



Psychometric Evaluation of the *Functional Capacity Card Sort*: Measuring Caregiver Appraisal of Functional Capacity in Persons with Dementia

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Background and Research Objective

Caregivers play a vital role in the safety and well-being of people with dementia

- Majority of people with dementia live at home, are cared for by families or close friends/neighbors, and require supervision or assistance with daily activities
- 80% of care provided in the home is delivered by unpaid caregivers (Alzheimer's Association, 2013, Family Caregiver Alliance, 2006)

Functional capacity in the person with dementia is usually assessed by caregiver interview

- Caregiver report is an important proxy measure in dementia care as the person with the cognitive impairment tends to overestimate function (Karagiozis et al., 1998; Kiyak, et al., 1994)

Caregiver appraisal of functional capacity is an essential element to the day to day responsibilities of caregiving

- Cognitive process that caregivers use to judge functional capacity of the person with dementia
- Serves as a mediator for the actions caregivers take in providing daily care (amount and type of oversight; modifications to the home)
- Has consequences for safety and well-being of the person with dementia

Caregivers often misjudge functional ability of the person with dementia

- Caregivers overestimate and underestimate function (Karagiozis et al., 1998; Zanetti, et al., 1999; Argüelles, et al., 2001; Loewenstein et al., 2001; Davis, et al, 2006)

Caregiver scales have been developed to correspond with direct assessment to determine concordance status

- There are inconsistencies between certain items, which make it difficult to draw conclusions about caregiver accuracy
- The Functional Capacity Card Sort (FCCS) was developed to measure and interpret caregiver appraisal of functional capacity by comparing the caregiver rating to the score on the standardized Allen Diagnostic Module-2 (Earhart, 2006).

Research Objective: The purpose of this study was to establish content validity of the Functional Capacity Card Sort and advance its development by examining construct validity, specifically convergent and discriminate validity, and inter-rater reliability.

Method

Content Validity:
Four Phases. In Phases 1 to 3, he FCCS was reviewed by occupational therapists (N=14) with expertise in the CDM and Allen assessment tools and, in Phase 4, by graduate occupational therapist (N=10) trained in the CDM and assessment tools. The expert occupational therapists were asked to identify the intended Allen Cognitive Level for each card that was presented and then to provide recommendations to enhance the clarity of the descriptions on each card of each functional level associated with hand washing. The mean percent accuracy and standard deviation were calculated across raters. In Phases 2, 3, and 4, family caregivers (N= 72) were asked to rank cards in order from lowest to highest function and to rate four items addressing difficulty and clarity of use on a scale from 1 (not difficult and very clear) to 3 (very difficult and not clear).

Construct Validity (Convergent and Discriminant Validity):
Secondary analysis of data¹ was conducted with SAS® 9.3 using nonparametric statistical procedures. Convergent and discriminant validity were tested using Spearman's rank correlation with the sample of 88 caregivers. The Spearman correlation coefficient was calculated between the caregiver score on the FCCS and caregiver score on the ADL section of the Caregiver Appraisal of Function and Upset (CAFU), a conceptually related proxy measure on which caregivers appraise the functional independence of their family member with dementia (Gitlin et al, 2005) and the Neuropsychiatric Inventory (NPI), a conceptually unrelated proxy measure on which caregivers report the frequency and severity of neuropsychiatric symptoms in the person with dementia (Cummings, 1997).

Inter-rater reliability:
Secondary analysis of data¹ was conducted with SAS® 9.3 using nonparametric statistical procedures Inter-rater reliability was examined by measuring the degree to which caregivers consistently ranked the FCCS cards from low to high function. The Kendall's W statistic was used to determined the strength of agreement among caregiver ranking, which ranges form 0 (no agreement) to 1 (complete agreement) with higher agreement indicating higher inter-rater reliability.

¹Gitlin, Hodgson, Piersol, Hauck, Hess (2013)

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Functional Capacity Card Sort

Theoretical Framework: Cognitive Disabilities Model (CDM)

- Hierarchy of cognitive abilities and activity demands
- Describes ability to perform daily activities given the complex interactions between cognitive ability and the context in which the activity takes place (Allen & Blue, 1998)
- Sequential modes of performance (.0, .2, .4, .6, and .8) further distinguish patterns of behaviors, forming an ordinal scale that represents the ability to notice and react appropriately to increasingly complex activity and environmental demands (Allen, Blue & Earhart, 1995; Pollard & Olin, 2005).

Six Cards describe the activity of “washing self”

- “Washing self” has universal application
- Allowed for the development of clear statements distinguishing the hallmark features of the Allen Cognitive Levels (Allen, Blue & Earhart, 1995)
- Each card maps onto an Allen Cognitive Level grouping of high and low modes that reflect a hierarchy of functional capacity

Your family member...

DOES NOT WASH;
SITS while being washed;
MAY HOLD the washcloth if handed the washcloth BUT DOES NOT MOVE IT.

SCORING:
Caregiver Appraisal Rating: 1
Allen Cognitive Levels: High 2: 2.6, 2.8

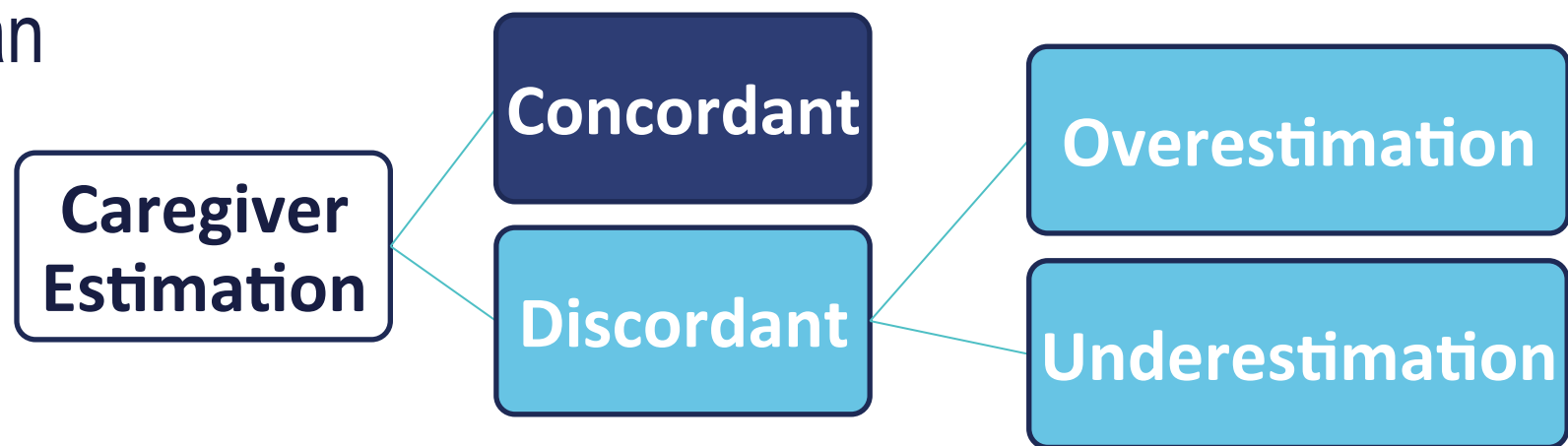
Your family member...

WASHES INDEPENDENTLY AND COMPLETELY;
COMPLETES all steps even if interrupted by something;
NOTICES that the floor is wet and AVOIDS SLIPPING;
DOES NOT ASK FOR REASSURANCE;
AUTOMATICALLY gets more soap independently if the soap runs out.

SCORING:
Caregiver Appraisal Rating: 6
Allen Cognitive Levels: Low 5: 5.0, 5.2, 5.4

Interpreting Caregiver Appraisal
A comparison of occupational therapist and caregiver ratings yielded three categories:

- Concordant estimation** (FCCS caregiver rating consistent with the occupational therapist derived ADM-2 score) implying the caregiver accurately appraised functional capacity using the occupational therapy rating as the gold standard.
- Overestimation** (FCCS rating was higher than the occupational therapist ADM-2 score) implying the caregiver appraised functional capacity at a higher level than indicated by the standardized test score
- Underestimation** (FCCS rating was lower than the ADM-2 score) implying the caregiver inaccurately appraised functional capacity at a lower level than indicated.



Conclusions

- The FCCS is an easy to administer assessment that has been shown to be well received by caregivers and user friendly.
- The outcomes of this study demonstrate that the FCCS is a valid and reliable tool for use in practice and research.
- As a clinical tool, it offers occupational therapists using the Allen assessment battery a compatible addition to their assessment tool kit.
- In research, the FCCS can be used to examine variables associated with caregiver appraisal.
- Mapping caregiver appraisal across the disease process would contribute to a better understanding of the multifaceted nature of appraisal and further guide the development of caregiver intervention.

Results

Participants	Caregiver (N = 88)			Person with Dementia (N = 88)		
	M	SD	Range	M	SD	Range
Age	65.8	12.2	38-89	81.7	8.0	56-97
MMSE				17.7	4.6	10 - 28
Years Caregiving	5.1	3.5	0.5-22			
	n		%	n		%
Female	78		88.6	46		52.3
White	68		77.3	67		76.1
Spouse	49		55.7			
>High School	86		97.7			

Content Validity					Caregiver Ease of Use Rating for Functional Capacity Card Sort					
Expert and Caregiver Accuracy in Identifying Correct Allen Cognitive Levels										
	Occupational Therapists (N=24)		Family Caregivers (N=72)		Phase	n	Difficulty using tool ^a M ± SD	Difficulty choosing card ^b M ± SD	Clarity of directions ^b M ± SD	Clarity of statements ^b M ± SD
Phase 1	5 OTs	45 ± 0.13	NA	NA	Phase 2	24	1.33 ± 0.56	1.58 ± 0.65	1.12 ± .34	1.12 ± 0.34
Phase 2	7 OTs	100 ± 0	24	74 ± 0.34	Phase 3	22	1.36 ± 0.58	1.54 ± 0.67	1.13 ± 0.35	1.12 ± 0.42
Phase 3	5 OTs	100 ± 0	22	81 ± 0.28	Phase 4	26	1.23 ± 0.43	1.50 ± 0.58	1.11 ± 0.33	1.11 ± 0.33
Phase 4	10 OT Grad Students	93 ± 0.14	26	94 ± 0.16	a 3 point scale (1=not at all difficult, 2=somewhat difficult, 3=very difficult). Lower ratings represent less difficulty b 3 point scale (1=very clear, 2=somewhat clear, 3=not at all clear). Lower ratings represent more clarity					

Correlations between the FCCS and CAFU and NPI (N = 86)		
Validity Test Variables	FCCS	p
Convergent Validity (CAFU - ADL items)	0.43	<.0001
Discriminant Validity (NPI)	-0.14	.19

CAFU = Caregiver Assessment of Function and Upset
NPI = Neuropsychiatric Inventory

Inter-rater Reliability

Inter-rater Reliability of the FCCS by Caregivers (N = 72)															
FCCS Card Number		M	SD	Card Ranking											
				1		2		3		4		5		6	
				n	%	n	%	n	%	n	%	n	%	n	%
	1	1.20	0.75	65	90.3	3	4.1	2	2.8	0	0	2	2.8	0	0
	2	2.01	0.59	5	6.9	65	90.3	0	0	1	1.4	0	0	1	1.4
	3	1.24	0.76	2	2.9	0	0	55	76.4	11	15.3	2	2.8	2	2.8
	4	3.93	0.73	1	1.4	1	1.4	10	13.9	53	73.6	4	5.6	3	4.1
	5	4.86	0.66	0	0	2	2.8	1	1.4	6	8.3	99	81.9	4	5.6
	6	5.74	0.75	0	0	0	0	4	5.6	1	1.4	5	6.9	62	86.1

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