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The effects of daily stress on positive and negative mental health: Mediation through self-efficacy

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KEYWORDS
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Abstract Daily stressors, compared to traumatic events, are increasingly recognized as important risk factors for mental health. The role of general self-efficacy on the relationship between daily stress and aspects of mental health has not yet been examined. Taking into account the dual factor model of mental health, which postulates that mental health is more than the absence of psychopathological symptoms, we tested mediation effects of self-efficacy separately for positive and negative mental health. Total, direct and indirect effects were estimated using data from a large nationally representative German population sample (N = 1,031) by bootstrapped mediation analyses providing 95% bias corrected bootstrap confidence intervals. Results indicated self-efficacy as a mediator of the effects of daily stressors on mental health, with superior effect sizes for positive compared to negative mental health. Mediation effects were replicated in student samples from Germany (N = 394), Russia (N = 604) and China (N = 8,669). Findings suggest that self-efficacy operates as a buffer of daily stress. However, a full mediation model was not supported as multiple psychological resources can have protective effects. This study provides the first transnational evidence for different stress-buffer effects for the two dimensions of mental health.

PALABRAS CLAVE
Autoeficacia;
salud mental;
estrés cotidiano;
mediación;
estudio descriptivo de poblaciones

Efectos del estrés cotidiano en la salud mental positiva y negativa: mediación de la autoeficacia

Resumen El estrés cotidiano, en comparación con acontecimientos traumáticos, es reconocido cada vez más como un importante factor de riesgo para la salud mental. El papel de la autoeficacia general en la relación entre estrés diario y aspectos de la salud mental todavía no se ha examinado. Teniendo en cuenta el modelo de dos factores, que postula que la salud mental es más que la ausencia de síntomas psicopatológicos, examinamos la mediación de la

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autoeficacia separadamente para la salud mental positiva y negativa. Efectos totales, directos e indirectos fueron evaluados, utilizando datos de una muestra de la población alemana representativa ($N = 1.031$). La autoeficacia es un mediador de los efectos del estrés cotidiano, con efectos superiores para la salud mental positiva. Los resultados fueron replicados en muestras de estudiantes de Alemania ($N = 394$), Rusia ($N = 604$) y China ($N = 8.669$). La autoeficacia actúa como un búfer para el estrés cotidiano. Un modelo de mediación completo no fue apoyado con múltiples recursos psicológicos que pueden tener efectos protectores. Es la primera evidencia transnacional para diferentes efectos del búfer-estrés para las dos dimensiones de salud mental.

To fully illuminate the processes at work behind the impact of stress on mental health, it is essential to examine the buffering potential of psychological resources and coping mechanisms (Wheaton, 1985). The stress-buffering model postulates that specific psychosocial variables are protective for the pathogenic impact of stress (Cohen & Edwards, 1988; Lazarus & Folkman, 1984). While stress is recognized as an important risk factor, not all people who experience stress, experience impaired mental health. Although there is evidence that chronic stress of daily life is a better predictor of mental health and well-being (Newnham, Pearson, Stein, & Betancourt, 2014), previous studies predominantly concentrated on traumatic incidents or major life events (e. g. Bosmans, Benight, Knaap, Winkel, & van der Velden, 2013; Guerra, Cumsille, & Martínez, 2014). The cumulative effects of daily stressors are important predictors for the emergence of symptoms of depression and anxiety (D'Angelo & Wierzbicki, 2003; Parrish, Cohen, & Laurenceau, 2011). However, assumptions that merely include direct effects of stress on health are incomplete and ignore possible intervening or mitigating factors, leading to a potentially inaccurate estimation of effect sizes. The strength of the association between stress and mental state depends on characteristics and strategies that differentiate individuals from one another (Leiva-Bianchi, Baher, & Poblete, 2012). The extent to which the effects of daily stress on mental health are mediated through personal characteristics has not yet been examined.

Self-efficacy is a positive resistance resource that is part of the cognitive appraisal process and essential for the regulation of stress (Bandura, 1992; Bisschop, Kriegsman, Beekman, & Deeg, 2004). It refers to an individual's capabilities to perform appropriately in challenging situations. Based on this stress regulatory capacity a wealth of research suggests that self-efficacy is related to aspects of mental health and psychological disorders (e.g. Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli, 2003; Sandín, Sánchez-Arribas, Chorot, & Valiente, 2015). Furthermore, it operates as a mediator for the relationship between stressful life events and depressive symptoms (Maciejewski, Prigerson, & Marzure, 2000). Similarly, there is evidence for its intervening role in context of occupational and student's examination stress (Grau, Salanova, & Peiró, 2001; Karademas & Kalantzi-Azizi, 2004). Although a correlation with daily hassles was found (Holohan, Holohan, & Belk, 1984), there is still a lack of evidence for the mediation effects of general perceived self-efficacy, which refers to a broad range of various functional areas, with stressors of every day life to protect mental health. Moreover, considering the recognition that complete mental health is more than just the absence of psychopathological symptoms (World Health Organization (WHO), 2001), the traditional unidimensional model is no longer sufficient. The protective impact of positive characteristics is relevant for the prevention of health problems as well as for boosting well-being. On this basis, mental health can be divided into two dimensions. Positive mental health is defined as an optimal way of psychological functioning and a general feeling of well-being (Deci & Ryan, 2008; Keyes, Shmotkin, & Ryff, 2002). In contrast, negative mental health includes deleterious facets such as health problems, psychopathology or psychiatric disorders. Despite their intercorrelation, these two factors are distinct and may act relatively independently (Keyes, 2007; Suldo & Shaffer, 2008; Weich et al., 2011). A disregard of the presence of positive characteristics would therefore reduce the predictive value of stress. Perceived self-efficacy expectations are highly positively correlated with positive mental health and negatively with negative mental health. High self-efficacy is related to high levels of subjective well-being, optimism and life satisfaction (Azizli, Atkinson, Baughman, & Giarmmarco, 2015; Bandura, 1992; Luszczynska, Gutiérrez-Doña, & Schwarzer, 2005). Low self-efficacy in turn is related to more symptoms of anxiety, distress and depression (Kashdan & Roberts, 2004; Kwasky & Groh, 2014). The present study seeks to examine the role of general perceived self-efficacy in explaining the effects of daily stress on both positive and negative aspects of mental health. While the cultural background indeed is an important determinant of mental health (e.g., Maercker et al., 2015), it is still unclear whether self-efficacy buffers stress across different cultures. Differences among perceptions of self-efficacy are assumed as eastern cultures are regarded to be more collectivistic and less individualistic and self-focused than western cultures (Bond, 1991). Thus, it is interesting to disclose the effects in China as an eastern nation and Germany as a western nation and in a nation that is undergoing substantial change, like Russia. It has been shown that Chinese report to be lower self-effective than western cultures (Schwarzer, Bassler, Kwiatek, Schroder, & Zhang, 1997). Compared to Germans and Russians, there are also

the lowest values among Chinese (Scholz, Doña, Sud, & Schwarzer, 2002). There is not yet, however, any indication of the stress-buffer effects being dependent on culture. The protective effects should therefore be globally relevant. The first aim of this study was to examine the degree to which the effects of daily stressors on the two dimensions of mental health are mediated through general perceived self-efficacy in a representative population sample. The second aim was to investigate whether the buffer effects of general perceived self-efficacy occur in samples of college students from Germany, Russia and China. According to its identification as a specific predictor for the positive aspect of mental health (Karademas, 2007) we expect that the mediation effects are larger for positive than for negative mental health.

Method

Participants

Data were gathered in the context of the Bochum Optimism and Mental Health study program (BOOM). It was designed to investigate protective factors for positive and negative mental health and transcultural aspects in a series of cross-sectional studies. All study procedures received research and ethics committee approval. Participants were provided information about the purpose of the study and an assurance of their anonymity in participation, and gave written informed consent in order to participate. A total sample of 1,031 representative participants for the general German population aged 18-87 years (47.9% female, M_{age} = 48.03, SD_{age} = 14.26) completed the full battery of self-report questionnaires. Data were quoted according to age, gender, state, school education (1.3% still in school, 33.5% lower secondary education, 34.7% upper secondary education, 30.4% european baccalaureate, 0.2% without school education) and educational qualification (5.2% without education, 2.4% apprentices, 5.4% students, 69.3% completed apprenticeship and 17.7% university degree) to adjust representativeness for the German population. Additionally, student samples were gathered by the collaborating Departments of Psychology in Germany (Ruhr-University Bochum, Heinrich-Heine University Düsseldorf), Russia (Lomonossov University Moscow, University of Voronesh, University of Orenburg) and China (Capital Normal University Beijing, Hebei United University, Nanjing University). Students from the whole range of disciplines were recruited. The student samples consist of 394 participants from Germany (69.0% female, M_{age} = 26.33, SD_{age} = 5.23), 8669 participants from China (62.7% female. M_{age} = 21.57, SD_{age} = 1.68) and 604 participants from Russia (66.6% female, M_{age} = 21.39, SD_{age} = 2.19). Language specific versions of the different instruments were administered using the customary translation-back-translation method. In case of discrepancies, the procedure was repeated until complete agreement was achieved.

Measures

Negative mental health was assessed using the widely-used Depression Anxiety Stress Scales (DASS-21; Henry & Crawford, 2005). The DASS-21 provide a broad range of psychological distress symptoms. Participants rate 21 core symptoms of negative emotional states over the previous week on a scale ranging from 0 (*never*) to 3 (*almost always*) across the three subscales depression, anxiety and stress. Responses can be averaged within subscale or across all three for a total item score. Psychometric properties are well established in both clinical and non-clinical samples (Crawford & Henry, 2003; Ng et al., 2007). Internal consistency estimates of reliability were good to excellent for the total score at the Cronbach's α level of .96 as well as for the subscales depression (α = .93), anxiety (α = .86) and stress (α = .91) in the population-based sample.

The Positive Mental Health Scale (PMH; Lukat, Margraf, Lutz, van der Veld, & Becker, 2015) assessed emotional, psychological and social aspects of well-being across 9 items, rated on a scale ranging from 0 (*do not agree*) to 3 (*agree*). The PMH is a person-centered questionnaire that consists of judgments across non-specific situations, thus constitutes a general measure of psychological functioning. One example of an item is *I enjoy my life*. Unidimensional structure and good convergent and discriminant validity are demonstrated in samples comprised of students, patients and the general population. Reliability score was excellent at Cronbach's α level of .94 in the population-based sample of the present study.

The Brief Daily Stressor Screening (BDSS; Scholten, Lavalle, Velten, Zhang, & Margraf, 2014) was used to assess routine stressful experiences across 9 items rated on a 5-point Likert scale ranging from 0 (*not at all*) to 4 (*very much*). Items assess hassles or inconveniences within the past twelve months across various aspects of daily life including family responsibilities, health problems, financial constraints, dissatisfaction with studies or job, difficulties with secondary employment, dissatisfaction with housing, and difficulties with related persons and other persons or hassles not mentioned before. In contrast to the stress subscale of the DASS-21, it consists of general stress indicators rather than stress related symptoms, such as problems with relaxing. It comprises environmental problems as sources of stress, thus does not measure the way stress is manifested. High values indicate a high level of daily stress. Cronbach's α was .82, indicating good reliability.

The General Self-Efficacy Scale (GSE; Schwarzer & Jerusalem, 1995) was used to assess a general sense of perceived self-efficacy across 10 items rated on a 4-point scale (from *not at all true* to *exactly true*). The GSE comprises judgments concerning the evaluation of one's abilities how to perform in unexpected situations or surprising events. A sample item would be *I am confident that I could deal efficiently with unexpected events*. As good psychometric properties for a 5-item solution were found in a pilot student sample of 663 participants (α = .80), we used this shortened version. The population-based sample of the present study showed a reliability coefficient of .86.

Statistical analyses

In Figure 1 self-efficacy is a mediator (M) of the relationship between daily stress (X) and positive and negative mental health (Y). We used bootstrapping (10,000 samples) to

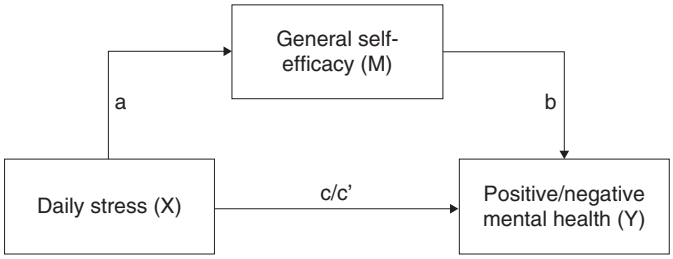

Figure 1 The mediation model: General self-efficacy (M) operates mediationally between daily stressors (X) and positive and negative mental health (Y).

analyse the extent to which the effect of daily stress is mediated through perceived self-efficacy (Hayes, 2009; Hayes & Preacher, 2014). In this procedure, a sample of cases from the complete data set is selected and the effects are determined in the resamples to generate the bootstrapping sampling distributions. It is a non-parametric test and bias-corrected for variables that are not normally distributed. Total effects, direct effects and indirect effects are estimated by means of ordinary least squares (OLS) regression analyses separately for positive and negative mental health. The effect of the independent variable (daily stress) is displayed in the total effect; when controlling for the mediator variable (self-efficacy) it is indicated in the direct effect. The indirect effect comprises the path over self-efficacy. Providing accelerated confidence intervals bootstrapping mitigates power problems and constitutes more accurate type I error rates. Thus, it offers a more reliable estimation than the traditional Sobel test (Sobel, 1986) or the causal step method by Baron and Kenny (1986) for testing indirect effects. For standardization of the relative magnitude of the indirect effect, kappa-squared (κ^2) with 95% bootstrapped confidence intervals was calculated (Preacher & Kelley, 2011). This is a ratio of the indirect effect to the maximum possible effect considering sample characteristics such as variances and covariances, independently of the sample size (Cohen, Cohen, West, & Aiken, 2003; MacKinnon, Fairchild, & Fritz, 2007; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). Preacher and Kelley interpret the size of κ^2 with reference to Cohen's guidelines (1988) for squared correlation coefficients by determining small, medium and large effect sizes as .01, .09, and .25. All statistics were performed using IBM SPSS Statistics for Windows (IBM Corporation, 2012) and the macro PROCESS (Hayes, 2012).

Results

Participant characteristics and correlations

Descriptive features of the samples are presented in Table 1. In the representative sample of the German population, the mean BDSS was 11.70 ($SD = 7.13$), the mean GSE 14.82 ($SD = 2.88$) and the mean PMH 16.72 ($SD = 6.46$). Levels of the DASS-21 including the subscales were in the lower range.

Associations between the variables are displayed in Table 2. Analyses demonstrated that all variables were significantly correlated with each other in each sample (all $p < .001$). The Pearson correlation coefficient between perceived self-efficacy and positive mental health was significant. Furthermore, greater perceived self-efficacy was closely associated with lower negative mental health and milder symptoms of depression, anxiety and stress. Inverse correlations also occurred between perceived self-efficacy

Table 1 Mean and standard deviations of the scales by sample.

	M	*SD*
Representative German population sample (N = 1,031)		
BDSS	11.70	7.13
GSE	14.82	2.88
PMH	16.72	6.46
DASS-21 total	13.01	12.80
DASS-21 dep	4.55	5.14
DASS-21 anx	3.25	3.94
DASS-21 stress	5.21	4.73
German students (N = 394)		
BDSS	12.45	6.12
GSE	14.72	2.65
PMH	18.53	5.63
DASS-21 total	12.94	11.27
DASS-21 dep	4.29	4.62
DASS-21 anx	2.74	3.49
DASS-21 stress	5.91	4.69
Russian students (N = 604)		
BDSS	12.12	7.52
GSE	14.46	3.16
PMH	18.09	5.27
DASS-21 total	13.90	11.48
DASS-21 dep	4.50	4.24
DASS-21 anx	3.54	3.75
DASS-21 stress	5.86	4.55
Chinese students (N = 8,669)		
BDSS	11.20	6.33
GSE	14.52	3.35
PMH	20.49	5.17
DASS-21 total	8.17	9.23
DASS-21 dep	2.15	3.12
DASS-21 anx	2.72	3.23
DASS-21 stress	3.31	3.52

Note: BDSS, Brief Daily Stressor Screening; GSE, General Self-efficacy Scale; PMH, Positive Mental Health Scale; DASS-21, Depression, Anxiety and Stress Scales.

Table 2 Associations between the variables by sample.

Scale	1	2	3	4	5	6	7
Representative German population sample (N = 1,031)							
1 BDSS	-						
2 GSE	-.40***	-					
3 PMH	-.56***	.60***	-				
4 DASS-21 total	.58***	-.43***	-.62***	-			
5 DASS-21 dep	.54***	-.43***	-.66***	.94***	-		
6 DASS-21 anx	.51***	-.36***	-.48***	.90***	.75***	-	
7 DASS-21 stress	.57***	-.41***	-.55***	.94***	.83***	.78***	-
German students (N = 394)							
1 BDSS	-						
2 GSE	-.39***	-					
3 PMH	-.56***	.60***	-				
4 DASS-21 total	.59***	-.43***	-.64***	-			
5 DASS-21 dep	.54***	-.44***	-.66***	.89***	-		
6 DASS-21 anx	.48***	-.38***	-.51***	.85***	.64***	-	
7 DASS-21 stress	.54***	-.32***	-.51***	.90***	.68***	.66***	-
Russian students (N = 604)							
1 BDSS	-						
2 GSE	-.44***	-					
3 PMH	-.49***	.57***	-				
4 DASS-21 total	.57***	-.42***	-.50***	-			
5 DASS-21 dep	.51***	-.40***	-.53***	.92***	-		
6 DASS-21 anx	.49***	-.40***	-.42***	.89***	.71***	-	
7 DASS-21 stress	.56***	-.37***	-.43***	.94***	.79***	.76***	-
Chinese students (N = 8,669)							
1 BDSS	-						
2 GSE	-.19***	-					
3 PMH	-.31***	.65***	-				
4 DASS-21 total	.43***	-.32***	-.46***	-			
5 DASS-21 dep	.39***	-.28***	-.44***	.93***	-		
6 DASS-21 anx	.40***	-.29***	-.40***	.94***	.82***	-	
7 DASS-21 stress	.41***	-.32***	-.45***	.94***	.79***	.83***	-

Note: BDSS, Brief Daily Stressor Screening; GSE, General Self-efficacy Scale; PMH, Positive Mental Health Scale; DASS-21, Depression, Anxiety and Stress Scales
***$p<.001$.

and daily stressors and between positive and negative mental health.

Total, direct and indirect effects of daily stress on mental health

In the population-based sample the total effects of the bootstrapped mediation analyses indicated a strong relationship between daily stressors and negative mental health as well as between daily stressors and the subscales depression anxiety and stress (Table 3). Daily stressors were also inversely related to positive mental health. More importantly, for the mediation hypothesis, adding perceived self-efficacy to the model reduced these effects. With negative mental health as the outcome variable, there were reductions of the total effects of daily stressors in the model that included perceived self-efficacy. Similar results occurred for depression, anxiety and stress. For positive mental health, the total effect of daily stressors was also reduced by controlling for perceived self-efficacy.

Finally, significances of the indirect effects (i.e. the pathway of daily stressors on mental health via perceived self-efficacy) were tested. These analyses provided further evidence for perceived self-efficacy as a mediator between daily stressors and negative mental health and between daily stressors and symptoms of depression, anxiety and stress. Similarly, the mediation through perceived self-efficacy was significant for the positive mental health outcome. Effect size measures according to Preacher and Kelley (2011) indicated a medium mediation effect of perceived self-efficacy between daily stressors and negative mental health, $\kappa^2 = 0.11$, 95% CI [0.08, 0.14]. Moreover, effect sizes of the mediation effect of perceived self-efficacy were $\kappa^2 = 0.11$, 95% CI [0.08, 0.14] for depression, $\kappa^2 = 0.08$, 95% CI [0.05, 0.11] for anxiety and $\kappa^2 = 0.10$, 95% CI [0.07, 0.13] for stress. For the positive mental health outcome there was a larger mediation effect, $\kappa^2 = 0.20$, 95% CI [0.16, 0.23]. When comparing effect sizes between positive

Table 3 Estimated coefficients for mediation model of self-efficacy.

	Total effect[a]			Direct effect[b]			Indirect effect[c]			Effect size		
	c	SE	95% CI	c'	SE	95% CI	ab	SE	95% CI	κ^2	SE	95% CI
Representative German population (N = 1,031)												
Positive Mental Health	**−0.506**	0.023	[−0.552, −0.460]	**−0.346**	0.022	[−0.390, −0.302]	**−0.160**	0.017	[−0.195, −0.020]	0.195	0.018	[0.160, 0.232]
Negative Mental Health	**1.049**	0.045	[0.960, 1.139]	**0.879**	0.047	[0.785, 0.973]	**0.171**	0.029	[0.117, 0.233]	0.109	0.016	[0.078, 0.143]
Depression	**0.390**	0.019	[0.353, 0.427]	**0.318**	0.020	[0.279, 0.357]	**0.072**	0.012	[0.050, 0.097]	0.110	0.016	[0.080, 0.143]
Anxiety	**0.282**	0.015	[0.253, 0.312]	**0.242**	0.016	[0.211, 0.273]	**0.040**	0.009	[0.024, 0.060]	0.080	0.016	[0.048, 0.112]
Stress	**0.377**	0.017	[0.344, 0.411]	**0.319**	0.018	[0.284, 0.355]	**0.058**	0.010	[0.040, 0.080]	0.099	0.016	[0.070, 0.131]
German students (N = 394)												
Positive Mental Health	**−0.516**	0.039	[−0.592, −0.441]	**−0.354**	0.036	[−0.425, −0.282]	**−0.163**	0.024	[−0.214, −0.119]	0.196	0.026	[0.148, 0.251]
Negative Mental Health	**1.090**	0.075	[0.942, 1.237]	**0.920**	0.079	[0.765, 1.074]	**0.170**	0.042	[0.097, 0.261]	0.107	0.023	[0.064, 0.157]
Depression	**0.407**	0.032	[0.344, 0.470]	**0.325**	0.033	[0.260, 0.391]	**0.081**	0.017	[0.050, 0.119]	0.119	0.023	[0.078, 0.166]
Anxiety	**0.273**	0.025	[0.223, 0.323]	**0.222**	0.027	[0.170, 0.275]	**0.051**	0.014	[0.026, 0.083]	0.094	0.024	[0.051, 0.145]
Stress	**0.410**	0.033	[0.345, 0.474]	**0.372**	0.035	[0.303, 0.442]	**0.038**	0.016	[0.010, 0.073]	0.070	0.010	[0.052, 0.090]
Russian students (N = 604)												
Positive Mental Health	**−0.346**	0.025	[−0.395, −0.297]	**−0.211**	0.025	[−0.259, −0.162]	**−0.136**	0.019	[−0.176, −0.010]	0.201	0.027	[0.149, 0.254]
Negative Mental Health	**0.869**	0.051	[0.770, 0.970]	**0.726**	0.055	[0.618, 0.835]	**0.144**	0.026	[0.094, 0.198]	0.104	0.018	[0.070, 0.141]
Depression	**0.288**	0.020	[0.249, 0.327]	**0.235**	0.021	[0.193, 0.277]	**0.054**	0.010	[0.036, 0.074]	0.100	0.017	[0.067, 0.135]
Anxiety	**0.242**	0.018	[0.207, 0.277]	**0.193**	0.019	[0.155, 0.231]	**0.050**	0.010	[0.031, 0.070]	0.103	0.019	[0.067, 0.141]
Stress	**0.339**	0.020	[0.299, 0.379]	**0.299**	0.022	[0.255, 0.343]	**0.040**	0.011	[0.021, 0.062]	0.074	0.018	[0.039, 0.111]
Chinese students (N = 8669)												
Positive Mental Health	**−0.254**	0.008	[−0.270, −0.237]	**−0.159**	0.007	[−0.172, −0.146]	**−0.095**	0.006	[−0.107, −0.084]	0.130	0.008	[0.115, 0.146]
Negative Mental Health	**0.623**	0.014	[0.595, 0.651]	**0.554**	0.014	[0.527, 0.582]	**0.069**	0.006	[0.058, 0.080]	0.051	0.004	[0.044, 0.060]
Depression	**0.191**	0.005	[0.181, 0.200]	**0.171**	0.005	[0.161, 0.180]	**0.020**	0.002	[0.017, 0.023]	0.044	0.004	[0.037, 0.051]
Anxiety	**0.200**	0.005	[0.192, 0.212]	**0.180**	0.005	[0.171, 0.190]	**0.022**	0.002	[0.018, 0.026]	0.046	0.004	[0.039, 0.054]
Stress	**0.230**	0.005	[0.220, 0.241]	**0.203**	0.005	[0.193, 0.214]	**0.027**	0.002	[0.023, 0.031]	0.052	0.004	[0.045, 0.060]

Note: All confidence intervals generated with bias corrected and accelerated bootstrapping ($N = 10{,}000$). All findings in bold are significant ($p < .001$).

[a] effect of daily stressors.

[b] effect of daily stressors controlling for self-efficacy.

[c] indirect path via self-efficacy.

Results of the mediation analyses of the representative population-based study are presented in the text.

and negative mental health, confidence intervals showed no overlap. Significant differences between the mediation effects were therefore obtained, indicating larger effects for positive than for negative mental health.

Results from the German, Russian and Chinese student samples are also presented in Table 3. Analyses in the international student samples replicated the finding that perceived self-efficacy operated as a mediator of the relationship between daily stressors and positive and negative mental health. Furthermore, the mediation effects were significant larger for positive than for negative mental health. Superior effect sizes for positive mental health occurred in each sample.

Discussion

Although there is strong evidence for the associations between self-efficacy and psychological disorders (e.g. Maciejewski et al., 2000; Montepetit & Bergman, 2007), the role of general perceived self-efficacy expectations in the relationship between daily hassles and both positive and negative mental health remained completely unexplored until now. Considering symptoms specifically associated with stress (Maercker et al., 2013), the present nationally-representative population sample study indicated that part of the effect of daily stress on mental health is mediated through the impact of daily stress on general perceived self-efficacy. Results of mediation analyses were significant for all mental health outcomes. A full mediation model nevertheless was not obtained, as the direct effects of daily stressors were still significant. Hence, there are likely multiple factors that mediate the association between daily stress and mental health. Other internal resources like self-esteem or optimism as well as external psychosocial resources, such as social support or social identity may also be determinants in the buffering process (Bovier, Chamot, & Perneger, 2004; Häusser, Kattensbroth, van Dick, & Mojzisch, 2012; Lai, 2009).

The finding that the mediation effects of general perceived self-efficacy differed between positive and negative mental health similarly is a novel contribution to extend literature. In line with Karademas (2007) who specified self-efficacy as a particular factor for positive well-being, the degree to which the effects of daily stressors were buffered were greater for positive than for negative mental health. This fits with the dual factor model of mental health, acknowledging psychological functioning and mental health problems as separate, yet correlated, unipolar dimensions (Keyes, 2007; Suldo & Shaffer, 2008; Wang, Zhang, & Wang, 2011; Weich et al., 2011). Our findings firstly demonstrated that there might be different protective mechanisms for the two dimensions of mental health in context of stress-buffering processes of daily life.

By investigating student samples from Germany, Russia and China, we were able to replicate our findings across different cultures. Although there were some cultural differences in effect sizes, the mediation effects via general perceived self-efficacy were significant in each sample. In line with previous research suggesting associations between self-efficacy and depressive symptoms among a Chinese unemployed population (Wang et al., 2014), we found that the effects of daily stress on mental health were buffered through perceived self-efficacy cross-culturally. Quantitative comparisons between the nations should be considered cautiously, however, until measurement invariance of the constructs has been established (Sass, 2011). It is nevertheless interesting that the lowest levels of the negative and the highest of the positive mental health scales were found among the Chinese sample. This is in line with previous research indicating lower levels of somatic depressive symptom endorsement compared to western nations (Yen, Robins, & Lin, 2000). The problem of stigmatization when admitting mental health impairments should yet be outlined (Fung, Tsang, Corrigan, Lam, & Cheng, 2007).

One point to be taken into consideration is that there is some debate about whether and in which cases structural equations models (SEM) are the better choice for detecting indirect effects. SEM indeed increases the accuracy of measurement estimates, but does this at the cost of reduced power and increased standard errors (Ledgerwood & Shrout, 2011). As low measurement error is essential when conducting mediation analyses (Aiken & West, 1991; Kenny & Judd, 2013), strong measurement reliability is important. Reliabilities of the scales in the present study are good to excellent. The good, though slightly lower, internal consistency of the BDSS might have occurred because it measures stress-related factors in a wide variety of life circumstances. Taking into account data characteristics, methods and the buffering issue of a simple mediation model with a fixed order, we preferred these bootstrapped analyses by Preacher and Hayes (2004). However, conclusions regarding causality are limited by the cross-sectional nature of our study and by the exclusive reliance on self-report questionnaires. To display changes over time due to variations of the mediator, future research is needed that on the one hand includes an experimental manipulation of the mediator and on the other hand collects data in several sequences to elucidate long-term consequences of daily stress.

For better differentiation between healthy and psychologically impaired people a clinical sample is required. Maciejewski et al. (2000), for instance, demonstrated that the effect of major life events on depressive symptoms was mediated by self-efficacy only for people with prior depression and not for those without prior depression. Also, further investigation is needed to elucidate the psychophysiological nature of stress-buffering mechanisms and long-term consequences of stress. It is assumed that self-efficacy also impacts the neuroendocrinological stress response and symptoms of distress one year after traumatic stress (Bosmans, Hofland, De Jong, & Van Loey, 2015; Nierop, Wirtz, Aliki, Zimmermann, & Ehlert, 2008). Based on coping mechanisms and psychological resources in general, a full mediation model that accounts for multiple internal and external resources and considers both sides of mental health is necessary to completely reveal the pathways of daily stress on mental health.

The most important result of our study is that general perceived self-efficacy was a mediator between the effect of daily stress on positive and negative mental health, including symptoms of depression, anxiety and stress. In conclusion, these findings suggest that prevention aimed at positive indicators of functioning and coping is essential to minimize the subjective stress (see Priebe, Omer, Giacco,

& Slade, 2014). As self-efficacy can be changed, it constitutes a valuable target for treatments. These findings were not only demonstrated in a large general population that included the whole range of the mental health continuum but also in student samples derived from different cultures. This is an important point, as strengthening psychological resources such as general self-efficacy should be promoted early enough, so that the effect of stress on health can be reduced prior to the development of psychiatric disorders. In light of the assessment of chronic hassles of daily life, previous work that predominantly focused on traumatic or acute stress was extended.

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