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Psychometric Assessment of the Depressive Cognition Scale Among Caregivers of Persons with Autism Spectrum Disorder

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Abstract

Caregivers of persons with autism spectrum disorders (ASD) are prone to depression, and early identification of cognitive depressive symptoms is important to prevent the development of clinical depression. The Depressive Cognition Scale (DCS) can be used for early detection, but the scale's psychometrics has not been tested in caregivers of persons with ASD. In this study, 95 caregivers of persons with ASD completed the eight-item DCS and measures of caregiver burden and resourcefulness. A Cronbach's alpha of .90 indicated internal consistency. Construct validity was

supported by significant correlations with caregiver burden (.59) and resourcefulness (– .57). Principal component factor analysis produced a single factor with 58% of the variance explained. The findings suggest the DCS is useful for early detection of depression in caregivers of persons with ASD.

In the United States, 2.8 million people have autism spectrum disorder (ASD) (Rice, 2009), a complex developmental disability that affects a person's ability to communicate and to interact socially. Persons with ASD can be aggressive, anxious, overactive, and self-injurious (Hoffman et al., 2008, Matson and Fodstad, 2009). ASD symptoms emerge before age three (APA, 2000), and caregiving for these children is demanding, and often overwhelming, and can affect family caregivers' physical and psychological well-being (Altiere and Von Kluge, 2009, Baker et al., 2005, Benson, 2006, Benson et al., 2008, Gray, 2006, Phetrasuwan and Miles, 2009).

Caregiver burden results from the child's problem behaviors, life-long dependency, and lack of social interactions, as well as financial difficulties, frustration, anxiety, reduction in leisure activities, and worry about the future (Baker et al., 2005, Benderix et al., 2006, Benson, 2006, Carbone et al., 2010, Montes and Halterman, 2007). Previous research has indicated that caregivers report depressive symptoms associated with the burden of providing care to persons with ASD (Benson, 2006, Benson and Karlof, 2009, Carter et al., 2009, Ekas et al., 2010). In addition, recent research indicates that persons with ASD themselves may experience anxiety and depression (Strang et al., 2012), which can in turn increase caregivers' depression and anxiety. Parents of persons with ASD have been shown to be at higher risk for developing depression than parents of normally developed children (Benson, 2006). In turn, caregiver depression can be a factor in chronic illnesses such as heart disease, diabetes, and cancer (Steptoe, 2007).

The Center for Epidemiological Studies Depression Scale is the scale most widely used scale to assess depressive symptoms among caregivers of persons with ASD (CES-D; Radloff, 1977) (Benson and Karlof, 2009, Carter et al., 2009, Davis and Carter, 2008, Ekas et al., 2010, Ekas and Whitman, 2010, Ekas et al., 2009, Magana and Ghosh, 2010, Smith et al., 2008). In addition, the Self- Rating Depression Scale by Zung (1965) has been used to assess depressive symptoms in mothers of children with autism and compared these depressive symptoms to mothers of children without autism (Tunali & Power, 2002). The Hospital Anxiety and Depression scale (HADS; Zigmond & Snaith, 1983) is also used to assess parents of children with ASD mental health (Hastings et al., 2005, Lloyd and Hastings, 2009). However, although these scales are widely used and they have acceptable reliability and validity, they all measure a constellation of symptoms that may reflect clinical depression; none of the scales measure the cognitive symptoms that may precede clinical depression. Therefore, there is an urgent need to assess depressive cognitions in order to ensure early detection and treatment and prevent severe depression among caregivers of persons with ASD. This study therefore measured the psychometric properties of the Depressive Cognition Scale among caregivers of persons with ASD.

The Depressive Cognition Scale: conceptual basis, description, and uses

The Depressive Cognition Scale (DCS) was developed originally by Zauszniewski (1995), based on Beck's cognitive theory, which suggests that cognitive symptoms of depression develop before clinical depression (Beck, 1991). The scale is also based on Erikson's psychosocial stages of development, and

each of the eight depressive cognition items on the scale reflects unsuccessful resolution of one of the stages outlined by Erikson (Erickson, 1994, Zauszniewski, 1995); thus the DCS measures depressive cognitions when scoring is reversed.

The DCS has been used with various populations, including older adults (Bekhet et al., 2008, Zauszniewski, 1995, Zauszniewski, 1997), African-American women (Zauszniewski, Picot, Debanne, Wykle, & Roberts, 2002), caregivers of persons with serious mental illness (Zauszniewski & Suresky, 2010), and females with type 2 diabetes (Zauszniewski, Chung, Krafcik, & Sousa, 2001). The eight-item DCS has also been translated into many languages including Arabic (Bekhet et al., 2011, Bekhet and Zauszniewski, 2010), Portuguese (Sousa et al., 2008, Sousa et al., 2005), Korean (Yeun, Kwon, & Kim, 2012), and Thai (Bunthumporn, 2012).

Methods

Design

This assessment of the psychometric characteristics of the DCS with caregivers of persons with autism spectrum disorder used data from a cross-sectional study of caregivers of persons with ASD. The findings from the parent study have been reported elsewhere (Bekhet, Johnson, & Zauszniewski, 2012 under review).

Sample

The sample included 95 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 socio-economic 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, sponsored by the ASD Speaks Foundation (http://www.iancommunity.org/cs/subject_recruitment_materials/overview). Institutional review board (IRB) approval for the parent study was obtained from the university. IAN contacted caregivers by e-mail and sent them an IRB approved flyer. The IAN directed potential participants to the Internet Web site (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 e-mail address at the end of the survey, and were sent a code that could be redeemed for \$25 at www.Amazon.com. E-mail addresses were destroyed after incentive codes were sent to participants.

Instruments

Descriptive data on caregivers of persons with ASD were collected in the parent study. In addition, measures of caregiver burden and resourcefulness were administered to measure construct validity since they are theoretically related to depressive cognitions.

Psychometric characteristics of the Depressive Cognition Scale (DCS)

The DCS has demonstrated acceptable reliability and validity, as evidenced by acceptable internal consistency ($\alpha = .78$) (Zauszniewski, 1995), and by significant correlations ($P < .001$) with measures of

depression, and resourcefulness (r 's = .54 and $-.37$, respectively). Confirmatory factor analysis resulted in the emergence of a single factor that explained 40% of the total variance, with all item factor loadings exceeding .30 (Zauszniewski, 1997, Zauszniewski et al., 2001). The internal consistency of the DCS has been tested among different populations in the United States with a reported alpha of .84 in older adults who relocated to retirement communities (Bekhet et al., 2008); .87 in women family members of persons with serious mental illness and African-American women (Zauszniewski, Picot, et al., 2002, Zauszniewski and Suresky, 2010); and .85 in women with type 2 diabetes (Zauszniewski et al., 2001). Construct validity of the eight-item DCS was supported by significant correlations ($P < .001$) in the expected direction with measures of psychosocial development ($r = -.63$), adaptive functioning ($r = -.60$), and depressive symptoms ($r = .63$) in elders (Zauszniewski, 1995, Zauszniewski, 1997); and with measures of resourcefulness ($r = -.53$) in women with diabetes and in African American women ($r = -.36$) (Zauszniewski, Picot, et al., 2002, Zauszniewski et al., 2001). Answers are given on a six-point Likert scale ranging from strongly agree (5) to strongly disagree (0), to reflect the degree to which each statement describes subjects' current thoughts (Zauszniewski, 1995). All eight items are phrased positively (Zauszniewski et al., 2001). Scores may range from 0 to 40. A higher composite score reflects a greater number of depressive cognitions after reverse coding the eight items (Zauszniewski, 1997).

Caregiver Burden

The Zarit Burden Interview (ZBI) was used to measure caregiver burden (Zarit, Reever, & Bach-Peterson, 1980) and the 22 item version has been used in this study (Knight, Fox, & Chou, 2000). The ZBI consists of 22 items that reflect the burden individuals sometimes feel when they are taking care of another person. Responses are given on a five-point Likert type scale, ranging from never (0) to nearly always (4). Scores may range from 0 to 88, with higher scores reflecting higher levels of burden. The Zarit Burden Interview (ZBI) has internal consistency estimates ranging from Cronbach's alpha = .88 to .92 (Chou et al., 2003, Thompson et al., 1993). Cronbach's alpha in this study was .92.

Resourcefulness

The 28-item Resourcefulness Scale (RS) (Zauszniewski, Lai, & Tithiphontumrong, 2006), was used to measure individuals' abilities to use self-help (personal resourcefulness) and help-seeking behaviors (social resourcefulness) when facing challenging situations (Zauszniewski et al., 2006). The Resourcefulness Scale consists of 28 items; 16 items measure personal resourcefulness and 12 items measure social resourcefulness (Zauszniewski et al., 2006). Respondents use a six-point scoring system ranging from 0 (not at all like me) to 5 (very much like me) (Zauszniewski et al., 2006). Scores may range from 0 to 140, with higher composite scores reflecting greater personal and social resourcefulness (Zauszniewski et al., 2006). Internal consistency estimates of .83, .79, and .85 have been reported for the total scale and for the personal and social resourcefulness subscales, respectively (Zauszniewski et al., 2006). Construct validity was indicated by the emergence of two dimensions of resourcefulness (personal and social) in a confirmatory factor analysis and by substantial intercorrelations between the two subscales ($r = .41$, $P < .001$) (Zauszniewski et al., 2006). Cronbach's alpha in this study was .92.

Psychometric Analysis

Psychometric testing of the DCS measure involved determining initial estimates of reliability (internal consistency) and construct validity. Data were analyzed using IBM SPSS Statistics 19.0. Preliminary data

analysis involved examination of descriptive, including means and standard deviations as well as frequency distributions. Reliability analyses involved examination of Cronbach's alphas, inter-item correlations, and item-to-total scale correlations. Construct validity involved factor analysis and significant correlations in the expected direction with measures of theoretically related constructs namely burden and resourcefulness.

Results

The mean age of caregivers was 43 years; their ages ranged from 23 to 67 years. 96.8% were females and the vast majority of the caregivers were Caucasians representing 92.6% of the total sample. Of the caregivers, 76.8% were married and 16.8% were either divorced or separated, and 6.4% were either never married or widowed. More than half of the sample had incomes over \$45,000. Detailed description of the sample has been reported elsewhere (Bekhet et al., 2012 under review).

Table 1 displays the means, standard deviations, possible ranges, and actual ranges on measures of depressive cognitions, caregiver burden, and resourcefulness.

Table 1. Descriptive Statistics for Depressive Cognition Scale and Construct Validation Measures in Caregivers of Persons With Autism ($N = 95$).

Validating construct	Mean (SD)	Actual range	Possible range	Cronbach's range alpha
Depressive cognitions	10.2 (7.7)	0–33	0–40	.90
Caregiver burden	42.5 (14.8)	8–7	60–88	.92
Resourcefulness	87.4 (20.96)	37–132	0–140	.92

Reliability

The overall internal consistency of the DCS was Cronbach's alpha = .90. This estimate indicates acceptable internal consistency and exceeds the minimum criterion of .70 (Ferketich, 1991, Nunnally and Bernstein, 1994). Deletion of any one of the items would not improve the scale's internal consistency (Table 2). In addition, all inter-item correlations were between $r = .30$ and $r = .70$, indicating that the scale meets the required criteria of internal consistency (Nunnally & Bernstein, 1994).

Table 2. The Depressive Cognition Scale Item Analysis and Factor Analysis.

DCS item	Alpha if item deleted	Item-to-total score correlations	Factor loadings	Communality values
Emptiness	.881	.656	.745	.555
Helplessness	.874	.734	.813	.661
Hopelessness	.869	.763	.833	.693
Loneliness	.882	.648	.734	.539
Meaninglessness	.877	.716	.796	.633
Powerlessness	.884	.616	.705	.497
Purposelessness	.879	.664	.755	.570
Worthlessness	.884	.617	.711	.505

To determine the homogeneity of the scale, item-to-total scale correlations were examined (Ferketich, 1991). As shown in Table 2, 63% of the scale items had item-to-total scale correlations within the recommended range of $r = .30$ to $r = .70$. Three of the items, hopelessness, helplessness, and meaninglessness, exceeded the recommended range, but none of the eight-items on the DCS fell below it (Table 3).

Table 3. Inter-Item Correlation Among the Eight DCS Items in Family Caregivers of Persons With Autism ($N = 95$).

DCS item	1	2	3	4	5	6	7	8
1. Emptiness		.560**	.622**	.521**	.554**	.409**	.476**	.390**
2. Helplessness			.651**	.467**	.572**	.498**	.603**	.570**
3. Hopelessness				.516**	.653**	.633**	.541**	.417**
4. Loneliness					.559**	.475**	.492**	.469**
5. Meaninglessness						.412**	.545**	.525**
6. Powerlessness							.422**	.482**
7. Purposelessness								.523**
8. Worthlessness								1

Note. Correlation is significant at the 0.01 level.

**Correlation is significant at the 0.01 level.

Dimensionality and Construct Validity

Based on the recommended criteria of 5–10 subjects per item, the sample of 95 caregivers of persons with autism was adequate to conduct factor analysis of the eight-item DCS (Hair, Anderson, Tatham, Black, et al., 1998). In addition, the Kaiser–Meyer–Olkin (KMO) value was checked to determine the sample's adequacy for factor analysis. A value of at least .60 is required (Tabachnick & Fidell, 2001); in this study the KMO value was .88 indicating that the sample size was adequate for factor analysis. Bartlett's test of sphericity was significant ($\chi^2 = 371.18$; $P < .001$; determinant = .017), indicating that the correlation matrix was appropriate for factor analysis (Strickland, 2003). Principal components factor analysis was carried out on the eight-item DCS to extract the minimum number of factors that explained the maximum variance in scale items. The extraction resulted in only one factor with eigenvalues greater than one, this factor explained 58.16 of the variance in scale items (Table 2). All communality values were above .30, and all eight scale items have strong factor loadings, exceeding the minimum criterion of .30 (Table 2) (Nunnally and Bernstein, 1994, Polit, 1996, Tabachnick and Fidell, 2001). Construct validity was also supported by significant correlations in the expected direction with measures of burden and resourcefulness. Strong positive correlations were found between the DCS and the Zarit Burden Interview ($r = .59$; $P < .01$), indicating that higher caregiver burden was associated with greater depressive cognitions. On the other hand, strong negative correlations were found between the DCS scale and the resourcefulness scale ($r = -.57$; $P < .01$), indicating that the more the depressive cognitions, the lower the resourcefulness of caregivers.

Discussion

This psychometric analysis of the properties of the DCS provides further evidence of its reliability and validity as a measure of depressive cognitions in women caregivers (mostly mothers) of persons with

autism spectrum disorders. The reliability estimates found with this sample indicate that the DCS has adequate internal consistency for this population. Although the measure was originally developed to capture depressive cognitions in elders (Zauszniewski, 1995), this sample ranged in age from 23 to 67, with an average of 43, suggesting that the DCS is also reliable for adults of younger adults.

While this is the first study to examine the psychometric properties of the DCS in family caregivers of persons with autism spectrum disorder, two published studies have tested the DCS in family members of persons with dementia (Zauszniewski, Picot, et al., 2002) and serious mental illnesses that included schizophrenia, bipolar disorder, and depression (Zauszniewski & Suresky, 2010). As in the study reported here, family caregivers in those two studies were also mostly women. However, the average age of the dementia caregivers was 58 years (Zauszniewski, Picot, et al., 2002) and the average age of the women family members of the mentally ill was 46 years (Zauszniewski & Suresky, 2010). Thus, the caregivers in this study were younger, on average, which may account for differences in the psychometrics for the DCS measure. In addition, the dementia caregiver study focused on African-American women caregivers (Zauszniewski, Picot, et al., 2002), while women in this study were mainly Caucasian which may account for differences in the factor structure of the DCS measure.

The internal consistency estimate of .90 obtained in this study is consistent with previous psychometric studies of the DCS, in which Cronbach's alphas ranged between .75 and .87 (Zauszniewski, 1995, Zauszniewski, 1997, Zauszniewski, Picot, et al., 2002, Zauszniewski and Suresky, 2010, Zauszniewski et al., 2001). The average inter-item correlation of .52 for this sample was considerably higher than for women caregivers of persons with other mental disorders. The mean inter-item correlation was low, .27, in African American women dementia caregivers (Zauszniewski, Picot, et al., 2002) and moderate, .46, in women family members of the seriously mentally ill (Zauszniewski & Suresky, 2010).

In this study, five of the eight DCS items were correlated with the total scale in the optimal range (between .30 and .70), demonstrating the instrument's homogeneity, that is, the degree to which scale items measure the same concept (Ferketich, 1991). However, the homogeneity of the DCS was a bit lower than in other studies of family caregivers. In both of those studies, six of the eight DCS items had acceptable item-to-total scale correlations in the .30 to .70 range (Zauszniewski and Suresky, 2010, Zauszniewski, McDonald, et al., 2002, Zauszniewski, Picot, et al., 2002). The three items that exceeded the .70 criteria in this study of caregivers of persons with autism spectrum disorder were hopelessness, helplessness, and meaninglessness. These items also had the strongest factor in the factor analysis, indicating that these negative cognitions were of greatest concern to the caregivers of persons with ASD.

Interestingly, the three most prominent negative cognitions among family caregivers of persons with ASD differed from those that were of greatest concern to family caregivers in the other studies. In the study of women family members of the mentally ill (Zauszniewski & Suresky, 2010), there were high factor loadings on worthlessness, purposelessness, and meaninglessness, while in the study of women dementia caregivers (Zauszniewski, McDonald, et al., 2002, Zauszniewski, Picot, et al., 2002), factor loadings were high for purposelessness, hopelessness, and meaninglessness.

However, in all three caregiver studies, the item measuring meaninglessness (not believing that life was worth living) emerged as a prominent depressive cognition with high factor loadings. It is

interesting to note that the author of the DCS (Zauszniewski, 1995) designed this item to reflect Erikson's final developmental stage during which the conflict between integrity and despair emerges. Because the original scale was built on this final developmental stage in life, the appropriateness of the DCS for younger persons (i.e. not over age 65) was of initial concern (Zauszniewski et al., 2001). Yet the DCS has been found to be reliable and valid in both young and middle aged adults despite their not having experienced all eight of Erikson's developmental stages.

The literature shows that family caregivers of persons with mental disorders may be prone to experience despair or meaninglessness (Gravitz, 2001). For example, in a study of parents of children with ASD, Wong and Heriot (2007) examined vicarious futurity, which includes the bipolar concepts of hope and despair. They found that the great majority (80%) of parents of children with ASD reported high despair for their child and suggested that cognitive processes underlay these negative expectancies (Wong & Heriot, 2007).

This finding is consistent with a study by Pisula and Kossakowska (2010) which found that parents of autistic children reported significantly lower meaningfulness in life than parents whose children were developmentally normal as well as a tendency toward feeling a greater sense of responsibility. Taking on responsibility has been categorized as an emotion-focused coping strategy that may involve blaming oneself for the existence of a problem (Pisula & Kossakowska, 2010). Thus, the prominence of meaninglessness in the family caregivers sampled in the study reported here may reflect self-blame for the autism in the family member.

The high factor loading on the DCS item capturing hopelessness found in this study was similar to that in the study of women caregivers for those with dementia (Zauszniewski, McDonald, et al., 2002, Zauszniewski, Picot, et al., 2002), but was not found in the study of family caregivers of the mentally ill (Zauszniewski & Suresky, 2010). However, in that study 60% of the caregivers did not live in the same household of the care receiver (Zauszniewski & Suresky, 2010). Perhaps the level or type of care these family members provided for their mentally ill relatives differed from the care provided by caregivers of persons with dementia or autism. Finally, in the psychometric analysis reported here and in studies of family caregivers of persons with dementia (Zauszniewski, McDonald, et al., 2002, Zauszniewski, Picot, et al., 2002) and persons with serious mental illness (Zauszniewski & Suresky, 2010), construct validity was supported by strong correlations with two theoretically related constructs, caregiver burden and resourcefulness.

Conclusion

This psychometric study of the DCS in family caregivers of persons with ASD provides further evidence of the measure's reliability and validity. Since depressive cognitions are believed to appear before other more serious symptoms of depression (Beck, 1987), the measure can be useful for screening for depression. In a recent study, a cut score of 7 on the DCS was identified as the point at which interventions to strengthen positive thinking in order to prevent depression may be beneficial (Zauszniewski & Bekhet, 2012). Examination of the usefulness of applying this cut score with family members of persons with autism may help to identify the point at which they could benefit from cognitive-behavioral intervention to strengthen their positive thinking.

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