The Social Vulnerability Scale for Older Adults: An Exploratory and Confirmatory Factor Analytic Study

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Abstract

The Social Vulnerability Scale (SVS), a 22-item informant-report of vulnerability to exploitation and, in particular, financial exploitation in older adults, was administered to 266 respondents who assessed the social vulnerability of a significant other aged 50 years or over; either a person with dementia or other neurological condition (n = 116), or a healthy adult (n = 150). Exploratory factor analysis in the combined sample revealed a 15-item two-factor solution labelled *gullibility* and *credulity*. Stability in factor structure was established in an independent sample (n = 123) using confirmatory factor analysis, and sound reliability (internal consistency) and validity (known-groups) were demonstrated. The SVS15 is a potentially useful instrument for assessing older adults' vulnerability to exploitation.

Keywords:

social vulnerability, financial exploitation**,** dementia, memory, cognitive functioning, neuropsychology, ageing

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Early identification of older adults at risk of exploitation is critical for ensuring a balance between autonomy and safety in later life. While individuals of any age may be potentially vulnerable to various forms of exploitation, for example, being coerced into acts of a sexual or criminal nature, among older people, financial misappropriation and consumer fraud are comparatively common vis-à-vis other forms of exploitation (Carcach, Graycar, & Muscat, 2001; Kurrle, Sadler, & Cameron, 1992; Neale, Hwalek, Goodrich, & Quinn, 1996; Quinn & Tomita, 1997). Many older people have accumulated substantial wealth and their advanced age places them at greater risk of physical illness, cognitive impairment, and social isolation. For these reasons, older people may be seen as particularly lucrative and easy targets of financial crime and mistreatment.

In an effort to understand the factors which make some older adults particularly vulnerable to exploitation (termed *social vulnerability*), some studies have examined the characteristics of identified victims of abuse and exploitation. Research to date has provided information about these characteristics, namely extreme dependence, frailty, social isolation, severe physical illness, and cognitive impairment (Choi, Kulick, & Mayer, 1999; Fulmer, 1991; Kapp, 1995; Podnieks, 1992; Wilber & Reynolds, 1996; Wolf & Pillemer, 1989).[1] Several studies have also identified factors associated with perpetrators of abuse and exploitation, which include a history of substance abuse, psychopathology, caregiver burden, dysfunctional family and interpersonal relationships, financial dependency on the older person, and greed (Choi et al., 1999; Fulmer, 1991; Giordano, Yegidis, & Giordano, 1992; Kapp, 1995; Podnieks, 1992; Wolf, 1995). However, while it

[1] Some studies have also noted that a majority of abused or neglected older adults are female (Block & Sinnott, 1979; Sengstock & Liang, 1983). However, this finding is not unexpected given the greater proportion of females in the older population (Sengstock & Barrett, 1993). In the interests of brevity, a detailed discussion on the proposed causes of abuse and neglect of older adults will not be presented here but the reader is referred to Sengstock and Barrett (1993, pp. 179-187).

is generally acknowledged that multiple factors can lead to exploitation, there is currently no widely accepted model for describing or explaining such forms of vulnerability in later life (Hafemeister, 2003) .

In an effort to identify older adults at greater risk of exploitation, various screening instruments have been developed which target symptoms of vulnerability in a broader context of abuse. These instruments can be grouped into two broad categories: (1) assessment tools designed to identify victims or potential victims of abuse and exploitation (primary prevention); and (2) instruments designed for ongoing assessment of an existing, verified case of abuse for future risk following referral to adult protective services (secondary prevention) (Wolf, 2000). The present paper is primarily concerned with primary prevention assessment methods, and methods of secondary prevention will not be considered further here.[2]

Screening instruments currently available for primary prevention purposes include the Elder Abuse Suspicion Index (EASI) (Yaffe, Wolfson, Lithwick, & Weiss, 2006), the Indicators of Abuse Screen (IOA) (Reis & Nahmiash, 1998), the Elder Assessment Instrument (EAI) (Fulmer, 1984; Fulmer, Paveza, Abraham, & Fairchild, 2000; Fulmer, Street, & Carr, 1984; Fulmer & Whetle, 1986), and the Vulnerability to Abuse Screening Scale (VASS) (Schofield & Mishra, 2003). Referral of the older person to social services is generally recommended when there is clear evidence of mistreatment, a subjective complaint is made by the older person, or the clinician has cause to believe that there is a high risk of abuse, neglect, exploitation, or abandonment (Fulmer, 1984; Fulmer et al., 2000; Fulmer et al., 1984; Fulmer & Whetle, 1986). The development of primary prevention screening instruments has therefore provided considerable assistance to

[2] The reader is referred to Hafemeister (2003) for a detailed discussion on methods of assessment for secondary prevention of abuse and exploitation of older adults.

medical practitioners and social service providers with identifying older people in potentially abusive situations.

A personal characteristic which can contribute to exploitation is a tendency towards credulity and gullibility (Greenspan, 2005; Greenspan, Loughlin, & Black, 2001; Greenspan & Stone, 2002). Credulity is as propensity to believe things that are unproven or unlikely to be true (Greenspan, 2005, p. 130), whereas gullibility pertains to a susceptibility to being manipulated or deceived, either repeatedly or in the presence of obvious warning signs (Greenspan et al., 2001, p. 102). For example, an older person might accept a sales pitch from a stranger for unnecessary or overpriced home repairs (credulity), and proceed to hand over large sums of money prior to commencement of the work (gullibility). Various factors could underlie credulous and gullible behaviors but in particular, cognitive impairment due to neurological disorders such as dementia could significantly limit the ability to discriminate between honorable and exploitive intentions of other people. Although credulity and gullibility have obvious implications for social vulnerability and financial exploitation in later life, these attributes are not directly addressed by any of the aforementioned screening instruments.

To this end, we have recently developed the Social Vulnerability Scale (SVS), a 22-item measure, which targets credulous and gullible behaviors thought to contribute to exploitation among older people, especially financial forms of exploitation. Because the SVS was intended for use primarily with cognitively-impaired older adults, and due to the problems associated with the reliability of self-rating scales in clinical populations, for example, loss of insight into one's own behavior (e.g., McKhann et al., 2001; Miller et al., 2001; Rankin, Baldwin, Pace-Savitsky, Kramer, & Miller, 2005; Stuss, Picton, & Alexander, 2001), the scale was designed for completion by an informant.

In an initial validation study (Pinsker, Stone, Pachana, & Greenspan, 2006a), content for 28 candidate items was derived from literature searches, in consultation with experts in the field of gerontology, and from an unpublished scale developed previously by Greenspan and Stone (2002) targeting similar forms of vulnerability in younger adults with developmental disorders. Examples of the scale items are: "Has been deceived by someone who has deceived him/her before"; "Believes things that other people would view as clearly untrue"; "Has been taken in by postal scams e.g., prize draws requiring an initial payment"; and "Has been persuaded to purchase unneeded products or services".

The 28 items were piloted in a sample of university undergraduate students who completed the scale in relation to a relative or friend aged 50 years or older with whom they were well acquainted; either someone with memory problems, stroke, dementia or other neurological condition (clinical sample), or a healthy older adult (nonclinical sample). Item analyses resulted in the retention of 22 scale items. Sound psychometric properties of the 22-item scale were demonstrated in terms of reliability (internal consistency) and validity (comparison of known groups). Internal consistency of the scale was .92, test-retest reliability at one week in a small sub-sample was .87, and a significant difference in SVS scores was observed between clinical and nonclinical samples such that older adults with a neurological condition were judged to be significantly more vulnerable to exploitation than healthy older people. This effect remained robust after controlling for subject age and frequency of contact between respondents and subjects (Pinsker et al., 2006a).

While the aforementioned study provided preliminary evidence of the scale's reliability and validity, to date, the factor structure of the instrument has not been examined. Use of the SVS in its current form assumes that the scale items assess a single construct of vulnerability (i.e. the items are summed). However, without knowledge of the

measure's underlying latent dimensions, the notion of the SVS as a single factor scale may be problematic, with potential implications for the use, scoring, and interpretation of the instrument. The present paper was directed towards addressing this issue.

Objectives of the Present Series of Studies

The primary aim of the present work was to examine the factorial solution of the SVS in a heterogeneous nonclinical and clinical sample of older adults. Because only preliminary investigations of the psychometric properties of the SVS were reported previously (Pinsker et al., 2006a), exploratory factor analysis (EFA) was first performed (Study 1). An advantage of EFA is that it can consolidate variables and generate hypotheses about underlying processes, which can subsequently be tested using confirmatory factor analysis (CFA). Based on the factor solution and retained scale items from an EFA, the second aim of the present work was to re-examine the reliability (internal consistency) and validity (known-groups) of the scale/s. The third aim was to evaluate the fit of the emergent factor model in an independent sample using CFA (Study 2).

STUDY 1

Method

Participants

In total, 266 adults participated in this study. Participants were given the 22 SVS items to assess the social vulnerability of a person aged 50 years or over with whom they were well acquainted (referred to from herein as *subjects*). To increase variability in the data set, both clinical and nonclinical samples of older subjects were included. Participants were asked to complete the SVS with respect to an older, significant other with memory problems, stroke, Alzheimer's disease, another form of dementia, or other neurological

problem e.g., Parkinson's disease (clinical sample). If they were not well acquainted with such a person, they were asked to rate a healthy older adult (nonclinical sample).

One reason for including a clinical sample was to assess whether social vulnerability as the target construct demonstrated different properties in different samples. A second aim of including a clinical sample was to enable the disclosure of important scale factors, which might not be revealed in more homogenous subsamples. For example, if examining attributes that predict success as a basketball player, only with the inclusion of a normal sample would height emerge as an important factor (Tabachnik & Fidell, 2001). While factor analysis can be used to examine the factor structure of a measure in homogeneous groups, it can also be used to examine the factor structure of a measure which is intended for use in all populations (Hair, Anderson, Tatham, & Black, 1992), for example, measures of intelligence (e.g., Lim, 1994). A third reason for including a clinical sample was to obtain data for the second phase of the study to enable an evaluation of known-groups validity for social vulnerability scores.

Participants for the present study were recruited through three sources: (1) university undergraduate students (n = 167), (2) community nonclinical sample (i.e. participants from the general community who rated a healthy older subject; n = 68), and (3) a community clinical sample in which participants rated a subject who had been clinically diagnosed with probable dementia (n = 31). Participants in the undergraduate student sample were enrolled in a second year psychology course at the University of Queensland, and took part voluntarily during a scheduled class session. Independent contact was not made with the subjects in this part of the sample (i.e. the people who were rated). Thus, it was not possible to verify the diagnostic/symptom category of subjects nominated by participants or the presence of cognitive impairment, and it was necessary to rely solely on informant reports for this information.

Participants and subjects in the community nonclinical sample were recruited through volunteer databases at The University of Queensland (n = 50), a random elector sample from the Australian Electoral Commission (n = 14), and a small community organisation (n = 4). All participants and subjects in this sample were reasonably healthy, lived independently in the community, were free of any psychiatric or neurological conditions, and spoke English as a first language.

Participants and subjects in the community clinical sample (i.e. subjects with known or suspected neurological impairment) were recruited through geriatricians, clinical research trial co-ordinators, and neuropsychologists from two hospitals in Brisbane, Australia. Participants in this sample rated a subject known to them who had been clinically diagnosed with probable dementia; either Alzheimer's disease according to the NINDCS-ADRDA criteria (McKhann et al., 1984; n = 23), frontotemporal dementia (FTD) according to the clinical diagnostic criteria (Neary et al., 1998; frontal variant n = 1, temporal variant or semantic dementia n = 1), or vascular dementia (VaD) according to the NINDS-AIREN criteria (Roman et al., 1993; n = 6). Again, participants (i.e. raters) in this sample reported that they were reasonably healthy, lived independently, were free of any psychiatric or neurological conditions, and spoke English as a first language.

Characteristics of the Full Sample

Data for participant-subject dyads from the three samples were pooled into two groups; a *clinical* sample for all subjects with known or suspected memory impairment, dementia, or other neurological condition, and a *nonclinical* sample for subjects without a known or suspected neurological condition. Gender and mean age of participants and subjects by sample are depicted in Table 1.

[*Insert Table 1 about here*]

Recruitment for this research did not include gender selection. Females were overrepresented in both the subject (n = 154, male n = 112), $\chi^2 = 6.02$, $p < .05$, and participant groups (n = 172, male n = 94), $\chi^2 = 22.87$, $p < .001$. The ratio of males to females was relatively consistent across clinical and nonclinical samples, however, and the degree of gender disproportion was similar to that reported in other studies of older adults (Fratiglioni, Viitanen, von Strauss, Tontodonati, & Herlitz, 1997; Gao, Hendrie, Hall, & Hui, 1998; Hofman et al., 1991; Wertman, Brodsky, King, Bentur, & Chekhmir, 2007; Zhang et al., 1990). Nevertheless, gender was examined in subsequent analyses.

There was no significant difference in age between participants who rated a nonclinical subject (M = 36.34, SD = 20.99) and those who rated a clinical subject (M = 39.63, SD = 19.42), $p > .05$. However, clinical subjects (M = 75.91, SD = 10.84) were significantly older than nonclinical subjects (M = 68.11, SD = 11.84), $t(264) = -5.52$, $p < .001$. In subsequent analyses, covariate statistical techniques were used to control for this age difference.

In terms of the relationships between subjects and participants, in the clinical sample, grandmothers were the most frequent target of participants' responses (n = 36; 31%) while mothers were rated most frequently by participants in the nonclinical sample (n = 37, 25%). In terms of diagnostic/symptom categories in the clinical sample, Alzheimer's disease (n = 35, 30%) and memory problems (n = 31, 27%) were the most frequent (Table 3 in a subsequent section of this paper details all diagnostic/symptom categories of subjects). On average, participants had known their respective subjects for 29.28 years (SD = 15.60), and had verbal or personal contact with them on 14.20 days per month (SD = 12.45). Participants were therefore highly familiar with subjects and well placed to provide informant-based assessments of social vulnerability. However, clinical subjects had fewer days of contact per month with their respective participants (M = 10.58,

SD = 11.59) than nonclinical subjects (*M* = 16.75, *SD* = 12.44), $t(264) = 4.10$, $p < .001$. Statistical covariate techniques were used to control for the difference in frequency of contact in subsequent data analyses.

Materials

Social Vulnerability Scale

As noted earlier, the SVS is a 22-item informant report of older adults' vulnerability to exploitation. Scoring of the measure is based on a 5-point Likert-type scale regarding the frequency with which the behaviour of interest is exhibited where 0 = never, 1 = rarely, 2 = sometimes, 3 = often, and 4 = always. Higher scores therefore indicate greater social vulnerability (range = 0 – 88). Development of the scale and initial validation work are detailed elsewhere (Pinsker, Stone, Pachana, & Greenspan, 2006b).

Design and Procedure

The present study employed a cross-sectional design. Participants were given a brief written description of the study, advising that participation was voluntary and confidentiality would be assured. After signing a consent form, participants completed a brief questionnaire pertaining to demographic and background information (e.g., age; gender; participant/subject relationship; level of familiarity and frequency of contact; subject age and gender; and category of neurological condition e.g., Alzheimer's disease, stroke, etc.) in addition to the SVS items. On completion of the questionnaires, participants were debriefed in writing regarding the aims of the study.

Statistical Procedures

Because the underlying factor structure of the scale had not been examined previously (Pinsker et al., 2006b), and due to a lack of existing factor solutions, an EFA was performed in the first instance. Data were screened for normality, extreme scores, linearity, bivariate normality using scatterplots, homoscedasticity, multicollinearity, and sphericity.

There were no missing values. Linearity, bivariate normality, and homoscedasticity were all considered to be satisfactory, and there was no evidence of singularity or extreme multicollinearity. Analysis of extreme scores indicated that 3% of cases were potential univariate outliers. However, the removal of outliers had negligible effect on the outcome of the factor analysis and its interpretation, and all cases were included.

When item distributions for the whole sample were examined visually, as recommended by Field (2005) and Tabachnik and Fidell (2001) when evaluating skewness in larger data sets (i.e. >200 cases), a number of distributions were significantly, positively skewed, although to a lesser degree when the distributions for the clinical sample were examined separately. Because the scale was developed for use with neurological patients and assesses behaviors that depart from normal functioning, no correction for skewness was undertaken and factor analysis was performed on untransformed values.

The size of the full data set was sufficient to satisfy the recommended criteria for factor analysis: number of cases $\geq$ 5 x number of variables (Jones, van Schaik, & Witts, 2006; Kline, 1994; Lewis, 1995), and $N - n - 1 \geq 50$ where N = number of participants and n = number of variables (Lawley & Maxwell, 1971). In terms of factorability of the data, Tabachnik and Fiddell (2001) recommend that several sizeable correlations (at least over .30) should be evident for the data to be factorable. Examination of the correlation matrix revealed that at least 71% of the correlations were above .30. A significant result on Bartlett's test of sphericity, $\chi^2(231) = 2527.25$, $p < .001$, and a Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy of .93 indicated reasonable sampling adequacy and appropriate preconditions for factor analysis (Field, 2005).

Results

Exploratory factor analysis with principal components extraction was performed on the 22 scale items to examine the latent dimensions of the scale, and to reduce the number of

items to those with high loadings on a given factor. As some conceptual overlap in the scale items and dimensions was hypothesized, an oblique (Promax) rotation was used. Inspection of initial eigenvalues (λ = 8.62, 1.57, 1.28, 1.07), scree plot, and interpretability of factors failed to provide a clear indication of the number of factors to retain. Accordingly, two-, three-, and four-factor solutions were examined as recommended by Tabachnik and Fidell (2001).

The most appropriate factor solution was determined using the following criteria: (1) factors containing items with at least moderate loadings (i.e., values $\geq$ .50), (2) minimized ambiguous loadings (i.e., items with loadings of .30 or greater across two or more factors), (3) a minimum of four items loading on each factor, (4) interpretable factors, and (5) percentage of variance explained by each rotated factor (Hair et al., 1992; Tabachnik & Fidell, 2001). According to these criteria, the two-factor solution was found to best fit the data, providing the most parsimonious and interpretable solution. Six items which cross-loaded on both factors were removed. The content of these items related to: being talked into giving up objects of value, doing unreasonable favours for others, being made the brunt of practical jokes, tricked into accepting blame, lending money, and false confessions. An additional item with a relatively weak loading on Factor 1 and poor conceptual coherence with the remaining factor items was also removed (i.e. tricked into revealing secrets).

Factor analysis with a forced two-factor solution and Promax rotation was repeated on the remaining 15 items. In the final solution, eigenvalues of 6.48 and 1.54 were observed for Factors 1 and 2, with each rotated factor accounting for 27% of the total explained variance (53.44%). Inspection of the rotated loadings revealed that eight items loaded on Factor 1 and seven items loaded on Factor 2. Refer to Table 2 for the rotated factor loadings for all retained scale items.

[*Insert Table 2 about here*]

As evident in Table 2, salient loadings were observed for all retained scale items (bolded coefficients). The two factors were significantly and moderately inter-correlated (r = .60), suggesting that the factors measure distinct, but related, constructs. The content of items loading on the respective factors suggested that Factor 1 represents an amalgamation of items relating primarily to tangible behavioural outcomes of a financial nature whereas items loading on Factor 2 were more cognitive in nature, and represent a tendency to believe things that are unproven or unlikely to be true. Consistent with Greenspan et al.'s distinction between cognitive and behavioural markers of exploitive susceptibility, as described earlier, the two scale dimensions will now be referred to as *gullibility* and *credulity* factors.

Comparable factor solutions were obtained when the clinical and nonclinical groups were examined separately, indicating reasonable stability in structure across different samples. From herein, the 15 retained items will be referred to as the *SVS15*. Data for the SVS15 two-factor rotated solution plotted in two-dimensional space are depicted in Figure 1.[3]

[*Insert Figure 1 about here*]

Reliability of the SVS15

Using Cronbach's alpha, internal consistency of the SVS15 for the combined clinical and nonclinical samples was .90 (95% CI = .88 - .92). Inter-item correlations ranged from .17 to .60. Corrected item-total correlations ranged from .47 to .70. For the subscales, alpha was .85 (95% CI = .83 - .88) for the items loading on Factor 1 (gullibility) and .86 (95% CI = .84 - .89) for Factor 2 (credulity). When alpha was calculated for the

[3] Orthogonal rotation (e.g., Varimax) generates independent (uncorrelated) factors, maximizes the variance of the squared loadings for each factor, and therefore polarizes loadings to a degree (either high or low on factors). Oblique rotation (i.e. Promax) allows correlation between the factors but generates even greater polarization (Wang, 2006). Thus, because a Promax rotation was used in the present study, the solution depicted in Figure 1 appears to be orthogonal although the factors were correlated.

clinical and nonclinical samples separately, coefficients ranged from .81 to .86, indicating sound internal consistency across the subsamples and subscales.

Validity of the SVS15: Comparison of Known Groups

Construct validity of the SVS15 was evaluated using known-groups analysis, that is, the effectiveness of the measure in differentiating groups among which differences on these dimensions would be expected theoretically (Cronbach & Meehl, 1955). Total raw scores for each factor were obtained by summing participants' responses on the items defining Factors 1 and 2. An overall total for all items was also obtained. Scores potentially ranged from 0 to 32 for gullibility (8 items), 0 to 28 for credulity (7 items), and 0 to 60 for all items as a total combined score.

Because the diagnostic/symptom category of subjects in the clinical groups in this study was not independently verifiable for all subjects (i.e. subjects rated by undergraduate students), analysis of known groups was conducted after the data for all subjects in the clinical sample were collapsed into a single group. For illustrative purposes, however, descriptive statistics for raw scores on the SVS15 scales for each group based on preliminary diagnosis appear in Table 3. As evident in the table, the clinical sample comprised a relatively heterogeneous group of subjects with one of several suspected or diagnosed neurological disorders.

[*Insert Table 3 about here*]

Overview of Statistical Analyses. To assess known-groups validity of the SVS15 and its subscales, analysis of covariance (ANCOVA) and multivariate analysis of covariance (MANCOVA), respectively, were performed. As noted earlier, due to differences across samples in subject age and frequency of contact between participants and subjects, known-groups comparison of SVS15 scores was conducted after adjusting for subject age and frequency of contact.

Data screening. Results of evaluation of the assumptions of linearity, homogeneity of regression slopes, and reliability of covariates were all satisfactory. However, significant results on Levene's test indicated violation of the assumption of homogeneity of error variances between the groups (SVS15, $F[1, 264] = 7.91$, $p < .001$; gullibility, $F[1, 264] = 14.33$, $p < .001$; credulity, $F[1, 264] = 9.59$, $p < .001$). Statistics for skewness and visual inspection of the distributions both indicated that each of the dependent variables (SVS15 and subscale raw scores) was significantly, positively skewed, and four univariate outliers were present in the distribution for credulity in the clinical sample. While the removal of outliers had little effect on the distribution or the substantive interpretation, square-root transformations of all dependent variables achieved homogenous variance in the groups and approximations to normal distributions. In accordance with these findings, subsequent analyses were performed on the full data set but with square-root transformed SVS15 scores.

Effect of gender. Initially, ANCOVA and MANCOVA analyses were used to check for any effects of gender. With (transformed) SVS15 total scores as the dependent variable, subject gender and group (clinical vs. nonclinical) as independent variables, and subject age and contact days per month as covariates, there were no significant main effects of gender, and no significant two-way, three-way, or four-way interactions of gender with either group or the covariates (p values > .05). Similarly, with gullibility and credulity scores as dependent variables in a MANCOVA model, there were no significant main effects of gender and no significant interactions (p values > .05). Accordingly, subsequent analyses were performed on combined data for males and females.

Results of Known-Groups Comparisons

SVS15 scores. With (transformed) SVS15 scores as the dependent variable, group as the independent variable, and subject age and contact days per month as covariates, the

relationship between the covariate, subject age, and the dependent variable was not significant, $F(1, 262) = 1.41$, $p = .23$. However, the relationship between the second covariate, contact days, and the dependent variable was significant (although modest), $F(1, 262) = 4.63$, $p = .03$, partial $\eta^2 = .02$. As predicted, after controlling for the two covariates, SVS15 scores were significantly higher for the clinical group (adjusted $M = 4.01$, $SE = 0.10$) than for the nonclinical group (adjusted $M = 2.88$, $SE = 0.09$), $F(3, 262) = 62.92$, $p < .001$, partial $\eta^2 = .19$ (medium effect). Adjusted mean scores for each group were graphed and appear in Figure 2.

[*Insert Figure 2 about here*]

SVS15 subscales. With (transformed) SVS subscale scores (gullibility and credulity) as dependent variables, group as the independent variable, and subject age and contact days as covariates, the overall MANCOVA model yielded a significant multivariate effect (Wilks' $\lambda = 0.80$, $p < .001$). The relationship between subject age (the covariate) and the dependent variables was statistically significant (although weak) for gullibility, $F(1, 262) = 4.28$, $p = .04$, partial $\eta^2 = .02$, but not for credulity, $p > .05$. There were also significant relationships between the second covariate, contact days per month, and both gullibility, $F(1, 262) = 3.97$, $p = .05$, partial $\eta^2 = .01$, and credulity, $F(1, 262) = 6.55$, $p = .01$, partial $\eta^2 = .02$.

After partialling out the effects of the two covariates, adjusted mean (transformed) scores for gullibility were significantly higher for clinical subjects (adjusted $M = 2.18$, $SE = 0.07$) than for nonclinical subjects (adjusted $M = 1.42$, $SE = 0.09$), $F(3, 262) = 29.60$, $p < .001$, partial $\eta^2 = .10$ (medium effect). Similarly, adjusted mean scores for credulity were significantly higher for clinical subjects (adjusted $M = 3.27$, $SE = 0.08$) than nonclinical subjects (adjusted $M = 2.39$, $SE = 0.07$), $F(3, 262) = 66.52$, $p < .001$, partial η^2

= .20 (medium to large effect). Adjusted mean scores for the gullibility and credulity scales by sample were graphed and appear in Figure 3.

[*Insert Figure 3 about here*]

Summary

The aims of the present study were to examine the factor structure, reliability, and known-groups validity of the SVS. Exploratory factor analysis with principal components extraction and oblique rotation resulted in a two-factor solution and the retention of 15 scale items. This solution was the most acceptable, interpretable, and parsimonious based on (1) eigenvalues greater than unity (2) factors containing items with loadings of .50 or greater, (3) minimized ambiguous loadings, (4) a minimum of four items loading on each factor, and (5) interpretable factors (Hair et al., 1992; Tabachnik & Fidell, 2001). Factor 1 was defined by eight items relating to outcomes of social vulnerability, for example, being talked into purchasing unneeded products. This factor was labelled *gullibility*. All items which loaded on this factor were relevant to financial forms of exploitation. Items of a financial nature therefore provide a relatively coherent set of markers for social vulnerability. Factor 2 was characterised by seven items relating to cognitive behaviours, or a tendency to believe things that are unproven or questionable. This factor was labelled *credulity*.

In terms of reliability, alpha coefficients for the full scale and two subscales were relatively high. With regard to known-groups validity, social vulnerability scores were significantly higher for clinical subjects than for nonclinical subjects, indicating that older adults with a neurological condition are significantly more vulnerable to exploitation than neurologically healthy individuals. The results of this study therefore provide preliminary support for the SVS15 as a psychometrically-sound instrument for assessing social vulnerability among middle-aged and older adults.

STUDY 2

The aim of this study was to test the invariance of the SVS15 factor structure obtained in Study 1 in an independent sample using CFA. It was anticipated that the data from an independent sample would yield an acceptable fit to the factor model obtained in Study 1.

Method

Participants

Participants in this study (n = 123) were all undergraduate students at the University of Queensland, and took part in exchange for course credit. The sample comprised 29 males aged between 17 and 29 years (M = 19.28, SD = 2.48) and 94 females aged between 17 and 47 years (M = 20.59, SD = 6.26). The subject group comprised 44 males aged 50 to 97 years (M = 67.14, SD = 12.60), and 79 females aged 50 to 97 years (M = 67.78, SD = 13.06). Gender and mean age of participants and subjects by group appear in Table 4.

[*Insert Table 4 about here*]

The ratio of males to females in both the participant and subject groups across samples was similar to that in Study 1. There was no significant difference in age between participants who rated a clinical subject and (M = 20.45, SD = 5.67) and those who rated a nonclinical subject (M = 19.98, SD = 5.59), $p > .05$. The mean age of subjects in each group was also similar to Study 1 and, again, subjects in the clinical sample (M = 75.91, SD = 10.84) were significantly older than subjects in the nonclinical sample (M = 68.11, SD = 11.84), $t(264) = -5.52$, $p < .001$. Participants had known their respective subjects for 18.89 years (SD = 6.35) on average, and had verbal or personal contact with them on 10.36 days per month (SD = 11.10). On this basis, participants could be regarded as highly

familiar with their respective subjects. Characteristics of the samples in Study 1 and Study 2 were therefore similar overall.

Measures and Procedure

The measures and test procedures used in this study were identical to those in Study 1.

Statistical Procedures

Descriptive statistics and the reliability of the SVS15 were analysed using SPSS Version 11.5.0 (2002) while the CFA was performed using LISREL 8.80 (Jöreskog & Sorbom, 2007). Preliminary data screening indicated that there were no missing data, and no evidence of singularity or multicollinearity. Measures were screened for univariate and multivariate outliers, and normality of distributions. With a criterion of 3.29 standard deviations ($p < .001$, two-tailed test) above or below the mean (Tabachnik & Fidell, 2001), one outlier was identified. On further checking, however, this data point was gauged to be meaningful. Furthermore, its removal had negligible effect on the overall interpretation of the CFA and, accordingly, it was not removed. Using Mahalanobis distance with a critical probability value of $p < 0.001$, no multivariate outliers were identified; analyses were performed on the full data set.

As in Study 1, a number of SVS15 item distributions were significantly, positively skewed and kurtosed, indicating possible violation of the assumption of multivariate normality. However, the variables were considered to be meaningful (Weston & Gore, 2006), and analyses were performed on untransformed data using a corrective analytical approach. Unweighted least squares (ULS) is a method of parameter estimation used in CFA that does not assume multivariate normality, and can be used with smaller samples (e.g., >150) (Kline, 2005). In addition, Satorra and Bentler (1994, 2001) have proposed a family of scaling corrections aimed at improving chi-square approximations of goodness-

of-fit in smaller samples, and where non-normal distributions are involved. The Satorra-Bentler scaled χ^2 statistic has been shown to more closely approximate chi-square than the uncorrected statistic, to have more robust standard errors, and to perform equally well, or better than, the asymptotic methods generally recommended when distributional assumptions are violated (Satorra & Bentler, 1994). In accordance with these findings, ULS was used for model estimation, and the Satorra-Bentler scaled χ^2 was used to calculate model fit.

Other relative and absolute goodness-of-fit indices were also examined. For relative fit, the comparative fit index (CFI) (Bentler, 1990), normed fit index (NFI) (Bentler & Bonett, 1980), and non-normed fit index (NNFI) (Bentler & Bonett, 1980) were calculated. Two indices of absolute fit, the root mean square error of approximation (RMSEA) (Steiger, 1990) and standardised root mean square residual (SRMR) (Bentler, 1990), were used. Although there is no universal agreement on criteria for determining acceptable model fit, Hu & Bentler (1999) have suggested the following combination of values: ≥ .95 for relative fit indices, ≤.06 for RMSEA, and ≤ .08 for SRMR. These criteria were used to determine model fit in the present study.

Results

Means, standard deviations, ranges, and coefficient alpha for the SVS15 total and subscales for each group appear in Table 5.

[*Insert Table 5 about here*]

Consistent with Study 1, mean SVS15 scores on each scale were significantly higher for clinical vs. nonclinical subjects (*p* values < .01). Mean scores on each scale in the nonclinical sample in this study were higher overall than in the nonclinical sample in Study 1 (*p* values < .05), but not statistically different from the data for only the undergraduate part of the nonclinical sample in Study 1 (*p* values > .05). Furthermore,

there were no significant differences in SVS15 scores on any of the scales between the clinical sample in this study and the undergraduate part of the clinical sample in Study 1 (p values > .05).

Properties of the SVS15 in an Independent Sample

Item correlations. An inspection of the correlation matrix revealed moderate to high intercorrelations between a majority of scale items, with correlations ranging from .20 to .68. An exception was the item "persuaded to subscribe to books or magazines in which (s)he has little interest or doesn't read", which shared statistically non-significant correlations with four other items. Nevertheless, this item correlated significantly with all items loading on the same factor (i.e., gullibility; see Study 1).

Reliability: Internal consistency. Using coefficient alpha, values for internal consistency were similar to those obtained in Study 1, although slightly lower when the clinical and nonclinical samples were examined separately. For the combined samples, alpha was .88 (95% CI = .86 - .90) for the SVS15 total scale (.90 in Study 1). For the subscales, alpha was .79 (95% CI = .77 - .81) for gullibility (.85 in Study 1) and .85 (95% CI = .84 - .89) for credulity (.86 in Study 1).

Confirmatory Factor Analysis

Using a measurement model in LISREL, results of the CFA revealed no significant difference between the parameters of the data and the specified two-factor model, χ^2 (89) = 103.93, p = .13, indicating a highly satisfactory model fit. Other indices of fit were also sound (CFI = .99; NFI = .96; NNFI = .99, RMSEA = .04, SRMR = .07). All items were found to load on their respective factors in accordance with the two proposed subscales, and all standardised loadings were above .55 apart from one item ("persuaded to subscribe to books or magazines in which (s)he has little interest or doesn't read"), which had a lower standardised loading of .45. This item may not have tapped the

underlying latent construct of gullibility to the extent of the other items. The correlation between the factors was .56, supporting the inter-factor correlation of .60 found in Study 1. Thus, the two-factor structure of the SVS15 obtained in Study 1 was replicated in the current data set, and the overall goodness-of-fit of the model was very sound by conventional standards (Hu & Bentler, 1999; Tabachnik & Fidell, 2001). Parameter Estimates for the two-factor model using standardised coefficients are depicted in Figure 4.

[*Insert Figure 4 about here*]

General Discussion

The objectives of the present series of studies were to (1) examine the factor structure of the SVS using EFA, (2) to evaluate the reliability (internal consistency) and validity (known groups) of the revised scale, and (3) to evaluate the fit of the obtained factor model in an independent sample using CFA. An EFA with principal components extraction and oblique rotation resulted in a two-factor solution, and the final retention of 15 scale items defining the factors of gullibility and credulity. This finding was supported by the results of a CFA in an independent sample. All items loaded appropriately on the respective factors, and the overall goodness-of-fit of the model was highly satisfactory. Using a known-groups design, SVS15 scores for the full scale and subscales were significantly higher for clinical subjects than nonclinical subjects, even after taking subject age and frequency of contact into account. On the basis of these findings, the SVS15 is an appropriate and potentially useful measure for assessing social vulnerability among older people.

According to the present findings, the construct of social vulnerability comprises at least two components as behavioural indicators of exploitation. One component relates to overt gullible acts while the second component relates to credulity as a cognitive

behaviour. All items which loaded on the gullibility factor pertained to behavioural indicators of financial exploitation, for example, investing in questionable business deals. Instances of financial exploitation may be pertinent real-world markers of vulnerability. Accordingly, items pertaining to financial exploitation were predominant in defining the SVS15 gullibility scale.

Items loading on the credulity factor pertained to a predisposition to unquestioningly believe verbal or written information, even if presented with deliberately false or misleading information from that source previously. The concept of credulity may be distinguishable from the more general concept of *trust*; a trusting person assumes information from others to be true until proven otherwise whereas a credulous person is insensitive to information revealing untrustworthiness such as previous acts of deceit or exploitation. While anyone could fall victim to exploitation, credulous people fail to learn from previous experience and are therefore at heightened susceptibility.

The findings from the aforementioned studies indicate that the SVS15 factors of gullibility and credulity are not orthogonal, suggesting that the two constructs are related. In a research and clinical context, differentiating between credulity and gullibility may be conceptually useful. Separate SVS15 subscale scores could now be used to address specific questions regarding cognitive behaviors (credulity) and gullible acts as markers of social vulnerability. Nevertheless, because the factors were correlated, the instrument could still be scored and interpreted as a global measure of social vulnerability as originally conceived. Overall, the SVS15 appears to be an acceptable, face-valid measure of susceptibility to financial exploitation in particular and social vulnerability in general among older adults.

As noted in our previous work (Pinsker et al., 2006a), in terms of the observed group difference in SVS15 scores between clinical and nonclinical subjects, one

explanation for this finding pertains to the potential impact of cognitive dysfunction on everyday decision-making. Different aspects of cognitive dysfunction (e.g., memory impairment, dysexecutive syndromes, and social intelligence deficits) arising from various neurological conditions could all contribute to social vulnerability but in different ways.

Memory deficits, which typify Alzheimer's disease, could impede the recall of information regarding a previous fraudulent or deceitful act, or a financial agreement which had already been settled previously. Deficits in executive functioning, arising from neurological conditions affecting cortical and subcortical circuits in dorsolateral prefrontal regions (Pohjasvaara, Mäntylä, Ylikoski, Kaste, & Erkinjuntti, 2003), could impede the ability to problem-solve or formulate a plan to avoid manipulation and exploitation. Alternatively, deficits in social intelligence arising from impairment in orbitofrontal neurological regions can limit the ability to make inferences about the thoughts and intentions of other people (Gregory et al., 2002) and, by extension, the ability to detect potentially deceitful social exchanges (Stone, Cosmides, Tooby, Kroll, & Knight, 2002). Thus, deficits in various cognitive functions could have potentially contributed to the higher SVS15 scores obtained for clinical subjects.

Limits to Generalizability and Future Directions

With regard to the results of Study 2, a couple of cautionary notes are necessary. There is no universal agreement regarding the adequacy of sample size for CFA, which will depend on the size of the model, distributions of the variables, and the strength of relationships amongst the variables (Muthén & Muthén, 2002). However, Kline (2005) has offered the following general guidelines: samples < 100 can be considered "small" and only acceptable for simple models; 100 to 200 would constitute a "medium" sample and an acceptable minimum if the model is not overly complex; and > 200 can be considered a "large" sample. According to these standards, analyses in Study 2 were based on a

medium-sized sample. Taking into account the complexity of the model and the number of parameters estimated, the sample size was at the lower limits, although adequate. Future research with larger samples would improve the statistical stability of the results.

Second, although the specified model in Study 2 provided an adequate fit to the data, this finding does not necessarily mean that the current model is the *only* model that should be considered. Various authors (Bollen, 1989; Jöreskog, 1993; MacCallum, Wegener, Uchino, & Fabrigar, 1993; Stevens, 2002) have noted that in a majority of cases, other models will fit the data as well as, if not better than, the model originally hypothesised. Alternative models are based on competing hypotheses, which should be excluded if the original model is to be supported (MacCallum et al., 1993). At the same time, consideration of several models *a priori* is rare in practice (Jöreskog, 1993), and the purpose of Study 2 was to obtain validation for the two-factor model obtained in Study 1 in an independent sample.

Several methodological hurdles exist in the development of an assessment instrument to assess vulnerability to exploitation in everyday life. Generalizability of SVS15 scores may be limited by cultural differences in perceptions of, and attitudes towards, abuse and exploitation. Beliefs regarding reciprocity, helping behaviour, family inheritance, and future beneficiaries could all influence perceptions of social vulnerability. Sharing family resources might be an entrenched value in some cultures, for example, in Indigenous Australians, while other cultures might support a belief that an older person's financial resources should be used solely by that person. For these reasons, use of the scale in its current form would be limited to individuals from western, English speaking cultures.

Issues of validity and, in particular, ecological validity, are an important concern for clinical tests examining everyday functioning. Being an informant-based instrument,

reliability and validity of the SVS15 depend on accurate responses from the caregiver or significant other in order to effectively generalise SVS15 scores to naturalistic settings. Although clinical subjects were judged to be significantly more vulnerable than nonclinical subjects in the present studies, the validity of informant-derived information can be impacted by biases on the part of family members and caregivers. For a variety of reasons, informants may provide inaccurate responses regardless of the *actual* level of vulnerability demonstrated in everyday life.

Caregivers of many frail and dependent older adults with dementia may themselves be equally frail, impaired, and co-dependent (Schulz & Beach, 1999). Concerns regarding the potential for institutionalisation of, or separation from, one's spouse could impact upon the accuracy of informant responses regarding independent functioning. Bias could also be introduced by "malingering" informants who provide deliberately inflated estimates of social vulnerability in an effort to instigate guardianship arrangements, or to argue for institutionalisation of an extremely dependent or demanding relative.

Furthermore, if the informant who is approached to complete the SVS15 is a concomitant exploiter of the older person, reports pertaining to the victim's actual level of vulnerability may be highly erroneous. If this situation were suspected by the clinician, more rigorous investigations could be undertaken using information from multiple sources regarding the patient's behaviour, financial situation, living arrangements, and personal relationships. At the same time, it would seem unlikely that an exploiter would bring issues of vulnerability to the attention of clinicians or community services and risk jeopardizing a lucrative avenue for exploitation. While informant biases are unlikely to have impacted on the substantive interpretation of the present findings, research to develop improved methods of assessing social vulnerability should, nevertheless, be actively pursued.

A means to overcome potential issues of informant bias when assessing social vulnerability would be to develop a standardised test battery which can be administered directly to the patient. Task-oriented methods employed in other tools such as the Behavioural Assessment of Dysexecutive Syndrome (BADS) (Wilson, Alderman, Burgess, Emslie, & Evans, 1996) could be used to supplement informant-based assessments using the SVS15. To achieve this aim, case scenarios of exploitive situations could be constructed in which respondents are required to demonstrate an understanding of the situation, an appreciation of its significance, the ability to reason and generate potential consequences, the capacity to communicate a choice. These functional abilities are based on legal standards of competency which were originally proposed by Appelbaum and Roth (1982), and have been subsequently employed by a majority of researchers in the field (Sturman, 2005).

In particular, the standards have been used to develop clinical assessment tools with respect to informed consent (Grisso & Appelbaum, 1991; Janofsky, McCarthy, & Holstein, 1992), and consent to treatment and research (Appelbaum & Grisso, 1988, 2001; Edelstein, 1999; Grisso & Appelbaum, 1998; Marson, Ingram, Cody, & Harrell, 1995; Marson, McInturff, Hawkins, Bartolucci, & Harrell, 1997). Future development of task-oriented measures based on the four legal standards could similarly offer promise in terms of targeting the ability to avoid exploitation. For the present purposes, however, development of a performance-based measure was beyond the scope of the paper, which first aimed to elucidate the nature of the social vulnerability construct.

Psychometric testing should be incremental (Carmines & Zeller, 1979), and additional work is needed to establish levels of convergent and discriminant validity of the SVS15. Evidence of the scale's predictive validity could be obtained using longitudinal investigations in which social vulnerability is assessed at one point in time, and scores are

compared to actual reported incidences of exploitation at a subsequent point in time. Furthermore, having identified gullibility and credulity as latent variables underlying vulnerability to exploitation in later life, methodological approaches such as path analysis could be used to explore causal relationships between cognitive variables, broader contextual factors such as economic, cultural, and political influences, and gullibility and credulity.

Nevertheless, the present findings provide support for the SVS15 as a psychometrically sound instrument with potential applications in both research and applied settings. The inclusion of relatively heterogeneous clinical samples in both studies, in addition to the finding that comparable factor solutions were obtained across clinical, nonclinical, and combined samples in Study 1 suggest that the scale could be used effectively in older adults with a range of neurological disorders and varying degrees of cognitive impairment.

References

Appelbaum, P. S., & Grisso, T. (1988). Assessing patients' capacities to consent to treatment. *New England Journal of Medicine, 319*, 1635-1638.

Appelbaum, P. S., & Grisso, T. (2001). *MacArthur Competence Assessment Tool for Clinical Research (MacCAT-CR)*. Sarasota, FL: Professional Resource Press.

Appelbaum, P. S., & Roth, L. H. (1982). Competence to consent to research: A psychiatric overview. *Archives of General Psychiatry, 39*, 951-958.

Bentler, P. M. (1990). Comparative fit indices in structural models. *Psychological Bulletin, 107*, 238-246.

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88*, 588-606.

Block, M. R., & Sinnott, J. D. (1979). *The battered elder syndrome: An exploratory study*. College Park, MD: Center on Aging.

Bollen, K. A. (1989). *Structural equations with latent variables* New York: Wiley.

Carcach, C., Graycar, A., & Muscat, G. (2001). *The victimisation of older Australians*. Canberra: Australian Institute of Criminology.

Carmines, E. G., & Zeller, R. A. (1979). *Reliability and validity assessment*. Thousand Oaks, CA: Sage.

Choi, N., Kulick, D., & Mayer, J. (1999). Financial exploitation of elders: Analysis of risk factors based on county adult protective services data. *Journal of Elder Abuse and Neglect, 10*, 39-62.

Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *psychological Bulletin, 52*, 281-302.

Edelstein, B. (1999). *Hopemont Capacity Assessment Interview manual and scoring guide*. Morgantown, WV: West Virginia University.

Field, A. (2005). *Discovering statistics using SPSS* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Fratiglioni, L., Viitanen, M., von Strauss, E., Tontodonati, V., & Herlitz, A. (1997). Very old women are at the highest risk for dementia and Alzheimer's disease: Incidence data from the Kungsholmen project, Stockholm. *Neurology, 48*, 132-138.

Fulmer, T. (1984). Elder abuse assessment tool. *Dimensions of Critical Care Nursing, 3*, 216-220.

Fulmer, T. (1991). Elder maltreatment: Progress in community detection and intervention. *Family and Community Health, 14*, 26-34.

Fulmer, T., Paveza, G., Abraham, I., & Fairchild, S. (2000). Elder neglect assessment in the emergency department. *Journal of Emergency Nursing, 26*, 436-443.

Fulmer, T., Street, S., & Carr, K. (1984). Abuse of the elderly: Screening and detection. *Journal of Emergency Nursing, 10*, 131-140.

Fulmer, T., & Whetle, T. (1986). Elder abuse screening and intervention. *Nurse Practitioner, 11*, 33-38.

Gao, S., Hendrie, H. C., Hall, K. S., & Hui, S. (1998). The relationships between age, sex, and the incidence of dementia and Alzheimer's disease: A meta-analysis. *Archives of General Psychiatry, 55*, 809-815.

Giordano, J. A., Yegidis, B. L., & Giordano, N. H. (1992). Victimization of the elderly: Individual and family characteristics of financial abuse. *Arete, 17*, 26-37.

Greenspan, S. (2005). Credulity and gullibility among service providers: An attempt to understand why snake oil sells. In J. W. Jacobson, R. M. Foxx & J. A. Mulick (Eds.), *Controversial therapies for developmental disabilities: Fad, fashion, science in professional practice* (pp. 129-138). Mahwah, NJ: Erlbaum.

Greenspan, S., Loughlin, G., & Black, R. S. (2001). Credulity and gullibility in people with developmental disorders: A framework for future research. *International Review of Research in Mental Retardation, 24*, 101-135.

Greenspan, S., & Stone, V. E. (2002). *Gullibility Rating Scale.* . Unpublished manuscript.

Gregory, C., Lough, S., Stone, V. E., Erzinclioglu, S., Martin, L., Baron-Cohen, S., et al. (2002). Theory of mind in patients with frontal variant frontotemporal dementia and Alzheimer's disease: Theoretical and practical implications. *Brain, 125*, 752-764.

Grisso, T., & Appelbaum, P. S. (1991). Mentally ill and non-mentally ill patients' abilities to understand informed consent disclosure for medication. *Law and Human Behavior, 15*, 377-388.

Grisso, T., & Appelbaum, P. S. (1998). *Assessing competence to consent to treatment: A guide for physicians and other health professionals*. New York: Oxford University Press.

Hafemeister, T. L. (2003). Financial abuse of the elderly in domestic settings. In R. J. Bonnie & R. B. Wallace (Eds.), *Elder mistreatment: Abuse, neglect, and exploitation in an aging America* (pp. 382-445). Panel to review risk and prevalence of elder abuse and neglect. Committee on National Statistics and Committee on Law and Justice, Division of Behavioral and Social Sciences and Education. Washington, DC: National Academic Press.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1992). *Multivariate data analysis*. New York: Macmillan.

Hofman, A., Rocca, W. A., Brayne, C., Breteler, M. M., Clarke, M., Cooper, B., et al. (1991). The prevalence of dementia in Europe: A collaborative study of 1980-1990

findings. Eurodem Prevalence Research Group. *International Journal of Epidemiology, 20*, 736-748.

Hu, L.-T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Convention al criteria versus new alternatives. *Structural Equation Modeling, 6*, 1-55.

Janofsky, J. S., McCarthy, R. J., & Holstein, M. F. (1992). The Hopkins Competency Assessment Test: A brief method for evaluating patients' capacity to give informed consent. *Hospital and Community Psychiatry, 43*, 132-136.

Jones, J. J. S., van Schaik, P., & Witts, P. (2006). A factor analysis of the Wechsler Adult Intelligence Scale (WAIS-III) in a low IQ sample. *British Journal of Clinical Psychology, 45*, 145-152.

Jöreskog, K. G. (1993). Testing structural equation models. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 294-313). Newbury Park, CA: Sage.

Jöreskog, K. G., & Sorbom, D. (2007). LISREL 8.80. Lincolnwood, IL: Scientific Software International.

Kapp, M. B. (1995). Elder mistreatment: Legal interventions and policy uncertainties. *Behavioral Sciences and the Law, 13*, 365-380.

Kline, P. (1994). *An easy guide to factor analysis*. London: Routledge.

Kurrle, S., Sadler, P., & Cameron, I. (1992). Patterns of elder abuse. *Medical Journal of Australia, 157*, 673-676.

Lawley, D. N., & Maxwell, A. E. (1971). *Factor analysis as a statistical method*. London: Butterworth.

Lewis, J. R. (1995). IBM computer usability satisfaction questionnaires: Psychometric evaluation and instructions for use. *International Journal of Human-Computer Interaction, 7*, 57-78.

Lim, T. K. (1994). Gender-related differences in intelligence: Application of confirmatory factor analysis. *Intelligence, 19*, 179-192.

MacCallum, R. C., Wegener, D. T., Uchino, B. N., & Fabrigar, L. R. (1993). The problem of equivalent models in applications of covariance structure analysis. *Psychological Bulletin, 114*, 185-199.

Marson, D. C., Ingram, K. K., Cody, H. A., & Harrell, L. E. (1995). Assessing the competency of patients with Alzheimer's disease under different legal standards. *Archives of Neurology, 52*, 949-954.

Marson, D. C., McInturff, B., Hawkins, B. S., Bartolucci, A., & Harrell, L. E. (1997). Consistency of physician judgments of capacity to consent in mild Alzheimer's disease. *Journal of the American Geriatrics Society, 45*, 453-457.

McKhann, G., Albert, M. S., Grossman, M., Miller, B. L., Dickson, D., & Trojanowski, J. Q. (2001). Clinical and pathological diagnosis of frontotemporal dementia. *Archives of Neurology, 58*, 1803-1809.

McKhann, G., Drachman, D., Folstein, M. F., Katzman, R., Price, D., & Stadlan, E. M. (1984). Clinical diagnosis of Alzheimer's disease: Report of the NINCDS-ADRDA Work Group under the auspices of Department of Health and Human Services Task Force on Alzheimer's disease. *Neurology, 34*, 939-944.

Miller, B. L., Seeley, W. W., Mychack, P., Rosen, H. J., Mena, I., & Boone, K. (2001). Neuroanatomy of the self: Evidence from patients with frontotemporal dementia. *Neurology, 57*, 817-821.

Muthén, L. K., & Muthén, B. O. (2002). How to use a Monte Carlo study to decide on sample size and determine power. *Structural Equation Modeling, 4*, 599-620.

Neale, A. V., Hwalek, M. A., Goodrich, C. S., & Quinn, K. (1996). The association of elder abuse and substance abuse in the Illinois elder abuse system. *The Gerontologist, 36*, 694-700.

Neary, D., Snowden, J. S., Gustafson, L., Passant, U., Stuss, D., Black, S., et al. (1998). Frontotemporal Lobar Degeneration: A consensus on clinical diagnostic criteria. *Neurology, 51*, 1546-1544.

Pinsker, D. M., Stone, V. E., Pachana, N. A., & Greenspan, S. (2006a). Social vulnerability scale for older adults: A validation study. *Clinical Psychologist, 10*, 109-119.

Pinsker, D. M., Stone, V. E., Pachana, N. A., & Greenspan, S. (2006b). Social vulnerability scale for older adults: A validation study. *Clinical Psychologist, 10*, 117-127.

Podnieks, E. (1992). National Survey on Abuse of the Elderly in Canada. *Journal of Elder Abuse and Neglect, 4*, 5-58.

Pohjasvaara, T., Mäntylä, R., Ylikoski, R., Kaste, M., & Erkinjuntti, T. (2003). Clinical features of MRI-defined subcortical vascular disease. *Alzheimer Disease and Associated Disorders, 17*, 236-242.

Quinn, M. J., & Tomita, S. K. (1997). *Elder abuse and neglect: Causes, diagnosis, and intervention strategies* (2nd ed.). New York: Springer Publishing.

Rankin, K. P., Baldwin, E., Pace-Savitsky, C., Kramer, J. H., & Miller, B. L. (2005). Self awareness and personality change in dementia. *Journal of Neurology, Neurosurgery, and Psychiatry, 76*, 632-639.

Reis, M., & Nahmiash, D. (1998). Validation of the Indicators of Abuse (IOA) screen. *The Gerontologist, 38*, 471-480.

Roman, G. C., Tatemichi, T. K., Erkinjuntti, T., Cummings, J. L., Masdeu, J. C., Garcia, J. H., et al. (1993). Vascular dementia: Diagnostic criteria for research studies. Report of the NINDS-AIREN International Workshop. *Neurology, 43*, 250-260.

Satorra, A., & Bentler, P. M. (1994). Corrections to test statistics and standard errors in covariance structure analysis. In A. von Eye & C. C. Clogg (Eds.), *Latent variables analysis: Applications for developmental research* (pp. 399-419). Thousand Oaks, CA: Sage Publications.

Satorra, A., & Bentler, P. M. (2001). A scaled differences chi-square test statistic for moment structure analysis. *Psychometrika, 66*, 507-514.

Schofield, M., & Mishra, G. (2003). Validity of a self-report screening scale for elder abuse: Women's Health Australia study. *The Gerontologist, 43*, 110-120.

Schulz, R., & Beach, S. (1999). Caregiving as a risk factor for mortality: The Caregiver Health Effects Study *Journal of the American Medical Association. , 282*, 2215.

Sengstock, M. C., & Barrett, S. A. (1993). Abuse and neglect of the elderly in family settings. In J. Campbell & J. Humphreys (Eds.), *Nursing care of survivors of family violence* (2nd ed., pp. 173-208). St. Louis: Mosby-Year Book Inc.

Sengstock, M. C., & Liang, J. (1983). Domestic abuse of the aged: Assessing some dimensions of the problem. *Interdisciplinary topics in gerontology, 17*, 58-68.

SPSS. (2002). Statistical Package for the Social Sciences (Version 11.5.0). Chicago, Ill: SPSS Incorporated.

Steiger, J. H. (1990). Structural model evaluation and modification: An internal estimation approach. *Multivariate Behavioral Research, 25*, 173-180.

Stevens, J. P. (2002). *Applied multivariate statistics for the social sciences* (4th ed.). Mahwah, NJ: Lawrence Erlbaum

Stone, V. E., Cosmides, L., Tooby, J., Kroll, N., & Knight, R. T. (2002). Selective impairment of reasoning about social exchange in a patient with bilateral limbic system damage. *Proceedings of the National Academy of Sciences of the United States of America, 99*, 11531-11536.

Sturman, E. D. (2005). The capacity to consent to treatment and research: A review of standardized assessment tools. *Clinical Psychology Review, 25*, 954-974.

Stuss, D., Picton, T. W., & Alexander, M. P. (2001). Consciousness, self-awareness, and the frontal lobes. In S. Salloway, P. Malloy & J. Duffy (Eds.), *The frontal lobes and neuropsychiatric illness* (pp. 101-109). Washington, DC: American Psychiatric Publishing Inc.

Tabachnik, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). Boston, MA: Allyn and Bacon.

Wang, F. (2006). *Quantitative methods and applications in GIS*. New York: CRC Press.

Wertman, E., Brodsky, J., King, Y., Bentur, N., & Chekhmir, S. (2007). An estimate of the prevalence of dementia among community-dwelling elderly in Israel. *Dementia and Geriatric Cognitive Disorders, 24*, 294-299.

Weston, R., & Gore, P. A. (2006). A brief guide to structural equation modeling. *Counselling Psychologist, 34*, 719-751.

Wilber, K. H., & Reynolds, S. L. (1996). Introducing a framework for defining financial abuse of the elderly. *Journal of Elder Abuse and Neglect, 8*, 61-80.

Wilson, B. A., Alderman, N., Burgess, P., Emslie, H., & Evans, J. J. (1996). *Behavioural assessment of the dysexecutive syndrome* St Edmunds, UK: Thames Valley Test Company.

Wolf, R. (1995). Elder abuse and family violence: Written testimony before the U.S. Senate Special Committee on Aging. In *Society's secret shame: Elder abuse and family violence*. 104th Congress (serial no. 104-3). Portland, Maine. Washington, DC: U.S. Government Printing Office.

Wolf, R. (2000). Risk assessment instruments. National Center on Elder Abuse. Retrieved 2nd May, 2008, from http://www.ncea.aoa.gov/NCEAroot/Main_Site/Library/Statistics_Research/Research_Reviews/risk_assessment.aspx

Wolf, R., & Pillemer, K. (1989). *Helping elderly victims*. New York: Columbia University Press.

Yaffe, M. J., Wolfson, C., Lithwick, M., & Weiss, D. (2006, October). *The Elder Abuse Suspicion Index: A method to improve identification of elder abuse by doctors.* Paper presented at the North American Primary Care Research Group Annual Meeting, Tucson, AZ.

Zhang, M., Katzman, R., Salmon, D., Jin, H., Cai, G. J., Wang, Z. Y., et al. (1990). The prevalence of dementia and Alzheimer's disease in Shanghai, China: Impact of age, gender, and education. *Annals of Neurology, 27*, 428-437.

Table 1

Gender and Mean Age of Participants and Subjects for Clinical and Nonclinical Samples

	Clinical Sample[a] (n = 116)		Nonclinical Sample[b] (n = 150)	
	Men	*Women*	*Men*	*Women*
Participants	44 (38%)	72 (62%)	50 (33%)	100 (67%)
Age (*SD*)	34.03 (17.95)	37.75 (22.66)	40.78 (19.40)	39.06 (19.49)
Subjects	46 (40%)	70 (60%)	66 (44%)	84 (56%)
Age (*SD*)	75.41 (10.30)	76.23 (11.24)	68.23 (12.14)	68.06 (11.47)

[a]Clinical Sample = subjects with a known or suspected neurological condition: memory problems, Alzheimer's disease, stroke, vascular dementia, frontotemporal dementia, dementia type not specified, or other neurological condition (e.g., Parkinson's disease).
[b]Nonclinical Sample = subjects without a known or suspected neurological condition, and asymptomatic at the time of testing.

Table 2

Rotated Component Matrix for the Two-Factor Solution

SVS15 Item	Factor	
	1	2
7. Persuaded to purchase unneeded products or services	**.62**	.08
9. Tricked into paying for something that was never forthcoming	**.65**	.12
12. Signed up for investments or deals that seem too good to be true	**.87**	-.14
13. Persuaded to donate excessive sums of money to charities	**.66**	.10
15. Taken in by postal scams (e.g., prize draws requiring initial payments)	**.87**	-.16
16. Talked into giving cheques or bank a/c details to a stranger	**.63**	.13
18. Tricked into paying another person's bill or share of a bill	**.53**	.12
19. Persuaded to subscribe to unneeded or unwanted books/magazines	**.72**	-.03
1. Believe what (s)he is told even when deceived before by that person	-.15	**.74**
3. Believe things that other people would view as clearly untrue	-.01	**.77**
5. Believe everything (s)he reads (e.g., newspapers, advertisements)	-.04	**.68**
11. Deceived by someone who has deceived him/her before	.15	**.61**
17. Believe what s(he) is told even when the person has lied before	.11	**.71**
20. Easily fooled	.06	**.78**
21. Believe rumours from a questionable source	.01	**.82**
% variance rotated	26.94	26.50
[a]Mean raw score (*SD*)	4.35 (4.18)	8.53 (4.93)

Note. Promax rotation. $\lambda = 6.48, 1.54$. Factor loadings in bold type are $\geq .50$. In some cases, item descriptions in the table are summarised versions of the actual items. Item numbers refer to those of the 22-item version obtained from Phase 1.
[a]Mean raw scores were calculated using the sum of the raw scores for all items pertaining to each factor, averaged across the full sample.

Table 3

Raw Score Ranges, Means, and Standard Deviations for SVS15 Scales for Nonclinical and Clinical Samples Based on Preliminary Diagnosis

	Gullibility Scale		*Credulity Scale*		*SVS15 Total Score*	
Group	Range	*M (SD)*	Range	*M (SD)*	Range	*M (SD)*
Nonclinical (*n* = 150)	0 - 14	3.17 (3.34)	0 - 18	6.41 (3.87)	0 - 27	9.59 (6.44)
Clinical (*n* = 116)	0 - 20	5.87 (4.65)	3 - 25	11.27 (4.81)	3 - 40	17.14 (8.33)
Vascular Dem.(*n* = 6)	1 - 13	6.17 (4.88)	3 - 16	9.17 (4.62)	4 - 26	15.33 (9.11)
Stroke (*n* = 21)	0 - 16	4.67 (4.49)	3 - 22	11.52 (5.08)	3 - 38	16.19 (8.35)
Alzheimer's (*n* = 35)	0 - 17	4.94 (4.14)	3 - 25	11.69 (5.06)	6 - 40	16.63 (8.19)
Memory Probs (*n* = 31)	0 - 20	6.03 (4.74)	3 - 19	10.77 (4.60)	4 - 39	16.81 (8.23)
[a]Other (*n = 23)*	0 - 17	8.09 (4.93)	4 - 21	11.61 (4.68)	6 - 35	19.70 (8.68)

[a]Other dementia or neurological condition not specified