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ORIGINAL ARTICLE

## Psychometric evaluation of Turkish version of the Perceived Stress Scale with Turkish college students

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### Abstract

**Background:** The Turkish version of the *Perceived Stress Scale* (T-PSS-10) measures the extent to which situations in one's life are appraised as stressful.

**Aims:** The purpose of this study was to evaluate the measurement structure of T-PSS-10.

**Method:** Two-hundred and thirty-five Turkish university students (93 men and 142 women) completed the T-PSS-10, the *Patient Health Questionnaire-9* (PHQ-9), the *General Anxiety Disorder 7-Item Scale* (GAD-7), and the *Inventory of Common Problems* (ICP).

**Results:** Confirmatory factor analysis results indicated that a one-factor model did not fit the data, whereas a two-factor correlated model (stress related self-efficacy beliefs, stress related feelings of helplessness) provided a better fit between the model and the data. Significant moderate correlations were found for the stress-related self-efficacy beliefs and stress-related feelings of helplessness factors with depression, anxiety, academic difficulty, relationship problems and health problems. The internal consistency reliability coefficients for the stress-related self-efficacy beliefs and stress-related feelings of helplessness factors were 0.68 and 0.85, respectively.

**Conclusions:** This study provided support for the reliability and validity of T-PSS-10 suggesting that it can be used as a screening instrument by health professionals working with Turkish college students.

### Keywords

Perceived stress, factor analysis, reliability, validity, Turkish college students

### History

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The relationship between stress and physical and mental health problems is well documented in the psychosocial literature (Beck, 1987; Cohen et al., 2007; Johnson et al., 2002). The stress level of college students has been a particular concern of mental health professionals (Sawatzky et al., 2012). Higher levels of college stress have been associated with anxiety and other mental health problems (Dixon & Kurpius, 2008). Sawatzky et al. (2012) indicated that experience of stress is directly related to increased level of depression symptoms among college students, and this relationship is mediated through perceived ability to manage stress. Stress has been also consistently found to be associated with negative health behaviors such as unhealthy eating, smoking, drinking and sleep problems (Hudd et al., 2000). Bayram & Bilgel (2008) consequently reported that comorbidity of stress with mental (i.e., depression and anxiety) and physical health problems in undergraduate students represent a neglected public health problem.

In addition to health problems, stress can elevate the risk for poor academic performance, retention problems, and

psychosocial adjustment difficulties (Beck, 1987; Lee et al., 2014). Sohail (2013) found a moderate negative and significant correlation between perceived level of stress and academic performance among college students. Landow (2006) indicated there is a strong link between stress and psychosocial adjustment in relation to interpersonal and family problems. Further, stress is a contributing factor to students' college persistence problem (Rayle & Chung, 2007).

As such, symptoms of depression and anxiety in students in both community colleges and four-year universities are relatively high (Eisenberg et al., 2007; Klein et al., 2011). Bayram & Bilgel (2008) reported relatively higher rate of severe depression (8.1%), anxiety (20.8%) and stress (6.9%) among Turkish college students in comparison to the rates of depression, anxiety and stress reported in published non-clinical studies. Failure to identify students who are experiencing significant psychological stress can result in a number of negative outcomes ranging from poor academic performance and social isolation to more dire outcomes such as violent behaviors toward peers and educators and suicide (Lee et al., 2014). However, colleges and universities in developing countries such as Turkey may lack the resources to accurately and efficiently evaluate and identify students at-risk for mental health problems limiting the effectiveness of

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mental health services. In addition, Turkish students are increasingly pursuing higher education in western countries such as the United Kingdom, Germany and the United States. Since transition to college life can be difficult and stressful for international students, it would be helpful to evaluate stress level of Turkish students and understand how Turkish students respond to a generic stress questionnaire for health professionals who are working with diverse populations of students.

One resource that may be useful for assessing the stress levels of college students is the *Perceived Stress Scale* (PSS). To the best of our knowledge, only two validation studies of the PSS-10 have been conducted in Turkey. Erci (2006) investigated the factorial structure of the Turkish version of the PSS-10 (T-PSS-10) with a sample of 108 primary health care patients and found a one-factor solution accounting for 58% of the total variance. Örucü & Demir (2009) validated factorial structure of the T-PSS-10 with a sample of 508 freshman students in a major Turkish university. Using exploratory factor analysis, they identified two factors that accounted for 56% of the total variance. The two factors were labelled as perceived self-efficacy and perceived helplessness. Örucü & Demir (2009) followed their exploratory factor analysis with a confirmatory factor analysis and found the two-factor model provides a relatively good fit to the data. However, it should be noted that Örucü & Demir (2009) conducted both exploratory factor analysis and the confirmatory factor analysis without splitting their sample into a validation sample and a cross-validation sample. Although conducting both exploratory factor analysis and confirmatory factor analysis with the same sample can be justified (Van Prooijen & Van der Kloot, 2001), Osborne & Fitzpatrick (2012) recommend that researchers should examine the stability or volatility of exploratory factor analysis solutions to determine robustness and gain insight into how to improve their instruments using an independent sample. Further, Örucü and Demir did not assess the association of the T-PSS-10 with other psychological health variables that are associated with psychological stress including general health status, depression, anxiety, and college life adjustment.

Factorial structure of a psychological test can only be confirmed when several studies using different samples provide similar results (Tabachnick & Fidell, 2007). In Turkey, two-factor analytic studies of the T-PSS-10 provided two different results. Factorial structure of the T-PSS-10, therefore, needs to be further investigated with different samples in Turkey. The purpose of this study was to evaluate the goodness-of-fit of the one-factor and two-factor models of the T-PASS-10 with a sample of college students from two major Turkish universities using confirmatory factor analysis. The results of this study may facilitate understanding of Turkish students responses a generic stress questionnaire to develop individualized interventions for them.

## Method

### Participants

A convenient sample of 235 university students (93 men and 142 women) was recruited from two Turkish universities (i.e. Karadeniz Teknik University and Eskisehir Osmangazi University) on a volunteer basis to participate in this study

in 2013. The age of the students ranged from 17 to 34 years, with a mean age of 20.22 years (SD = 1.88). The sample comprised 57 first year (24%), 79 second year (34%), 49 third year (21%), and 50 fourth year college students (21%). Participants who were not Turkish citizens were excluded from the study.

### Measures

*Perceived Stress Scale (PSS-10)*. The PSS was developed by Cohen et al. (1983) to measure the extent to which situations in one's life are appraised as stressful. Several alternate versions of the PSS exist which vary in the number of items used to describe perceived stress. The three versions of the PSS are the PSS-14, PSS-10 and the PSS-4 (Cohen & Williamson, 1988). Lee (2012) conducted a comprehensive review of the psychometric properties of the PSS and reported that all versions of the PSS have acceptable psychometric properties. Original English version of the PSS-4 had one factorial structure, whereas the PSS-10 and PSS-14 had two factors (Cohen & Williamson, 1988). However, the PSS-10 demonstrated the best psychometric evidence comparing to PSS-14 and PSS-4. A Turkish version of PSS-10 (T-PSS-10) which is a translation of PSS-10 was used in this study (PSS-10: Cohen & Williamson, 1988). Sample item for the PSS-10 include: "In the last month, how often have you felt that you were unable to control the important things in your life". Each item is rated on a 5-point Likert-type scale with response options of 0 (never) to 4 (very often). Responses are summed over the 10 items after reversing the scores on four positive items to produce a PSS-10 total score, which range from 0 to 40, with higher scores indicating higher perceived stress. The internal consistency reliability coefficient (Cronbach's alpha) of 0.84 was reported for a sample of Turkish college students (Örucü & Demir, 2009).

*The Patient Health Questionnaire-9 (PHQ-9)*. The PHQ-9 was developed by Kroenke et al. (2001) as a brief measure of depression and depression severity. It is composed of nine depressive symptom items listed in the Diagnostic and Statistical Manual of Mental Disorders-4th edition (DSM-IV) for depression. Patients were asked to rate the extent their symptoms had bothered them during the previous 2 weeks using a 4-point Likert rating scale. The PHQ-9 severity score ranges from 0 to 27. Patients achieving a score equal or above 15 are regarded as suffering from at least minor depression. The internal consistency reliability (Cronbach's  $\alpha$ ) of the PHQ-9 measure was reported to range between 0.86 and 0.89 (Kroenke et al. 2001). Turkish version of the PHQ-9 was reported to have very good reliability and validity (Corapcioglu & Ozer, 2004).

*General Anxiety Disorder 7-Item (GAD-7) Scale*. GAD-7 was developed by Spitzer, Kroenke, Williams, and Lowe (2006) as a brief clinical measure to assess general anxiety disorder. It is comprised of seven items representing the DSM-IV symptom criteria for GAD (e.g., "Feeling nervous, anxious or on edge"). Patients were asked to indicate how often, during the last 2 weeks, they were bothered by each symptom, using a 4-point Likert-type rating scale. Total test scores range from zero to 21 with a score of eight deemed sufficient to identify symptoms of general anxiety disorder,

panic disorder, post-traumatic stress disorder or social anxiety disorder. The internal consistency reliability of the Turkish version of the GAD-7 (Cronbach's  $\alpha = 0.85$ ) (Konkan et al. 2013) and the test-retest reliability (intraclass correlation = 0.83) were reported to be good (Spitzer et al., 2007).

*Inventory of Common Problems (ICP)*. The ICP was developed by Hoffman & Weiss (1986) to measure personal problems related to adjustment to college life. It is composed of 24 items. Each item is rated on a 5-point Likert type rating scale with response options of 1 (not at all) to 5 (very much). However, since the PHQ-9 was included to assess depression and the GAD-7 to assess anxiety, only the ICP subscales measuring academic problems, interpersonal problems, physical health problems, and alcohol and drug use problems were considered in this study. The internal consistency reliability (Cronbach's  $\alpha$ ) of the academic problems, interpersonal problems, physical health problems, and alcohol and drug use problems subscales were reported by the developers of the ICP to be 0.71, 0.67, 0.52 and 0.45 respectively (Hoffman & Weiss, 1986). Currently, no validation study of Turkish ICP has been reported. The Turkish version of the ICP used in this study was translated using the back-translation method (Brislin, 1970). The internal consistency reliability (Cronbach's  $\alpha$ ) of academic problems, interpersonal problems, physical health problems and substance abuse problems subscales for this study were 0.75, 0.71, 0.65 and 0.16, respectively. Since the alcohol and drug use problems subscale had low reliability, we eliminated it from this study.

## Procedure

Institutional review board approval was obtained from the universities affiliated with the researchers. Participants were recruited with the assistance of their class instructors. They were informed that participation was voluntary and no identifying information would be collected. Participants were given as much time as they needed to complete the questionnaires online in a computer lab.

## Data analysis

Confirmatory factor analysis was used to evaluate the factorial structure of the T-PSS-10. In addition, Pearson correlation coefficients were computed to examine the relationship between the T-PSS-10 factors and other stress-related psychological constructs.

## Results

### Descriptive statistics

The results indicated the students had moderate level of perceived stress, the mean and standard deviation of the T-PSS-10 were  $M = 18.03$ ,  $SD = 6.12$ . Those results were similar to the data reported for T-PSS-10 on college students in Turkey (Örücü & Demir, 2009). One-way analysis of variance (ANOVA) results indicated no significant differences on T-PSS-10 scores were found between male ( $M = 17.66$ ,  $SD = 7.03$ ) and female students ( $M = 18.27$ ,  $SD = 5.46$ ),  $F(1, 233) = 0.55$ ,  $p = 0.456$ ; and between freshman ( $M = 16.41$ ,  $SD = 6.45$ ), sophomore ( $M = 18.65$ ,  $SD = 5.72$ ), junior ( $M = 19.32$ ,  $SD = 6.48$ ) and senior students

( $M = 17.63$ ,  $SD = 5.73$ ),  $F(3, 231) = 2.44$ ,  $p = 0.06$ . The results showed that 26 of the students had 15 or above PHQ-9 scores indicating that those students were experiencing at least a minor depression.

### Confirmatory factor analysis

A confirmatory factor analysis was conducted using the AMOS graphics statistical program to test the factorial validity of the T-PSS-10 (Arbuckle, 2007). As suggested by structural equation modeling researchers, the goodness of fit of the measurement model was evaluated using the chi-square goodness-of-fit test and several other fit indices:  $\chi^2/df$  ratio, the Goodness of Fit Index (GFI), and the Comparative Fit Index (CFI). As  $\chi^2$  goodness-of-fit test is sensitive to sample size,  $\chi^2/df$  ratio provides corrected test statistic, GFI assesses how well a model fits to observed data, and CFI evaluates improvements with the hypothesized model compared to a more restricted model. A non-significant chi-square, a relative chi-square ( $\chi^2/df$ ) in the range of 3 to 1, and values greater than 0.90 for GFI and CFI indicate an acceptable model fit; with value of 0.95 or higher for the CFI indicate an excellent fit (Aebi et al., 2013; Byrne 2001; Hu & Bentler, 1995; Weston et al. 2008). In addition, a root mean square error of approximation (RMSEA) which corrects for complexity of a model, with 90% confidence interval was reported, where a value of less than 0.05 are considered a close fit and values up to 0.08 considered reasonable errors of approximation in the population (Byrne, 2001).

As researchers in Turkey found a one-factor and a two-factor measurement structure for the T-PSS-10 in two separate studies, two CFA models were evaluated: (a) the one-factor model, and (b) the two-factor intercorrelated model. The results reveal a poor fit for the one-factor model:  $\chi^2(35, N = 235) = 122.90$ ,  $p < 0.01$ ;  $\chi^2/df = 3.51$ ; GFI = 0.90; CFI = 0.90; RMSEA = 0.10, 90% CI [0.08, 0.12]. Conversely, for the two-factor model, two goodness-of-fit indices (GFI = 0.96 and CFI = 0.94) show a good fit between the model and the data. An examination of the modification indices suggested that error terms for two pairs of items should be correlated. These four items appear to measure the affective reaction of nervousness, anger and stress because things are out of control. The correlated error terms indicated that knowing the residual of one item helps in knowing the residual associated with another item. The respecified two-factor intercorrelated model fit the data well:  $\chi^2(32, N = 235) = 65.41$ ,  $p < 0.01$ ;  $\chi^2/df = 2.04$  (between 1 and 3); GFI = 0.94 (> 0.90); CFI = 0.96 (> 0.95); and RMSEA = 0.07 (< 0.80), 90% CI [0.04, 0.09]. All factor loadings were significant at  $p < 0.01$  ranging from 0.41 to 0.74 for the first factor and between 0.55 and 0.80 for the second factor. As such, the CFA results indicate that the one-factor model did not fit the data, whereas the two-factor intercorrelated model fit the data well after connecting two pairs of error terms. This result strongly supports the two-factor measurement model for the T-PSS-10 as all of the fit indices provided acceptable statistical results for the two-factor intercorrelated model.

The first factor was related to having control over life, being on top of things and being confident in skills and abilities, whereas the second factor was related to feelings of

stress, things happening unexpectedly, difficulties piling up, and not being able to overcome them. Örucü and Demir (2009) labelled their factors as perceived self-efficacy and perceived helplessness. A careful review of the items in each factor suggested that the two factors should be labeled as stress related self-efficacy beliefs and stress related feelings of helplessness to more accurately reflect that T-PSS-10 is a measure of perceived stress. Comparison of means, standard deviations and factor loadings of the current study and Örucü and Demir (2009) study for the T-PSS-10 are presented in Table 1.

### Reliability and validity of the T-PSS-10

Cronbach's alpha coefficients were used to measure internal consistency reliability estimates. Alphas for the stress related self-efficacy beliefs and stress related feelings of helplessness factors were 0.68 and 0.85, respectively. Although the alpha value of the stress-related self-efficacy beliefs factor was below the generally accepted cut point .70, a relatively low (e.g. 0.50) level of reliability coefficients should not attenuate validity as Cronbach's alpha is a function of item interrelatedness and test length (Schmitt, 1996). The results indicate acceptable reliability for the stress related self-efficacy beliefs and stress related feelings of helplessness subscales.

Concurrent validity of the T-PSS-10 was established by correlating stress related self-efficacy beliefs and stress related feeling of helplessness with measures of depression, anxiety, academic difficulty, relationship problems and health problems. The results indicated stress related self-

efficacy beliefs was significantly associated with depression ( $r = -0.52, p < 0.001$ ), anxiety ( $r = -0.48, p < 0.001$ ), academic difficulty ( $r = -0.37, p < 0.001$ ), relationship problems ( $r = -0.55, p < 0.001$ ), and health problems ( $r = -0.31, p < 0.001$ ). Stress-related feelings of helplessness was significantly associated with depression ( $r = 0.60, p < 0.001$ ), anxiety ( $r = 0.58, p < 0.001$ ), academic difficulty ( $r = 0.43, p < 0.001$ ), relationship problems ( $r = 0.60, p < 0.001$ ) and health problems ( $r = 0.45, p < 0.001$ ). Generally, significant correlations in the moderate range were found for stress-related self-efficacy beliefs and stress-related feelings of helplessness with depression, anxiety, academic difficulty, relationship problems and health problems. The concurrent validity results are shown in Table 2.

### Discussion

The results of the present study are consistent with Örucü and Demir's (2009) findings and with those of previous studies in support of the two-factor solution of the PSS-10 (Golden-Kreutz et al., 2004; Örucü & Demir, 2009; Roberti et al., 2006). The goodness-of-fit indices for the two-factor model of the T-PSS-10 indicated a good model fit in our sample of Turkish college students. Furthermore, the present study identified a moderate association between stress-related self-efficacy beliefs and stress-related feelings of helplessness and the following stress-related constructs: depression, anxiety, academic difficulty, relationship problems and health problems. The moderate inverse relationship between stress-related self-efficacy beliefs and stress-related feelings of

Table 1. Comparison of Means, Standard Deviations, and Factor Loadings of the Current Study and Örucü and Demir (2009) Study for T-PSS-10.

Description	M (SD)	Factor loadings of T-PSS-10 in the current study		M (SD)	Factor loadings of T-PSS-10 in the Örucü and Demir (2009) study	
		Stress related self-efficacy beliefs	Stress related feelings of helplessness		Perceived self-efficacy	Perceived helplessness
8. In the last month, how often have you felt that you were on top of things?	3.50 (0.82)	.74		1.81 (0.97)	.75	
5. In the last month, how often have you felt that things were going your way?	3.30 (0.85)	.67		1.77 (1.03)	.52	
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	3.70 (0.81)	.61		1.57 (1.00)	.70	
7. In the last month, how often have you been able to control irritations in your life?	3.48 (0.81)	.41		1.97 (0.95)	.77	
1. In the last month, how often have you been upset because of something that happened unexpectedly?	3.00 (0.98)		.80	2.06 (0.97)		.72
2. In the last month, how often have you felt that you were unable to control the important things in your life?	2.88 (0.93)		.76	1.91 (1.12)		.75
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	2.95 (1.00)		.71	1.46 (1.11)		.76
3. In the last month, how often have you felt nervous and "stressed"?	3.36 (0.89)		.69	2.36 (1.14)		.67
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	3.26 (0.87)		.57	1.69 (1.05)		.66
9. In the last month, how often have you been angered because of things that were outside of your control?	2.77 (1.00)		.55	2.25 (1.07)		.75

Table 2. Correlations between T-PSS-10 and measures of depression, anxiety, academic difficulty, relationship problems, and health problems.

	Depression	Anxiety	Academic difficulty	Relationship problems	Health problems
Stress related self-efficacy beliefs	-.52	-.48	-.37	-.55	-.31
Stress related feelings of helplessness	.60	.58	.43	.60	.45

helplessness provided further evidence for two-factorial solution. Cronbach's alpha values demonstrated that each of two subscale of T-PSS-10 are internally reliable and consisted of a set of interrelated items.

The findings support that Turkish college students with higher stress-related self-efficacy beliefs (as compared to their peers) exhibited lower level of depression, anxiety, academic difficulty, relationship problems and health problems. Further, Turkish college students who perceived that stressful situation was changeable were more likely to experience positive psychological and health outcomes. Overall, students who had lower stress scores had higher physical and mental health outcomes.

Stress is an important construct for emotional and physical well-being of college students. The experience of stress in college students has been directly linked to academic performance (Akgun & Ciarrochi, 2003) and drop out from universities (Samin, 2013). Prior research has indicated that factors such as social connectedness, adjustment difficulties, neuroticism and openness to experience can predict stress in college students (Duru & Poyrazli, 2007). However, it is the individual subjective experience of stress that holds primacy in understanding student difficulties in navigating the challenges of the transition to university settings. According to Lazarus and Folkman's (1984) transactional theory of stress and coping, how people appraise a situation as demanding or threatening is related to their perception of their abilities, skills and resources to cope with the situation. Students who appraise themselves as having low levels of abilities, skills and the psychological resources to cope with stressful situations will have low stress related self-efficacy beliefs and high stress-related feelings of helplessness. Assessing students' appraisal of their stress-related self-efficacy beliefs and stress-related feelings of helplessness can provide a mechanism for identifying individuals at risk for depression, poor self-esteem and negative emotional states (Durak et al., 2010). The T-PSS-10 is a brief and valid stress appraisal measure that can be used to evaluate the extent to which situations in a student's life are appraised as stressful.

### Implications

The results indicate that T-PSS-10 is consisted of two stress factors that were identified as stress related self-efficacy beliefs and stress-related feelings of helplessness. The T-PSS-10 is a psychometrically sound stress appraisal measure that can be used as a screening instrument to assess perceived levels of stress experienced by Turkish college students. The T-PSS-10 can also be used as an outcome measure to evaluate the benefits of counseling interventions designed to mitigate perceived stress level of students.

The identification of the two stress factors can support researchers and practitioners in their efforts to design specific

interventions targeting stress-related self-efficacy belief and stress-related feelings of helplessness to mitigate stress concerns. Practitioners who are working with Turkish students in different settings and countries around the world, particularly can design programs to increase students' confidence in their abilities and control over their life in order to increase stress related self-efficacy beliefs. Likewise, practitioners can reduce students' feelings of helplessness through activities such as psychological counseling and social support interventions for students.

The results indicate that stress-related self-efficacy beliefs and stress-related feelings of helplessness were significantly associated with depression, anxiety, academic difficulty and health problems. Therefore, practitioners who work with college students need to pay attention to stress level of students not only as a health issue but also for students' academic success and psychological well-being. In particular, Turkish students who obtain higher education may experience high level of stress after their arrival to those countries due to encountering with a different culture and education system. Initial screening and ongoing assessment of stress levels of students may help to mitigate mental health concerns prior to those concerns overwhelming students and resulting in mental health issues that can affect academic performance.

The research findings imply that Turkish college students may have limited knowledge of counseling services available at their universities and thus may underutilize those services (Güneri, 2006; Koydemir et al., 2010). Outreach services such as orientation and information dissemination activities may be required to increase students' knowledge about counseling services and the psychological benefits of these services. By providing outreach services to increase students' awareness of counseling services, practitioners will be able to proactively identify those students who are experiencing stress and offer services that aimed at reducing their stress levels.

Turkish students who are studying abroad may be under a higher risk of experiencing stress in their efforts to adjust to the challenges of studying under unfamiliar education and cultural systems. The results indicate that Turkish students may not prefer to receive help from counseling services and rather to share their problems with their friends and families. In addition to that, Turkish students have limited knowledge about counseling services. Consequently, practitioners who are working with Turkish college students should be aware of this and provide training sessions to change Turkish students' perceptions about receiving mental health services. In addition to that outreach programs targeting Turkish students could inform those students regarding mental health resources available to them.

The findings of this study can be extended to Turkish immigrants in western countries. The trauma of leaving one's homeland and starting a new life in a different country can be very stressful for immigrants. Practitioners who are working

with Turkish immigrants may need a brief but valid psychometric measure to assess the stress level of their clients. Additionally, findings of this study indicated that stress-related self-efficacy beliefs and stress-related feelings of helplessness are the two factors of stress perception. Mental health therapists who work with Turkish immigrants should consider including intervention aimed at increasing Turkish immigrants' stress related self-efficacy beliefs to help them cope with the vicissitudes of life as immigrants in the western world.

## Conclusions

The results of the study showed that T-PSS-10 had a two-factor measurement structure: stress related self-efficacy and stress-related feelings of helplessness. Both factors had concurrent validity and reliability. Stress-related self-efficacy beliefs and stress-related feelings of helplessness were moderately associated with anxiety, depression, academic difficulty, relationship problems and health problems. Internal consistency reliability estimates showed an acceptable level of internal consistency for stress-related self-efficacy beliefs and good internal consistency for stress-related feelings of helplessness. Taken together, the T-PSS-10 is a valid and reliable tool that can be used to measure perceived stress for college students in mental health and related settings around the world. However, additional research is needed to provide further evidence on the validity and reliability of T-PSS-10.

## Declaration of interest

No potential conflict of interest was reported by the authors.

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