Performance-Based Measures of Cognitive and Everyday Function in Relation to Life-Space Among Older Adults

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BACKGROUND

▪Changes in cognition are common with aging, and a possible consequence of cognitive decline is restriction in life-space, a measure of spatial mobility.

▪Decreases in mobility have important implications, in that loss of independence resulting from mobility restriction can adversely affect the quality of life for older persons while increasing the demand on family members for assistance and introducing the possibility of future formal nursing care.

▪Evidence indicates there is a relationship between cognitive function and life- space, yet it is not clear which domains of cognition are most strongly predictive of mobility outcomes.

▪Given that mobility can be defined as a functional outcome, it is uncertain whether traditional cognitive tests or performance-based functional measures may offer the greatest predictive utility.

AIMS

▪To examine the association between cognitive function and life-space in a large sample of older adults with diversity in sample representation.

▪To investigate the role of "everyday" performance-based measures in prediction of mobility outcomes.

Literature Cited

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ACKNOWLEDGEMENTS

ACTIVE was supported by grants from the National Institute on Aging and the National Institute of Nursing Research to Hebrew Rehabilitation Center for the Aged (U01 NR04507), Indiana University School of Medicine (U01 NR04508), Johns Hopkins University (U01 AG14260), New England Research Institutes (U01AG14282), Pennsylvania State University (U01 AG14263), University of Alabama at Birmingham (U01 AG14289), and University of Florida (U01 AG014276).

METHODS

Participants

▪ The ACTIVE (Advanced Cognitive Training for Independent and Vital Elderly) [1] multi-site study recruited a baseline sample of 2,802 adults aged 65 and over who were living largely independent of formal care.

▪ Subjects were excluded from the study if they showed signs of dementia or significant decline in physical abilities and functional independence.

▪ The sample for the current analysis included 2, 737 participants who had complete data for the variables of interest at baseline.

Table 1. Participant Characteristics (n=2737)

	Number(%)	Range	Mean (SD)
Age		65 – 94	73.6 (5.9)
Female gender	2126 (75.9)		
African-American	747 (26.7)		
Yrs of education		4 – 20	13.5 (2.7)
MMSE		23 – 30	27.3 (2.0)
CES-D 12-item		0 – 34	5.2 (5.1)
SF-36 PF		0 – 100	68.8 (24.1)
Memory Comp		-8.2 – 8.3	0 (2.5)
Reasoning Comp		-7.8 – 10.5	0 (2.7)
Processing Speed Comp		-7.9 – 4.1	0 (2.5)
TIADL		46.0 – 606.1	139.2 (74.1)
OTDL		1 – 28	17.6 (4.4)
EPT		0 – 28	18.7 (5.7)
Life-space		1 – 9	7.2 (1.3)

Measures

Sociodemographic factors: Age, race, and gender self-reported.

Education: Highest grade completed

Physical functioning: SF-36 Physical Component scale

Depressive symptoms: CES-D 12-item scale

Cognitive function: Memory, Reasoning, and Processing Speed Composites Scores from the ACTIVE protocol [1]

Everyday cognitive function: Timed Activities of Daily Living (TIADL) [2]; Everyday Problems Test [3]; Observed Tasks of Daily Living [4]

Mobility/Life-space: Life-Space Questionnaire (LSQ) [5]

Analysis 1

• Multiple Regression Models
Model 1: Demographic factors (age, race, gender, years of education, CES-D 12-item score, and SF-36 Physical Component score) as predictors of life-space
Model 2: Memory composite score added to model (demographic factors as covariates)
Model 3: Reasoning composite score added to model (demographic factors as covariates)
Model 4: Processing speed composite score added to model (demographic factors as covariates)

Analysis 2

•Multiple regression models:
Model 1: Demographic factors and memory, reasoning, and processing speed composite scores as predictors of life-space
Model 2: TIADL score added to model (demographic factors and cognitive composites as covariates)
Model 3: OTDL score added to model (demographic factors and cognitive composites as covariates)
Model 4: EPT score added to model (demographic factors and cognitive composites as covariates)

All values taken from baseline data.

RESULTS

Analysis 1 **Cognitive Function and Life-Space**

Predictor	Total Life-Space			
	Model 1	Model 2	Model 3	Model 4
Age	-.122***	-.091***	-.087***	-.092***
Race	.073***	.050**	.037	.067***
Gender	-.015	-.035	-.020	-.012
Yrs. Education	.188***	.166***	.146***	.181***
CES-D 12-item	-.046**	-.036	-.034	-.044*
SF-36 PF	.151***	.144***	.145***	.143***
Memory Composite		.093***		
Reasoning Composite			.117***	
Speed Composite				-.067***
Adjusted R-square	.111	.116	.119	.113
R-square	.113	.119	.121	.115
R-square change		.006***	.009***	.003***

Analysis 2 **Everyday Function and Life-Space**

Predictor	Total Life-Space			
	Model 1	Model 2	Model 3	Model 4
Age	-.069***	-.062***	-.065***	-.069***
Race	.036	.026	.036	.023
Gender	-.030	-.042*	-.030	-.024
Yrs. Education	.147***	.139***	.144***	.128***
CES-D 12-item	-.032	-.031	-.030	-.028
SF-36 PF	.136***	.130***	.135***	.139***
Memory Composite	.048*	.032	.039	.028
Reasoning Composite	.086***	.059*	.076***	.052
Speed Composite	-.023	-.013	-.020	-.020
TIADL		-.097***		
OTDL			.037	
EPT				.084***
Adjusted R-square	.120	.126	.120	.122
R-square	.123	.130	.123	.125
R-square change		.006***	.001	.003***

*Notes: *p < .06; **p < .02; ***p < .005*

▪After controlling for age, gender, race, years of education, depressive symptoms, and physical functioning, each composite domain of cognitive function predicted life-space in separate models.

▪Performance-based measures of everyday function added predictive utility, after adjusting for demographic factors and cognitive composite scores. Specifically, TIADL significantly predicted life-space, as did EPT.

CONCLUSIONS

▪Memory, reasoning, and processing speed are significant cognitive predictors of life-space even after adjusting for demographics, physical functioning, and depressive symptoms. Reasoning ability emerged as the strongest predictor in the current study, indicating an association between higher-order cognitive function and mobility.

▪Performance-based functional measures add predictive value to mobility outcomes, lending support for their use as an adjunct to traditional cognitive batteries.