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# Measuring Use of Positive Thinking Skills: Psychometric Testing of a New Scale

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## Abstract

Positive thinking interventions improve adaptive functioning and quality of life in many populations. However, no direct measure of positive thinking skills taught during intervention exists. This psychometric study of a convenience sample of 109 autism spectrum disorder (ASD) caregivers examined a new eight-item Positive Thinking Skills Scale (PTSS), which measures the frequency of use of positive thinking skills. The PTSS was found to be internally consistent ( $\alpha = .90$ ). Construct validity was supported by significant correlations ( $p < .01$ ) with positive cognitions ( $r = .53$ ), resourcefulness ( $r = .63$ ), depression ( $r = -.45$ ), and general well-being ( $r = .40$ ). The findings support use of the PTSS as a potential indicator of intervention fidelity among ASD caregivers. However, because it is not specific

for ASD caregivers, the PTSS has the potential for wider usage in other populations for whom the identification of specific positive thinking skills could provide direction for future intervention.

## Keywords

mental health, clinical focus, anxiety/stress, health behavior/symptom focus, descriptive quantitative, methods, caregivers, population focus

Professionals in the psychological, social, and nursing sciences value positive thinking and have developed strategies for teaching, enhancing, and reinforcing it (Appold, 2009). Positive thinking interventions have shown increases in adaptive functioning and enhanced quality of life in various populations (Appold, 2009; Dekker, Peden, Lennie, Schooler, & Moser, 2009; Jung et al., 2007; Lightsey & Boyraz, 2011). However, there is currently no direct measure of specific positive thinking skills that can be easily taught to persons within an intervention. This study examined the psychometric properties of a new eight-item Positive Thinking Skills Scale (PTSS), which measures the frequency with which intervention recipients use positive thinking skills.

## Positive Thinking in Caregivers

The rate of autism spectrum disorders (ASD) diagnoses has increased dramatically over the last three decades (Lord & Bishop, 2010); it is estimated that 1 out of 88 American children has ASD (Centers for Disease Control and Prevention, 2012). ASD is a complex neurodevelopmental disorder that affects the child's reciprocal communication, social interactions, and behavioral patterns throughout his or her life span (American Psychiatric Association, 2000). In fact, raising a child with ASD can be overwhelming and can place a great burden on caregivers (Karst & Van Hecke, 2012). Literature review demonstrated that family caregivers of persons with ASD have reported higher burden, depression, anxiety, and poor quality of life (Blacher & McIntyre, 2006; Carbone, Behl, Azor, & Murphy, 2010; Davis & Carter, 2008; Hastings et al., 2005; Montes & Halterman, 2007). In addition, research has shown that parents of persons with ASD are at higher risk for developing depression than parents of normally developed children (Benson, 2006).

A recent descriptive research conducted by Bekhet, Johnson, and Zauszniewski (2012) has shown that positive thinking attenuated the effects of caregivers' burden and enhanced their levels of resourcefulness and psychological well-being in a sample of 95 caregivers of persons with ASD (Bekhet et al., 2012). In addition, it has been documented that research on interventions to help children with ASD and their families is relatively limited (Karst & Van Hecke, 2012). Furthermore, it has been suggested that caregivers of persons with ASD might benefit from a positive thinking training intervention (Bekhet et al., 2012) to help them not only to survive the day to day burdens associated with ASD but also to help them to grow psychologically and become healthier, stronger, and more flexible persons.

However, before delivering the positive thinking training intervention to caregivers of persons with ASD, a measure of intervention fidelity, that is, whether the intervention was implemented according to a planned protocol, is needed (Dumas, Lynch, Laughlin, Phillips Smith, & Prinz, 2001; Zauszniewski, 2012; Zauszniewski & Bekhet, 2011). One of the methods that have been pointed out in the literature

to obtain information on fidelity is the use of a reliable and valid scale to evaluate the content of the intervention. For instance, in the case of the positive thinking training intervention, measuring the degree to which intervention recipients report their use of the positive thinking skills taught to them would provide useful evaluative information concerning the delivery of the positive thinking training and whether it adhered to the prescribed protocol (Dumas et al., 2001; Zauszniewski, 2012; Zauszniewski & Bekhet, 2011). Therefore, the purpose of this study is to develop and to test the psychometric properties of the PTSS as a measure of intervention fidelity that is designed to capture the frequency of use of eight skills for thinking positively.

Positive thinking is a cognitive process that creates hopeful images, develops optimistic ideas, finds favorable solutions to problems, makes affirmative decisions, and produces an overall bright outlook on life. However, positive thinking does not ignore the need for realistic appraisal. Rather, it acknowledges both the negative and positive aspects of issues, events, and situations, and then favors movement toward a positive focus and interpretation. Positive thinking has been suggested as a useful strategy for coping with adversity, including illness (Tod, Warnock, & Allmark, 2011). Two benefits of positive thinking for those who are ill are greater ability to cope with the experience of illness and with the treatment needed for illness, and increased likelihood of a favorable health outcome, such as cure or remission (McGrath, Jordens, Montgomery, & Kerridge, 2006; Naseem & Khalid, 2010). In addition, there is evidence that positive thinking is generally associated with better quality of life, less depression, greater life satisfaction, enhanced psychological and physical well-being, and a sense of meaning in life (Appold, 2009; Dekker et al., 2009; Jung et al., 2007; Lightsey & Boyraz, 2011; Zauszniewski, Bekhet, & Suresky, 2009).

However, blind acceptance of positive thinking as the major strategy for coping with life has been called into question (McGrath et al., 2006; Tod et al., 2011), and negative consequences of positive thinking have been identified, particularly among persons with cancer (Ruthig, Holfeld, & Hanson, 2012). For example, some researchers have argued that asking persons with cancer to think positively may impose on them a psychosocial burden grounded in feelings of self-blame, guilt, or worthlessness (McGrath et al., 2006; Naseem & Khalid, 2010; Tod et al., 2011). Others have argued, however, that a diagnosis of cancer presents a complex situation that sets it apart from other life situations, for which positive thinking may yield beneficial outcomes (Naseem & Khalid, 2010).

Although the positive thinking movement dates back to the years following the Great Depression, it has recently become more popular and is now being applied across many disciplines, including business, psychology, social work, and health care. In psychology and psychiatry, cognitive theories of depression emerged in the late 1960s, and some of these theories focused on the effects of negative automatic thoughts in generating depressive symptoms (Beck, 1967, 1976). For clinicians and researchers to assess the thought processes of persons at risk for depression, initially, self-report questionnaires were developed to measure negative automatic thoughts, including the Automatic Thoughts Questionnaire–Negative (ATQ-N), developed by Hollon and Kendall (1980). The ATQ-N is based on the premise that negative thinking is central to depressive illness. However, Ingram and Wisnicki (1988) argued that a full cognitive assessment was incomplete without an evaluation of positive thoughts, and therefore they developed a parallel measure of positive automatic thoughts, the ATQ-P.

The Hollon and Kendall (1980) measure consists of 30 negative self-statements and asks respondents to rate the frequency with which these or similar self-statements occur over the previous week. The ATQ-N has widely reported reliability and validity across multiple studies and in various populations. The Ingram and Wisnicki (1988) measure contains 30 positive self-statements to assess the presence of positive automatic cognitions. Respondents are asked to rate the frequency with which these positive self-statements occurred over the previous week. The ATQ-P was found to be a reliable and valid measure; however, its correlation with the ATQ-N was not substantial, suggesting that negative and positive thinking are independent concepts and not likely to reflect opposite ends of a continuum (Bryant & Baxter, 1997; Ingram & Wisnicki, 1988).

One year later, Kendall, Howard, and Hayes (1989) proposed a 10-item subscale to be added to the ATQ-N, to reflect positive cognitions. Burgess and Haaga (1994) compared the 30-item measure developed by Ingram and Wisnicki (1988) and Hollon and colleagues' 10-item subscale. The two measures were found to be internally consistent and to be correlated highly with each (Burgess & Haaga, 1994). However, while both of the instruments measure positive cognition, they do not capture the positive thinking skills, which individuals may use to preserve or promote their mental health. Furthermore, no psychometric studies of measures of positive automatic thoughts and such outcomes as life satisfaction, psychological well-being, or other positive outcomes have been published.

In 1989, the Global Constructive Thinking Inventory (CTI) was developed by Epstein and Meier to measure different kinds of constructive thought content and processes. The CTI has six subscales, namely, Emotional Coping, Behavioral Coping, Categorical Thinking, Superstitious Thinking, Naive Optimism, and Negative Thinking (Epstein & Meier, 1989). As discussed by the developers of the CTI "it is a broad-band measure that predicts many variables moderately well, but does not predict specific behaviors as well as the narrower, more focused scales" (Epstein & Meier, 1989, p. 344). Therefore, there is a need to a specific and psychometrically sound scale that measures the frequency of use of positive thinking skills that might be taught to caregivers during a positive thinking training intervention.

Another scale that has been addressed extensively in the literature is the Attributional Style Questionnaire (ASQ). The ASQ consists of 48 items that assess an individual's explanatory style (positive vs. negative; Peterson et al., 1982; Seligman, Abramson, Semmel, & Baeyer, 1979). Explanatory style is a cognitive personality variable that indicates how the person might explain the causes of events (Peterson, 1991). The questionnaire consists of 12 hypothetical events; 6 of them are good and 6 are bad. The scale consists of four subscales: (a) Achievement Situations With a Good Outcome, (b) Achievement Situations With a Bad Outcome, (c) Affiliation Situations With a Good Outcome, and (d) Affiliation Situations With a Bad Outcome. For each situation, the participant was asked to name the one major cause of the outcome that he or she described. The participants then rated each cause on a 7-point scale for degree of internality, stability, and globality (Peterson et al., 1982), and rated the degree of importance each situation would be if it happened to them. The reliabilities for the subscales range from .39 to .64 (Seligman et al., 1979).

Although the Attributional Style Scale measures a cognitive personality variable and may reflect the individual's explanatory style, it does not capture the positive thinking skills that might be taught during the positive thinking training intervention as the PTSS does.

In a recent research conducted by Caprara and Steca, positive thinking was assessed by measuring life satisfaction, self-esteem, and optimism using three different scales. These scales are the 5-Item Set of Life Satisfaction Scale, 10-Item Set of Life Orientation Test, and the 10-Items Self-Esteem Scale (Caprara & Steca, 2006). However, the authors in the present study are interested in measuring the frequency of use of specific skills constituting positive thinking as a direct measure of intervention fidelity.

The PTSS was therefore developed to capture the frequency of use of eight strategies for thinking positively. Grounded in cognitive-behavioral theory, the skills measured in the scale reflect cognitive activities to increase positive thoughts and eliminate or modify negative ones. Thus, the measure recognizes both negative and positive aspects of cognition while capturing the frequency with which respondents use the skills directed toward achieving positivity. Half of the scale items focus on supporting positive thoughts, whereas the other half highlight the need to change from negative to positive thinking; higher scores on the measure indicate more positive thinking. This measure holds great promise in its ability to capture strategies used by individuals to maintain a positive outlook. However, lower scores may suggest the need to interventions directed toward encouraging more positive thinking.

This study evaluated the reliability and the validity of the eight-item PTSS as a measure of the enactment of positive thinking skills.

The PTSS has been developed as a measure of intervention fidelity of the eight skills that is designed to be taught during a positive thinking training intervention session. The intervention and the scale were developed by the authors. For the intervention and the scale development, the panel consists of two nursing faculty (the investigator and the coinvestigator), who have extensive experience working in the area of mental health and cognitive-behavioral therapy, and one medical doctor. The coinvestigator is the developer of the Depressive Cognition Scale (DCS) that measures positive cognitions (Zauszniewski, 1995). In addition, the investigator and the coinvestigator found that a cut score of 7 on the DCS would be that point at which individuals should begin initiating strategies to change negative thoughts into positive ones (Zauszniewski & Bekhet, 2012). For the present study, an extensive literature review and a review of existing positive thinking instruments were used in both the intervention development and the instrument development. The panel reviews the literature independently and concurrently. This process resulted in the initial identification of the skills constituting positive thinking, which was believed to capture the positive thinking skills to be taught during positive thinking training skills intervention. Mnemonic strategies are used to facilitate learning and recall (Hampstead et al., 2012; Zauszniewski & Bekhet, 2011). The panel decided to use the acronym "THINKING" to group the skills and to facilitate learning and recall. Again, the panel work independently and concurrently to come up with the skills within the acronym THINKING. The panel met and discussed the skills within the acronym until they reached 100% agreement. An *acronym*, by definition, is formed by the first letter of words or groups of words to form a new word. The acronym uses the eight letters spelling *THINKING* to prompt recall of specific positive thinking skills as follows: *Transforming* negative thoughts into positive thoughts, *Highlighting* positive aspects of the situation, *Interrupting* pessimistic thoughts by using relaxation techniques and distraction, *Noting* the need to practice positive thinking, *Knowing* how to break a problem into smaller parts to be manageable, *Initiating* optimistic beliefs with each part of the

problem, Nurturing ways to challenge pessimistic thoughts, Generating positive feelings by controlling negative thoughts.

In addition to using of the acronym as a mnemonic strategy, chunking is also used as another mnemonic strategy (Thornton & Conway, 2013). *Chunking* refers to the common rule that a person can remember between five and nine things at one time. The word *THINKING* contains eight letters, which is a reasonable “chunk” of ideas for the caregivers to remember. As PTSS has been developed to be used as a direct measure of intervention fidelity, we used the same acronym THINKING for the PTSS to measure the frequency of use of the eight skills by caregivers.

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. It is also using mnemonic strategies (acronym and chunking) to facilitate retention and recall; thus, this measure can be used for assessing the skills used by caregivers and can be used to evaluate the frequency of using them.

This study, therefore, evaluated the psychometric properties of the eight-item PTSS as a measure of the enactment of positive thinking skills.

## Method

### Design

A cross-sectional descriptive design was used to assess the psychometric properties of the PTSS, which measures the enactment of positive thinking skills. The study was conducted with caregivers of persons with ASD.

### Sample

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 on the basis of gender, race, or socioeconomic status.

### Data Collection

Participants were recruited by convenience sampling from the Interactive ASD Network (IAN) Research registry service provided by the Kennedy Krieger Institute and Johns Hopkins Medicine–Baltimore, and sponsored by the ASD Speaks Foundation ([http://www.iancommunity.org/cs/subject\\_recruitment\\_materials/overview](http://www.iancommunity.org/cs/subject_recruitment_materials/overview)). 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](http://www.surveymonkey.com)) where a consent form and a link to the study questionnaires were housed. Those who chose to accept the incentive provided their email address at the end of the survey and were sent a code that could be redeemed for US\$15 at [www.amazon.com](http://www.amazon.com).

### Instruments

Descriptive data on caregivers of persons with ASD were collected. In addition, measures of positive cognitions, depression, general well-being, and resourcefulness were administered to measure construct validity since they are theoretically related to positive thinking skills.

In addition to collecting demographic and descriptive information about caregivers of persons with autism, we administered the eight-item PTSS to measure the frequency of use of eight specific skills. On the PTSS, respondents are asked how frequently they use each of the eight skills on a 4-point scale ranging from 0 = *never* to 3 = *always*. Examples of the scale items are “Transform negative thoughts into positive thoughts” and “Know how to break a problem into smaller part to be manageable.” Scores may range from 0 to 24 with higher scores indicating more frequent use of positive thinking skills.

To establish validity, we administered another measure of positive cognitions and three measures of theoretically related constructs. The other measure of positive cognitions was the DCS (Zauszniewski, 1995). The measures of theoretically related constructs were the Resourcefulness Scale (RS; Zauszniewski, Lai, & Tithiphontumrong, 2006), the Center for Epidemiologic Studies–Depression Scale (CES-D), and the General Well-Being Schedule (GWB; Dupuy, 1984).

The eight-item DCS (Zauszniewski, Chung, Krafcik, & Sousa, 2001) measures depressive cognitions when scoring is reversed. However, in this study, the scores were not reversed so as to measure positive cognitions; the scale has also been used previously to measure positive cognitions (Bekhet, Zauszniewski, & Wykle, 2008). Respondents indicate the degree to which each statement describes their current thoughts on a 6-point Likert-type scale ranging from 0 = *strongly disagree* to 5 = *strongly agree* (Zauszniewski, 1995). Scores may range from 0 to 40. The DCS has reported internal consistency with Cronbach’s alphas ranging from .75 to .87 (Zauszniewski, McDonald, Krafcik, & Chung, 2002; Zauszniewski & Suresky, 2010). Construct validity was supported by correlations in the expected directions ( $p < .001$ ) with caregiver burden, resourcefulness, sense of coherence, and quality of life ( $r_s = .40, -.65, -.77, -.70$ , respectively; Zauszniewski & Suresky, 2010). Confirmatory factor analysis produced a single factor with 48% of the variance explained, and factor loadings  $>.45$  for all items (Zauszniewski & Suresky, 2010).

The 28-item RS measures both personal (self-help) resourcefulness (16 items) and social (help-seeking) resourcefulness (12 items). Respondents indicate the degree to which each item describes their behavior, ranging from 0 = *extremely nondescriptive* to 5 = *extremely descriptive*. Scores may range from 0 to 140, with higher scores indicating greater resourcefulness. The scale is reliable as indicated by a Cronbach’s alpha of .85. Evidence of construct validity was supported by confirmatory factor analysis indicating the presence of the two forms of resourcefulness: the 16 items on the Personal Resourcefulness subscale loaded cleanly on one factor, while the 12 items on the Social Resourcefulness subscale loaded cleanly on a second factor; no items had cross loadings that exceeded .30, and substantial intercorrelations between the two factors further supported the scale’s construct validity (Zauszniewski et al., 2006).

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 .92 in mothers of children with ASD (Ekas, Whitman, & Shivers, 2009). Principal components factor analysis revealed four factors that together explained 48% of the variance. Construct 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).

General well-being was measured by the GWB (Dupuy, 1984), a self-administered questionnaire that offers a broad indicator of well-being and distress. The GWB questionnaire is composed of 18 items; the first 14 items use a 6-point Likert-type scale representing intensity or frequency, and the remaining 4 items use 0 to 10 rating scales defined by adjectives at each end. Scores can range from 0 to 110 after reverse coding 8 items; 14 is subtracted from the total score in the scoring system described by Dupuy (1984). The GWB identifies three types of disorders: scores of 0 to 60 reflect severe distress, 61 to 72 reflect moderate distress, and 73 to 110 reflect positive well-being (Dupuy, 1984). Reliability was demonstrated by high internal consistency, .92, in a sample of Black women (Taylor et al., 2003). Construct validity was demonstrated by significant correlations in the expected directions with Zung's Self-Rating Depression Scale and the Personal Feeling Inventory (.66 and .78, respectively; Fazio, 1977).

## Analysis

Data were analyzed using the PASW Statistical Package for the Social Sciences software version 18.0. Descriptive statistics were used to examine the demographics and main study variables. The psychometric analysis consisted of computing Cronbach's alpha coefficient, interitem correlations, and item-to-total correlations to determine the internal consistency and homogeneity of the PTSS. Factor analysis was conducted to assess scale dimensionality and construct validity. In addition, the correlation between the total scores on the PTSS and the DCS was examined for criterion validity. In addition, construct validity was evaluated by significant correlation in the expected direction with measures of depression, resourcefulness, and psychological well-being.

## Results

### Descriptive Statistics

The 109 caregivers who participated in the study had an average age of 42 years ( $SD = 7$ ; range 24-58 years). All except 4 were female caregivers. The majority (88% of the sample) were Caucasian ( $n = 96$ ), 10% were Hispanic ( $n = 11$ ), and only 2 caregivers were African American; 37.6% had completed a college degree ( $n = 41$ ), 31.2% had an associate degree or some college education, 26.6% had graduate or professional training, and 4.6% had a high school diploma. More than half of the sample (57.8%) reported an annual income equal to or greater than US\$45,000. More than half (55%) reported their health as good, and 23.9% reported their health as excellent; approximately one fifth (21.1%) reported their health as fair. All the sample except for 2 caregivers lived in the same household with the family member who had ASD ( $n = 107$ ), and the other 2 caregivers reported that they lived with the person with ASD part of the time. Most (80.7%) of the caregivers said that they provided direct care to their family member who had ASD. Almost all the participants of the sample (94.5%) reported that they are either a father or a mother of the person with ASD ( $n = 103$ ). Interesting enough, 5 caregivers (4.6%) reported that they are a son or a daughter of persons with ASD. One caregiver reported the relationship to the individual with ASD as "other" than father, mother, cousins, daughter, or son, but

he or she did not specify the relationship. The age range of the persons with ASD ranged from 2 years to 21 years old as reported by their caregivers. In all, 7 caregivers reported that they have two children diagnosed with ASD, and 1 caregiver reported having three children diagnosed with ASD.

### Psychometrics of the PTSS

The means, standard deviations, and ranges on measures of the PTSS are displayed in Table 1. Normality was assessed using the Shapiro–Wilk test;  $p$  values greater than the significance level denote normally distributed data (Sen & Srivastava, 1990). Using this test, the PTSS was found to be normally distributed ( $p = .1195$ ).

Table 1. Descriptive Statistics for the Positive Thinking Skills Scale and Construct Validation Measures in Caregivers of Persons With Autism.

Validating construct	Measures	<i>M</i> ( <i>SD</i> )	Possible range	Actual range	Cronbach's $\alpha$
Positive thinking skills	The Positive Thinking Skills Scale	14.28 (4.94)	0-24	2-24	.90
Positive cognitions	The Depressive Cognition Scale <sup>a</sup>	32.70 (5.22)	0-40	13-40	.86
Resourcefulness	The Resourcefulness Scale	92.28 (18.45)	0-140	50-140	.90
General well-being	The General Well-Being Schedule	62.47 (15.48)	0-110	19-94	.89
Depression	The Center for Epidemiologic Studies–Depression Scale	17.11 (12.21)	0-60	2-54	.93

Note:  $N = 109$ .

<sup>a</sup>The Depressive Cognition Scale measures positive cognitions when scores are not reversed.

### Reliability

Cronbach's alpha for the eight-item PTSS was .90, indicating acceptable internal consistency (Nunnally & Bernstein, 1994). In addition, there was evidence that the internal consistency of the scale would not be improved if any of its items were deleted (Table 2), and 79% ( $n = 22$ ) of the 28 possible interitem correlations were between  $r = .30$  and  $r = .70$ , further supporting internal consistency (Table 3). One interitem correlation fell below the minimum of .30, and five interitem correlations were above the maximum of .70. Item-to-total scale correlations were also examined to determine the homogeneity of the PTSS (Cronk, 2004); 63% of these item-to-total scale correlations were within the recommended range of .30 to .70 (Table 2).

Table 2. The Positive Thinking Skills Scale Item Analysis and Factor Analysis.

Item	Alpha if item deleted	Corrected item- total correlation	Factor loadings	Communality values
1. Transform negative thoughts	.88	.70	.79	.62
2. Highlight positive aspects	.89	.67	.76	.58

3. Interrupt pessimistic thoughts	.88	.69	.78	.60
4. Practice positive thinking	.90	.46	.55	.30
5. Break a problem	.89	.57	.66	.43
6. Initiate optimistic beliefs	.88	.76	.83	.69
7. Challenge pessimistic thoughts	.87	.83	.88	.77
8. Generate positive feelings	.87	.79	.85	.72

Note:  $N = 109$ .

Table 3. PTSS Interitem Correlation Matrix.

Item	PTSS-1	PTSS-2	PTSS-3	PTSS-4	PTSS-5	PTSS-6	PTSS-7	PTSS-8
PTSS-1		.78	.51	.37	.37	.57	.61	.57
PTSS-2			.50	.33	.33	.60	.53	.53
PTSS-3				.33	.51	.55	.71	.60
PTSS-4					.28	.35	.44	.44
PTSS-5						.49	.56	.54
PTSS-6							.73	.71
PTSS-7								.74
PTSS-8								

Note: PTSS = Positive Thinking Skills Scale.  $N = 109$ .

All of the correlations were statistically significant at  $< .001$ .

### Validity

Criterion validity was examined by comparing the PTSS to established, psychometrically sound measure of positive cognitions, including the DCS (Zauszniewski, 1995). The DCS measures positive cognitions when scores are not reversed. The DCS queries respondents about their general use of positive cognitions in specific situations but does not provide information about the frequency of use of specific positive thinking skills, as the PTSS does. A significant positive correlation was found between the PTSS and the DCS ( $r = .53, p < .01$ ).

Construct validity was determined by examining the strength, direction, and significance of the correlations between the PTSS and measures of theoretically related constructs. Significant correlations in the expected directions were found between the PTSS and resourcefulness ( $r = .63, p < .01$ ), depression ( $r = -.45, p < .01$ ), and general well-being ( $r = .40, p < .01$ ) indicating that more frequent use of positive thinking skills is associated with fewer depressive symptoms, and better resourcefulness and psychological well-being.

The means, standard deviations, and ranges on measures of positive cognitions, resourcefulness, general well-being, and depression are shown in Table 1.

Exploratory factor analysis was used to further examine the construct validity of the PTSS scale in this sample of caregivers of persons with ASD. Since the scale was new and no previous studies had

reported information on the basic dimensions underlying the scale, exploratory factor analysis was used (Fabrigar, Wegener, MacCallum, & Strahan, 1999). Before conducting the analysis, the adequacy of the sample and the data were examined in relation to specific statistical parameters (Strickland, 2003). The sample size of 109 exceeded the minimum requirement of 5 to 10 participants per item on a scale that is recommended for factor analysis (Bekhet & Zauszniewski, 2010; Nunnally & Bernstein, 1994; Sousa, Zanetti, Zauszniewski, Mendes, & Daguano, 2008; Stevens, 2002). In addition, the Kaiser-Meyer-Olkin index of sampling adequacy of .87 exceeded the recommended value of .60 (Kaiser, 1974; Tabachnick & Fidell, 2001). In addition, Bartlett's test of sphericity ( $\chi^2 = 498.85$ ,  $p < .001$ , determinant = .008) indicated that the correlation matrix was suitable for factor analysis (Strickland, 2003).

The data from the eight-item PTSS were then subjected to factor analysis. The principal axis factoring method of extraction with varimax rotation was used to extract the minimum number of factors that explained the maximum variance in the items of the PTSS scale. An inspection of eigenvalues and the scree plot revealed a single factor that explained 59% of the variance. As shown in Table 2, all the items loaded cleanly on one factor

## Discussion

This article reports the first analysis of the reliability and validity of a measure of positive thinking skills among caregivers of persons with ASD. Reliability of the PTSS was demonstrated by an alpha coefficient of .90, exceeding the recommended minimum of .70 (Nunnally & Bernstein, 1994). Collectively, the skills captured by the PTSS reflect an individual's positive thinking, and consistent measurement of these skills is important for assessing intervention fidelity, defined as the competent delivery on an intervention that adheres to a prescribed protocol (Horner, Rew, & Torres, 2006; Santacrose, Maccarelli, & Grey, 2004; Zauszniewski & Bekhet, 2011).

A study of the DCS, which measures positive cognitions when scores are not reversed, also reported an alpha of .90 in a sample of 95 caregivers of persons with ASD (Bekhet et al., 2012), and another study reported an alpha of .87 in a sample of 60 women family caregivers of persons with serious mental illness (Zauszniewski & Suresky, 2010).

In this study, 63% of the item-to-total scale correlations were within the recommended range of .30 to .70. In other words, five of the eight PTSS items were correlated with the total scale in the optimal range (between .30 and .70), demonstrating the degree to which scale items measure the same concept (Ferketich, 1991). This is consistent with the findings of a study of the DCS, in which five of the eight items were within the recommended range of .30 to .70 (Bekhet & Zauszniewski, 2012). The three items that exceeded the .70 criteria in this study of caregivers of persons with ASD were initiate optimistic beliefs, challenge pessimistic thoughts, and generate positive feelings by controlling negative thoughts. These items also were strongest in the factor analysis, indicating that negative cognitions were of greatest concern to caregivers of persons with ASD.

In this study, 79% ( $n = 22$ ) of the 28 possible interitem correlations were between  $r = .30$  and  $r = .70$ . One interitem correlation fell below the minimum of .30, and five were above the maximum of .70. The correlations that fell outside the recommended range might have reflected the sample characteristics and therefore require cautious interpretation.

The study showed that the factor loadings of the PTSS ranged from .55 to .88 suggesting that the PTSS is a valid measure. That is, the PTSS measures the construct it purports to measure, and it approximates a previously established “gold standard” measure (Zauszniewski, 1995). Although the PTSS should be tested further with more diverse populations, among caregivers of persons with ASD, the PTSS provides a preliminary evidence of its validity for evaluating the positive thinking skills taught during positive thinking training.

The newly developed eight-item PTSS differs from other measures of positive thinking in that it measures the frequency of use of specific positive thinking skills, which may be taught during positive thinking training. Positive thinking skills include transforming negative thoughts into positive thoughts, highlighting positive aspects of the situation, interrupting pessimistic thoughts by using relaxation techniques and distraction, practicing positive thinking, breaking a problem into smaller parts, initiating optimistic beliefs with each part of the problem, and generating positive feelings by controlling negative thoughts.

Convenience sampling and the use of the Internet to recruit the sample limited the generalizability of the findings. Results will be only generalizable to those who use Internet. Given the reality that currently more and more people are using the Internet, an advantage could be the ability to recruit a national sample. Also, this study did not collect data regarding the specific diagnosis of persons with ASD that might have effects on the caregivers’ thinking, resourcefulness, well-being, and depression. Therefore, we recommend that future research might collect data regarding the specific diagnosis and the role it might play on shaping the experiences of caregivers. Also, the study did not address important indicators of scale reliability, such as test–retest reliability. Therefore, future research might consider measuring test–retest reliability of the PTSS. Despite these limitations, the findings from the study provide promising evidence of the reliability and construct validity of the PTSS and suggest that the PTSS effectively assesses the frequency of use of specific positive thinking skills. However, to enhance the usefulness of the scale, further psychometric testing with other populations is needed.

The scale has implications for practice. This scale can be used by nurses and health care professionals to plan for primary and secondary prevention strategies to help caregivers of persons with ASD to retain, attain, or maintain their psychological well-being. Primary prevention is directed toward promoting caregivers’ wellness by preventing or decreasing the stress and burden of caregivers, especially those who are at high risk of developing stress and depression. Those could be caregivers who have recently learned about their child diagnosis. In fact, assessing caregivers’ frequent use of positive thinking skills will help early detection and prevention of depressive symptoms that might develop as a result of caregiving. This eight-item PTSS is a brief scale that takes around 5 min to complete. The PTSS will help the health care providers to identify which of the positive thinking skills are used by caregivers so these skills can be reinforced and which ones are not used so that they need to be taught for better outcomes to caregivers of persons with ASD. The PTSS can be used on a secondary level prevention. For example, for those caregivers who are diagnosed with depression, the positive thinking skills can be taught to them and then the scale can be administered to identify which skills are used by them and how frequent they are using them. Because the scale consists of only eight items, it can be administered frequently, and it can help in assessing the progress in using these skills.

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