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The Direct Assessment of Functional Abilities (DAFA): A Comparison to an Indirect Measure of Instrumental Activities of Daily Living<sup>1</sup>

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**The Direct Assessment of Functional Abilities (DAFA) was designed as a direct measure of instrumental activities of daily living (IADLs) that could be compared with an indirect assessment of IADLs by the Pfeffer Functional Activities Questionnaire (PFAQ). The DAFA (28 demented and 15 control subjects) and PFAQ (subjects and informants) were administered twice, together with a brief cognitive battery. Demented subjects performed significantly worse on direct assessment (DAFA) than predicted by self-report (PFAQ), and overestimation of abilities increased with severity of dementia. In contrast, informants tended to underestimate abilities of demented subjects, but not to a significant degree. Control (nondemented) subjects had comparable results with the two methods. The DAFA may provide a more objective measure of functional status in demented subjects than do indirect methods of assessment.**

**Key Words:** Performance measure, Self-report and informant-based ratings, Dementia

# The Direct Assessment of Functional Abilities (DAFA): A Comparison to an Indirect Measure of Instrumental Activities of Daily Living<sup>1</sup>

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A diagnosis of dementia requires documentation of cognitive decline as well as functional impairment in either social or occupational domains (APA, 1994). These criteria emphasize the importance of instruments for studies of aging and dementia that can accurately assess patients' functional abilities.

Instrumental Activities of Daily Living (IADL) scales assess the functional abilities, such as shopping, cooking, and management of finances, that allow the patient to cope with his or her environment. While IADLs are often measured indirectly by either self-report or informant-based methods (Blessed, Tomlinson, & Roth, 1968; Fillenbaum, 1985; Lawton & Brody, 1969; Pfeffer, Kurosaki, Harrah, Chance, & Filos, 1982; Pfeiffer, 1975; Williams et al., 1991), they also can be measured using direct approaches. Indirect measures of IADLs (informant or self-report) have the advantage of being less time-consuming and more economical than direct methods. Never-

theless, it is uncertain whether indirect methods are as accurate as direct methods for assessing IADLs.

Studies comparing the accuracy of indirect measures of IADLs with various direct methods are few in number. Loewenstein et al. (1989) compared patients' performance on the Direct Assessment of Functional Status (DAFS) to an indirect measure of IADLs (Blessed Dementia Rating Scale). Their results indicated that functional information obtained through direct assessment was superior to information obtained through indirect measures, since it was less likely to be prone to biases inherent in indirect measures, such as overestimation of patients' functional abilities. Reuben, Valle, Hays, and Siu (1995) and Rozzini, Frisoni, Bianchetti, Zanetti, and Trabucchi (1993) compared patients' performance on the Physical Performance Test (PPT), a direct measure of IADLs, to an indirect measure of IADLs (Lawton and Brody IADL Scale) in community-dwelling elderly populations. Results from Reuben et al. (1995) suggested that these subjects tended to underestimate their functional abilities and that there were weak to moderate associations among the different methods of assessment. Results from Rozzini et al. (1993) indicated that direct methods were more sensitive to functional impairment than were indirect methods of assessment.

Since relatively few studies have compared direct and indirect methods of assessing IADLs, and to our knowledge, those conducted have not had item to

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item correspondence between measures, we designed the Direct Assessment of Functional Abilities (DAFA) study to address this issue. The Pfeffer Functional Activities Questionnaire (PFAQ) was selected as the IADL measure for this study because it includes additional domains not typically assessed in IADL scales, making it more sensitive to early dementia. In addition, the PFAQ was selected because it is easily administered.

The DAFA was designed to measure IADLs queried in the PFAQ, with a direct correspondence between DAFA and PFAQ items. The instrument was designed to be administered to mild to moderately demented individuals in a clinic-based setting. This study compares the responses of subjects to the DAFA with those from both the subjects and informants to the PFAQ. In addition, the DAFA was administered twice to examine test-retest reliability.

## Methods

### DAFA Test Development

In designing the DAFA we adapted the ten items in the PFAQ, which encompasses seven functional domains of IADLs, for application to patients in the clinic. As shown in Table 1, the DAFA and the PFAQ have an exact item to item correspondence, and differ primarily in that the DAFA is a direct measure while the PFAQ is an indirect measure of assessment. The DAFA test is given in the Appendix.

Definitions of functional abilities used in scoring the DAFA are equivalent to those used in scoring

the PFAQ. Items on the DAFA and PFAQ are both evaluated by using an integer score from 0 (independent functioning) to 3 (dependent functioning) as shown in Table 2.

For each item on the PFAQ, six possible choices are provided. Each response corresponds to an integer score from 0 to 3. The total score (0–30) on the PFAQ is the sum of the integer scores for the ten individual test items.

Each item on the DAFA is scored by first observing the component parts of each task. (See Appendix for the specific components of each item.) Each component part is assigned an integer score from 0 to 3. The overall score for each item (0–3) is the average of these component scores rounded to the nearest integer. The total score (0–30) for the DAFA is the sum of the integer scores for the ten individual test items.

### Subjects

Forty-three subjects participated in this study. This sample size was based on the feasibility of recruiting and testing a group of subjects in approximately a one year period. The 28 demented subjects that completed the protocol were recruited from outpatient geriatric neurology clinics at The Johns Hopkins University School of Medicine and Bayview Medical Center in Baltimore, Maryland. Medical chart reviews were used to identify potential participants. Subjects were selected to capture a broad range of cognitive impairment as measured by the Mini-Mental State Exam (MMSE) (Folstein, Folstein, & McHugh, 1975). Control subjects were

Table 1. PFAQ/DAFA Item Comparison

Item #	Domain	PFAQ	DAFA*
1	Money management	Writing checks, paying bills, balancing checkbook, keeping financial records.	Writing a check, recording it in check ledger, subtracting for correct balance.
2	Money management	Making out insurance or Social Security forms, handling business affairs or papers, assembling tax records.	Making out insurance form.
3	Shopping	Shopping alone for clothes, household necessities and groceries.	Shopping alone for basic necessities.
4	Hobbies	Playing a game of skill such as bridge, or other card games, chess, working a hobby such as painting, photography, woodwork, stamp collecting.	Playing bingo or checkers.
5	Meal preparation	Heat the water, make a cup of coffee or tea, and turn off the stove.	Fill pot with water, heat water, unplug pot, make coffee.
6	Meal preparation	Prepare a balanced meal.	Make a sandwich.
7	Awareness	Keep track of current events, either in the neighborhood or nationally.	Comment on current events in politics, sports or entertainment.
8	Reading	Pay attention to, understand, and discuss the plot or theme of a one-hour television program, get something out of a book or magazine.	Summarize three main points of a passage from a story.
9	Awareness	Remember appointments, plans, household tasks, car repairs, family occasions, holidays, medications.	Report birth date, next national holiday, number and schedule of medications.
10	Transportation	Travel out of neighborhood, driving, walking, arranging to take or change buses, trains, planes.	Locate cafeteria using directions provided.

\*DAFA item administration was conducted in the following order: 1,2,7,8,9,4,5,10,6,3.

**Table 2. A Comparison of the Definitions of the Scores Assigned by the PFAQ and DAFA for Each Test Item**

Score	PFAQ Definition	DAFA Definition
0	Does without difficulty or advice, or doesn't do regularly, but can do normally now with a little practice, if has to.	Performs without any difficulty or assistance.
1	Does without difficulty or advice, but more difficult than used to be, or never did and would find it difficult to start now.	"Difficulty," completes task successfully without cues, but verbalizes that it is difficult, or becomes agitated and frustrated, self-corrects.
2	Requires frequent advice or assistance which was not previously necessary.	"Assistance," verbal, visual or other cues required, directions repeated a third time, requires physical aid, requires three or fewer cues to complete task.
3	Someone has taken over this activity completely or almost completely.	"Dependent," incorrectly performs, is unable, or refuses to continue a task, or fails to complete a task despite maximum number (3) of cues.

**Table 3. Demographics of Study Participants by Group**

	Demented Subjects	Informants of Demented Subjects	Control Subjects	Informants of Control Subjects
Sample size	28	28	15	15
Age (years) [mean (sd)]	77.0 (5.8)	65.2 (13.2)	64.0 (9.9)	48.2 (15.2)
Gender (%): female	57.1	64.3	60.0	66.7
Race (%): White	92.9	89.3	93.3	93.3
Black	7.1	10.7	6.7	6.7
Education (years) [mean (sd)]	12.0 (4.2)	13.9 (2.8)	14.9 (2.3)	15.0 (2.5)
Relationship to subject (%)				
spouse		57.1		53.3
child		32.1		33.3
friend		7.1		6.7
sibling		0.0		6.7
paid caregiver		3.6		0.0

the first 15 volunteers from the Hopkins community who responded to posted advertisements regarding the study. The MMSE was also used to ensure normal cognitive status among controls. Seven additional demented patients and caregivers were contacted but declined participation. Eight additional demented subjects completed a first visit but did not return for the second visit due to illness or lack of interest in completing the protocol.

All study participants were required to provide a reliable informant and to be at least 50 years of age. Table 3 summarizes the demographic information of study participants, and Table 4 summarizes the mental status scores of demented subjects. All control subjects were cognitively normal, and there was no evidence of depression in any of the subjects as measured by the Center for Epidemiological Studies-Depression (CES-D) scale (Radloff, 1977).

*Procedures for Demented Subjects and Their Informants.*—Initially, the subjects' informants underwent the MMSE and Blessed Information-Memory-Concentration (Blessed IMC) test (Blessed et al., 1968) to document their normal cognitive status, followed by the Clinical Dementia Rating (CDR) scale (Hughes, Berg, Danziger, Coben, & Martin, 1982) and the PFAQ to obtain an informant-based assess-

**Table 4. Distribution of Subjects' Mental Status Scores at Baseline in Percent**

	Demented Subjects	
MMSE <sup>a</sup>	22–30	28.6
	16–21	35.7
	≤15	35.7
CDR <sup>b</sup>	0.0	0.0
	0.5	7.1
	1.0	35.7
	2.0	42.9
	3.0	14.3

<sup>a</sup>Mini-Mental State Examination; <sup>b</sup>Clinical Dementia Rating Scale.

ment of the subjects' memory and functional abilities. They provided information to verify the subject's responses. Subjects were then administered a battery of tests according to the following protocol. First, to assess mental status, the MMSE, Blessed IMC, CDR, and CES-D were administered. Next, the PFAQ was given as a self-rated test of the subjects' functional ability. Lastly, a research assistant, blind to the results of the cognitive testing, administered the DAFA.

*Procedures for Control Subjects and Their Informants.*—The procedures for control subjects were similar to those for demented subjects except for the informant's participation. Informants of control subjects completed the protocol by telephone and through mailings rather than in person. Instead of the MMSE, control subjects received the Blessed Telephone-Information-Memory-Concentration (TIMC) test (Kawas, Karagiozis, Resau, Corrada, & Brookmeyer, 1995).

*Study Protocol.*—A summary of the procedures listed above, in the order in which they were administered, is given in Table 5. The test battery was administered twice, approximately four weeks apart (range: 1.9–14.6 weeks), in an outpatient clinical setting with all tests completed in a single session. Control subjects, together with their informants, completed the protocol in approximately 1.25 hours (45 minutes for the DAFA). Together it took demented subjects and their informants longer to complete the protocol, with the most severely demented subjects taking up to 2.5 hours (approximately 1.5 hours for the DAFA). Informed consent was obtained from all control subjects. Consent for the severely demented subjects was provided by their informants.

*Statistical Analysis.*—Since each subject completed the test battery twice, the resulting scores from the subject's two visits were likely to be correlated. Random effects regression models (Laird & Ware, 1982) were used to account for such correlation. In addition to exploratory plots, random effects models were used to estimate the average difference between DAFA and PFAQ scores and to determine if this difference was significant. The models used the difference between DAFA and PFAQ scores as the response variable, and included a random intercept for each individual to account for the correlation. Random effects models also were used to determine whether such differences depended upon covariates (e.g., informant's relationship to subject or subject's dementia severity).

In an item-wise comparison of the DAFA and PFAQ, McNemar's Test was used to determine which specific items favored either overestimation or underestimation by indirect assessment as com-

pared to direct assessment. Test-retest reliability of the DAFA was assessed by Pearson's correlation coefficient and the intraclass correlation coefficient. A paired *t*-test was used to determine if the average difference between DAFA scores from first and second visits was significant.

## Results

*Completion Rates of Direct Assessment.*—Occasionally subjects did not perform all of the items on the DAFA: 16% of subjects had one or more missing items at the first visit and 23% at the second visit. However, all subjects completed at least 70% of the DAFA items. Missing values were generally due to time constraints rather than a subject's inability to perform a task. When missing values occurred, mean substitution was used in calculating the total DAFA score.

*Direct Versus Indirect Assessment.*—Figure 1 shows plots of DAFA versus PFAQ scores from both subjects (Figure 1A) and informants (Figure 1B) at the first visit. For both the DAFA and PFAQ, a higher score indicates more impaired functional ability in IADLs. Direct assessment of demented subjects generally yielded higher scores than self-assessment, implying that demented subjects typically overestimated their functional abilities (Figure 1A). In contrast, Figure 1B shows that informant-based assessment of demented subjects yielded scores near or higher than direct assessment scores. Thus, informants tended to underestimate slightly the functional abilities of demented subjects. Direct assessment of normal subjects was comparable to both self- and informant-based assessment, with scores clustered near perfect functional ability on both the DAFA and PFAQ, perhaps reflecting a ceiling effect.

On the basis of data from both visits and adjusting for the repeated measurements, the average amount by which demented subjects overrated their functional abilities was estimated to be 8.1 points (s.e. = 1.4,  $p < 0.01$ ), while the average amount by which informants underestimated the functional abilities of demented subjects was estimated to be 0.9 point (s.e. = 1.1,  $p = 0.41$ ). Control subjects showed no significant difference between DAFA and PFAQ scores,

Table 5. Battery of Tests Administered to Each Group

Cognitive Test Battery	Demented Subjects	Informants of Demented Subjects	Control Subjects	Informants of Control Subjects
MMSE <sup>a</sup>	x	x	x	
Blessed IMC <sup>b</sup>	x	x	x	x TIMC <sup>c</sup>
CDR <sup>c</sup>	x	x	x	x
CES-D <sup>d</sup>	x		x	
PFAQ <sup>e</sup>	x	x	x	x
DAFA <sup>f</sup>	x		x	

<sup>a</sup>Mini-Mental State Examination; <sup>b</sup>Blessed Information-Memory-Concentration test; <sup>c</sup>Clinical Dementia Rating scale; <sup>d</sup>Center for Epidemiological Studies-Depression scale; <sup>e</sup>Pfeffer Functional Activities Questionnaire; <sup>f</sup>Direct Assessment of Functional Ability; <sup>g</sup>Blessed Telephone-Information-Memory-Concentration test

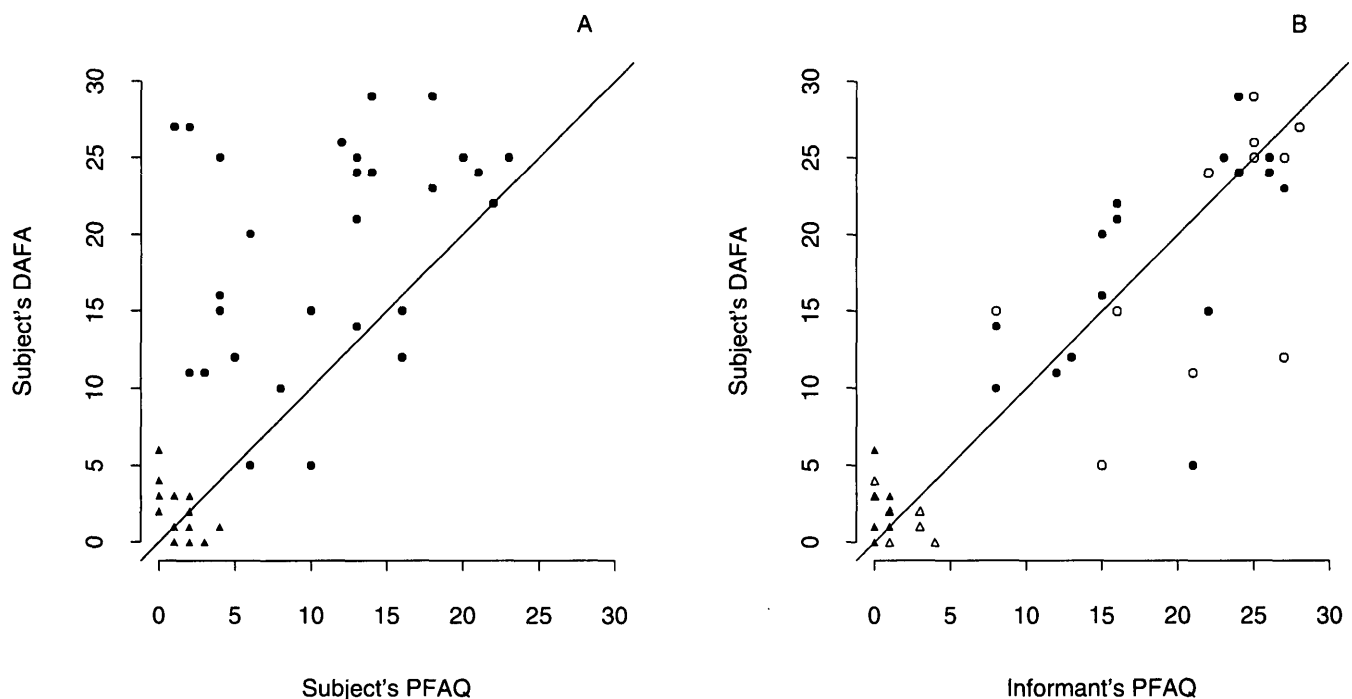


Figure 1. Direct versus indirect methods of assessment of functional abilities. A, comparison of direct assessment and self-rated assessment (● = demented subjects; ▲ = controls); B, comparison of direct assessment and informant-based assessment (● = spouse of demented subject; ○ = other type of informant of demented subject; ▲ = spouse of control; △ = other type of informant of control).

with the average amount by which control subjects overestimated their functional abilities estimated to be 0.5 point (s.e. = 0.4,  $p = 0.21$ ), while the average amount by which informants overestimated the functional abilities of control subjects was estimated to be 0.9 point (s.e. = 0.7,  $p = 0.07$ ). In addition, the amount of over- and underestimation did not differ significantly at the two visits for any of the subject groups.

*Effect of Relationship of Informant to Demented Subject.*—As a group, informants underestimated the functional abilities of demented subjects by an average of 0.9 point. When informants were separated into two groups, spouses and others (child, friend, paid caregiver), spouses slightly overestimated (mean = 0.4 point, s.e. = 1.4,  $p = 0.77$ ) while the “other” group underestimated (mean = 2.6 points, s.e. = 1.6,  $p = 0.11$ ) the functional abilities of the demented subjects. Neither the overestimation by spouses nor the underestimation by the “other” group was statistically significant. In addition, the average difference between the two informant groups (mean = 3.0 points, s.e. = 2.1,  $p = 0.17$ ) was not significant.

*Relationship Between Accuracy of Functional Ratings and Severity of Dementia.*—We next examined the relationship between MMSE score and the accuracy of self and informant-based assessment of functional ability, where accuracy is defined as the difference between DAFA and PFAQ scores (DAFA minus PFAQ). A positive value implies overestimation of abilities, while a negative accuracy implies

underestimation of abilities. Figure 2 contains data from the first visit and shows that subjects’ overestimation of functional abilities increased with dementia severity. In contrast, the accuracy of informants’ ratings generally was not related to the severity of the subjects’ dementia.

Although the MMSE score was found to have a statistically significant effect on the subject’s accuracy ( $p < 0.01$ ), the subject’s MMSE score did not affect the informant’s accuracy significantly ( $p = 0.66$ ). Furthermore, the relationship between the subject’s MMSE score and the subject’s accuracy was found to be nonlinear. For example, the average increase in accuracy for subjects with MMSE scores of 15 as compared to MMSE scores of 10 was estimated to be 5.3 points (s.e. = 1.0), while the average increase in accuracy for subjects with MMSE scores of 20 versus 25 was estimated to be 2.5 points (s.e. = 0.5).

Examination of the relationship between Blessed IMC scores and accuracy, as well as between CDR scores and accuracy, yielded the same conclusion. Namely, subjects’ accuracy significantly decreased with greater dementia severity, but informants’ accuracy was not significantly affected by the severity of the subjects’ dementia.

*Comparison of Direct Versus Indirect Assessment for Each Item.*—Table 6 presents a comparison of indirect versus direct method of IADL assessment in demented subjects. Values represent the percentage of participants who, relative to direct assessment by the DAFA, overestimated or underestimated the functional abilities of demented subjects by the PFAQ at Visit 1. Items are marked for which

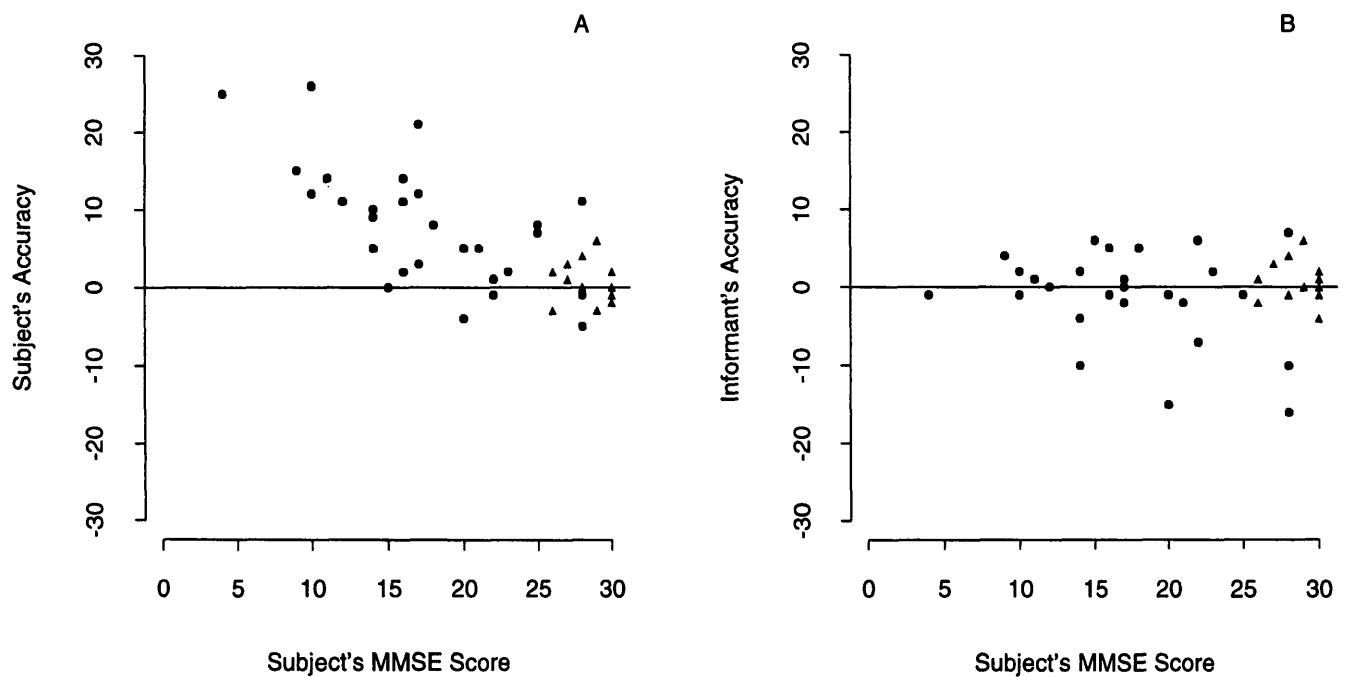


Figure 2. Accuracy versus MMSE score. A, comparison of subject's accuracy and subject's MMSE score; B, comparison of informant's accuracy and subject's MMSE score (● = demented subjects; ▲ = control).

Table 6. Comparison of Indirect (Self or Informant) Versus Direct Assessment of Demented Subjects for Each Item on the DAFA/PFAQ

Item #	Domain	Underestimated Ability	Correctly Estimated Ability		Overestimated Ability
			Self-Assessment	Informant-Based Assessment	
1	Money management	25.0	46.4	28.6	28.6
2	Money management	25.0	46.4	28.6	28.6
3	Shopping	32.1	14.3	53.6	53.6
4	Hobbies	21.4	39.3	39.3	39.3
5	Meal preparation*	17.9	25.0	57.1	57.1
6	Meal preparation*	14.3	25.0	60.7	60.7
7	Awareness*	7.1	28.6	64.3	64.3
8	Reading*	3.6	7.1	89.3	89.3
9	Awareness*	21.4	25.0	53.6	53.6
10	Transportation	25.0	21.4	53.6	53.6
Informant-Based Assessment					
1	Money management	25.0	57.1	17.9	17.9
2	Money management	25.0	46.4	28.6	28.6
3	Shopping	39.3	35.7	25.0	25.0
4	Hobbies	53.6	21.4	25.0	25.0
5	Meal preparation*	53.6	42.9	3.6	3.6
6	Meal preparation*	53.6	25.0	21.4	21.4
7	Awareness	21.4	32.1	46.4	46.4
8	Reading*	10.7	14.3	75.0	75.0
9	Awareness*	42.9	42.9	14.3	14.3
10	Transportation	35.7	53.6	10.7	10.7

\*Percentage of overestimation significantly differed from percentage of underestimation ( $p < 0.05$ ).

Note: Values are percentage of participants who rated functional abilities of demented subjects at Visit 1 either correctly or incorrectly (overestimated or underestimated).

there was significant asymmetry; i.e., there was a significant difference between the percentage of subjects who overestimated and the percentage of subjects who underestimated. While overall, demented subjects overestimated their abilities, fewer

subjects overestimated their skills in money management (items 1 and 2), shopping (item 3), and hobbies (item 4). A greater percentage of demented subjects overestimated their abilities in the domains of awareness (item 7) and reading (item 8). Similarly,

a greater percentage of informants overestimated subjects' abilities in reading (item 8), and underestimated subjects' skills in meal preparation (items 5 and 6) and awareness (item 9).

**Test-Retest Reliability of DAFA.**—The DAFA had excellent test-retest reliability as illustrated in Figure 3. The correlation between Visit 1 and Visit 2 DAFA measurements was estimated to be 0.95 ( $p < 0.01$ ) using Pearson's correlation coefficient, and 0.95 ( $p < 0.01$ ) using the intraclass correlation coefficient. Furthermore, the average difference between DAFA scores at first and second visits (second minus first) was estimated to be  $-0.05$  point (s.e. = 0.48,  $p = 0.92$ ), and not statistically different from zero.

## Discussion

This study compared direct and indirect methods of IADL assessment to determine whether the two

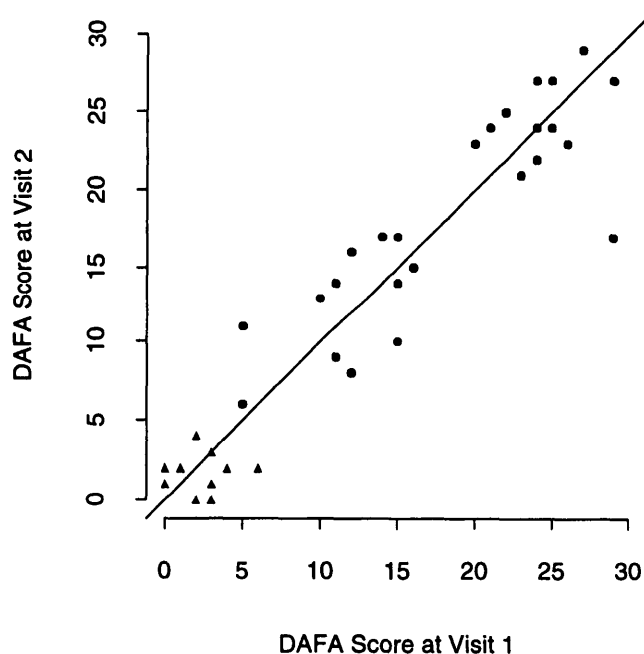


Figure 3. DAFA test-retest reliability (● = demented subjects; ▲ = control).

methods provided similar results. The Direct Assessment of Functional Ability (DAFA) was designed to evaluate IADLs in subjects with a range of cognitive impairments, and had a direct item to item correspondence to the Pfeffer Functional Activities Questionnaire (PFAQ), an indirect measure of IADLs. For comparison purposes, Table 7 shows additional characteristics of the DAFA and other direct measures of IADLs that have been developed.

DAFA scores were compared to both subject and informant responses to the PFAQ. The results indicate that demented subjects significantly overestimated their functional abilities when measured by indirect methods of assessment, whereas there was a trend for informants to underestimate the subjects' functional abilities. Although informants tended to underestimate subjects' functional abilities, their ratings were more accurate than the subjects' self-ratings. Subjects with greater cognitive impairment showed poorer judgment of their functional status, while informants' accuracy was not significantly affected by subjects' cognitive ability. Although the results suggested that spouses were better informants for demented subjects than "other" individuals, this study did not allow for a more detailed comparison of informant types, as few informants were friends, siblings, or paid caregivers.

Demented subjects tended to overestimate their abilities most often on an item in the domain of awareness and on an item evaluating reading comprehension. They overestimated their abilities less frequently on items involving money management, shopping, and hobbies. It is conceivable that subjects were more optimistic about their awareness and reading comprehension because there was no concrete way for them to measure their loss of abilities in these domains. In comparison, domains such as money management and shopping offer the subjects more tangible evidence of their declining abilities. Informants may have overestimated subjects' abilities on reading comprehension for the same reasons that subjects overestimated them. Items measuring subjects' abilities in the domain of meal preparation and an item in the domain of awareness were underestimated by informants possibly because they may have assumed complete responsibility for these tasks prematurely.

Table 7. Comparison of Various Characteristics of Direct Methods of Assessment of IADLs

Direct Methods of Assessment of IADLs	Assesses Physical Abilities?	Appropriate for Community-dwelling Populations?	Appropriate for Inpatient Populations?	Appropriate for Severely Impaired Populations?	Timed Performance Measure?
Physical Performance Test (PPT) <sup>a</sup>	Yes	No	Yes	No	Yes
Structured Assessment of Independent Living Skills (SAILS) <sup>b</sup>	Yes	Yes	Yes	Yes	Yes
Direct Assessment of Functional Status (DAFS) <sup>c</sup>	No	Yes	Yes	Yes	No
Direct Assessment of Functional Abilities (DAFA)	No	Yes	Yes	Yes	No

<sup>a</sup>(Reuben & Siu, 1990); <sup>b</sup>(Mahurin, DeBettignies, & Pirozzolo, 1991); <sup>c</sup>(Loewenstein, et al., 1989).



Although we compared self-reported and informant-based scores to direct assessment scores, the direct method of assessment does not necessarily represent the gold standard. In fact, it may be true that DAFA scores detected functional disability that was imperceptible to subjects and informants. This notion has been referred to as "preclinical" disability and has been studied by Fried et al. (1996). Their studies indicate that direct measures of assessment may identify individuals at risk of developing functional disability despite failure to report difficulty on self-rated assessments. Therefore, the DAFA has potential for detecting disability that will ultimately have clinical significance.

Myers, Holliday, Harvey, and Hutchinson (1993) suggest that one of the advantages of self-ratings is that they are influenced by a longer time frame and performance in a variety of environments. Self-ratings may be affected by adaptations subjects have made which allow them to perform functional activities. The DAFA, a direct method of assessment of IADLs conducted in an outpatient setting, removes the influence of a familiar environment. While standardizing the environment does not account for adaptations, a strength of direct methods of assessment is that they allow for easier comparison of scores between subjects.

The DAFA was administered reliably to subjects with different degrees of dementia. Occasionally subjects did not complete all of the items included in the DAFA. Since using this direct method of IADL assessment required more time and effort from study subjects, it is not unexpected that more data were missing than with the indirect method of assessment. For this study, it took demented subjects approximately 1.5 hours to complete the DAFA. However, we administered DAFA items in different locations (e.g., cafeteria, gift shop, exam room) which accounted for a portion of the time to complete the test. This length of time could be reduced by creating a test environment where all of the DAFA items could be administered in a central location.

Since the sample size for this study was relatively small, our results need to be confirmed in a larger, more diverse sample of cases and controls. Moreover, future studies might be conducted to observe the effect of informant relationship on assessment of functional abilities in greater detail. The effect of the administrator of the direct assessment on subjects' IADL scores could also be examined. In addition, the effect of such demographic variables as education and race on accuracy of functional ability assessment could be of interest. Furthermore, from this study it was difficult to determine if direct methods of assessment were more accurate than indirect methods for control subjects because of ceiling effects. Adding a timed measurement to each item might provide further information to distinguish among control subjects' functional abilities. Also, a more diverse socioeconomic background among control subjects might increase the variability in their scores. This would increase the sensitiv-

ity to detect differences between the direct and indirect methods of assessment in control subjects.

More accurate assessment of IADL functioning may be gathered by direct methods of assessment than by either self-report or informant-based methods. In addition to avoiding the potential biases associated with indirect measures of IADLs, direct methods of assessment conducted in an outpatient clinical setting, such as the DAFA, have the advantage of removing the influence of a familiar environment and potentially detecting preclinical disability. In this regard, direct methods of assessment can provide additional information about subjects' functional abilities that may not be reported by subjects or informants.

Often, however, direct methods of assessment conducted in an outpatient clinical setting are not feasible due to time and financial constraints. When direct methods of assessment are not feasible, the results of the comparison presented between direct and indirect methods of IADL assessment should be taken into consideration.

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## Appendix

The Direct Assessment of Functional Ability (DAFA) Test. Items are listed in the order administered, and space was provided for comments after each item.

- 1) *Money Management*: Ask subject to write a check to Bill Smith for \$50.00. Check must have accurate date, name, signature, and amount (number and words). Subject permitted to refer to a watch or calendar to get the correct date without penalty. Have subject deduct \$50.00 from a balance of \$300.00.

A. \_\_\_ date; B. \_\_\_ name (Smith); C. \_\_\_ dollar amount; D. \_\_\_ word amount; E. \_\_\_ signature; F. \_\_\_ subtraction from balance (\$250.00 remaining); G. \_\_\_ Total (0–18)

- 2) *Money Management*: Have subject fill out the highlighted, personal information section of a Blue Cross and Blue Shield insurance form (name, address, social security number, date, and signature). Subject permitted to refer to social security cards without penalty.

A. \_\_\_ date; B. \_\_\_ name; C. \_\_\_ address; D. \_\_\_ social security number; E. \_\_\_ signature; F. \_\_\_ Total (0–15)

- 7) *Awareness*: Ask subject to recall one of the week's headlines pertaining to politics, sports, entertainment, or the weather. Information will have been provided by informant regarding the topic that may be most familiar to subject.

Topic: \_\_\_\_\_; Subject's response: \_\_\_\_\_;  
Is this correct? \_\_\_ Yes \_\_\_ No

Scoring: 0 = aware and response was correct; 1 = less aware, difficulty present; 2 = aware somewhat of current events; 3 = no awareness

A. \_\_\_ Total (0–3)

- 8) *Reading*: Give the subject the verbal directions: "I want you to read this passage carefully because I am going to ask you some questions about it when you are finished." After the subject is finished, ask him/her to summarize three elements of the excerpt.

Scoring: 0 = 3 responses, no cueing or difficulty; 1 = 3 responses, but shows difficulty; 2 = 3 responses with cueing (maximum of 3 cues allowed); 3 = less than 3 responses despite cueing

A. \_\_\_ Total (0–3)

- 9) *Awareness*: Ask subject his/her birthday, date of the next national holiday, and his/her current medication schedule. Verify correct schedule if given based on informant response. If they do not take medication, their score is 0 for that subitem.

A. \_\_\_ birthday; B. \_\_\_ holiday; C. \_\_\_ medication;  
D. \_\_\_ Total (0–9)

- 4) *Hobbies*: Have subject engage in a game of checkers, bingo, dominoes, or tic-tac-toe for about 2–3 minutes.

Scoring: 0 = no difficulty present or advice required;  
1 = difficulty present but no advice required;  
2 = assistance or advice required; 3 = unable to play

A. \_\_\_ Total (0–3)

- 5) *Meal Preparation*: Have subject heat water, make a cup of coffee, and turn off electric kettle.

A. \_\_\_ fill pot with water; B. \_\_\_ plug pot into outlet;  
C. \_\_\_ coffee in cup; D. \_\_\_ pours heated water into cup;  
E. \_\_\_ turns pot off; F. \_\_\_ Total (0–15)

- 10) *Transportation*: The tester will accompany the subject at all times during this task. Indicate to the subject that you will only say the directions once. Further instructions or advice qualifies as assistance when scoring. Read these instructions to the subject aloud: "Please guide me to the cafeteria. Here are the directions from where we are standing."

A typical set of instructions would be: "Walk to the end of this hall, make a right turn, and proceed though the double glass doors." At the doors, give the directions: "Walk to the end of this hallway, turn left into the front of the elevators, take the elevator to the first floor, and exit the elevator"

Scoring: 0–3 for each of two sets of directions

A. \_\_\_ first set of directions; B. \_\_\_ second set of directions; C. \_\_\_ Total (0–6)

- 6) *Meal Preparation*: Accompany subject from elevators to the outpatient center's cafeteria. Get a tray for him/her and lead him/her over to the sandwich counter. Ask him/her to prepare a sandwich. The research assistant will pay for the sandwich.

A. \_\_\_ plate; B. \_\_\_ bread; C. \_\_\_ fill; D. \_\_\_ Total (0–9)

- 3) *Shopping*:

Accompany subject to a gift shop within the clinical outpatient setting. At the gift shop, give them \$4.00 and instruct them to purchase: (for example) a pack of gum, a magazine that costs \$2.00 or less, and a greeting card.

A. \_\_\_ item 1; B. \_\_\_ item 2; C. \_\_\_ item 3; D. \_\_\_ pay;  
E. \_\_\_ Total (0–12)