Highlights

- Cyberbullying is positively associated with suicide ideation/behavior.

- Positive mental health fully mediates this association.

- Positive mental health confers resilience and reduce suicide risk.

Cyberbullying, Positive Mental Health and Suicide Ideation/Behavior

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Abstract

Cyberbullying has regularly been shown to be associated with suicide ideation/behavior. The present study investigated whether positive mental health, i.e., high levels of emotional, cognitive and psychological well-being, buffers the association between cyberbullying and suicide ideation/behavior. A total of 225 students completed measures of cyberbullying, suicide ideation/behavior, and positive mental health. Positive mental health fully mediated the association between cyberbullying and suicide ideation/behavior. Positive mental health seems to confer resilience and should be taken into account in clinical and preventive programs for student populations.

Keywords: cyberbullying; suicide risk; protection

1. Introduction

College students are at marked risk for lifetime suicide ideation (15.3%) and suicide attempts (3.2%; Mortier et al., 2017). Involvement in bullying as well as cyberbullying has been identified as a risk factor for depression and anxiety symptom (Navarro et al., 2016) as well as suicide ideation/behavior (van Geel et al., 2014). Cyberbullying is defined as "willful and repeated harm inflicted through the use of computers, cell phones and other electronic devices" (Hinduja and Patchin, 2010; p. 208). In general, cyberbullying involves sending harassing or threatening messages, posting humiliating comments or threatening someone online. Estimates suggest that about 15% of adolescents have suffered from cyberbullying victimization (Modecki et al., 2014). While efforts have been made to understand which negative factors mediate the association between cyberbullying and suicide ideation/behavior (Litwiller and Brausch, 2013), far less attention has been paid to factors that confer resilience against the development of suicide ideation/behavior in the face of cyberbullying.

According to the Bi-Dimensional Framework (Johnson, 2016), a variable has to meet three criteria to be viewed as conferring resilience: (1) It should comprise a separate dimension to risk and buffer the association between risk and outcome; (2) It should be viewed as existing on a bipolar continuum, with its inverse amplifying the association between risk and outcome; (3) It should be a psychological construct, such as a set of positive beliefs. In recent cross-sectional and longitudinal studies positive mental health, that is, high levels of emotional, cognitive and psychological well-being, has been shown to buffer the association between depression and suicide ideation (Siegmann et al., 2018; Teismann, Forkmann, et al., 2018): For students who reported high levels of positive mental health, the levels of suicide ideation did not increase significantly even when they experienced a heightened level of depressive symptoms. Furthermore, positive mental health has been shown to predict the remission of suicide ideation in a large sample of young women, whereas severity of psycho-

pathology, life satisfaction and self-efficacy did not predict the course of suicide ideation (Teismann et al., 2016). Positive mental health may therefore be considered as conferring resilience according to the Bi-Dimensional Framework (Johnson, 2016). However, by now, it remains unclear whether positive mental health also buffers the impact of other risk factors than depression on suicide ideation/behavior.

On this background, the current study aimed to investigate whether positive mental health buffers the impact of cyberbullying on suicide ideation/behavior within a sample of university students. Suicide ideation and excessive Internet use is especially common in young adults (Brailovskaia and Margraf, 2018; Mortier et al., 2017), making students a relevant sample to focus on.

2. Methods

2.1 Procedure and participants

The present study belongs to the ongoing BOOM (Bochum Optimism and Mental Health) research program which investigates risk and protective factors of mental health (Margraf and Schneider, 2017). Data of 225 students from a large German university (76.4% female; age: M=23.36, SD=4.18, range: 17–40; 51.6% in steady relationship) was collected by an online survey between October and November 2017. The Ethics Committee of the Faculty of Psychology of the Ruhr-Universität Bochum approved the study (number: 043; approval date: 17.09.13). All national regulations and laws regarding human subjects research were followed. Participants were properly instructed and gave online their informed consent to participate. A priori conducted power analyses (G*Power program, version 3.1) showed that the current study needs a sample consisting of at least N=85 (power>.80, α=.05, effect size f^2=0.15; cf., Mayr et al., 2007). Accordingly, the present sample size was sufficient.

2.2 Measures

2.2.1 Positive Mental Health Scale (PMH-Scale; Lukat et al., 2016). Emotional, psychological and social well-being was measured with the Positive Mental Health-Scale. Participants respond to statements such as "In general, I am confident", "All in all, I am satisfied with my life", "I feel that I am actually well equipped to deal with life and its difficulties" on a 4-point Likert scale ranging from 0 (*I do not agree*) to 3 (*I agree*). Unidimensional structure and good convergent and discriminant validity are demonstrated in samples comprised of students, patients and the general population (Lukat et al., 2016). Cronbach's alpha was $\alpha = .94$ in the current study.

2.2.2 Suicidal Behaviors Questionnaire – Revised (SBQ-R; Osman et al., 2001). Lifetime suicide ideation/behavior was assessed using Item 1 of the SBQ-R (i.e., "Have you ever thought about or attempted to kill yourself?"). Though the original SBQ-R consists of four items, only the aforementioned item was used in the current study due to space constraints. However, Item 1 of the SBQ-R has been recommended for screening purposes and has repeatedly been used in clinical and non-clinical samples (Osman et al., 2001).

2.2.3 Lifetime Cyberbullying. Lifetime cyberbullying experiences were assessed with a single item (i.e., "How often have you been online threatened, blackmailed, and insulted while using the Internet, e.g., social networking sites such as Facebook, Instagram and Twitter?") modeled after the *Bullying Recall Questionnaire* (BRC; Wolke and Sapouna, 2008) for the present study. The item was rated on a 5-point Likert scale (1=*never*, 5=*several times a week*).

2.3 Statistical analyses

Statistical analyses were conducted with the Statistical Package for the Social Sciences (SPSS) 24 and the macro Process version 2.16.1 (www.processmacro.org/index.html). Associations between the investigated variables were assessed by calculating univariate correlations and a multiple linear regression analysis. Cyberbullying and positive mental health served as independent variables and suicide ideation/behavior as dependent variable, control-

ling for age and gender. A mediation model (model 4 of the macro Process) was analyzed
including positive mental health as hypothetical mediator. The basic relationship between
cyberbullying (predictor, X) and suicide ideation/behavior (outcome, Y) was denoted by *c*
(the total effect). The path of cyberbullying to positive mental health (mediator, M) was de-
noted by *a*, and the path of positive mental health to suicide ideation/behavior was denoted by
b. The indirect effect was represented by the combined effect of path *a* and path *b*. Path *c'*
denoted the direct effect of cyberbullying to suicide ideation/behavior after the inclusion of
positive mental health. The mediation effect was assessed by the bootstrapping procedure
(10.000 samples) that provides accelerated confidence intervals (95%). Considering the
shortcomings of the effect size kappa-squared (κ^2) commonly used in mediation analyses, P_M
(the ration of the indirect effect to the total effect) was used as the mediation effect measure.

3. Results

Lifetime cyberbullying experiences were reported by 23.1% of the sample. Serious suicide
ideation/behavior was found in 24.8% of the sample. Mean values of cyberbullying and posi-
tive mental health, as well as their correlations with suicide ideation/behavior are presented in
Table 1.

[insert Table 1 about here]

The whole regression model explained 25.6% of the variance, $F(4,220)=18.887$, $p<.001$.
While age ($\beta=.088$, n.s.) and gender ($\beta=-.096$, n.s.) did not show significant results, positive
mental health ($\beta=-.432$, $p<.001$, 95%CI[-.084;.048]) became significant. The result of cyber-
bullying was close to statistical significance ($\beta=.119$, $p=.054$, 95%CI[-.003;.353]).

[insert Figure 1 near here]

As presented in Figure 1, the bootstrapped mediation analysis demonstrated that positive
mental health fully mediated the relationship between cyberbullying and suicide idea-

tion/ideation (*c*: *p*=.0003; *c'*: *p*=.0687). The indirect effect (*ab*) became significant, *b*=.185, SE=.049, 95%CI[.098;.295]; P_M: *b*=.529, SE=.552, 95%CI[.240;1.421].

4. Discussion

In line with previous studies, cyberbullying was positively associated with suicide idea-tion/behavior in this sample of young adults. Furthermore, this association was fully mediated by positive mental health. Accordingly, positive mental health buffers the association be-tween cyberbullying and suicide ideation/behavior. The current findings complement previ-ous studies showing that well-being, as assessed with the Positive Mental Health-Scale, seems to be of special relevance to positive psychological functioning. As such, a series of previous studies found positive mental health to confer resilience against suicide idea-tion/behavior (Siegmann et al., 2018; Teismann et al., 2016; Teismann, Brailovskaia, et al., 2018; Teismann, Forkmann, et al., 2018).

In terms of clinical implications, the results of the current study suggest that it may be im-portant to account for the presence of resilience factors in addition to risk factors, when as-sessing individuals for suicide risk. In particular, facets of positive mental health could be central aspects to focus on. Furthermore, since positive mental health can significantly alter the impact of cyberbullying, it may be beneficial to think of fostering well-being in clinical and preventive programs for student populations (cf., Huffman et al., 2014). On a theoretical level, the current results underscore the necessity that theoretical models of suicide idea-tion/behavior should strive to integrate both pathogenetic and protective factors (cf., Cheav-ens et al., 2016).

A major limitation of the current study is its cross-sectional design. Therefore, conclusions on causality cannot be drawn. Though there is strong evidence for the predictive ability and rele-vance of single items assessing suicide ideation (Green et al., 2015), future studies should use more comprehensive measures of suicide ideation/behavior. Furthermore, generalization of

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the results towards other age or societal groups than university students is not possible, since the study focused only on this highly educated population. Studying the buffering qualities of positive mental health in clinical samples is highly warranted.

Nonetheless, current findings in addition to previous results highlight the importance of positive mental health in suicide risk.

Declarations of interest: none.

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Table 1.

Descriptive statistics of cyberbullying and positive mental health and their correlations with suicide ideation/behavior

	M(SD)	Min–Max	Suicide ideation/behavior
			r
Cyberbullying	1.31(.67)	1–5	.237**
Positive Mental Health	17.51(6.48)	0–27	-.478**

Notes. *N*=225; *M*=Mean; *SD*=Standard Deviation; *Min*=Minimum; *Max*=Maximum;

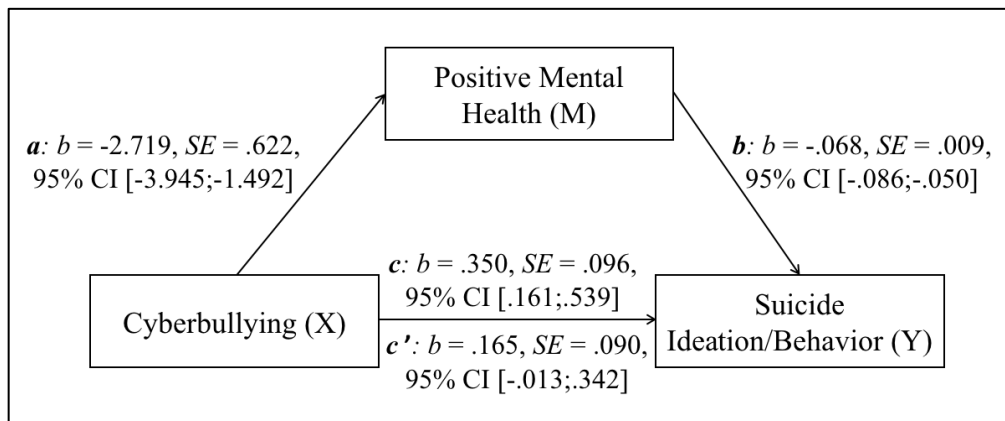*r*=Correlation; **p < .01.

Figure 1. Mediation model including cyberbullying (X), positive mental health (M), and suicide ideation/behavior (Y).

Note. c = total effect, c' = direct effect; b = standardized regression coefficient, SE = standard error, CI = confidence interval.