymel S. Beyond hurt feelings: Investigating why some victims of bullying are at greater risk for suicidal ideation. Merrill-Palmer Q 2010;56:420–40.

[9] Espelage DL, Aragon SR, Birkett M, et al. Homophobic teasing, psychological outcomes, and sexual orientation among high school students: What influence do parents and schools have? Sch Psychol Rev 2008;37:202–16.

[10] Espelage DL, Holt MK. Suicidal ideation and school bullying experiences after controlling for depression and delinquency. J Adolesc Health 2013;53:S27–31.

[11] Bauman S, Toomey RB, Walker JL. Associations among bullying, cyberbullying, and suicide in high school students. J Adolesc 2013;36:341–50.

[12] Brunstein Klomek A, Marrocco F, Kleinman M, et al. Bullying, depression, and suicidality in adolescents. J Am Acad Child Adolesc Psychiatry 2007;46:40–9.

[13] Brunstein Klomek A, Sourander A, Niemelä S, et al. Childhood bullying behaviors as a risk for suicide attempts and completed suicides: A population-based birth cohort study. J Am Acad Child Adolesc Psychiatry 2009;48:254–61.

[14] Kim YS, Koh Y-J, Leventhal B. School bullying and suicidal risk in Korean middle school students. Pediatrics 2005;115:357–63.

[15] Hong JS, Kral MJ, Sterzing PR. Pathways from bullying perpetration, victimization, and bully victimization to suicidality among school-aged youth a review of the potential mediators and a call for further investigation. Trauma Violence Abuse 2015;16:379–90.

[16] Jantzer V, Haffner J, Parzer P, et al. Does parental monitoring moderate the relationship between bullying and adolescent nonsuicidal self-injury and suicidal behavior? A community-based self-report study of adolescents in Germany. BMC Public Health 2015;15:1.

[17] Borowsky IW, Taliaferro LA, McMorris BJ. Suicidal thinking and behavior among youth involved in verbal and social bullying: Risk and protective factors. J Adolesc Health 2013;53:S4–12.

[18] Kendrick K, Jutengren G, Stattin H. The protective role of supportive friends against bullying perpetration and victimization. J Adolesc 2012;35:1069–80.

[19] Rothon C, Head J, Klineberg E, et al. Can social support protect bullied adolescents from adverse outcomes? A prospective study on the effects of bullying on the educational achievement and mental health of adolescents at secondary schools in East London. J Adolesc 2011;34:579–88.

[20] Davidson LM, Demaray MK. Social support as a moderator between victimization and internalizing-externalizing distress from bullying. Sch Psychol Rev 2007;36:383.

[21] Vivolo-Kantor AM, Martell BN, Holland KM, et al. A systematic review and content analysis of bullying and cyber-bullying measurement strategies. Aggression Violent Behav 2014;19:423–34.

[22] Fleming LC, Jacobsen KH. Bullying among middle-school students in low and middle income countries. Health Promotion Int 2010;25:73–84.

[23] Srabstein JC, Leventhal BL. Prevention of bullying-related morbidity and mortality: A call for public health policies. Bull World Health Organ 2010;88:403–4.

[24] Carli V, Wasserman C, Wasserman D, et al. The saving and empowering young lives in Europe (SEYLE) randomized controlled trial (RCT): Methodological issues and participant characteristics. BMC Public Health 2013;13:479.

[25] Wasserman D, Hoven CW, Wasserman C, et al. School-based suicide prevention programmes: The SEYLE cluster-randomised, controlled trial. Lancet 2015;385:1536–44.

[26] Wasserman D, Carli V, Wasserman C, et al. Saving and empowering young lives in Europe (SEYLE): A randomized controlled trial. BMC Public Health 2010;10:192.

[27] WHO. Global school-based student health survey (GSHS). Available at: http://www.who.int/chp/gshs/en/. Accessed 12 May, 2010.

[28] Brunstein Klomek A, Snir A, Apter A, et al. Association between victimization by bullying and direct self injurious behavior among adolescence in Europe: A ten-country study. Eur Child Adolesc Psychiatry 2016;25:1183–93.

[29] Beck AT, Steer RA, Ball R, et al. Comparison of Beck Depression Inventories-IA and-II in psychiatric outpatients. J Pers Assess 1996;67:588–97.
[30] Zung WW. A rating instrument for anxiety disorders. Psychosomatics 1971;12:371–9.
[31] Kaess M, Brunner R, Parzer P, et al. Risk-behaviour screening for identifying adolescents with mental health problems in Europe. Eur Child Adolesc Psychiatry 2014;23:611–20.
[32] Paykel E, Myers J, Lindenthal J, et al. Suicidal feelings in the general population: A prevalence study. Br J Psychiatry 1974;124:460–9.
[33] Raudenbush SW, Bryk AS, Congdon R. HLM 6 for Windows [computer software]. Skokie, IL: Scientific Software International, Inc; 2004.
[34] Preacher KJ, Curran PJ, Bauer DJ. Computational tools for probing interaction effects in multiple linear regression, multilevel modeling, and latent curve analysis. J Educ Behav Stat 2006;31:437–48.
[35] Aiken LS, West SG, Reno RR. Multiple regression: Testing and interpreting interactions. Thousand Oaks, CA: Sage; 1991.
[36] Dawson JF. Moderation in management research: What, why, when, and how. J Business Psychol 2014;29:1–19.
[37] Rubin DB. Multiple imputation for nonresponse in surveys. New York: John Wiley & Sons; 2009.
[38] Barzilay S, Feldman D, Snir A, et al. The interpersonal theory of suicide and adolescent suicidal behavior. J Affect Disord 2015;183:68–74.
[39] Nock MK, Hwang I, Sampson NA, et al. Mental disorders, comorbidity and suicidal behavior: Results from the National Comorbidity Survey Replication. Mol Psychiatry 2010;15:868–76.
[40] Espelage DL, Swearer SM. Research on school bullying and victimization: What have we learned and where do we go from here? Sch Psychol Rev 2003;32:365–84.