



Psychometric properties of the positive thinking skills scale among college students

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ABSTRACT

Suicide continues to be in the top leading causes of death among college students. Positive thinking has been linked to increasing health outcomes and decreasing the effects of stress. The psychometric properties of the 8-item Positive Thinking Skills Scale (PTSS) has not been tested in American college students. The study used resilience as the theoretical framework. In 131 students, internal consistency and construct validity was supported. The Cronbach's alpha of 0.86 and significant correlation with measures of suicide resilience, perceived social support, and self-esteem demonstrated good reliability and validity. The findings of the study provide directions for future suicide prevention efforts.

Each year an estimated 750,000 people know someone who has committed suicide (American Association of Suicidality, 2015). This number is expected to rise as the number of daily interactions between people continues to increase (Berman, 2011). The individuals who know someone who committed suicide have an increased risk for attempting suicide and blaming themselves for not preventing the death (CDC, 2015). To end this destructive cycle, it is important to target the protective factors, such as positive thinking, in vulnerable populations to prevent an individual from committing suicide. As the suicide rate has continued to increase, there is an increase need for suicide prevention programs, including examining protective factors to further aid in suicide prevention efforts (U.S. Department of Health and Human Services [US DHHS], 2014).

Suicide continues to be the second leading cause of death for college students (CDC, 2016). In fact, youth (18–25 years old) were more likely than the other adult age groups to have a plan to commit suicide (US DHSS, 2014). In college students, stress was one of the factors found to have the potential to increase one's risk of suicidal thoughts (Wilburn & Smith, 2005). Positive thinking has the potential to counteract the negative effects of stress. A person who uses positive thinking will be less threatened by stressful events and have better coping than those who have negative thoughts (Naseem & Khalid, 2010). Individuals who use positive thinking were also found to have decrease academic burnout and better health outcomes (Fandokht, Sa'dipour, & Ghawam, 2014; Naseem & Khalid, 2010).

The resilience theory served as the framework for the parent study.

Resilience is the effect of the risk and protective factors that support an individual's stability when experiencing an adverse situation (American Psychological Association, 2015). More specifically, it is a dynamic process rather than linear or stagnant which explains why individuals respond differently to the same adverse event (Yates, Tyrell, & Masten, 2015). Healthy development, positive health outcomes, and the ability to withstand stressors in one's life have been associated with having resilience (Yates et al., 2015). Resilience has also been described as a phenomenon where an individual would not only maintain their performance and health but also thrive during stressful situations (Maddi, 2013). Suicide resilience is the ability to regulate suicidal thoughts by using resources available to the individual (Osman et al., 2004). Matel-Anderson, Bekhet, and Garnier-Villarreal (2018) used resilience as the theoretical framework and suicide resilience as the dependent variable in the parent study. Ultimately, the study found that positive thinking had a direct effect on suicide resilience in college students (Matel-Anderson et al., 2018).

Positive thinking is a cognitive process that assists individuals to have hopeful images of the future (Bekhet & Zauszniewski, 2013). The effects of positive thinking include positive feelings, emotions, behavioral qualities, and assistance in problem solving (Bekhet & Zauszniewski, 2013; Naseem & Khalid, 2010). Having positive thoughts can also aid in psychologically recovering from negative emotional experiences (Tugade & Fredrickson, 2004). The thoughts a person has regarding a situation can intensify the stress experienced. Positive thinking can affect ones' perception and ability to cope by creating a

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less threatening experience (Lazarus & Folkman, 1984). Positive thoughts can motivate individuals whereas negative thoughts are associated with poor health outcomes and devaluing oneself (Naseem & Khalid, 2010). When negative thoughts occur frequently, coping with daily stress can become dysfunctional (Naseem & Khalid, 2010). One study using responses from undergraduate nursing students the U.S., Thailand, Taiwan and Japan found the students who reported an increase in stress also reported having more depression (Ross et al., 2015). This study also found that stress significantly predicted depression among nursing students in the U.S. and Japan (Ross et al., 2015). Positive or negative thinking can affect the way a situation is approached, the person's experience, and their anticipation of an outcome which can have profound effects on one's life.

In fact, positive thinking is acquired throughout life, and because it is learned, it can be modified and strengthened over time (Bekhet & Garnier-Villarreal, 2017). The pilot intervention trial conducted by Bekhet found that the mean scores of the positive thinking Skills Scale improved for the intervention group and decreased for the control group in a sample of 73 caregivers following an online positive thinking training intervention (Bekhet & Garnier-Villarreal, 2017).

A review of the recent literature found positive thinking has been linked to increasing mental health, whereas negative thinking can decrease ones' mental health (Naseem & Khalid, 2010; Tugade & Fredrickson, 2004). A study examining resilience of patients' who survived a suicide attempt from the perspective of registered nurses indicated that having future plans was a protective factor. The future plans described by the staff were positive thoughts of the future include a favorite food they are looking forward to eating and anticipating a vacation or social activity (Matel-Anderson & Bekhet, 2016). This finding supports, an examination of the role of positive thinking in building resilience. To our knowledge, this is the first study that measures positive thinking among American college students using the PTSS. Evidence shows that positive thinking is learned, and it can be taught (Bekhet & Zauszniewski, 2013; Scheier & Carver, 1993). Findings from previous studies indicated that college students who had positive attitudes about the future (Hirsch, Wolford, Lalonde, Brunk, & Morris, 2007), higher optimism (O'Keefe & Wingate, 2013), and higher expectations for the future (Chou, Ko, Wu, & Cheng, 2013) had a decreased risk of having suicidal thoughts.

In a sample of 109 caregivers of persons with autism, the PTSS was found to be internally consistent, with a Cronbach's alpha of 0.90. The study also found the scale to have construct validity by demonstrating significant correlations with positive cognitions, resourcefulness, depression, and general well-being (Bekhet & Zauszniewski, 2013). These findings support the use of this scale in caregivers of persons with autism and also support the efforts in testing the reliability and validity of its use in other populations.

In examining the PTSS use in undergraduate college students, this scale could be applied to screen college students as well as develop their positive thinking skills. Developing positive thinking skills can decrease their perception of stress which ultimately has the potential to decrease their risk of having suicidal thoughts. In sum, positive thinking can play a role in suicidal ideation and therefore is likely decrease one's risk of having suicidal thoughts. To date, no studies have examined the reliability and validity of the PTSS in undergraduate U.S. college students as proposed in this study.

Description of PTSS

The Positive Thinking Skills Scale (Bekhet & Zauszniewski, 2013) was used to measure positive thinking skills in college students. The PTSS was developed in 2013 by a panel consisting of two nursing faculty members who have extensive experience working in the area of mental health and cognitive-behavioral therapy, and one medical doctor (Bekhet & Zauszniewski, 2013). In developing the scale, the authors reviewed the current existing positive thinking measures. They

noted some deficiencies in previous measures including the inability to capture the positive thinking skills, the lengthy items which can overburden the subjects, and or lacking the ability to report the psychometrics of the previous scales (Bekhet & Zauszniewski, 2013; Ingram & Wisnicki, 1988; Peterson et al., 1982; Seligman, Abramson, Semmel, & Baeyer, 1979). The panel did an extensive literature review independently as well as concurrently and came up with the skills constituting positive thinking. The panel met and discussed the skills until they reached 100% agreement (Bekhet & Zauszniewski, 2013). Grounded in cognitive-behavioral theory, the skills measured in the scale reflect cognitive activities to increase positive thoughts and eliminate or modify negative ones. Higher scores on the PTSS indicate more positive thinking skills used by respondents (Bekhet & Zauszniewski, 2013). The reliability of the PTSS scale was then tested and supported by a Cronbach's alpha of 0.90 in caregivers of persons with autism (Bekhet & Zauszniewski, 2013). The validity of the scale was found with the correlations of the PTSS with measures of resourcefulness, depression and general wellbeing ($r = 0.63, -0.45, 0.40$, respectively; $p < .01$; Bekhet & Zauszniewski, 2013). All the items loaded cleanly on one factor and explained 59% of the variance.

The PTSS is an eight-item scale ranging from 0 "never" to 3 "always." The final scores range from the lowest score of 0 and the highest score of 24. A higher score indicates positive thinking skills are being used more frequently whereas a lower score indicates less positive thinking skills are being used (Bekhet & Zauszniewski, 2013). The PTSS has been used and psychometrically tested with caregivers of persons with autism and caregivers of persons with dementia (Bekhet, 2013; Bekhet & Garnier-Villarreal, 2017; Bekhet & Zauszniewski, 2013). Examples of the scale items are: Transform negative thoughts into positive thoughts; highlight positive aspects of the situation; and interrupt pessimistic thoughts by relaxation techniques and or distractions.

The PTSS has been translated into the Turkish language and used in a sample of 295 college students in Turkey (Akin, Uysal, & Akin, 2015). The scale was found to be valid and reliable with the internal consistency coefficient of the scale at 0.87 and the item-total correlations ranging from 0.54 to 0.68. Another study also found the PTSS to be reliable in a sample of 128 nurses in the United States (Tully, 2016). The study examined positive thinking on the perception of the practice environment stressors in a hospital setting. The Cronbach's alpha was found to be 0.89. The purpose of this study was to measure the psychometric properties of the PTSS that capture positive thinking skills among college students.

Method

Design and sample

The datum is a secondary analysis of the psychometric properties of the PTSS using the responses of 131 students from a large, private, Midwestern college in a cross-sectional study from 2017 (Matel-Anderson et al., 2018). The study examined the mediating effects of positive thinking and/or social support on suicide resilience. The inclusion criteria for the study was undergraduate students 18–24 years old who enrolled as full or part times status and were able read English. The study did not exclude based on race, gender or economic status.

Table 1 shows the demographic characteristics of the participants. The majority of the college students were Caucasian, single, and female freshman to senior level.

Data collection

The sample was obtained in the parent study through convenience sampling by a random selection of participants from the student database of the university (Matel-Anderson et al., 2018). The Institutional Review Board (IRB) approval was obtained from the university. The students who met the research criteria were provided a link to Qualtrics

Table 1
Descriptive statistics of parent study.

Variable Age	M = 20.05, SD = 1.29	Range = 18–24	
		(n = 131)	%
Gender	Male	42	(32.06%)
	Female	89	(67.94%)
Race	White	93	(70.99%)
	Asian	17	(12.98%)
	Hispanic	10	(7.63%)
	African American	7	(5.34%)
	Other	4	(3.05%)
Level in college	Freshman	35	(26.72%)
	Sophomore	32	(24.43%)
	Junior	30	(22.9%)
	Senior	34	(25.95%)

which provided information about the study and the consent form which then opened to the survey. The survey database, Qualtrics, allowed for responses to be obtained without linking the Internet Protocol (IP) Address to the survey responses, therefore the survey is not connected to the participant (Matel-Anderson et al., 2018). The university counseling center, the national suicide hotline, and the crisis texting line were provided to the students in the initial recruitment email and at the end of the survey as resources for accessing mental health services. After the survey was completed, a second survey opened to where the participants had the option to provide an email to obtain an \$8 Starbucks gift card that could be redeemed at their convenience. The emails for the gift cards were destroyed after the gift cards were sent to the participants. For this study no additional incentive was provided.

Instruments

Descriptive data on college students and measures of positive thinking, self-esteem, social support and suicide resilience were collected in the primary study. The information was used in this analysis for the construct validity because of the relation of the concepts to positive thinking.

Measures of construct validation

The Suicide Resilience Inventory (SRI)

Suicide resilience is having the perception and ability to use available resources to regulate one's suicidal thoughts and emotions (Osman et al., 2004). Suicide resilience was measured using the 25 item SRI (Rutter, Freedenthal, & Osman, 2008). Scores can range from 1 “strongly disagree” to 6 “strongly agree”. The total score is determined by taking the sum of the items (25–150) divided by 25 (the number of items). The higher the score indicate less suicide risk. The lower score indicates a higher suicide risk (Rutter et al., 2008). In a sample of 540 adolescents and adults from a high school, community college and two universities, the reliability was demonstrated with the Cronbach alpha of 0.96 (Osman et al., 2004). The construct validity was shown by the correlations with the Becks Hopelessness Scale ($r = -0.68$) and Suicide Ideation Questionnaire ($r = -0.67$) in a sample of 239 college students (Rutter et al., 2008).

The Multidimensional Scale of Perceived Social Support (MSPSS)

Perceived social support is the interpretation of being understood and supported by individuals in one's life (Liu, Mei, Tian, & Huebner, 2016). Perceived social support was measured using the MSPSS. The scale has 12 items and uses a 7 point Likert scale. The scale ranges from 1 “very strongly disagree” to 7 “very strongly agree.” The total score is calculated by taking the sum of the 12 items, which can range from 12 to 84) and dividing by the number of items (12). The final result can range from 1 to 7, with the higher scores indicating having an increased

perception of social support (Zimet, Powell, Farley, Werkman, & Berkoff, 1990). The MSPSS was found to have a Chronbach alpha of 0.84 to 0.92, indicating a good internal reliability among 265 women in their third trimester receiving prenatal care, 74 adolescents in Madrid or Paris, and 55 first and second year pediatric residents (Zimet et al., 1990). In analyzing the factorial validity, a multivariate analysis of the subscales was measured with $p < .005$ which supports the validity of the scale (Zimet et al., 1990).

The Collective Self-Esteem Scale (CSES)

Self-esteem is the belief in oneself as being worthy of respect (Modrcin-Talbott, Pullen, Ehrenberger, Zandstra, & Muenchen, 1998). Self-esteem was measured using the Collective Self-Esteem Scale. The CSES has 16-items that range from 1 “strongly disagree” to 7 “strongly agree,” with the total score ranging from 16 to 112. Eight of the items in the CSES use reverse coding. Once reverse coding was accounted for, higher scores indicate a higher self-esteem (Luhtanen & Crocker, 1992). Reliability was found for the total scale with the Cronbach's alpha score of 0.85 from the responses of 887 psychology students from a north-western university (Luhtanen & Crocker, 1992). For assessing the validity, the CSES had a moderate positive correlation with the Rosenberg Self-Esteem Scale and the Cronbach's alpha reported in that study was 0.68 (Luhtanen & Crocker, 1992).

Results

The mean age of the undergraduate students was 20 years, their ages ranged from 18 to 24 years. Of the participants, 67% were female with the vast majority of the sample (70.9%) being Caucasian. The level of college was evenly mixed ranging from freshman to senior level. The participants were either single, dating or married/or in a domestic partnership. Most, (60%) of the college students were not in a relationship, 38.9% were in a committed relationship but not married, and 0.76% were married or in a domestic partnership. Approximately 42% of the students were not working and 40% working 6–15 h per week.

Reliability

The internal consistency of the PTSS was reflected in the Cronbach's alpha = 0.86. This exceeds the minimum criterion of 0.70 and indicates good consistency (Ferketich, 1991; Nunnally & Bernstein, 1994). Deletion of one of the items would not improve the scale alpha (Table 2). All of the inter-item correlations were between 0.30 and 0.70 which demonstrates the scale measures moderately diverse aspects of positive thinking (Table 4).

The corrected item-to-total scale correlation was examined to determine the homogeneity of the PTSS (Ferketich, 1991). 89% of the 28 possible inter-item correlations fell within the desired range (Table 4).

The corrected item-to-total scale correlation was examined to determine the homogeneity of the PTSS (Ferketich, 1991). All items had item-to-scale correlations within the recommended range of 0.30 to 0.70 demonstrating homogeneity of the PTSS (Table 2).

Dimensionality and construct validity

The 131 college students meet the recommended criteria of 5 to 10 participants per item to conduct factor analysis of the 8-item PTSS (Hair Jr., Anderson, Tatham, & Black, 1998). The Kaiser-Meyer-Olkin (KMO) was checked to determine whether the sample was adequate for factor analysis, with a value of at least 0.60 required (Tabachnick & Fidell, 2001). In this study the KMO was 0.87 indicating the sample size was adequate for factor analysis (Tabachnick & Fidell, 2001). Bartlett's test of sphericity was significant ($\chi^2 = 361.281$; $p = .000$), indicating that the correlation matrix was appropriate for factor analysis (Strickland, 2003).

Table 2
PTSS item analysis.

PTSS item no.	Description	Alpha if item deleted	Item-to-total score correlations	Factor loadings	Communality values
PTSS-1	Transform negative thoughts	0.833	0.619	0.730	0.532
PTSS-2	Highlight positive aspects	0.835	0.605	0.714	0.509
PTSS-3	Interrupt pessimistic thoughts	0.837	0.587	0.699	0.489
PTSS-4	Note the need to practice	0.842	0.546	0.657	0.431
PTSS-5	Know how to break	0.854	0.437	0.547	0.299
PTSS-6	Initiate optimistic beliefs	0.824	0.686	0.786	0.618
PTSS-7	Nurture ways to challenge	0.830	0.641	0.743	0.552
PTSS-8	Generate positive feelings	0.829	0.652	0.758	0.575

Note. PTSS = Positive Thinking Skills Scale.

Table 3
Construct validity table.

	SRI	PTSS	MSPSS	CSE
SRI	1			
PTSS	0.46*	1		
MSPSS	0.63*	0.39*	1	
CSES	0.48*	0.26*	0.55*	1

Note. SRI = Suicide Resilience Inventory; PTSS = Positive Thinking Skills Scale; MSPSS = Multidimensional Scale of Perceived Social Support; CSE = Collective Self-Esteem Scale.

* $p < .01$.

Principal component factor analysis was carried out on the eight-item PTSS to extract the minimum number of factors that explained the maximum variance in scale items. The extraction resulted in only one factor with an eigenvalue greater than one, this factor explained 50.07% of the variance in scale items (Table 2). All eight scale items have strong factor loadings, exceeding the minimum criterion of 0.30 (Table 2) (Nunnally & Bernstein, 1994; Tabachnick & Fidell, 2013). Construct validity was also supported by significant correlations in the expected direction with measures of suicide resilience, perceived social support, and collective self-esteem. Strong positive correlations were found between the PTSS and the Suicide Resilience Inventory, Perceived Social Support scale, and Collective Self-Esteem Scale ($r = 0.46$; 0.39 ; 0.26 respectively; $p < .01$), indicating that higher positive thinking was associated with greater suicide resilience, greater perceived social support, and greater collective self-esteem (Table 3).

Discussion

This study represents the first attempt to examine the reliability and validity of a measure of positive thinking; the 9-item Positive Thinking Skills Scale (PTSS) among undergraduate college students. The findings provide support for the scale's reliability and validity among college students. Reliability was demonstrated through good internal consistency; Cronbach's alpha was 0.86, exceeding the minimum criterion of 0.70 (Nunnally & Bernstein, 1994). This internal consistency estimate is consistent with the findings from previous studies that estimated the reliability and the validity of the PTSS. The first study reported an alpha of 0.90 in a sample of 109 caregivers of persons with ASD (Bekhet & Zauszniewski, 2013). The second study used the Turkish language of the PTSS and reported an alpha of 0.87 in Turkish university students ($n = 295$) (Akin et al., 2015). Similarly, PTSS yielded a Cronbach's alpha of 0.89 in a third study that involved acute care nurses ($n = 128$) (Tully, 2016).

Homogeneity of the PTSS scale was reinforced by item-to-total correlations (0.44 and 0.69) for all eight items. In other words, all eight items of the PTSS were correlated with the total scale in the optimal range (between 0.30 and 0.70), demonstrating the degree to which scale items measure the same concept (Ferketich, 1991). Reliability of the PTSS was also assessed by examining inter-item correlations, which

Table 4
The Positive Thinking Skills Scale Inter-Item Correlation Matrix.

Item	1	2	3	4	5	6	7	8
1. PTSS-1		0.44	0.45	0.42	0.28	0.55	0.41	0.53
2. PTSS-2			0.46	0.41	0.31	0.55	0.38	0.48
3. PTSS-3				0.44	0.25	0.48	0.45	0.40
4. PTSS-4					0.27	0.40	0.46	0.35
5. PTSS-5						0.40	0.35	0.39
6. PTSS-6							0.52	0.49
7. PTSS-7								0.60
8. PTSS-8								

should average between 0.30 and 0.70 (Nunnally & Bernstein, 1994). Applying this criterion, 89% of the 28 possible inter-item correlations fell within the desired range. No inter-item correlations were above 0.70, so none was indicative of redundancy (Table 4). The correlations that fell outside the recommended range might have reflected the sample characteristics and therefore require cautious interpretation.

The present study showed that the factor loadings of the scale in this sample of college students ranged from 0.55 to 0.79 suggesting that the PTSS scale is a valid measure. In other words, it measures the construct it is supposed to measure. Construct validity of the PTSS was supported in this study of U.S. undergraduate college students. As with other studies in which the PTSS was used, significant correlations with theoretically related constructs in the expected directions were found. Consistent with resilience theory, this study found that the PTSS correlated significantly with measures of suicide resilience, perceived social support, and self-esteem. The findings are also consistent with those found in a study of family members of persons with Autism Spectrum Disorders where positive thinking was found to be associated with measures of positive cognitions, resourcefulness, and general well-being (Bekhet & Zauszniewski, 2013). Ross, Boonyanurak, and Stopper (2014) found in a sample of undergraduate nursing students in Thailand, the students who used coping strategies such as emotional support from family and friends had less negative cognitions or worries.

Limitations of the study include collection of data from undergraduate college students in the U.S. with a sample from one university and the use of the internet in accessing the survey which may limit the generalizability of the findings. Another limitation is that the current study did not measure test-retest reliability as a vital indicator of the scale reliability. Therefore, future research might consider measuring other indicators of reliability, such as test-retest among undergraduate college students. Despite the study limitations, the findings from the study indicated evidence of the PTSS reliability and construct validity among undergraduate college students and suggest the use of the scale to effectively assess the frequency of use of specific positive thinking skills. Further psychometric testing with other populations is warranted to enhance the PTSS usefulness.

The PTSS scale has implications for practice. First, the PTSS scale can be used as a screening measure for suicide resilience. A study found positive thinking had a direct effect on suicide resilience indicating positive thinking plays a role in building one's resilience (Matel-

Anderson et al., 2018). The PTSS is a brief scale that takes five minutes to complete. Therefore, it can be used to identify which positive thinking skills are used by the students and which are not, so that appropriate interventions can be provided according to student's needs.

In fact, assessing students' frequent use of positive thinking skills will help early detection and prevention of depressive symptoms that might develop because of the stress experienced during ones' college years. The areas that are scored low could be improved through interventions to increase one's resilience. The PTSS can be used on a secondary level prevention. For example, for those students who are diagnosed with depression, the positive thinking skills can be taught to them and then the PTSS scale can be administered to identify which skills are used by them and how frequent they are using them. The PTSS can be given regularly to students to assess their progress in using the positive thinking skills.

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