SHORT COMMUNICATION

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The brief daily stressors screening tool: An introduction and evaluation

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Abstract

The present study introduces a short screening instrument for the measurement of experienced general daily stressors across different life domains that can be used in large-scale studies. The brief daily stressors screening tool (BDSST) assesses the experience of general daily stressors in eight distinct life domains. General daily stressors are indicated for the past 12-months on a five-point Likert scale. The present study evaluates the BDSST in two successive studies. The first study was conducted in a representative German sample (n = 7,849). The second study was conducted to assess one-month-retest-stability in another representative German sample (n = 1,294). The BDSST shows promising psychometric properties. It has a skewed positive distribution, internal consistency and stability are acceptable and its one-factor structure was confirmed in a bifactor confirmatory factor analysis. The BDSST is a reliable and valid short instrument for the assessment of experienced general daily stressors in large-scale studies and routine clinical practise. For in-depth clinical assessment, it can be used to identify relevant life domains for further investigation.

KEYWORDS
daily stressors, evaluation, representative sample, screening, stress experience

1 | INTRODUCTION

Given the high frequency of daily stressors and the negative consequences due to stress experiences and daily stressors' strain (Almeida, 2005; Mandel, Dunkley, & Moroz, 2015; Rahdar & Galván, 2014; Rickenbach, Almeida, Seeman, & Lachmann, 2014; Segerstrom & Miller, 2004; Van den Bergh, Mulder, Mennes, & Glover, 2005), we aimed to include it into our research in large student samples and the general population (Margraf & Schneider, 2019). We set out to find a measure to assess the intensity of stress experience associated with daily stressors across different life domains, but a cost-effective and therefore brief, general as well as valid, reliable, and accessible measure was lacking. For that reason, we developed the Brief Daily Stressors Scale (BDSST) and will introduce it subsequently as an alternative to existing measures for those who also want to assess the experience of daily stressors in large samples.

Various measures assess stressors, stress experiences, and strain or stress responses to them. A literature research on ISI Web of Science was conducted in November and December 2014 and updated in June 2018 to find common general measures of stressors. (The complete search strategy is outlined in Appendix 1.) Out of 2,213 results, the literature search yielded 27 general measures of stressors (Table 1). They contain a mean average of 46 items per measure (*min* = 5; *max* = 178). (For an overview see Appendix 2.) Only two general measures that assess daily stressors are relatively short (see Appendix 3 for a comparison of introduction, scale, and items). The 21-item daily stress scale (DSS; Bolger, Delongis, Kessler, & Schilling,

TABLE 1　Standardized parameter estimates for the bifactor CFA with items of the BDSST, PMH-9 and DASS-21

Scale	Item	BDSST	PMH	DASS	General factor
BDSST1	Difficulties with social obligations (e.g., associations, organisations)	.276			−.078
BDSST2	Difficulties with family responsibilities (e.g., household, care services, parenting, school)	.396			.121
BDSST3	Health problems (e.g., diseases, chronic sufferings)	.607			.152
BDSST4	Financial restrictions (e.g., low income, instalments)	.724			.214
BDSST5	Dissatisfaction with education/occupation (e.g., examinations, work overload)	.642			.188
BDSST6	Difficulties with (secondary) employment (e.g., compatibility with school/college, high responsibility, noise pollution)	.744			.014
BDSST7	Dissatisfaction with housing situation (e.g., noise, small flat)	.799			.027
BDSST8	Close persons (e.g., family, household, friends, partner)	.700			.197
BDSST9	Other persons (e.g., colleagues, fellow - students, neighbours, tenants, landlords)	.722			.220
BDSST10	Another burden/stressor not yet mentioned	.642			.199
PMH1	I am often carefree and in good spirits.		.596		−.491
PMH2	I enjoy my life.		.679		−.499
PMH3	All in all, I am satisfied with my life.		.719		−.529
PMH4	In general, I am confident.		.702		−.517
PMH5	I manage well to fulfil my needs.		.649		−.460
PMH6	I am in good physical and emotional condition.		.577		−.433
PMH7	I feel that I am actually well equipped to deal with life and its difficulties.		.509		−.534
PMH8	Much of what I do brings me joy.		.665		−.546
PMH9	I am a calm, balanced human being.		.649		−.502
DASS1	I found myself getting upset by quite trivial things			−.094	.588
DASS2	I was aware of dryness of my mouth			.522	.616
DASS3	I could not seem to experience any positive feeling at all			−.019	.591
DASS4	I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion)			−.053	.817
DASS5	I found it difficult to work up the initiative to do things			−.144	.674
DASS6	I tended to over-react to situations			−.031	.730
DASS7	I experienced trembling (e.g., in the hands)			.428	.728
DASS8	I found it difficult to relax			−.085	.759
DASS9	I was worried about situations in which I might panic and make a fool of myself.			.209	.725
DASS10	I felt that I had nothing to look forward to			.025	.784
DASS11	I found myself getting agitated			−.064	.888
DASS12	I felt that I was using a lot of nervous energy			.621	.690
DASS13	I felt down-hearted and blue			.339	.765
DASS14	I was intolerant of anything that kept me from getting on with what I was doing			.020	.868
DASS15	I had a feeling of faintness			.310	.580
DASS16	I was unable to become enthusiastic about anything			−.092	.791
DASS17	I felt I wasn't worth much as a person			−.091	.894
DASS18	I felt that I was rather touchy			−.085	.889
DASS19	I perspired noticeably (e.g., hands sweaty) in the absence of high temperatures or physical exertion			.264	.759
DASS20	I felt scared without any good reason			−.051	.700
DASS21	I felt that life was meaningless.			−.030	.842

Note. Bold numbers are significant ($p \leq .05$).

1989) and the 25-item weekly stress inventory short form (WSI-SF; Brantley et al., 2007). The DSS assesses the mere frequency of "troublesome things" (such as "a lot of work at home" or "problem with transportation") and "tension or argument" during the past 24 hr, but not the stress experience that is associated with each event (Bolger et al., 1989, p. 818). In contrast, the WSI-SF assesses both the frequency and the intensity in terms of stressfulness of events such as "was stared at" or "forgot something" (Brantley et al., 2007, p. 2007). Even though the WSI-SF seemed to suit our purpose, it still comprises 25 relatively specific items instead of a brief set of general stressors. Also, the validation of the two measures cannot be generalized because the DSS was validated with a sample of 64 married couples and another sample of 166 married couples and the WSI-SF was validated in a sample of 171 mostly African-American adults attending general medicine clinics. Finally, for the DSS reliability and factor analyses are not reported and while the WSI-SF has a good internal consistency a factor analyses is also missing. Thus, the validation of these two measures lacks generalizability in the first place and above that some of the well-established test statistics.

Another issue was the assessment of daily stressors across different life domains. Up till now the consideration of life domains seems to be varying unsystematically across different measures. Out of the 27 measures of the literature search, 25 questionnaires cover different life domains explicitly (see Appendix 2). Empirically, the most frequent life domains that are included in more than 10 of the considered questionnaires are relationships, especially family and friends, occupation, finances, health, education and household.

To sum up, researchers have made incremental headway into the measurement of daily stressors and its stress experience across recent decades. Nevertheless, the DSS and the WSI-SF are still too long or the items are too specific, they cannot be generalized, and do not cover different life domains systematically. The aim of this study is to close the research gap in screening for daily stressors and to present a brief measure of the stress experience caused by general daily stressors that we developed for the application in the general population and other large samples.

2 | METHOD

2.1 | Scale development

In a first step, items were formulated according to the assumption that daily stressors exist in different life domains (Almeida, Wethington, & Kessler, 2002; Morgan, Umberson, & Hertzog, 2014). We decided to address the six most frequent life domains (difficulties with familial duties [e.g., household, care of elderly family members, parenting, school]; health problems [e.g., illnesses, chronic diseases]; financial constraints [e.g., low income, paying by instalments] etc.) and included also social responsibilities and living situation. Finally, we added one item for "other demands." Second, we formulated the instruction as follows: "There are occasional minor and major challenges in daily life that can constantly reoccur, to which one can sometimes not get used to, and which can be

more or less burdensome. Please tick whether and how strongly you have been affected by the following annoyances or inconveniences OVER THE PAST 12 MONTHS." Finally, the subjective degree of stress is assessed on a five-point Likert scale, ranging from 0 (not at all) to 4 (very much) with a maximum score of 36.

The screening was slightly modified to be more consistent for a second study to assess retest-reliability of a one-month interval. Modification concerned item wording (Item 1: "social responsibilities" was rephrased into "difficulties with social responsibilities," Item 2: "familial responsibilities" was rephrased into "difficulties with familial responsibilities").

Besides the original German version, Chinese, English and Russian versions can be found in Appendix 4A-D.

2.2 | Procedure

The BDSST was validated in two successive studies. Both studies were approved by the Ethics Committee of the psychological faculty of the University of the First Author. The studies were funded by the Alexander-von-Humboldt Professorship given to the last author. The surveys were conducted in representative samples of the German general population. Informed consent was obtained after informing about anonymity, voluntariness, and general information about the survey prior to data assessment. In addition to the BDSST, in the first sample symptoms of depression, anxiety, and stress were assessed with a 21-item short version of the Depression, Anxiety and Stress Scales (Antony, Bieling, Cox, Enns, & Swinson, 1998; Scholten, Velten, Bieda, Zhang, & Margraf, 2017), positive mental health with a 9-item scale (Lukat, Margraf, Lutz, Van der Veld, & Becker, 2016) and gender, age, educational level, and marital status as sociodemographic characteristics. Descriptive statistics, reliability statistics, correlations and a bifactor confirmatory factor analysis (bifactor CFA; Reise, Scheines, Widaman, & Haviland, 2013) were conducted using SPSS version 21 (IBM Corporation, 2015), (R Development Core Team, 2013) with the lavaan-package (Rosseel, 2012) and MPlus (Muthén & Muthén, 2015). (Data assessment, measures, and statistical analysis are described in detail in Appendix 5.)

2.3 | Participant characteristics

In the first study, a total of 7,849 participants (women: n = 3,925 [50.0%]) completed the questionnaire. The participants were between 18 and 99 years old (M = 47.6, SD = 17.4) (Appendix 6). The majority of participants were married or in a relationship (50.8%), 33.3% of the participants were single, and 15.8% were separated, divorced or widowed. 26.6% (n = 2,082) of the participants finished a mandatory basic education as highest educational level, 53.3% (n = 4,173) completed their education after 10th to 13th grade and 18.5% (n = 1,447) held a university degree.

The sample of the retest-study comprised 1,294 participants. It differed significantly from the sample of the first study. The

participants were older ($t = -13.53$, $p < .001$, $g = .41$), a larger proportion of the participants was female ($X^2[1] = 16.53$, $p < .001$, $\varphi = -.04$), married ($X^2[3] = 109.01$, $p < .001$, $\varphi = .11$) and held a university degree ($X^2[3] = 168.99$, $p < .001$, $\varphi = .14$). Besides these aspects, the distribution of the samples also differed in relation to job ($X^2[3] = 177.03$, $p < .001$, $\varphi = .16$) and income ($X^2[4] = 692.89$, $p < .001$ $\varphi = .34$). However, according to Cohen (1988) who proposed $g \geq .20$ as the threshold for a small, $g \geq .50$ for a medium, and $g \geq .80$ for a large effect only the differences in age and income can be classified as small effects. From test to retest administration the sample composition did not change.

3 | RESULTS

3.1 | Descriptive properties

In the first sample, the BDSST showed a positive skew with item means ranging from $M = 0.72$ for residence problems to $M = 1.82$ for social obligations. The average total score was $M = 10.55$ (SD = 6.40). The corrected item-total correlation varied between $r = .31$ and $r = .54$. Cronbach's Alpha was $\alpha = .78$ for the total screening and if item by item was deleted ranged from $\alpha = .75$ (item 3, 4, 5, 7, 8 or 9 deleted) to $\alpha = .78$ (item 2 or 3 deleted). Inter-item correlations were small to moderate.

In the first administration of the second sample, items were also positively skewed. The item means ranged from $M = 0.46$ for residence problems to $M = 1.47$ for family responsibilities. The average total score was $M = 8.45$ (SD = 5.97). The corrected item-total correlation varied between $r = .19$ and $r = .49$. Cronbach's Alpha was slightly lower than in the first sample, but still acceptable ($\alpha = .76$, if item-by-item was deleted, it ranged from $\alpha = .71$ (item 4 deleted) to $\alpha = .77$ (item 2 deleted). Inter-item correlations were also small to moderate.

3.2 | Construct validity

In the first sample, the sum score of the BDSST correlated moderately positively with the DASS total score ($r = .60$, $p < .001$) and likewise, the DASS subscales correlated moderately with the BDSST sum score. In contrast, a moderate negative correlation was found between the BDSST and the PMH sum score ($r = -.53$, $p < .001$). Findings of the first administration of the second sample yielded comparable results.

3.3 | Bifactor CFA

The χ^2-Test of the bifactor CFA was significant at a $p < 0.01$ level ($\chi^2[700] = 33,840.505$, $p < .001$). The model fit based on fit indices indicated an acceptable fit (CFI = .897, RMSEA = .077 [.077; .078]). Factor loadings can be found in Table 1. A clear loading pattern with medium to high loadings was found for the BDSST and the PMH on the respective factors while the loading pattern of the DASS items on

the DASS factor is equivocal ($r = -.144$ to $r = .621$). Instead, the DASS items had high positive loadings on the general factor while the items of the PMH were loading negatively with medium values on the general factor. The loading pattern of the BDSST items onto the general factor was inconclusive with a significant small negative loading of the first item and partly significant small positive loadings of the other items.

3.4 | Intra-class correlation

The two-way mixed-effects model indicated an intra-class correlation of $r = .79$ with a 95% confidence interval of $r = .765 - r = .812$ (F [968] = 8.507, $p < .000$). This intra-class correlation can be classified as an acceptable stability.

4 | DISCUSSION

The brief daily stressors screening tool (BDSST) is short and easy to administer. Results supported the BDSST as a short instrument with overall satisfactory psychometric properties. At the same time, it integrates multiple conceptualizations of daily stressors into a set of general stressors. It assesses these general daily stressors across several distinct life domains, which helps to identify clinically relevant areas of stress. Finally, the large, representative sample and test–retest data are methodological strengths of the study.

A majority of respondents reported low stress experienced due to daily stressors, as indicated by the skewed positive distribution. This finding suggests a potential floor effect in the general population. This result has been found in other stress scales that were validated in representative studies such as the Trierer Inventory for Chronic Stress (Petrowski, Paul, Albani, & Brähler, 2012). It seems as if people experience only a small amount of daily stressors in the respective domains in this non-clinical, representative sample. Also, item wording referring to *difficulties*, *problems*, *restriction*, *dissatisfaction*, or *conflicts* and *tensions* could lead to a systematic understatement of the associated stress experience due to social desirability in the general population. In this case, a neutral wording (*social obligations* instead of *difficulties with social obligations)* and a scale that instead indicates the range of the stress experience may increase the variation of responses. Or, the focus might have been chosen too narrowly. In the introduction, participants are instructed to think of "annoyances and inconveniences." However, positive challenges or stressors might also be relevant or even more relevant causes of stress experience. A future, in-depth study on the experience of daily stressors, would benefit from a reformulation of the introduction, scale and items including a shorter time range such as a week or a month to assess whether experienced daily stressors may be rated differently.

Internal consistency and intra-class correlation were acceptable and comparable to the reliability of other measures of daily stress (Brantley et al., 2007; Brantley, Waggoner, Jones, & Rappaport, 1987; Schulz & Schlotz, 1999; Seidman et al., 1995). Nevertheless, results of

α = .70 to .80 are generally considered only within the acceptable. In the case of the BDSST, internal consistency of α = .78 could be due to the assessment of daily stressors across different life domains that are not necessarily represented by one concept. This consideration can be viewed in accordance to Almeida et al. (2002) and Morgan et al. (2014), who argue that daily stressors exist in distinct life domains. The intra-class correlation of r = .79 that was used as a measure of stability is not surprising either, as the stress experience of general daily stressors should vary slightly by definition. On the other hand, as the BDSST assesses experienced general daily stressors in the previous year, one-month-intra-class correlation should not vary completely. Therefore, r = .79 seems to be a reasonably good indicator for stability in this case. Overall, internal consistency and stability are thus appropriate for the BDSST and can be evaluated as indices for a satisfactory screening instrument.

The positive correlations with the DASS (Antony et al., 1998) and the negative correlation with the PMH (Lukat et al., 2016) show that there is a significant relation between daily stressors' stress experience and mental distress as well as mental health. In another empirical study with the BDSST, it has been shown that self-efficacy mediates the relationship between daily stressors and mental health (Schönfeld, Brailovskaia, Bieda, Zhang, & Margraf, 2015). Also, a German study with Facebook users showed that physical activity mediated the relationship between daily stressors and Facebook Addiction Disorder (Brailovskaia, Teismann, & Margraf, 2018). The relations lend validity evidence to the BDSST as the correlation between the experience of daily stressors, mental distress, and mental health can be expected according to the existing literature (Kanner, Coyne, Schaefer, & Lazarus, 1981; Segerstrom & Miller, 2004; Van den Bergh et al., 2005).

The loading patterns of the BDSST items in the bifactor CFA supported a one-factor solution for the BDSST and goodness-of-fit indices indicated an acceptable model fit. Taking a closer look at the factor loadings clear loading patterns can be found for the items of the BDSST and the PMH on the respective factors. Mostly items with reference to somatic symptoms such as *trembling, feeling of faintness* have high loadings onto the DASS factor. It seems as if the factor represents physical signs of stress instead of symptoms of depression, anxiety and stress. Instead, the general factor in the bifactor CFA might represent negative mood primed by the reference to *annoyances and inconveniences* in the introduction because the items of the DASS load highly positive and the items of the PMH load negatively on the general factor. However, this potential meaning does not seem to be associated to the ratings of the BDSST to a large extent as the loadings of the BDSST items on the general factor are rather small. Yet, loadings of Item 2 through Item 10 are also positive indicating that negative mood might be relevant in BDSST ratings. Only Item 1 loads negatively on the general factor like the items of the PMH. This finding might yield to the fact that *social obligations* are generally positive stressor because they are most often self-selected and include personal rewards. Nevertheless, future research should try to dismantle factors that potentially influence the responses to the BDSST in more detail. For example, a shorter, more balanced introduction might prevent negative bias or the same number of examples mentioned in each item would leave less variation to subjective interpretation. To give

more insight to how individuals process the general daily stressors which might lead to different levels of strain, appraisal could for example be assessed with the Stress Appraisal Measure (SAM) which assesses six dimensions of primary and secondary appraisal (such as "threat," "challenge," or "controllable-by-self"; Peacock & Wong, 1990), the Stressor Appraisal Scale (SAS) which is a 10 item measure that helps to classify participants in either challenged or threatened (Schneider, 2008), or the SAS version adjusted for the measurement of daily hassles (Gartland, O'Connor, & Lawton, 2012).

A methodological shortcoming of the current study is the complete validation of the BDSST. Modern diary methods would be the method of choice for validation. They constitute idiosyncratic, event- or signal-contingent measures for the assessment of stress experience. These involve repeated measurements during an individual's daily life. An example is the Daily Inventory of Stressful Events (DISE), which is an interview-based approach to the measurement of multiple aspects of daily stressors through daily telephone interviews (Almeida et al., 2002). Although they may have higher ecological validity, diary methods are extremely time-consuming and can be impractical in large-scale studies, as interviewers and participants need extensive training to complete them correctly (Bolger, Davis, & Rafaeli, 2003). In the presented representative surveys, it was not feasible to implement diary methods to validate the BDSST. Validating the BDSST with modern diary methods in sub-samples or other samples that are more easy to administer than large representative samples would complete the psychometric evaluation.

Future prospective studies should include longitudinal designs to contribute to the study of experienced daily stressors as a risk factor. Furthermore, the combination of subjective, physiological and behavioural measurement methods should be applied in the day-to-day assessment of stress. Finally, the BDSST could be used in studies that try to shed light on moderators and mediators between the experience of daily stressors and mental health (Brailovskaia et al., 2018; Schönfeld et al., 2015) as well as studies that examine its relation to other important individual factors such as lifestyle (Velten et al., 2014; Velten, Bieda, Scholten, Wannemüller, & Margraf, 2018).

5 | CONCLUSION

The BDSST is to our knowledge, the shortest measure for the experience of general daily stressors with satisfactory psychometric properties. The implementation of the complete questionnaire is suggested for researchers that are doing large-scale studies or studies in settings where time is too limited for more extended measures of stress, such as clinical settings. Results of the BDSST give an overview of people's experience of general daily stressors in different life domains. On an individual level, the BDSST can be used as a screening to identify which life domains are perceived to cause stress experiences due to general daily stressors. Based on this screening, further questionnaires or more behaviour or physiological measures can be applied according to the relevant domains.

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CONFLICT OF INTEREST

The author(s) declare that they have no competing interests.

DATA AVAILABILITY STATEMENT

The research data can be accessed upon request to the authors. The data cannot be publicly shared yet because they are currently still used for further analysis. A public access is planned once all analysis has been finalized.

AUTHOR'S CONTRIBUTIONS

All authors read and approved the final manuscript. Saskia Scholten and Jürgen Margraf developed the BDSS, planned and designed the study. Saskia Scholten was the lead author writing the manuscript. Jürgen Margraf oversaw data analysis, and the interpretation of the validation process, and contributed to the final editing of the article. Kristen Lavallee and Julia Velten contributed to the successive writing, reviewing and editing process. Statistical analysis were conducted by Saskia Scholten in collaboration with Xiao-Chi Zhang. Jürgen Margraf was the project director.

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REFERENCES

Almeida, D. M. (2005). Resilience and vulnerability to daily stressors assessed via diary methods. *Current Directions in Psychological Science*, 14(2), 64–68.

Almeida, D. M., Wethington, E., & Kessler, R. C. (2002). The daily inventory of stressful events: An interview-based approach for measuring daily stressors. *Assessment*, 9(1), 41–55. https://doi.org/10.1177/1073191102091006

Antony, M. M., Bieling, P. J., Cox, B. J., Enns, M. W., & Swinson, R. P. (1998). Psychometric properties of the 42-item and 21-item versions of the depression anxiety stress scales in clinical groups and a community sample. *Psychological Assessment*, 10(2), 176–181. https://doi.org/10.1037/1040-3590.10.2.176

Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary methods: Capturing life as it is lived. *Annual Review Psychology*, 54, 579–616. https://doi.org/10.1146/annurev.psych.54.101601.145030

Bolger, N., Delongis, A., Kessler, R. C., & Schilling, E. A. (1989). Effects of daily stress on negative mood. *Journal of Personality*, 57(5), 808–818.

Brailovskaia, J., Teismann, T., & Margraf, J. (2018). Physical activity mediates the association between daily stress and Facebook addiction disorder (FAD) - a longitudinal approach amongst German students. *Computers in Human Behaviour*, 86, 199–204. https://doi.org/10.1016/j.chb.2018.04.045

Brantley, P. J., Bodenlos, J. S., Cowles, M., Whitehead, D., Ancona, M., & Jones, G. N. (2007). Development and validation of the weekly stress inventory - short form. *Journal of Pschychopathological and Behavioural Assessment*, 29, 55–60. https://doi.org/10.1007/s10862-006-9019-8

Brantley, P. J., Waggoner, C. D., Jones, G. N., & Rappaport, N. B. (1987). A daily stress inventory: Development, reliability, and validity. *Journal of Behavioural Medicine*, 10(1), 61–74.

Cohen, J. (1988). *Statistical power analysis for the behavioural sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Gartland, N., O'Connor, D. B., & Lawton, R. (2012). The Effects of Conscientiousness on the Appraisals of Daily Stressors: Conscientiousness and Appraisal of Daily Stressors. *Stress and Health*, 28(1), 80–86. https://doi.org/10.1002/smi.1404.

IBM Corporation. (2015). *SPSS statistics. Version 23*. Armonk, NY: IBM SPSS Statistics.

R Development Core Team. (2013). *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing.

Kanner, A. D., Coyne, J. C., Schaefer, C., & Lazarus, R. S. (1981). Comparison of two modes of stress measurement: Daily hassles and uplifts versus major life events. *Journal of Behavioural Medicine*, 4(1), 1–33.

Lukat, J., Margraf, J., Lutz, R., Van der Veld, X., & Becker, E. (2016). Psychometric properties of the Positive Mental Health Scale (PMH-scale). *BMC Psychology*, 4(1), 8. https://doi.org/10.1186/s40359-016-0111-x.

Mandel, T., Dunkley, D. M., & Moroz, M. (2015). Self-critical perfectionism and depressive and anxious symptoms over 4 years: The mediating role of daily stress reactivity. *Journal of Counselling Psychology*, 62(4), 703–718.

Margraf, J., & Schneider, S. (2019). Bochum Optimism and Mental Health Programme. Retrieved on May 6, 2019, from http://www.kli.psy.ruhr-uni-bochum.de/klipsy/projekte/boom/en/boom-impressum-en.html

Morgan, E. S., Umberson, K., & Hertzog, C. (2014). Construct validation of self-reported stress scales. *Psychological Assessment*, 26(1), 90–99.

Muthén, L. K., & Muthén, B. O. (2015). *Mplus*. Los Angeles, CA: Muthén & Muthén.

Peacock, E. J., & Wong, P. T. P. (1990). The stress appraisal measure (SAM): A multidimensional approach to cognitive appraisal. *Stress Medicine*, 6(3), 227–236. https://doi.org/10.1002/smi.2460060308.

Petrowski, K., Paul, S., Albani, C., & Brähler, E. (2012). Factor structure and psychometric properties of the trier inventory for chronic stress (TICS) in a representative German sample. *BMC Medical Research Methodology*, 12, 42. https://doi.org/10.1186/1471-2288-12-42

Rahdar, A., & Galván, A. (2014). The cognitive and neurobiological effects of daily stress in adolescents. *NeuroImage*, 92, 267–273. https://doi.org/10.1016/j.neuroimage.2014.02.007

Reise, S. P., Scheines, R., Widaman, K. F., & Haviland, M. G. (2013). Multidimensionality and structural coefficient bias in structural equation modelling: A bifactor perspective. *Educational and Psychological Measurement*, 73(1), 5–26. https://doi.org/10.1177/0013164412449831

Rickenbach, E. H., Almeida, D. M., Seeman, T. E., & Lachmann, M. E. (2014). Daily stress magnifies the association between cognitive decline and everyday memory problems: An integration of longitudinal and diary methods. *Psychology and Ageing*, 29(4), 852–862. https://doi.org/10.1037/a0038072.Daily

Rosseel, Y. (2012). Lavaan: An R package for structural equation. *Journal of Statistical Software*, 48(2), 1–36. https://doi.org/10.18637/jss.v048.i02

Schneider, T. R. (2008). Evaluations of stressful transactions: What's in an appraisal?. *Stress and Health*, 24(2), 151–158. https://doi.org/10.1002/smi.1176.

Scholten, S., Velten, J., Bieda, A., Zhang, X. C., & Margraf, J. (2017). Testing measurement invariance of the depression, anxiety, and stress scales (DASS-21) across four countries. *Psychological Assessment*, 29(11), 1376–1390. https://doi.org/10.1037/pas0000440

Schönfeld, P., Brailovskaia, J., Bieda, A., Zhang, X. C., & Margraf, J. (2015). The effects of daily stress on positive and negative mental health: Mediation through self-efficacy. *International Journal of Clinical and Health Psychology.*, 16, 1–10. https://doi.org/10.1016/j.ijchp.2015.08.005

Schulz, P., & Schlotz, W. (1999). Trierer Inventar zur Erfassung von chronischem Streß (TICS): Skalenkonstruktion, teststatistische

Überprüfung und Validierung der Skala Arbeitsüberlastung The Trier Inventory for the Assessment of Chronic Stress. *Diagnostica*, *45*(1), 8–19. https://doi.org/10.1026//0012-1924.45.1.8

Segerstrom, S. C., & Miller, G. E. (2004). Psychological stress and the human immune system: A meta-analytic study of 30 years of inquiry. *Psychological Bulletin*, *130*(4), 601–630.

Seidman, E., LaRue, A., Aber, L. J., Mitchell, C., Feinman, J., Hirokazu, Y., ... Roper, G. C. (1995). Development and validation of adolescent perceived microsystem scales: Social support, daily hassles, and involvement. *American Journal of Community Psychology*, *23*(3), 355–388.

Van den Bergh, B. R. H., Mulder, E. J. H., Mennes, M., & Glover, V. (2005). Antenatal maternal anxiety and stress and the neurobehavioural development of the foetus and child: links and possible mechanisms. A review. *Neuroscience and Biobehavioral Reviews*, *29*, 237–258. https://doi.org/10.1016/j.neubiorev.2004.10.007

Velten, J., Bieda, A., Scholten, S., Wannemüller, A., & Margraf, J. (2018). Lifestyle choices and mental health: A longitudinal survey with German and Chinese students. *BMC Public Health*, *18*(1), 632. https://doi.org/10.1186/s12889-018-5526-2

Velten, J., Lavallee, K. L., Scholten, S., Meyer, A. H., Zhang, X.-C., Schneider, S., & Margraf, J. (2014). Lifestyle choices and mental health: A representative population survey. *BMC Psychology*, *2*(1), 1–11. https://doi.org/10.1186/s40359-014-0055

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.