Assessment of Social Cognition in Frail Older Adults and Its Association With Social Functioning in the Nursing Home

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Purpose: The aims of this study were to reliably assess a range of social-cognitive functioning in frail seniors and to examine the association between measures of social cognition and nurses’ ratings of residents’ social functioning in a nursing home. Design and Methods: Forty nursing home residents with and without cognitive impairment completed 11 social cognition tasks on two occasions after assessment of their cognitive functioning with the Cambridge Cognitive Examination—Revised (CAMCOG), CAMCOG Executive Function, and two tests of working memory. Staff on the nursing units completed two measures of social behavior. Results: Participants completed the social cognition protocol without difficulty. The measures demonstrated good internal (median alpha = .75) and test–retest reliability (median correlation = .70). Four of the social cognition measures were significantly associated with the measures of cognitive functioning; three additional measures showed significant positive associations with subsets of the cognitive tests. Regression analyses revealed that measures of social cognition were significantly and independently associated with nurses’ ratings of residents’ social functioning after age, gender, education, and the four measures of cognitive functioning were controlled for. One measure of social cognition that assessed interpersonal problem-solving accounted for 45% of the variance in nurses’ ratings of participants’ social functioning ($F = 41.35; df = 1,17; p < .001$). Implications: Measures of social cognition assess a domain of functioning that is not evaluated by traditional tests of cognitive status. These measures are informative about frail, older adults’ ability to understand and respond to others and could be used to predict patterns of social functioning in nursing homes and other naturalistic settings.

Key Words: Social cognition, Social functioning, Frail older adults, Nursing homes

A fulfilling life for older adults is characterized by social integration, that is, life with people (Blazer, 2001). Frail seniors, especially residents of skilled nursing facilities, often exhibit significant changes in levels of social participation and engagement. For example, a prospective study of new nursing home admissions found that on admission and after 1 year, approximately 50% of the residents were not participating in activities programs (Rovner, German, Burton, & Clark, 1994). One determinant of these declines in social functioning may be deterioration of cognitive abilities that are needed to process social information. This study examines the association between measures of social cognition and nurses’ ratings of residents’ social functioning in a nursing home.

The term social cognition refers to the collection of cognitive abilities that enables us to make sense of our social world and to interact effectively with others. It differs from nonsocial cognition in the type of stimuli processed. Social stimuli include the self, other individuals, and social situations, such as going to a restaurant; these stimuli are typically personally relevant and mutable (Fiske & Taylor, 1991). In contrast, nonsocial stimuli, that is, the numbers, words, or objects of paradigmatic cognitive research and mental status tests, are nearly always affectively neutral and static. Social cognition comprises a broad range of abilities and competencies, including recognizing emotions in facial expressions or gestures, forming impressions of others, explaining and predicting others’ behavior, and solving

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interpersonal problems. (For recent reviews, see Kunda, 1999 and Ochsner & Lieberman, 2001.)

Little is known about the impact of age- and disease-related changes in social cognition on social functioning in frail seniors. Hess (1999) concluded from a series of cross-sectional studies that the normative changes of aging affect the content and complexity of the impressions that older adults form of other people. Similarly, Blanchard-Fields (1999) determined from studies of social judgment and bias that age-related changes in cognition affect the way older adults understand and explain the reasons for others’ behavior. This work with healthy older adults, however, did not address the relationship between age changes in social cognition and everyday social functioning. Disease-related changes also have been documented in a number of social cognitive abilities, including recognition of facial expressions in frontotemporal dementia (Keane, Calder, Hodges, & Young, 2002; Koff, Zaithchik, Montepare, & Albert, 1999; Lavenu, Pasquier, Lebert, Pet, & Van der Linden, 1999) and in Alzheimer’s disease and other dementias (Cadieux & Greve, 1997; Lavenu et al., 1999; Ogrocki, Hills, & Strauss, 2000). Whereas it seems clear that deficits in social cognition are associated with dementia, what has not been determined is how these deficits affect social functioning, for example, in nursing homes.

Several studies have shown that measures of social cognition explain social functioning better than tests of nonsocial cognition. For example, a study with schizophrenic patients (Penn, Spaulding, Reed, & Sullivan, 1996) found that only tasks measuring social cognition were related to how the patients were observed to function on the ward. In a recent study with Alzheimer’s patients, Shimokawa et al. (2001) investigated the relationship between the ability to recognize facial expressions and interpersonal behavior in a psychiatric hospital. They found that the ability to recognize emotion was significantly associated with ratings of social functioning, whereas performance on a standard mental status test was not related to behavior on the ward. To our knowledge, only one study has looked directly at the relationship between a range of social-cognitive abilities and social functioning in older adults. Dolen and Bearison (1982) found a significant positive relationship between the magnitude and diversity of self-reported social role involvement and three measures of social cognition in community-dwelling seniors: interpersonal problem-solving, the ability to characterize well-known others, and the ability to assume the perspectives of multiple characters in a story. It is unclear, however, whether findings from this study, which used self-reports from older adults living in the community, generalize to observational ratings of social functioning in frail nursing home residents, especially those with cognitive impairment.

This is the first study to assess a range of social-cognitive functioning in frail seniors and to examine the relationships between measures of social cognition and observational measures of social functioning in natural settings, such as a skilled nursing facility. Specific aims were (a) to determine the feasibility of using existing experimental tasks and paradigms to measure social cognition in older adults with and without cognitive impairment, (b) to examine the distributional and psychometric properties of the individual tests in the protocol, and (c) to determine the independent association between social cognition measures and observational ratings of social functioning on a nursing unit.

Methods

This is an observational study of nursing home residents’ performance on measures of social cognition. Participants included those with and without cognitive impairment. The study also incorporated nurses’ ratings of participants’ social functioning on the nursing units.

The social cognition protocol comprised 11 tests: (a) 2 measures of face processing; (b) 3 measures of affect recognition; and 2 measures each of (c) person perception, or the ability to form impressions of and to characterize others, (d) representation of social situations, and (e) social reasoning. This ordering corresponds roughly to the degree of complexity of processing demands. The measure that was used for face processing is predominately perceptual. At the other end of the continuum was a social reasoning task that required the participant to describe an interpersonal problem and then to derive a solution to that problem. Two to three sessions of 1–2 hr each were required to administer the entire social cognition protocol. The protocol was readministered 1–2 weeks later to two to three sessions to measure test–retest reliabilities. Participants’ social behavior was assessed with two survey instruments completed by nursing staff.

Participants

Participants were recruited from a large skilled nursing facility in Northern California. Eligible residents were identified through a review of medical charts. Exclusion criteria included the following: poorly controlled depressive or psychotic symptoms as noted in the chart, poor hearing (i.e., unable to hear spoken conversation) or visual functioning (unable to see text in a font size of 14 points or smaller), a length of stay in the nursing facility of less than 3 months, and a score of 5 or greater on the Global Deterioration Scale (GDS; Reisberg, Ferris, de Leon, & Crook, 1988), with 5 corresponding to “moderately severe cognitive decline.” GDS scores were assigned in consultation with medical and nursing staffs. To minimize a self-selection bias,
potential participants were randomly selected for the consent procedure. Of 151 residents screened for the study, 44 (29.1%) did not meet the eligibility criteria. More than one third of those excluded had impaired hearing or vision; others were ineligible because of aphasia or poorly controlled psychiatric symptoms. Eight had GDS scores of 5 or greater. Of the 64 residents who were invited to participate, 22 declined. The amount of time required for the assessments was cited most often as a reason for not participating. Although those who declined to participate tended to be older than those enrolled in the study, the gender distributions were similar, as was the incidence of cognitive impairment and depressive symptoms.

Participants’ ages ranged from 73 to 97 (Table 1). Nearly all (88.1%) had one or more functional limitations. Approximately one half (47.6%) were in wheelchairs; less than one fourth (16.7%) could ambulate unaided. Forty (95.2%) of the participants had at least one of the chronic diseases or conditions listed in Table 1, with hypertension and current major depression or dysthymia the most prevalent. Median length of stay in the nursing facility was 20.5 months. Slightly more than one half of the participants (52.4%) were given GDS ratings of 1 or 2, corresponding to judgments of no or minimal cognitive impairment. The remaining participants had GDS ratings of 3 and 4, suggesting mild to moderate cognitive decline; 9 in this group had dementia diagnoses.

Tests of Cognitive Status

After giving informed consent, participants completed a brief neuropsychological battery and tests of working memory. For each measure, lower scores reflect greater cognitive impairment.

Cambridge Cognitive Examination—Revised (CAMCOG-R; Roth, Huppert, Mountjoy, & Tym, 1999).—The CAMCOG-R comprises the 19 items of the Mini-Mental State Examination (MMSE) (Folstein, Folstein, & McHugh, 1975); additional items to assess the functions measured by the MMSE more thoroughly; and items that assess abstract thinking, perception, and executive function, which are not covered by the MMSE. A separate executive function score is derived from subtests not included in the CAMCOG-R total.

Tests of Working Memory.—The Letter-Number Sequencing and Spatial Span Forward subtests of the Wechsler Memory Scale III (WMS-III; Wechsler, 1997) measure abilities to attend to information, to hold and process that information in memory, and then to formulate a response. For Letter-Number Sequencing, the examiner reads alphanumeric strings of increasing length, such as K – 2 – C – 7 – S. The subject repeats each string, giving the numbers first in ascending order and then the letters in alphabetical order. For Spatial Span Forward, the examiner taps cubes in a specified sequence on a board on which 10 cubes are mounted and asks the subject to tap the same sequence.

Social Cognition Measures

This study adapted experimental tasks that have been used to investigate social cognition in healthy adults, as well as in patients with schizophrenia, focal brain damage, or progressive dementias. The 11 measures were divided into three groups, each including tasks of varying difficulty, for
administration over several sessions. The sessions lasted from 1 to 2 hr. Order of administration of the groups of measures over the testing sessions was counterbalanced across participants. For each task, the individual items were presented to all subjects in the same order. Test administrator and time of testing were held constant across test and retest sessions. For all tasks, a higher score indicated greater ability on the aspect of social cognition being tested. Additional information about construction, administration, and scoring of each measure is available from the authors.

**Face Processing: Age Estimation.**—This test assesses the ability to discriminate differences between individual faces (Della Sala, Muggia, Spinnler, & Zuffi, 1995; De Renzi, Bonacini, & Faglioni, 1989). For the adaptation of the test used in this study, participants were shown 12 arrays of photographs of either four men or four women of different ages and asked to arrange them in order from youngest to oldest. Scores reflected participants’ ability to discriminate facial differences related to age.

**Face Processing: Discrimination of Facial Identity.**—This test measures the ability to discriminate one individual from another (Roudier, Marcie, Granche, Tzortzis, Starkstein, & Boller, 1998). Participants were shown pairs of photographs of actors expressing various emotions (Ekman and Friesen, 1975). Six each of four types of displays were used: same actor–same emotion, different actor–same emotion, same actor–different emotion, and different actor–different emotion. Participants were asked, “Is this the same person or two different people?” Scores reflected participants’ ability to discriminate facial identity.

**Affect Recognition: Discrimination of Facial Emotion.**—The two tests of affect recognition used stimuli similar to those for Discrimination of Facial Identity. For Discrimination of Facial Emotion, participants were shown six each of the following: same actor–same emotion, different actor–same emotion, same actor–different emotion, and different actor–different emotion. Participants were asked, “Is the same emotion being expressed in the photographs or are the emotions different?” Scores on this test reflected participants’ ability to discriminate similarities and differences in facial expressions.

**Affect Recognition: Identification of Emotional Expression.**—For the first condition (verbal), participants were shown 16 photographs of actors expressing one of six emotions: happy, sad, angry, surprised, afraid, or neutral (no emotion). They were asked to indicate which emotion was expressed. For the second condition (pointing), participants were shown four cards, each displaying four photographs of the same actor. They pointed, in turn, to the happy face, the angry face, the surprised or sad face, and the neutral face. Scores for each condition reflected participants’ ability to identify expressions of specific emotions.

**Person Perception: Descriptions of Familiar Others.**—This test assesses the ability to describe psychological attributes of familiar others, including family members (Dolen & Bearison, 1982). Participants were instructed to describe two people whom they had known well so that the interviewer would have a clear idea of what each was like. Verbatim transcripts of the descriptions were scored for two types of statements: “Differentiating,” which described the person in terms of fairly specific personal characteristics, such as interests or abilities; and “Dispositional,” which described general behavioral traits or which referred to the person’s thoughts and feelings. Scores on this test reflected participants’ ability to characterize a familiar person.

**Person Perception: Impressions of Unfamiliar Others.**—This measure assesses the ability to infer psychological attributes of strangers (Murphy, 1981). After viewing each of six videotapes of actors explaining what they would do with a large lottery win, participants answered the following questions: (a) “What is your impression of this person?,” (b) “What kind of a person do you think he or she is?,” and (c) “How would you describe this person to someone who hasn’t seen the tape?” Verbatim transcripts of the taped responses were scored for two types of statements: “Intentional,” which were inferences about the individual’s intentions, goals, and values; and “Dispositional,” which were inferences about psychological traits or attributes, as well as interpersonal qualities. Scores reflected participants’ ability to make inferences about core attributes of an unfamiliar person.

**Representation of Social Situations: Situational Feature Recognition.**—This test assesses the ability to identify both concrete and abstract features of social situations (Bower, Black, & Turner, 1979; Corrigan & Green, 1993). For each of eight social situations (e.g., attending a wedding), participants were given two lists. The first list comprised 12 possible actions associated with the situation. Participants checked the things that someone in that situation might do (e.g., “listen to vows,” or “throw rice”). The second list consisted of 12 possible goals associated with the situation. Participants checked possible reasons someone might have for engaging in the activity (e.g., “to celebrate a joyous event,” or “to have a good time”). The scores reflected the number of correct versus incorrect responses.

**Representation of Social Situations: Social Sequencing.**—This measure assesses the ability to sequence the component actions of a social situation
correctly (Corrigan & Addis, 1995). For each of 12 situations (e.g., meeting friends for dinner at a restaurant), participants were instructed to correctly order cards representing component actions (e.g., eat the main course, or follow the host to the table). Scores reflected the degree of correct sequencing.

**Social Reasoning: Theory of Mind.**—The term *theory of mind* refers to the ability to attribute independent mental states to others in order to predict and explain their behavior (Premack & Woodruff, 1978). Fourteen short passages (Happe, 1994; Happe, Brownell, & Winner, 1998) contained one of the following: persuasion, a double bluff, a mistake, a white lie, a more serious lie, irony or sarcasm, or the use of a figure of speech. Scores reflected understanding whether the main character was telling the truth and understanding the character’s mental state or intentions.

**Social Reasoning: Assessment of Interpersonal Problem-Solving Skills.**—This adaptation of a video-based test (Donahoe, Carter, Bloem, Hirsch, Laasi, & Wallace, 1990) assesses participants’ ability to determine in 12 taped interactions whether one person impedes the achievement of another’s goal (e.g., a waitress writes down an order incorrectly), and, if so, to describe the problem and to explain what they would say or do in that situation. Scores reflected participants’ ability to identify a problem, to specify the goal of the principal character and the obstacle that prevents that character from attaining the goal, and to propose a solution without negative consequences.

**Measures of Social Behavior**

**Social-Adaptive Functioning Evaluation (SAFE).**—Nurses rated residents on the social functioning scale of the SAFE, a measure designed to assess functional and social impairment in geriatric patients (Harvey, Davidson, Mueser, Parella, White, & Powchick, 1997). Scores on the social functioning factor have demonstrated high interrater reliability (intraclass correlation coefficient $\geq .88$). Higher SAFE scores indicate poorer social functioning.

**Social Intimacy Scale.**—This scale, adapted from an instrument used by Cohen-Mansfield and Marx (1992), comprises three items: intimacy with staff, intimacy with other residents, and intimacy with visitors. Higher scores indicate more positive relationships within the participant’s social network.

**Data Analysis**

The first set of analyses assessed the feasibility of using tasks from the experimental literature to measure social cognition in frail seniors with and without cognitive impairment. Descriptive statistics examined the distribution of scores on the individual tests from the first testing occasion.

The second set of analyses tested whether the social cognition measures evoked reliable responses from participants. Internal consistency of each measure was measured with Cronbach’s alpha. Items that were weakly correlated ($r < .08$) with total scores were eliminated. Test–retest reliabilities were calculated by correlating performance on the first administration of each test with that on the second, administered approximately 1–2 weeks apart.

The third set of analyses tested whether social cognition was associated with nursing home residents’ cognitive status and social functioning. Bivariate associations were determined by computing Pearson or Spearman correlation coefficients, as appropriate, between the social cognition measures and the CAMCOG, the tests of working memory, and the observational measures of social functioning. The pairwise method for incomplete data was used for selecting values for computing the correlation coefficients. Hierarchical regression analyses were then conducted to determine the independent association between each of the nurses’ ratings of social functioning and the social cognition measures after age, gender, educational level, CAMCOG score, and working memory scores were controlled for. Educational level was dichotomized as college or technical training versus no college or technical training. For each measure of social functioning, the demographic variables and the CAMCOG and working memory scores were entered simultaneously at Step 1. Next, social cognition measures with an association significant at the level of $p = .20$ or less with the measure of social behavior were entered by use of stepwise selection.

**Results**

**Properties of the Social Cognition Measures**

**Feasibility of the Social Cognition Protocol**—The testing sessions were well tolerated by the participants. Of the 42 nursing home residents enrolled in the study, 40 completed the initial testing sessions and 38 completed the retesting. Participants readily understood and engaged in the tasks. The Social Sequencing task was lengthy, and 8 participants asked to stop before completing it. Summary scores were based, therefore, on the average of items attempted. Hearing impairments prevented 6 participants from completing the Assessment of Interpersonal Problem-Solving Skills.

**Distributional Characteristics of the Social Cognition Measures**—Scores for 10 of the 11 measures in the social cognition protocol were well distributed (see Table 2). Only the pointing version of Identification of Emotional Expression had poor
distributional characteristics, with scores clustering at the top of the scale. This measure was not included in the remaining analyses.

Reliability of the Social Cognition Measures.— The social cognition measures showed both good internal consistency and test–retest reliability. All Cronbach alphas were above 0.70 except for Descriptions of Familiar Others, which had just two items (Table 2). Test–retest reliabilities ranged from .40 to .86 with a median value of .70. All are statistically significant, showing that the measures are producing consistent assessments in the short term. The relatively low value for Descriptions of Familiar Others is attributable, in part, to the fact that participants did not always describe the same individuals across testing sessions.

Correlations Among the Social Cognition Measures.— Scores on measures of the same domain of functioning were strongly associated, whereas scores on measures of dissimilar abilities were unrelated or weakly associated. Strong positive associations were found between the two measures of face processing \((r = .51, p < .001)\), between the measures of affect recognition \((r = .41, p < .01)\), between the measures of representation of social situations, and between the two measures of social reasoning \((r = .68, p < .001)\).

Correlations Between the Social Cognition Measures and Measures of Cognitive Status.— Participants’ scores on the cognitive tests exhibited a range of functioning from moderate to no impairment. Cognitive performance as assessed by the CAMCOG-R and the tests of working memory was associated with the measures of social cognition (Table 3). Statistically significant positive associations were found between all measures of cognitive status and each of the measures of representation of social situations and social reasoning. The two measures of affect recognition showed strong positive associations with the CAMCOG total score and the tests of working memory. Weaker associations were found between the measures of person perception and cognitive status.

Relationships Among Social Cognition, Cognitive Status, and Social Functioning

Nursing staff completed the SAFE for 31 of the participants. Six participants showed no impairment in any of the areas (Table 4). The median total score was 3.0 with a range of 0 to 14, reflecting that most participants had little, if any, impairment in social functioning. Median scores on the Social Intimacy Scale showed that, for many, the emotional tone of the relationships in their social network were frequently or always positive. Seven of the 10 social cognition measures were associated at a significance level of \(p = .20\) or lower with one or both of the measures of social functioning.
Prediction of Social Functioning From Demo-
graphic Characteristics, Cognitive Status, and
Measures of Social Cognition.—Measures of social
cognition were significantly and independently
associated with observations of social functioning
after age, gender, education, and cognitive perfor-
mance were controlled for. Social cognition mea-
sures accounted for 45% of the variance in SAFE
scores and 38% of the variance in a measure of social
intimacy (Table 5).

Better social functioning as measured by the SAFE
was associated with college or technical training,
higher scores on CAMCOG Executive Function,
lower CAMCOG total scores, and lower scores on
Letter-Number Sequencing. The addition of a social
cognition measure improved prediction of the SAFE
scores. The $R^2$ value significantly increased from .37
when only demographic characteristics and measures
of cognitive status were included to .82 with the
addition of the social cognition measure, Assessment
of Interpersonal Problem-Solving Skills. Better social
functioning as measured by the Social Intimacy Scale
was associated with lower educational level, higher
scores on CAMCOG Executive Function, and lower
Letter-Number Sequencing scores. The addition of
Discrimination of Facial Emotion and Theory of
Mind significantly improved prediction of this
measure of social functioning. The $R^2$ value increased
from .38 when only demographic characteristics and
measures of cognitive status were included to .76 with
the addition of the two social cognition measures.

Discussion

This study found that measuring social cognition
in frail older adults is feasible and provides
important, reliable information about a domain of
functioning that heretofore has not been assessed
clinically. The testing was well tolerated by the
participants in this study, some of whom had
a dementia diagnosis. Scores on 10 of the 11
individual social cognition measures were well
distributed and showed both good internal consist-
tency and test–retest reliability, indicating their
potential for being sensitive to changes that occur
over time or as the result of an intervention. The
measures examined here demonstrate distributional
and psychometric properties that would support
their use in future studies of social-cognitive
functioning in frail seniors, as well as in the
development of clinically feasible screens for deficits
in social cognition.

This work further demonstrated that measures of
social cognition reveal competencies needed for social
functioning that are not addressed by traditional
measures of cognition. Measures of social cognition

<table>
<thead>
<tr>
<th>Measure</th>
<th>CAMCOG</th>
<th>CAMCOG Exec. Function</th>
<th>Letter-Number Sequencing</th>
<th>Spatial Span Forward</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age estimation</td>
<td>.50**</td>
<td>.25</td>
<td>.46*</td>
<td>.39*</td>
</tr>
<tr>
<td>2. Discrimination of facial identity</td>
<td>.50**</td>
<td>.21</td>
<td>.33*</td>
<td>.32*</td>
</tr>
<tr>
<td>3. Discrimination of emotional expression</td>
<td>.22</td>
<td>.22</td>
<td>.25</td>
<td>.10</td>
</tr>
<tr>
<td>4. Identification of emotional expression (verbal)</td>
<td>.26</td>
<td>.18</td>
<td>.25</td>
<td>.12</td>
</tr>
<tr>
<td>5. Descriptions of familiar others</td>
<td>.30</td>
<td>.19</td>
<td>.16</td>
<td>.17</td>
</tr>
<tr>
<td>6. Impressions of unfamiliar others</td>
<td>.31</td>
<td>.39*</td>
<td>.26</td>
<td>.20</td>
</tr>
<tr>
<td>7. Situational feature recognition</td>
<td>.52**</td>
<td>.50**</td>
<td>.49**</td>
<td>.35**</td>
</tr>
<tr>
<td>8. Social sequencing</td>
<td>.51**</td>
<td>.48**</td>
<td>.58**</td>
<td>.52**</td>
</tr>
<tr>
<td>9. Theory of mind</td>
<td>.48**</td>
<td>.45**</td>
<td>.56**</td>
<td>.56**</td>
</tr>
<tr>
<td>10. Assessment of interpersonal problem-solving skills</td>
<td>.77**</td>
<td>.56**</td>
<td>.66**</td>
<td>.48**</td>
</tr>
</tbody>
</table>

Notes: The pairwise method for incomplete data was used to select values for computing the Pearson correlation coefficients. CAMCOG = Cambridge Cognitive Examination.

\*p < .05; \**p < .01.

Table 4. Social Functioning of Participants

<table>
<thead>
<tr>
<th>Measure</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social-Adaptive Functioning Evaluation: % w/impairment</td>
<td>19.4*</td>
</tr>
<tr>
<td>Conversation skills</td>
<td>38.7</td>
</tr>
<tr>
<td>Instrumental social skills</td>
<td>45.2</td>
</tr>
<tr>
<td>Social appropriateness/politeness</td>
<td>32.3</td>
</tr>
<tr>
<td>Social engagement</td>
<td>32.2</td>
</tr>
<tr>
<td>Friendships</td>
<td>41.9</td>
</tr>
<tr>
<td>Recreation/leisure</td>
<td>48.4</td>
</tr>
<tr>
<td>Participation in nursing home programs</td>
<td>6.0 (2–7)b</td>
</tr>
<tr>
<td>Tone of relationship w/staff</td>
<td>6.0 (2–7)</td>
</tr>
<tr>
<td>Tone of relationship w/other residents</td>
<td>6.0 (2–7)</td>
</tr>
<tr>
<td>Tone of relationship w/most frequent visitors</td>
<td>7.0 (3–7)</td>
</tr>
</tbody>
</table>

\*Percentage rated as showing mild, moderate, or severe impairment on item.

[1] = always negative, 2 = frequently negative, 3 = mostly indifferent with some negative tone, 4 = mostly indifferent or fluctuating all the time, 5 = mostly indifferent with some positive tone, 6 = frequently positive, and 7 = always positive.
significantly improved the prediction of ratings of social functioning in a nursing home beyond what could be explained by age, gender, educational level, and performance on tests of nonsocial cognition. Although social cognition is associated with cognitive functioning, the regression analyses showed that measures of social cognition assess domains of competency that cannot be directly tested by measures of memory, attention, and other general cognitive abilities. Measures of social cognition that were most strongly related to social functioning in the nursing home included a test of affect recognition, Description of Facial Emotions, and two tests of social reasoning, Theory of Mind and Assessment of Interpersonal Problem-Solving Skills.

**Limitations of This Study**

Conducting a total of 8–10 hr of testing on frail older adults limited the number of subjects that could be assessed. The sample size was adequate to address the specific aims of this study, but it reduced the power to detect low to moderate associations. This limitation was considered when the study was designed and analyses were planned to test the hypothesis that measures of social cognition are independently associated with social functioning. First, only nursing home residents from a single nursing home who had equal access to social situations were included. This prevented further reduction of the statistical power by eliminating the need for additional predictor variables in the model to account for opportunity for social interaction.

Second, by using nurses’ ratings of social behavior rather than self-reports, variability in the dependent variable caused by inaccurate recall by the nursing home residents was eliminated. Third, no tests of nonsocial cognition were excluded from the regression model; this allowed modeling of the effects of nonsocial cognition even though the associations of these tests with the dependent variable were not always statistically significant. Despite the small sample size, the results clearly demonstrated that measures of social cognition are important indicators of nursing home residents’ ability to function socially. The results provide compelling evidence for further exploration of social cognition in frail older adults. A second limitation of this study is that all participants were Caucasian. It is important that future investigations consider the effects of ethnicity and culture on age-related changes in social cognition (Kitayama, 2000). Another limitation of the study reported here is that formal diagnoses were unavailable for many of the participants with cognitive impairment. This limitation was addressed, in part, by including extensive measures of nonsocial cognition. Nonetheless, future research should determine the effects of various dementing illnesses on patterns of impaired and spared social-cognitive functioning.

**Directions for Future Research**

For the most part, earlier studies of social cognition with older adults have focused on a single aspect of social-cognitive functioning. For example,
investigators have examined visual discrimination of faces (Becker, Lopez, & Boller, 1995; Della Sala et al., 1995; Eslinger & Benton, 1983), perception of affect (Alberoni, Baddeley, Della Sala, Logie, & Spinnler, 1992; Cadieux & Greve, 1997; Koff et al., 1999; Kurucz, Soni, Feldmar, & Slade, 1980), social judgment (Erker, Searight, & Peterson, 1995), and self-recognition (Bologna & Camp, 1997). It is increasingly recognized that an understanding of the precise nature of dementing illnesses is only possible with a full assessment of higher cognitive functions (Goldsmith, 1996), including the processes that mediate social behavior. Additional theoretical work, however, is needed to develop a framework for measuring the many dimensions of social cognition. This study assessed a broad range of social-cognitive functioning by using measures that could be roughly ordered along a continuum from less to greater complexity of processing demands. The measures that were used for face processing are predominately perceptual. At the other end of the continuum was a task that required the participant to derive a solution to an interpersonal problem. A goal of future work is to develop a taxonomy of the social-cognitive processes that underlie social functioning in naturalistic settings.

Additional research is needed to clarify the complex relationships among social cognition, cognitive status, and social behavior and functioning. Theoretical analyses, such as those reviewed by Ochsner and Lieberman (2001), suggest that an understanding of actual behavior in a social setting is built from the top down, as well as from the bottom up, that is, from identifying basic neural systems. Also involved are people’s motivations and goals in a social encounter, as well as their perception of their own behavior and its evaluation by others. In frail adults, additional factors likely influence performance in social situations, such as chronic medical burden, mood state, the general social environment, and, in dementia patients, the premorbid level of social functioning. Future investigations in this area will begin to explore the interrelationships of the many factors that affect how older adults decode and interpret social signals.

A better understanding of the relationship between social-cognitive functioning and social behavior is important for clinical, as well as for theoretical, reasons. Several studies have found that the psychological and interpersonal problems of persons with Alzheimer’s disease and other dementias affect their family and professional caregivers more adversely than their physical comorbidity and activities of daily living deficits (e.g., Sattel, Geiger-Kabisch, Schretter-Gasser, Besthorn, & Forstl, 1993). Nursing home placement is often precipitated by an increase in behavioral problems and compromised social functioning (Steele, Rovener, Chase, & Folstein, 1990). An increased understanding and assessment of social cognition and social functioning in frail older adults will help address some of the problems that present the most difficulty to caregivers. Caregiver education, for example, can be expanded to help caregivers learn ways to support the dementia sufferer’s remaining interpersonal skills and prevent further social decline (Quayhagen, Quayhagen, Corbell, Roth, & Rodgers, 1995).

From the viewpoint of the older adult, social interaction is an important aspect of daily life. Both cognitively impaired and intact nursing home residents report often feeling lonely and needing more opportunities for socialization (Burgener, Shimer, & Murrell, 1993). Social interaction has been shown not only to improve quality of life for seniors but to also decrease their levels of depression (Mullins & Dugan, 1991) and to maintain their sense of personal worth and identity (Sabat & Harre, 1992). Recreational programs in skilled nursing facilities may be most beneficial if they focus on providing increased opportunities for social interactions between residents (Tannourne, 1995). Investigations of the type reported here will help increase understanding of the cognitive substrate of social functioning in frail, older adults. Improving our understanding of the basic mechanisms of seniors’ ability to interact with others will inform the design of interventions to optimize their social functioning.

References