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Efficient Assessment of Social Problem-Solving Abilities in Medical and Rehabilitation Settings: A Rasch Analysis of the Social Problem-Solving Inventory-Revised

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Abstract

The Social Problem Solving Inventory-Revised Scale (SPSI-R) has been shown to be a reliable and valid self-report measure of social problem-solving abilities. In busy medical and rehabilitation settings, a brief and efficient screening version with psychometric properties similar to the SPSI-R would have numerous benefits including decreased patient and caregiver assessment burden and administration/scoring time. Thus, the aim of the current study was to identify items from the SPSI-R that would provide for a more efficient assessment of global social problem-solving abilities. This study consisted of three independent samples: 121 persons in low-vision rehabilitation (M age = 71 years old, SD = 15.53), 301 persons living with diabetes mellitus (M age = 58, and SD = 14.85), and 131 family caregivers of persons with severe disabilities (M age = 56 years old, SD = 12.15). All persons completed a version of the SPSI-R, Center for Epidemiological Studies Depression Scale (CES-D), and the Satisfaction with Life Scale (SWLS). Using Rasch scaling of the SPSI-R short-form, we identified a subset of 10 items that reflected the five-component model of social problem solving. The 10 items were separately validated on the sample of persons living with diabetes mellitus and the sample of family caregivers of persons with severe disabilities. Results indicate that the efficient 10-item version, analyzed separately for all three samples, demonstrated good reliability and validity characteristics similar to the established SPSI-R short form. The 10-item version of the SPSI-R represents a brief, effective way in which clinicians and researchers in busy health care settings can quickly assess global problem-solving abilities and identify those persons at-risk for

complicated adjustment. Implications for the assessment of social problem-solving abilities are discussed.

Keywords

social problem solving; rehabilitation; screening; health conditions; medical settings

Social problem-solving abilities have been continuously found to influence adjustment among people in general and among those with a wide variety of emotional and medical health concerns (Dreer, Elliott, Fletcher, & Swanson, 2005; D’Zurilla & Nezu, 2007; Elliott, Grant, & Miller, 2004; Heppner, Witty, & Dixon, 2004; Hills-Briggs et al., 2006; Nezu, Nezu, Friedman, & Houts, 1999). For example, cross-sectional and prospective research has demonstrated that social problem-solving abilities are correlated in predicted directions with perceptions of health and physical symptoms (Elliott & Marmarosh, 1994), secondary health complications (Elliott & Shewchuk, 2003; Herrick, Elliott, & Crow, 1994), health compromising behaviors (Dreer, Elliott, & Tucker, 2004), and adherence to medical regimens (Johnson, Elliott, Neilands, Morin, & Chesney, 2006). Social problem-solving abilities have also been found to influence the adjustment of family members who assume caregiving responsibilities of persons with chronic disabilities (Bambara, Owsley, Wadley, Martin, Porter, & Dreer, in press; Dreer, Bambara, Simms, Snow, & Owsley, 2008; Elliott & Shewchuk, 2003; Elliott, Shewchuk, & Richards, 2001; Grant, Elliott, Giger, & Bartolucci, 2001; Kurylo, Elliott, DeVivo, & Dreer, 2004). In addition to the body of correlational research, evidence has also shown that interventions targeting social problem-solving abilities are effective in minimizing subsequent psychological distress and depression for both persons with chronic health conditions (Cameron, Shin, Williams, & Stewart, 2004; Nezu, Nezu, Friedman, & Faddis, 1998; Perri et al., 2001) and their family caregivers (Grant, Elliott, Weaver, Bartolucci, & Giger, 2002; Houts, Nezu, Nezu, & Bucher, 1996; Noojin & Wallender, 1997). Thus, measuring social problem-solving abilities in medical health care settings is important for identifying those who may be at risk for problems throughout rehabilitation and postdischarge. Despite the influence on adjustment, outcomes, and implications for treatment, routine assessment of social problem-solving abilities in medical settings is typically underutilized.

A number of empirically supported measures of social problem solving exist in the literature including the Means-End Problem Solving Procedure (MEPS; Platt & Spivack, 1975), the Problem Solving Inventory (PSI; Heppner, 1988), and the Social Problem Solving Inventory-Revised (SPSI-R; D’Zurilla, Nezu, & Maydeu-Olivares, 2002). Although several of these empirically based measures assess a specific aspect of problem solving, only the SPSI-R provides for a more comprehensive assessment of all theoretical components linked to contemporary models of social problem solving (i.e. problem orientation and problem-solving styles; D’Zurilla & Nezu, 2007; Nezu, Nezu, & D’Zurilla, 2007). More specifically, the SPSI-R is a theory-based measure of social problem-solving processes and has two current versions: (a) a comprehensive 52-item version, which consists of five scales (NPO—negative problem orientation, PPO—positive problem orientation, RPS—rational problem solving, ICS—impulsivity/carelessness style, AS—avoidance style), four subscales of the RPS scale, and a total global score; and (b) a 25-item short form version, which consists of the same five scales identified above and a total global score. The SPSI-R assesses a person’s perception of his or her general approach and styles toward solving problems in everyday living that are bothersome and has been repeatedly found to be reliable and valid (Chang, 2002; D’Zurilla, Chang, & Sanna, 2003; D’Zurilla & Maydeu-Olivares, 1995; D’Zurilla et al., 2002; Jaffee & D’Zurilla, 2003). The measure has also been shown to be related to important measures of psychological distress, well-being, and social competence (i.e. depression, distress, anxiety, health-related behaviors, life satisfaction, optimism, situational coping, aggression, externalizing behaviors;

Chang, 2002; Dreer et al., 2005; Dreer et al., 2004; Dreer, Ronan, Ronan, Dush, & Elliott, 2004; D’Zurilla & Chang, 1995; D’Zurilla et al., 2003; Jaffee & D’Zurilla, 2003). In clinical settings, the SPSI-R is often used to facilitate treatment planning, identify those at risk for problems with adjustment, provide insight for recommendations regarding patient disposition, treatment options, tracking of treatment skill acquisition, and follow-up evaluations. The instrument is also frequently used as an outcome measure in clinical trials as well as other research endeavors.

Although both versions of the SPSI-R provide detailed information regarding a person’s social problem-solving orientation and abilities, the length and administration of the measure can be quite cumbersome when used in medical settings where there are competing demands for time on both patients and their family members. Finding time to administer the SPSI-R is often complicated by demands for other immediate medical procedures and services (e.g. surgery, neuroimaging, chemotherapy, occupational and physical therapy; Glasgow et al., 2005; Strange, Woolf, & Gjeltema, 2002). Thus, participation in these medical-related procedures and decreased length of stay due to managed care may result in less time for detailed evaluations of social problem-solving abilities as well as assessment of other important aspects of psychological functioning (i.e. personality, family functioning, neuropsychological functioning). Because the current health care environment promotes quick and efficient evaluation of physical symptoms, this also leaves many health care providers without sufficient time to accurately screen for aspects of psychological functioning themselves (Baker, Keenan, & Zwischenberger, 2005). Another obstacle in medical settings is related to the fact that persons often have difficulty completing full versions of self-report measures due to fatigue following lengthy medical procedures and appointments or because of complications related to the person’s health condition in general (i.e. pain, problems with breathing, headaches). Although the short form version of the SPSI-R requires less time than its 52-item counterpart (10 minutes vs. 15–20 minutes; D’Zurilla et al., 2002), it can in some instances require twice as much time to administer in medical settings when a person’s chronic health condition calls for a slight modification of administration procedures or the person is fatigued (i.e. reading items and response scales to persons with visual impairments, problems with motor functioning, or hearing; Dreer et al., 2005). Other factors known to preclude the use of routine assessment of social problem-solving abilities in medical and rehabilitation settings include respondent burden, item and instrument redundancy, shrinking resources, reimbursement, and cognitive impairment (Andersen & Haley, 1997; Tang, 2006). Thus, clinicians and researchers in these types of settings are often faced with the difficult choice of using brief and efficient psychometrically sound measures or no measures at all to evaluate patients who may be at-risk for problems with adjustment (Elder et al., 2006; Stroud, McKnight, & Jensen, 2004).

Some of these same issues also overlap with reasons for why family member social problem-solving abilities are not routinely assessed in these types of settings. Other reasons may stem from the fact that family members (a) are not typically viewed as “the patient,” (b) are often occupied by accompanying their family relative into his or her medical appointment, (c) are busy completing their family member’s insurance and medical paperwork, or (d) are not able to devote additional time to complete an assessment of their own due other commitments (e.g. returning to work or to other family responsibilities; Kurtz, Kurtz, Given, & Given, 2004; Moen, Robison, & Dempster-McClain, 1995; Quittner, Glueckauf, & Jackson, 1990). Lastly, another reason family caregivers are not routinely assessed in these settings might be because health care providers are not aware of the body of research demonstrating the influence of family social problem-solving abilities on both the patient’s and family member’s adjustment and health outcomes.

These challenges have important implications for the measurement of social problem-solving abilities currently assessed by the SPSI-R short form in clinical and research endeavors in

medical settings. It may be possible, for example, that a more efficient assessment of elements representative of global problem-solving abilities may be achieved without the full array of items required for the robust and stable assessment of the five original scales, thereby minimizing respondent burden and item redundancy. Alternatively, it is also possible that specific items in the SPSI-R may be more sensitive indicators of global problem-solving than other items.

Therefore, we conducted the present study to identify items on the SPSI-R short form that might more efficiently assess social problem-solving abilities. To achieve this purpose, we conducted a Rasch analysis of the SPSI-R¹ that had been administered to three different clinical samples. Rasch analysis is an effective tool in item analysis, as it can detail the extent to which an item fits an underlying unidimensional measurement model and provides opportunities for identifying (and potentially deleting) redundant or misfitting items. By conducting these analyses on data collected from three distinct samples, we may examine the generalizability and replicability of the results. This latter feature may also reveal potential benefits for a more streamlined, efficient assessment of social problem-solving abilities particularly in health care settings, where competing time, attentional, and service demands routinely undermine assessment procedures.

The goal of this investigation was not to replace the SPSI-R short form, but rather to examine if there was a more efficient and rapid set of items that would maintain the key components identified in the social problem-solving model and yet address the practical needs of clinicians and researchers. This type of assessment would offer several potential benefits including reduced item redundancy of the SPSI-R short form and patient/caregiver assessment burden (i.e. fatigue, frustration, boredom with answering highly similar questions repeatedly), while minimizing scoring time and retaining the ability to identify those who might benefit from more comprehensive testing and potential psychological intervention.

Method

This study consisted of three independent samples: (a) 121 persons in low-vision rehabilitation, (b) 301 persons living with diabetes mellitus, and (c) 131 family caregivers of persons with severe disabilities. The 10 items were separately validated on a sample of persons living with diabetes mellitus and a sample of family caregivers of persons with severe disabilities.

Participants

Low-vision rehabilitation sample—This sample consisted of 50 men and 71 women ($N = 121$) who were admitted to an outpatient low-vision rehabilitation program. Prospective participants were informed about the study by their ophthalmologist or optometrist following their initial eye examination. Interested individuals were contacted on site by a research assistant and/or clinic staff working in the clinic, and informed consent was obtained. Average age of the sample was 71 years old ($SD = 15.53$), and average level of education was 12 years ($SD = 3.29$). One-hundred six participants were Caucasian (87.6%) and 15 participants were African American (12.4%). Macular degeneration was the most frequent primary referring diagnosis for the sample (59.5%, $N = 72$), approximately 9.1% ($N = 11$) were diagnosed with diabetic retinopathy as a primary diagnosis, 5% ($N = 6$) were diagnosed with glaucoma, 24% ($N = 29$) were diagnosed with other various vision impairments, and 1.7% were diagnosed with vision impairments of unknown origin ($N = 2$).

¹To obtain the 10 items that were selected from the SPSI-R short form for this efficient version of social problem-solving abilities, interested persons must contact the owners of the instrument: Multi-Health Systems, Inc., North Tonawanda, New York. Their contact information is as follows: 1-800-456-3003 (U.S.), 1-800-268-6011 (Canada), 416-492-2627 (International); e-mail: customerservice@mhs.com; Web site: www.mhs.com

Diabetes validation sample—This sample consisted of 313 persons with diabetes who were receiving outpatient services from the Diabetes Education Center in Baton Rouge, Louisiana (Elliott, Shewchuk, Miller, & Richards, 2001). Prospective participants identified from the clinic database by clinic administration were mailed a questionnaire containing a cover letter describing the nature of the study, a brief demographic form that did not request any personal identification, a consent form, and the measures of social problem-solving abilities and adjustment. Included in the packet was a letter from the clinic director describing the study. A stamped envelope with a return address was provided along with instructions for returning materials. There was no monetary incentive for returning materials.

Three-hundred thirteen protocols were received. Usable self-report protocols were available from 301 respondents diagnosed with diabetes (105 men and 196 women). Average age for the sample was 58 years old ($SD = 15.92$); 215 persons reported type II and 62 reported type I diabetes (36 did not report diabetes type). One hundred twenty-six persons reported at least a high school education or equivalent, and 37 reported less than a high school education, 136 reported greater than a high school education, 9 reported “other,” and 5 were missing. The sample was predominantly Caucasian ($N = 190$), 99 participants were African American, 9 were Native American, 1 was Asian Pacific Islander, 1 was Hispanic, 1 reported “other,” and 1 did not report ethnicity.

Caregiver validation sample—This sample consisted of 131 family caregivers of adults with disabilities such as a cerebrovascular accident ($N = 51$), traumatic brain injury ($N = 63$), cerebral palsy ($N = 15$), multiple sclerosis ($N = 1$), and spinal cord injury ($N = 1$). The sample was comprised of 99 Caucasians, 30 African Americans, and 2 Hispanic individuals with average age being 56 years ($SD = 12.15$). The majority of family caregivers were women ($N = 114$) and 17 were men. Their level of education ranged from 7 to 24 years, with an average of 13 years of education ($SD = 2.85$). Eighty-two family caregivers were unemployed, 39 were employed part-time, and 10 were employed fulltime. Of the sample, 81 were single, 26 were married, 16 were widowed, 5 were separated, and 3 were divorced.

Participants volunteered to participate in a study of an in-home problem-solving training intervention. Some prospective participants were identified by clinic staff upon learning which family member would be assuming responsibility for providing daily assistance and care to a patient following discharge from an inpatient rehabilitation program. Other recruitment strategies included advertisements sent to local churches, newspapers, and other health care providers in the surrounding areas. All interested caregivers were asked to contact the research coordinator to determine eligibility. Qualified caregivers were then scheduled for an appointment by a trained research staff member and asked to participate in the study. Those who agreed to participate provided informed consent and completed a variety of baseline psychosocial measures.

Measures

Social problem-solving abilities—Two versions of the Social Problem-Solving Inventory-Revised (SPSI-R; D’Zurilla et al., 2002) were used: (a) the SPSI-R short form, and (b) the SPSI-R long version. The short form is a subset of the 25-items contained in the long form. In the instructional set, the respondent is asked to rate each item in terms of the individual’s general approach and styles toward solving problems in everyday living that are bothersome, but that he or she does not know how to immediately make better or stop from being bothersome (not daily hassles or pressures). The respondent is further instructed to think about problems as either something about the respondent (i.e. his or her thoughts, feelings, behavior, health, or appearance), the respondent’s relationships with other individuals (i.e.

relatives, friends, boss), or the respondent's environment and things he or she owns (i.e. property, money).

The SPSI-R 25-item short form assesses two constructive or adaptive social problem-solving dimensions (PPO—positive problem orientation and RPS—rational problem solving) and three dysfunctional dimensions (NPO—negative problem orientation, IPC—impulsive/careless style, and AS—avoidance style). The PPO assesses a general cognitive set, which includes the tendency to view problems in a positive light, to see them as challenges rather than threats, and to be optimistic regarding the existence of a solution and one's ability to detect and implement effective solutions. In contrast, the NPO assesses a cognitive-emotional set that prevents effective problem solving. The RPS assesses an individual's tendency to use effective social problem-solving techniques systematically and deliberately, including defining the problem, generating alternatives, evaluating alternatives, and implementing solutions and evaluating outcomes. The ICS evaluates a tendency to implement skills in an impulsive, incomplete, and haphazard manner. The AS measures dysfunctional patterns of social problem solving characterized by putting the problem off and waiting for problems to solve themselves. Higher scores on each factor denote greater intensity on a particular dimension. Items on the SPSI-R are rated on a 5-point Likert-type scale (0 = *not at all true of me* to 4 = *extremely true of me*). Participants indicate how they usually respond to everyday problems. Psychometric properties for the SPSI-R short-form have demonstrated good reliability and validity (D'Zurilla et al., 2002).

The SPSI-R 52-item long form (SPSI-R; D'Zurilla et al., 2002) is used to more comprehensively assess social problem-solving abilities. The SPSI-R is based on a five-dimensional model of problem-solving and provides five scales (D'Zurilla et al., 2002) as described above (PPO, RPS, NPO, ICS, & AS) along with four subscales of the RPS. Similar to the SPSI-R short form, the long version has well-documented psychometric properties (D'Zurilla et al., 2002).

In the present study, the SPSI-R short form was administered to the low-vision sample. As part of separate, ongoing studies, the SPSI-R long-form version was administered to both the caregiver sample and the diabetes sample. Although the long form was administered to these samples, in the present study we examined only the subset of 25 items, which constitute the short form because our purpose was to compare the performance of a 10-item version to the existing 25-item short form of the SPSI-R. A composite raw score total for the final 10-item version can be computed by summing all 10 items after reverse scoring the items from the NPO, AS, and ICS subscales. Total scores on the 10-item SPSI-R version can range from 0 to 40, with higher scores reflecting greater effective social problem-solving abilities.

Depressive behavior—The Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977) provides an index of depressive behavior. Higher scores are indicative of depressive symptomatology.

Life satisfaction—The Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) evaluates subjective well-being and overall life satisfaction. The SWLS is a five-item instrument with items rated on a Likert-type response format ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Higher scores reflect greater subjective well-being. Psychometric studies of the SWLS have evidenced internal consistency ($\alpha = 0.87$) and reliability (2-month test-retest coefficient = 0.82; Diener et al., 1985).

Procedures

The low-vision rehabilitation sample was administered the SPSI-R short form and several other psychological measures following their initial clinical eye examination. The validation samples

were administered the SPSI-R long form. All measures were read aloud to the low-vision and caregiver samples; the diabetes sample completed the measures on their own recognizance and returned the completed questionnaires via mail. The institutional review board approved the study procedures for each study.

Data Analysis

The goal of the study was to identify items from the SPSI-R that might provide an efficient assessment of social problem-solving abilities and that correlated with measures of personal adjustment in a manner consistent with the theoretical model of social problem-solving abilities. Our first aim was to determine whether all items of the 25-item SPSI-R short form could be combined into a usefully unidimensional measure of general problem-solving ability. In previous studies, the items of the SPSI-R (both long and short forms) have been successfully fit to a 5-factor model (Maydeu-Olivares & D’Zurilla, 1996; Siu & Shek, 2005; Wakeling, 2007). However, D’Zurilla et al. (2002) suggest that an SPSI-R total score can be constructed for assessing general problem-solving functioning. The SPSI-R total scores (from both the long and short versions) have been used in many recent studies (e.g. Bray, Barrowclough, & Lobban, 2007; Dolgin et al., 2007; Fitzpatrick, Witte, & Schmidt, 2005; Golden, Gatchel, & Cahill, 2006; Kant, D’Zurilla, & Maydeu-Olivares, 1997; McMurrin, Egan, Blair, & Richardson, 2001). An implicit assumption in combining any set of items into a scale is that the items are at least approximately unidimensional (Wright & Linacre, 1989). Creating a total score from all SPSI-R items is partly justified by the high internal consistencies found for the full set of items, but internal consistency is a weak test of dimensionality (Hattie, 1985). In the present study, we evaluated the dimensionality of the SPSI-R total scale (short form only) by fitting all 25 items to an explicitly unidimensional Rasch model (Smith & Miao, 1994; Stansbury, Ried, & Velozo, 2006). Specifically, we used the Rasch rating scale model (Andrich, 1978) to assess the measurement structure of the full 25-item scale. The scaling was conducted using Winsteps (Version 3.48; Linacre, 2006). The psychometric properties of the full 25-item scale was assessed separately in all three samples described above, including correlations of the Rasch measures with CES-D and SWLS.

Our second aim in this study was to construct a reduced, 10-item version of the SPSI-R that might be useful as a screening tool for quick assessment of general problem-solving abilities. We wanted the reduced version to reflect the same item content coverage as the full 25-item SPSI-R scale. The 25-item scale includes 5 items for each of five scales. To maintain content validity with the full scale, we selected two items from each scale for inclusion in our reduced 10-item scale. We used the results from the Rasch scaling in the low-vision sample for our initial item selection. Specifically, we selected two items from each of the five SPSI-R scales with the lowest mean-square fit statistics. These 10 items were then fit to the Rasch model to assess item functioning and dimensionality of the reduced scale. The measurement properties of the 10 items were then cross-validated in the other two samples described above. The concurrent validity of the 10-item version was assessed by correlations of Rasch person measures with scales of depression and life satisfaction. (In Rasch scaling, ordinal raw score totals for each person are converted to interval [logit] measures. A raw score-to-logit conversion table for the 10-item version is available upon request from the corresponding author.) In all cross-validation analyses, the performance of the 10-item version was compared to the performance of the SPSI-R short form (25-item) scale.

Results

Rasch Scaling of the SPSI-R Short-Form Items

To verify that the original 25-items of the SPSI-R short form could be combined into a global, unidimensional measure of problem solving, the items were fit to the Rasch model for rating

scales in the sample of low-vision patients. The Rasch item separation reliability was 0.98 (values > 0.90 are acceptable), which indicates that the items are sufficiently separated in locations (“difficulties”) to form a measurement continuum. The person separation reliability (similar to Cronbach’s alpha coefficient) was 0.85, indicating that the scale is usefully distinguishing among levels of individual problem-solving effectiveness. The fit of individual items to the measurement model was evaluated using information-weighted mean-square fit statistics, which have an expected value of 1. Items with fit statistics less than 1.5 contribute successfully to the construction of measures (Linacre, 2003). All items fit the Rasch model adequately, with mean squares ranging from .66 to 1.48.

Item Selection for an Efficient Assessment of the SPRI-R: Evaluation of a 10-Item Version

The two best fitting items from each of the five SPRI-R scales were identified, and these 10 items were then fit to the Rasch rating scale model. The item separation reliability was .93; the person separation reliability was 0.72.

In Table 1, we present the item difficulty estimates and the mean-square fit statistics for each item (under Low-vision rehabilitation). Lower values of item difficulties indicate “easier-to-endorse” items. All items fit the model successfully, with fit statistics ranging from .68 to 1.44. Descriptive statistics for the raw score sum of the 10 items are also presented in Table 1. The correlation between measures on the 10-item and 25-item versions was .94, $p < 0.001$.

In Table 2 (see Low-vision rehabilitation), we present the correlations of the Rasch person measures from the 10-item and 25-item SPRI-R versions with the CES-D and the SWLS. Both social problem-solving versions were correlated negatively with depression and positively with life satisfaction, supporting the concurrent validity of the global problem-solving scores. The magnitudes of the correlations obtained with the 10-item version indicates that the reduction of the global SPRI-R composite score from 25 items to 10 items provided minimal loss of predictive power.

Cross-Validation

The results from the previous analyses were cross-validated in the sample of persons with diabetes and in the sample of family caregivers. In both cross-validation samples, the 25-items of the SPRI-R short form functioned adequately as a measure of global problem-solving effectiveness. Item separation reliabilities were 0.98 and 0.95 for the diabetic and caregiver samples, respectively; the corresponding person separation reliabilities were 0.87 and 0.88. Item fit statistics in the two samples ranged from 0.81 to 1.48. The 10 items were also cross-validated. Item separation reliabilities were .98 and .95 for the diabetic and caregiver samples, respectively; person separation reliabilities were 0.74 and 0.72; and item fit statistics in the two samples ranged from 0.78 to 1.26. Table 1 displays estimates and fit statistics, and also descriptive statistics for the raw score total of the 10 items. The correlations between the Rasch measures from the 10-item and 25-item version in the diabetic and caregiver samples were .93 and .94, respectively.

In Table 2 (see Diabetes and Caregiver samples), we also show the correlations of the Rasch measures of the 10-item and 25-item versions with the CES-D and SWLS. In both cross-validation samples, both the 10-item and 25-item versions were significantly correlated with depression and life satisfaction. As in the initial validation sample, the reduced version of the scale showed no great loss of predictive power in any of the analyses.

Scale Structure Stability

To assess the stability of the item locations in the reduced 10-item version across samples, we correlated item location estimates obtained separately in the validation and cross-validation

samples. The correlation between locations in the validation and diabetic sample was 0.65; between the validation and caregiver sample, .78; and between the two cross-validation samples, 0.88. To assess stability in the absolute level of item difficulties, we examined the displacement of item locations from the initial validation sample to the cross-validation samples. The item structure from the validation sample was used to anchor the items in the two cross-validation samples. Displacement is the difference between the anchored item structure and the structure estimated from the current data. An item displacement greater than 1 logit is often taken as an upper limit of acceptability; displacements less than half a logit are negligible (Linacre, 2006). Item displacements for the caregiver sample ranged from -0.63 to 0.53 ; displacements for the diabetic sample ranged from -0.37 to 0.42 . We also assessed uniform differential item functioning (DIF) between the three samples as another check on whether item difficulties were comparable across groups (Bond & Fox, 2001). First, Rasch scaling was conducted on item responses from subjects in all three samples combined, which provided anchor values for subject measures and the rating scale structure. Next, scaling was conducted for each sample separately, using anchor values from the combined analysis to equate the measures to a common scale (Bond & Fox, 2001). The DIF was evaluated by subtracting location estimates obtained in the three samples. Differences of less than half a logit are considered evidence of stability (Wright & Douglas, 1975). The differences among item location estimates ranged from -0.44 to 0.54 . Only one item had a somewhat higher value than half a logit. The results from these analyses suggest an adequate degree of measurement structure stability across samples.

Discussion

In this study, we examined the internal psychometric properties (using Rasch scaling) and concurrent validity of a more efficient 10-item version of the SPSI-R short form to assess social problem-solving abilities. Results from the Rasch analysis suggest that the reliability and item fit for the 10-item version was satisfactory and comparable across samples. Based on Rasch analysis, the 10-item and 25-item SPSI-R versions were found to be generally equivalent for these samples. The 10 items retain the overall unidimensional, global score of social problem-solving abilities, which correlates with CES-D and SWLS scores. The 10 items also demonstrate stable psychometric properties and may be substituted for its longer counterparts without loss of predictive power. Based on these results, the items appear to efficiently assess global social problem-solving abilities. Thus, clinicians and researchers might want to consider using this quick and efficient version when administrations of longer yet comprehensive versions of the SPSI-R measures are precluded in medical/rehabilitation settings and populations.

These results have important clinical implications. A brief assessment of global social problem-solving abilities consisting of 10 items may be short enough to serve as a routine and time-efficient measure, while minimizing respondent burden, fatigue, and item redundancy. The brevity of this 10-item SPSI-R version may also increase the likelihood of more routine assessment of social problem-solving abilities, and integrate well into other clinical assessment protocols (including bedside and other inpatient administrations in health care settings). These 10 items can be conveniently administered, scored, and interpreted. These features will increase the likelihood of their use by various health care providers and in settings in which particular chronic health conditions limit respondents from completing forms independently (e.g. visual impairments, loss or restriction of limb functioning, connection to IVs, hearing impairments).

The efficient assessment of social problem-solving abilities in health care settings may be particularly welcome as evidence indicates that patients with dysfunctional problem-solving abilities are more likely to demonstrate problems with distress, adherence, and secondary complications over time (i.e. Elliott, Bush, & Chen, 2006; Johnson et al., 2006). These

individuals may benefit from problem-solving training provided in brief interactions with physicians in primary care settings (Mynors-Wallis, Gath, Lloyd-Thomas, & Tomlinson, 1995), in telephone counseling provided by nurses (Grant et al., 2002), and from formal individual and group therapies conducted by mental health providers (Perri et al., 2001; Rath, Simon, Langenbahn, Sherr, & Diller, 2003). Because research suggests that health care professionals, for a variety of reasons, often fail to detect common psychological problems (Baker et al., 2005; Haley et al., 1998; Saunders & Wojcik, 2004), efficient and accurate screening for patients and their family caregivers may provide health care practitioners with relevant information from which to identify and refer persons for further psychological assessment if needed. Efficient assessment of ineffective social problem-solving abilities may ultimately translate into better emotional and physical adjustment (Karlawish, Casarett, Klocinski, & Clark, 2001) for those at risk for complicated adjustment.

The 10-item SPSI-R assessment may also be beneficial for research purposes as well when the length of the SPSI-R 52-item version or 25-item short form version is not feasible. For instance, the 10-item version may be recommended for populations that have great restrictions in their ability to complete questionnaires such as those persons with significant chronic health conditions, acute and severe psychiatric symptoms, and/or there are significant time demands for other medical procedures. The brevity and lack of redundancy of items may help to maximize the chances of inclusion and minimize attrition in research projects where multiple outcome measures are needed. An efficient assessment may also allow for the incorporation of other measures in studies examining the relationships between multiple constructs and for quickly monitoring responses to clinical interventions (i.e. problem-solving training) with difficult-to-assess medical populations. The minimization of item redundancy may also help to maintain participant interest and attention for completing research protocols that are often lengthy in large-scale clinical trials. However, when time permits, research participants should be given the 25-item form or 52-item given the wealth of psychometric data supporting these versions.

Although there were several strengths of the current investigation, the present study remains a preliminary validation of items obtained from the SPSI-R for alternative social problem-solving assessment. As a result, several limitations and directions for future research exist. First, the current study was limited to persons who were living under conditions of chronic stress. Examination of the 10-item SPSI-R version with other samples would help to confirm the generalizability of the present findings. The present study was cross-sectional in nature; longitudinal investigations evaluating the predictive nature of the identified SPSI-R assessment items are warranted. All measures included in the study were self-report questionnaires. The association between the 10-item version and the criterion measures might be due, in part, to shared method variance (i.e. mail-in/written vs. read aloud). Future studies examining these 10 items of the SPSI-R with social problem-solving performance-based measures are needed. Use of more objective measures of problem-solving and adjustment would provide important information about the sensitivity and usefulness of these items in everyday living. It should also be noted that with a 10-item measure, one loses the ability to assess the five-dimensional structure of problem solving. However, as discussed this may be necessary in health care settings where constraints prohibit a full-scale evaluation. Lastly, another limitation may be due to the variance in method administration (i.e. read aloud to patients with visual impairments vs. written/mail in).

Despite these limitations, the current findings suggest that a reduced amount of items from the SPSI-R may serve as an efficient measure for evaluating general social problem-solving abilities. Although these identified items do not replace the use of the full-length SPSI-R, our data suggest that a brief assessment may be effectively accomplished with the items we have identified.

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Table 1

Item Statistics and Raw Score Total Statistics for the Efficient 10-Item Version of the Social Problem-Solving Inventory-Revised (SPSI-R) by Sample

Item/Scale	Low-vision rehabilitation (N = 121)		Diabetes (N = 301)		Caregivers (N = 131)		Combined samples (N = 553)	
	d	MS Fit	d	MS Fit	d	MS Fit	d	MS Fit
21 RPS	.73	.85	.76	.84	.76	1.15	.74	.90
13 PPO	.30	.93	.71	1.01	.43	1.11	.54	1.03
16 RPS	.42	.68	.17	.94	.10	.78	.20	.82
14 ICS	-.17	1.14	.14	1.26	.36	1.20	.13	1.22
3 NPO	-.25	1.08	-.07	.92	.28	1.12	-.02	1.01
7 NPO	.02	1.14	-.20	1.09	-.01	.95	-.11	1.06
9 PPO	.17	.90	-.21	1.05	-.45	.92	-.17	1.00
10 AS	-.06	1.44	-.40	1.14	-.58	1.16	-.36	1.24
20 ICS	-.45	1.20	-.54	1.07	-.30	.98	-.46	.98
17 AS	-.71	1.34	-.41	.98	-.61	.95	-.50	1.03
Raw score total	M	SD	M	SD	M	SD	M	SD
	29.2	5.5	27.1	7.7	29.1	6.1	28.0	6.9

Note. Items are sorted by item location estimates obtained in the combined samples; item numbers are based on the ordering of the original SPSI-R short form. PPO = Positive problem orientation; RPS = rational problem solving; NPO = negative problem orientation; ICS = impulsivity/carelessness style; AS = avoidance style; d = estimated item location ("difficulty") in logits; MS Fit = the weighted mean square fit statistic.

Table 2

Comparison of Validity Between the SPSI-R Short Form and the Efficient 10-Item SPSI-R Version Among Samples

Sample	SPSI-R Short form (25 Items)	Efficient 10-item SPSI-R version
Low-vision rehabilitation		
CES-D	-.39 **	-.36 **
SWLS	.38 **	.35 **
Diabetes		
CES-D	-.44 **	-.41 **
SWLS	.26 **	.23 **
Caregivers		
CES-D	-.43 **	-.41 **
SWLS	.25 *	.26 *

Note. SPSI-R = Social Problem-Solving Inventory-Revised; CES-D = Center for Epidemiological Studies Depression Scale; SWLS = Satisfaction with Life Scale.

*
 $p < .01$.

**
 $p < .001$.