Original article

The Positive Thinking Skills Scale: A screening measure for early identification of depressive thoughts

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ABSTRACT

Background: Depression is currently considered the second leading cause of disability worldwide. Positive thinking is a cognitive process that helps individuals to deal with problems more effectively, and has been suggested as a useful strategy for coping with adversity, including depression. The Positive Thinking Skills Scale (PTSS) is a reliable and valid measure that captures the frequency of use of positive thinking skills that can help in the early identification of the possibility of developing depressive thoughts. However, no meaningful cutoff score has been established for the PTSS.
Aim: To establish a cutoff score for the PTSS for early identification of risk for depression.
Methods: This study used a receiver operating characteristic (ROC) curve to establish a PTSS cutoff score for risk for depression, using the Center for Epidemiological Studies–Depression Scale (CES-D) as the gold standard measure.
Results: In a sample of 109 caregivers, the ROC showed that the cutoff score of PTSS that best classify the participants is 13.5. With this PTSS score, 77.8% of the subjects with low CES-D are classify correctly, and 69.6% of the subjects with high CES-D are classify correctly. Since the PTSS score should be integer numbers, functionally the cutoff would be 13.
Conclusion: The study showed that a cut off score of 13 is a point at which referral, intervention, or treatment would be recommended. Consequently, this can help in the early identification of depressive symptoms that might develop because of the stress of caregiving.

Depression is currently considered the second leading cause of disability worldwide as compared to it being the fourth leading cause of disability in 1990 and the third leading cause of disability in 2000 (Ferrari et al., 2013). In 2014, it was estimated that 6.7% (16 million American adults) of those aged 18 or older had at least one major depressive episode (National Institute for Mental Health, 2015). Depression is a serious and debilitating mental illness that affects people of all ages however; it is as twice likely to occur in females more than males (Kessler, 2003). Depression has a substantial impact on work productivity and it is associated with increasing morbidity and mortality as well as has a significant impact on the global burden and the health care costs (Furlanetto, Mendlowicz, & Romildo Bueno, 2005; Yeung, Overstreet, & Albert, 2007; Zauszniewski & Bekhet, 2012).

Positive thinking is a cognitive process that helps individuals to deal with problems more effectively, and has been proved to be a valuable strategy for dealing with hardship, including depression (Tod, Warnock, & Allmark, 2011; Bekhet & Zauszniewski, 2013). Positive thinking has been found to be associated with less depression, better quality of life, less burden, greater life satisfaction, better psychological and physical well-being (Appold, 2009; Bekhet, Johnson, & Zauszniewski, 2012; Bekhet & Zauszniewski, 2013; Dekker et al., 2009; Jung et al., 2007; Lightsey & Boyraz, 2011; Zauszniewski, Bekhet, & Suresky, 2009). In addition, positive thinking was found to have mediating effects on the relationship between caregiver's depression and their children's challenging behaviors (Bekhet, 2016).

Findings of a recent study indicated that high depressive cognitions in Autism Spectrum Disorder (ASD) caregivers were associated with lower positive thinking ($r = -0.39$; $p < 0.001$) (Bekhet, 2017). Therefore, early recognition of the positive thinking skills used by caregivers can help early detection of the possibility of developing depressive thoughts which is vital in preventing the development of clinical depression and suicide (Sousa, Zauszniewski, Mendes, & Zanetti, 2005; Bekhet & Zauszniewski, 2013). As suggested by Beck's cognitive theory of depression, the depressive thoughts, or in other words the automatic negative thoughts, precede the development of clinical depression (Beck, Brown, Steer, Eidelson, & Riskind, 1987).

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Therefore, early identification of the negative automatic thoughts is essential in preventing clinical depression and the costs associated with it. In 2013, in response to the need of positive thinking training intervention for caregivers and the lack of a direct measure of positive thinking intervention fidelity, a new eight-item Positive Thinking Skills Scale (PTSS), which measures the frequency with which intervention recipients use positive thinking skills, was developed (Bekhet & Zauszniewski, 2013). The PTSS is a reliable and valid measure that capture the frequency of use of positive thinking skills that will help in the early detection of the possibility of developing depressive thoughts and prevention of depressive symptoms that might develop because of caregiving. Thus, the purpose of this study was to determine a meaningful cutoff score on the PTSS, using a receiver operating characteristic (ROC) curve, to identify the point at which referral, intervention, or treatment would be recommended.

1. The Positive Thinking Skills Scale

The PTSS is an eight item skills scale with responses on a 4-point Likert scale, ranging from 0 = never to 3 = always. Scores may range from 0 to 24; the higher the scores, the higher the frequency of using the skills constitute positive thinking. Examples of the scale items are: "Transform negative thoughts into positive thoughts" and "Highlight positive aspects of the situation." The PTSS is reliable as indicated by a Chronbach's alpha of 0.90 (α = 0.90). Criterion validity was supported by significant correlations ($p < 0.01$) with positive cognitions ($r = 0.53$), resourcefulness ($r = 0.63$), depression ($r = -0.45$), and general well-being ($r = 0.40$) (Bekhet & Zauszniewski, 2013; Bekhet, 2017). The PTSS is different from the other measures in that it is a brief measure that takes only 5 min to complete and is a direct measure of intervention fidelity to skills that may be taught to caregivers during a positive thinking training. This measure can be used for assessing the skills used by caregivers and can be used to evaluate the frequency of using them.

The PTSS has been translated into Turkish (Akin, Uysal, & Akin, 2015). Results of confirmatory factor analysis in the Turkish language demonstrated that the eight items loaded on one factor in a sample of 295 university students. Internal consistency coefficient of the scale was 0.87 and the corrected item-total correlations ranged from 0.54 to 0.68. These results demonstrate that this scale is a valid and reliable instrument. Another study conducted by Tully (2016) aimed at examining the effects of positive thinking on the perception of practice environment stressors in hospital based US nurses. The results indicated that the PTSS is a reliable scale as indicated by a Cronbach's alpha of 0.89 in sample of 128 acute care nurses.

2. Method

2.1. Design

The study was a secondary analysis of data from a cross sectional study of 109 caregivers of persons with autism spectrum disorders (ASD). The original study used a cross-sectional descriptive design to assess the psychometric properties of the PTSS.

2.2. Sample, setting, and data collection

In the parent study, the sample included 109 caregivers of persons with ASD who were able to read and understand English, had Internet access, and resided in the United States. No potential participants were excluded based on gender, race, or socioeconomic status. Participants were recruited by convenience sampling from the Interactive ASD Network (IAN) Research registry service. The institutional review board (IRB) approval was obtained from the university. IAN contacted caregivers by email and sent them an IRB-approved flyer directing them to the Internet website (www.surveymonkey.com) where they accessed

the consent form and a link to the study questionnaires. Participants provided their email addresses at the end of the survey to claim their incentives and they were sent a code that could be redeemed for US$15 at www.amazon.com (Bekhet & Zauszniewski, 2013).

2.3. Instruments

Descriptive data on caregivers of persons with ASD were collected. In addition, measures of positive thinking and depression were collected.

Depression was measured by the CES-D (Radloff, 1977). The CES-D is a 20-item Likert-type scale ranging from 0 = rarely or none of the time to 3 = most or all of the time; it was designed originally to assess depressive symptoms in adults and proved to be acceptable to both general and clinical populations (Radloff, 1977). Participants are asked to indicate how frequently they experience depressive feelings and behaviors during the past week. Scores may range from 0 to 60, after reverse coding 4 items, with higher scores indicating the presence of more depressive symptoms.

The CES-D has reported internal consistency with a Cronbach's alpha of 0.92 in mothers of children with ASD (Ekas, Whitman, & Shivers, 2009). Criterion validity of the CES-D was supported by significant correlations in the expected direction with the Hamilton Clinician's Rating Scale and with the Raskin Rating Scale (Radloff, 1977).

2.4. Analysis

Data were analyzed using R 3.3.3 (R Core Team, 2017). Descriptive statistics are presented along with measures of reliability for the scales. The reliability was evaluated with the Maximal Reliability (MR) coefficient. MR estimates the reliability of a scale assuming items have a different weight into it. MR is the maximal possible reliability for a linear combination of the scale items. MR involves the estimation of the optimal linear combination (OLC), which are the weights for each item, OLC represents the different item weights for MR. MR measures reliability of a scale, unlike Cronbach alpha which estimate inter item correlation (Raykov, 2012; Li, 1997). MR is estimated with the R package semTools (semTools Contributors, 2017).

The CES-D was the criteria to classify participants as those with and without relevant clinical depressive symptoms. For the CES-D a score of 16 is used to differentiate relevant clinical depressive symptoms (Radloff, 2007).

A receiver operating characteristic curve analysis (ROC) is used to identify the probability of proper classification based of different scores of the positive thinking scale (PT). The ROC determines the ability of the PT to differentiate between participants with and without relevant clinical depressive symptoms based of the CES-D classification.

The ROC analysis estimates the sensitivity and sensibility of classification for different scores of PT, sensitivity is the probability that PT model classify $\hat{y} = 1$ when y = 1 is present in our observations (true positives); an sensibility is the probability that our model classify $\hat{y} = 0$ when y = 0 in present in our observations (true negatives). From these estimates the optimal cutoff score is chosen in function of a desire balance between them. The ROC gives an estimate of area under the curve (AUC) which represents an overall performance of the PT score to classify participants correctly, a 1.0 (100%) indicates that PT classify subjects with perfect accuracy, the accuracy of the AUC has been evaluated as 0.50 to 0.70 = low; 0.70 to 0.90 = moderate; and > 0.90 = high (Streiner & Cairney, 2007).

3. Results

The sample consists of 109 participants, 96.3% are female, 88.1% are Caucasian, 10.1% are Hispanic, and 1.8 are African American; the average age in the sample was 42.02 (SD = 7.0). Table 1 shows the