



# Positive Mental Health, Stressful Life Events, and Suicide Ideation

## A 2-Year Follow-Up Study

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**Abstract.** *Background:* Stressful life events and suicide ideation regularly occur together. Yet, little is known about factors that buffer individuals against the development of suicide ideation. *Aim:* In a long-term follow-up study design, it was investigated whether positive mental health, that is, high levels of subjective and psychological well-being, buffers the association between stressful life events and suicide ideation. *Method:* A total of 126 German students (80.2% female; age:  $M = 24.29$ ,  $SD = 5.21$ ) were assessed at a baseline evaluation and again 24 months later. Data were collected using self-report questionnaires. *Results:* Linear hierarchical regression analysis was used to analyze the data. Positive mental health was considered to moderate the impact of stressful life events on suicide ideation – controlling for age and gender. *Limitations:* Current results are limited to university students. *Conclusions:* Positive mental health interacts with stressful life events, such that those with high levels of positive mental health show an attenuated increase in suicide ideation at elevated levels of stress. Positive mental health seems to confer resilience and should be focused on in counseling centers for students.

**Keywords:** positive mental health, stressful life events, suicide ideation, 2-year follow-up study

Stressful life events have been shown to be one of the strongest predictors of suicide (Franklin et al., 2017) and to be important correlates of suicide ideation and suicide attempts (Liu & Miller, 2014). The association between stressful life events and suicide ideation as well as suicide attempts has been found across different kinds of life events (e.g., somatic, financial, interpersonal stressors) as well as age groups, countries, and ethnic/cultural contexts (Liu & Miller, 2014). Although substantial efforts have been made to understand which risk factors contribute to suicide ideation, far less attention has been paid to factors that buffer individuals against the development of suicide ideation.

In their work on the buffering hypothesis, Johnson, Wood, Gooding, Taylor, and Tarrier (2011) suggest that to be viewed as conferring resilience, a variable needs to demonstrate three main characteristics: (a) It needs to comprise a separate dimension to risk and moderate the association between risk and outcome. Therefore, to ascertain resilience, an assessment of both risk and suicide ideation is necessary. (b) It needs to be viewed as existing on a bipolar continuum, with its inverse amplifying the association between risk and outcome. (c) It needs to be a psychological construct, such as a set of positive beliefs or personal resources that buffer individuals against the development of negative outcomes – such as suicide ideation

– when confronted with risk factors. Factors such as self-reported problem-solving ability and emotional intelligence have been shown to moderate the association between stressful negative life events and suicide ideation (Johnson et al., 2011).

Positive mental health (PMH), that is, high levels of subjective and psychological well-being (Keyes, Shmotkin, & Ryff, 2002), is another factor that has been repeatedly shown to confer resilience against suicide ideation. Individuals with high levels of PMH tend to view their lives as having purpose, often experience positive affect, and are likely to be self-accepting (Keyes et al., 2002): In this sense, PMH – as assessed with the Positive Mental Health scale (PMH; Lukat, Margraf, Lutz, van der Veld, & Becker, 2016) – has been found to moderate both the relationship between different risk factors (including depression, perceived burdensomeness, cyberbullying) and suicide ideation (Brailovskaia, Teismann, & Margraf, 2018; Siegmann et al., 2018, 2019), as well as the relationship between suicide ideation and suicide attempts (Brailovskaia, Forkman, et al., 2019). Corresponding effects have been shown in nonclinical (Siegmann et al., 2018) and clinical samples (Siegmann et al., 2019). However, at present, the buffering effect of PMH has been shown in only one long-term follow-up study. In this study, PMH buffered the impact of depression on suicide ideation over the course of 1 year in

German students (Teismann et al., 2018). No study to date has investigated whether PMH has a buffering effect over periods longer than 1 year. Furthermore, it is currently unknown whether PMH could buffer the effect of stressful life events on suicide ideation.

Against this background, this study aimed to examine whether PMH moderates the association between stressful life events and suicide ideation over the course of 2 years in a sample of German students. To investigate this issue longitudinally seems highly desirable particularly considering that suicide ideation increased in the younger population in the past decade (Twenge, Cooper, Joiner, Duffy, & Binau, 2019). It was expected that individuals who report high levels of PMH do not show significantly increased levels of suicide ideation in the face of stressful life events.

## Method

### Participants

In November 2016, a collective e-mail invitation to the first online survey (T1) was sent to a randomly selected sample of 200 students of a large German university in the Ruhr region. In November 2018, an e-mail invitation to the second online survey (T2) was sent to those who had completed the first survey ( $N = 142$ ). Participation was voluntary and participating students were compensated with course credits. In total, 126 persons (80.2% women; age [years] at T1:  $M = 24.29$ ,  $SD = 5.21$ , range: 19–57) completed both surveys. At T1, all participants were students: Semesters 1–4: 20.6% ( $n = 26$ ), Semesters 5–8: 49.2% ( $n = 62$ ), and Semester 9 and more: 30.2% ( $n = 38$ ). At T2, 31.7% ( $n = 40$ ) of them had finished their studies and were working. At T1, 41.3% ( $n = 52$ ) of the participants were single, 56.3% ( $n = 71$ ) had a romantic partner and 2.4% ( $n = 3$ ) were married, while at T2 39.7% ( $n = 50$ ) were single, 55.6% ( $n = 70$ ) had a romantic partner, and 4.8% ( $n = 6$ ) were married. In the analysis of the key variables, a  $t$  test for independent samples revealed no significant differences between those who completed only the first survey ( $n = 16$ ) and those who completed both surveys: stressful life events:  $t_{(140)} = -1.071$ ,  $p = .286$ ; PMH:  $t_{(140)} = 1.216$ ,  $p = .226$ ; suicide ideation:  $t_{(140)} = -.413$ ,  $p = .680$ . The study was approved by the responsible ethics committees. Participants were properly instructed and gave their informed consent to participate online. All national regulations and laws regarding research with human subjects were followed.

## Measures

### Stressful Life Events

Stressful experiences over the past 12 months were assessed with the Brief Daily Stressor Screening (BDSS; Scholten, Lavalée, Velten, Zhang, & Margraf, 2014). The instrument includes nine items rated on a 5-point Likert scale (0 = *not at all*, 4 = *very much*) that assess sources of stress in daily life (e.g., family, health, finances, study, or job). Higher scores indicate higher level of stress. Prior reported psychometric properties of this measure were satisfying (internal reliability:  $\alpha = .78$ , 1-month test-retest reliability:  $\alpha = .79$ , convergent validity with Depression Anxiety Stress Scales [DASS; Lovibond & Lovibond, 1995]: depression scale:  $r = .54$ ,  $p < .01$ , anxiety scale:  $r = .51$ ,  $p < .01$ , stress scale:  $r = .57$ ,  $p < .01$ , discriminant validity with General Self-Efficacy Scale [GSE; Schwarzer & Jerusalem, 1995]:  $r = -.40$ ,  $p < .01$ ; see Scholten et al., 2014; Schönfeld, Brailovskaia, Bieda, Zhang, & Margraf, 2016]. The current internal reliability of the scale was:  $\alpha_{T1} = .72$ .

### Positive Mental Health

The unidimensional PMH scale (Lukat et al., 2016) allows for a holistic assessment of subjective and psychological aspects of well-being. In this sense, aspects such as life satisfaction (e.g., “I enjoy my life”), self-acceptance (e.g., “I am in good physical and emotional condition”), and environmental mastery (e.g., “I manage well to fulfill my needs”) are measured with nine items, rated on a scale ranging from 0 (*do not agree*) to 3 (*agree*). Of note, the scale measures not only positive affect, but also attitudes a person has about herself/himself and her/his life. Unidimensional structure and good convergent and discriminant validity are demonstrated in samples comprising students, patients, and the general population (Lukat et al., 2016). Previous research has demonstrated good psychometric properties of this instrument (internal consistency:  $\alpha = .93$ , 1-week test-retest reliability:  $\alpha = .81$ ; convergent validity with the Subjective Happiness Scale [SHS; Lyubomirsky & Lepper, 1999]:  $r = .81$ ,  $p < .05$ , discriminant validity with DASS [Lovibond & Lovibond, 1995]: depression scale:  $r = -.74$ ,  $p < .05$ , anxiety scale:  $r = -.51$ ,  $p < .05$ , stress scale:  $r = -.56$ ,  $p < .05$ ; see Lukat et al., 2016). The current internal reliability of the scale was:  $\alpha_{T1} = .92$ .

### Suicide Ideation

We assessed 12-month suicide ideation (“How often have you thought about killing yourself in the past year?”) using the relevant item of the Suicidal Behaviors Questionnaire – Revised (SBQ-R; Osman et al., 2001) that is rated on a 5-point Likert scale from 1 (*never*) to 5 (*often*). The SBQ-R has been recommended for screening purposes and has

been repeatedly used in clinical and nonclinical samples (Osman et al., 2001). Although the original SBQ-R consists of four items, only the aforementioned item (Item 2) was used in the current study in order to reduce the burden on participants. The following convergent validity with the DASS depression scale (Lovibond & Lovibond, 1995) was reported for this item:  $r = .52, p < .01$  (see Brailovskaia, Teismann, Zhang, & Margraf, 2019).

### Data Analysis

Statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS 24). After descriptive analyses and correlation analyses, two hierarchical regression analyses (95% CI) were conducted to assess the potential moderation effect of PMH at T1 on the association between (1) stressful events at T1 and suicide ideation at T1, as well as on the association between (2) stressful events at T1 and suicide ideation at T2. In both regression models, suicide ideation was considered as dependent variable. Considering the composition of the present sample (more women than men, young age), age and gender at T1 were included in Step 1 as control variables. Stressful events at T1 and PMH at T1 were added in Step 2, their interaction was added in Step 3. A moderating effect of

PMH at T1 is indicated if the interaction term becomes significant. Power analyses conducted a priori (G\*Power program, version 3.1) revealed that the current sample size was sufficient for valid results (power > .80,  $\alpha = .05$ , effect size  $f^2 = 0.15$ ; Mayr, Erdfelder, Buchner, & Faul, 2007).

### Results

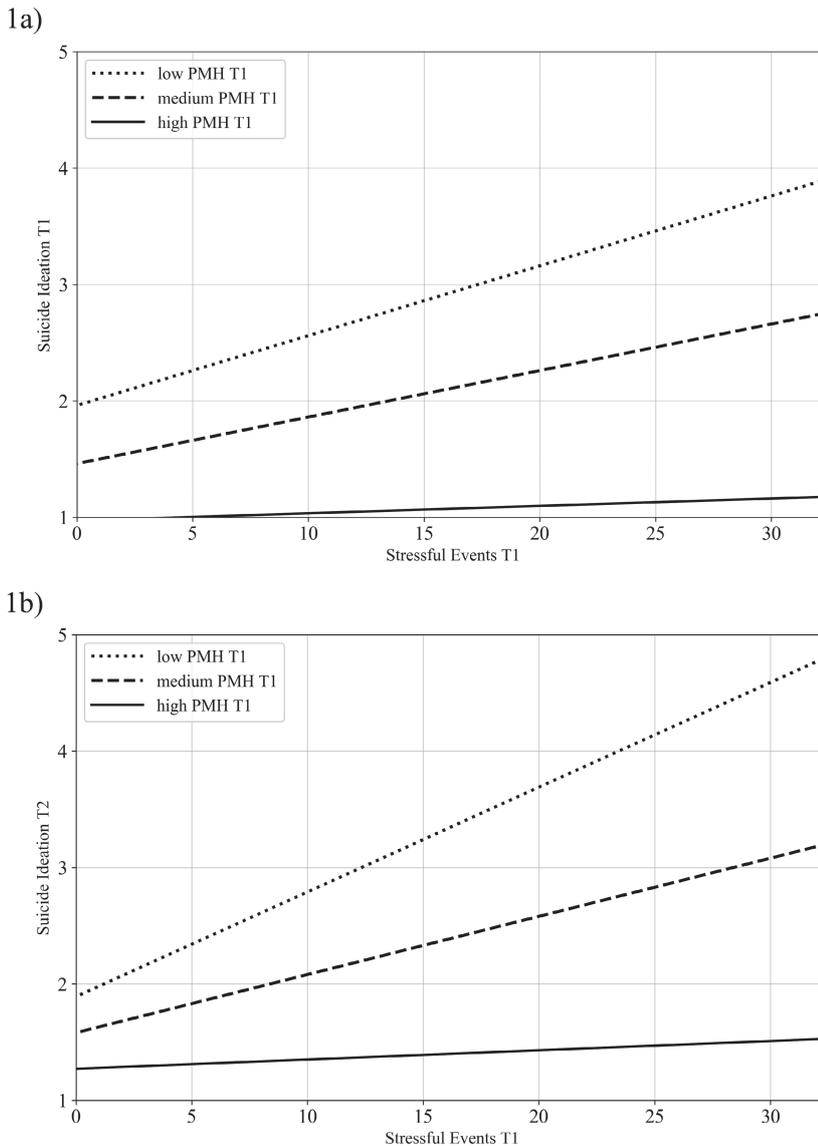
At T1, 27.8% ( $n = 35$ ) of the participants indicated some degree of suicidal ideation in the past 12 months (i.e., SBQ-R value > 1), while at T2 some degree of suicidal ideation was indicated by 33.3% ( $n = 42$ ) of the participants. In total, 26 participants reported suicide ideation at T1 and at T2. Stressful events at T1 ( $M = 12.41, SD = 6.10$ ) were negatively correlated with PMH at T1 ( $M = 18.17, SD = 5.87$ ),  $r = -.477, p < .001$ . Stressful events were positively associated with suicide ideation at T1 ( $M = 1.55, SD = 1.04$ ) and at T2 ( $M = 1.69, SD = 1.18$ ):  $r_{T1} = .399, r_{T2} = .345$ , both:  $p < .001$ . PMH at T1 was significantly negatively correlated with suicide ideation at T1,  $r_{T1} = -.620, p < .001$ , and at T2,  $r_{T2} = -.437, p < .001$ .

The results of the hierarchical regression analyses are presented in Table 1. The interaction term of stressful events at T1 and PMH at T1 added significant predictive

**Table 1.** Hierarchical regression analyses predicting suicide ideation at T1 and at T2

Model	$\beta$	95% CI	T	Adjusted $R^2$	Changes in $R^2$
<b>Model 1: Suicide ideation at T1</b>					
Step 1, $F(2,123) = 1.294, p = .278$				.005	.021
Age T1	.030	[-.029, .041]	.334		
Gender T1	.143	[-.089, .883]	1.598		
Step 2, $F(4,121) = 22.047, p < .001$				.402	.401
Stressful events T1	.174*	[.001, .058]	2.077		
PMHT1	-.535**	[-.124, -.066]	-6.508		
Step 3, $F(5,120) = 20.312, p < .001$				.436	.037
Stressful events T1 $\times$ PMHT1	-.539**	[-.008, -.002]	-2.856		
<b>Model 2: Suicide ideation at T2</b>					
Step 1, $F(2,123) = .272, p = .762$				-.012	.004
Age T1	.019	[-.036, .045]	.213		
Gender T1	.065	[-.334, .717]	.723		
Step 2, $F(4,121) = 8.684, p < .001$				.197	.219
Stressful events T1	.202*	[.002, .076]	2.084		
PMHT1	-.338**	[-.106, -.030]	-3.549		
Step 3, $F(5,120) = 9.060, p < .001$				.244	.051
Stressful events T1 $\times$ PMHT1	-.635**	[-.011, -.002]	-2.904		

Note.  $N = 126$ ;  $\beta$  = standardized coefficient beta. CI = confidence interval. PMH = Positive Mental Health. In each step, only new included variables are presented. \* $p < .05$ . \*\* $p < .01$ .



**Figure 1.** (a) Results of the regression model with stressful events at T1 predicting suicide ideation at T1 for low ( $M-1SD$ ), medium ( $M$ ), and high ( $M+1SD$ ) level of the moderator positive mental health (PMH) at T1; (b) Results of the regression model with daily stress at T1 predicting suicide ideation at T2 for low ( $M-1SD$ ), medium ( $M$ ), and high ( $M+1SD$ ) level of the moderator PMH at T1.

variance to both regression models, indicating a significant moderation effect.

Figure 1 presents the results of both regression models. For both models, a positive link between stressful events at T1 and suicide ideation at T1/T2 was revealed for people with low ( $M-1SD$ ), medium ( $M$ ), and high ( $M+1SD$ ) PMH. However, this association was remarkably lower for individuals with high levels of PMH at T1.

## Discussion

In this long-term follow-up study, PMH buffered the impact of stressful life events on suicide ideation. PMH interacted with stressful life events, such that individuals with high levels of PMH showed an attenuated increase

in suicide ideation at elevated levels of stress. Of note, the present study found associations between suicide ideation and comparatively milder stressful events, such as dissatisfaction with work, living conditions, or difficulties with family obligations. The current findings complement previous studies showing that PMH buffers the effect of various risk factors on suicide ideation (Siegmann et al., 2018; Siegmann et al., 2019; Teismann et al., 2018). Of particular importance is the fact that PMH conferred resilience against suicide ideation not only in the cross-sectional analysis, but also in the long-term follow-up analysis. This finding underlines the protective impact of PMH.

In a recent study, Teismann, Brailovskaia, and Margraf (2019) found positive affect to fully mediate the association between PMH and suicide ideation. Against the background of the broaden-and-build-theory (Fredrickson, 2001), one may therefore speculate that PMH translates

into more frequent everyday positive affect, which in turn broadens people's thought-action repertoires and helps them to bounce back from adversities (such as stressful life events or living conditions). The exact mode of action of PMH, however, still needs to be examined in more fine-grained analyses. In terms of practical implications, the results of the current study suggest that it may be important to foster PMH in counselling centers for students (Magyar-Moe, Owens, & Conoley, 2015). At present, there is a lack of studies investigating how PMH – as measured by the PMH scale – can be promoted. Therapeutic strategies from the field of positive psychology (Huffman et al., 2014) as well as Well-Being Therapy (Fava, 2016) might offer effective help. In addition, it needs to be investigated to what extent therapy programs that have proven effectiveness in preventing suicide attempts (Hawton et al., 2016) contribute to an increase in PMH.

## Limitations

There are several limitations to the present study. First, suicide ideation was only assessed with the relevant item of the SBQ-R instead of a more comprehensive method. Yet, it is rather common to assess suicide ideation with limited items in epidemiological studies (Borges, Angst, Nock, Ruscio, & Kessler, 2008) and there is strong evidence for the predictive ability and relevance of single items assessing suicide ideation (Green et al., 2015). Nonetheless, a comprehensive measure of suicide ideation as well as suicidal behavior should be used in future studies; in particular, to investigate whether PMH buffers the effect of stressful life events not only on suicide ideation, but also on suicidal behavior. Second, generalization of the results to other age or social groups than university students is not possible. However, suicide ideation/behavior represents a substantial health concern among student samples (Mortier et al., 2018) making it a very relevant population to focus on. Still, the current study focused on a comparatively small and homogeneous group of German students, as such it remains unclear to what extent the results generalize to other student populations. Nonetheless, the current study underscores the importance of PMH as a buffer against suicide ideation in the face of stressful life events.

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