

# Functional Assessment



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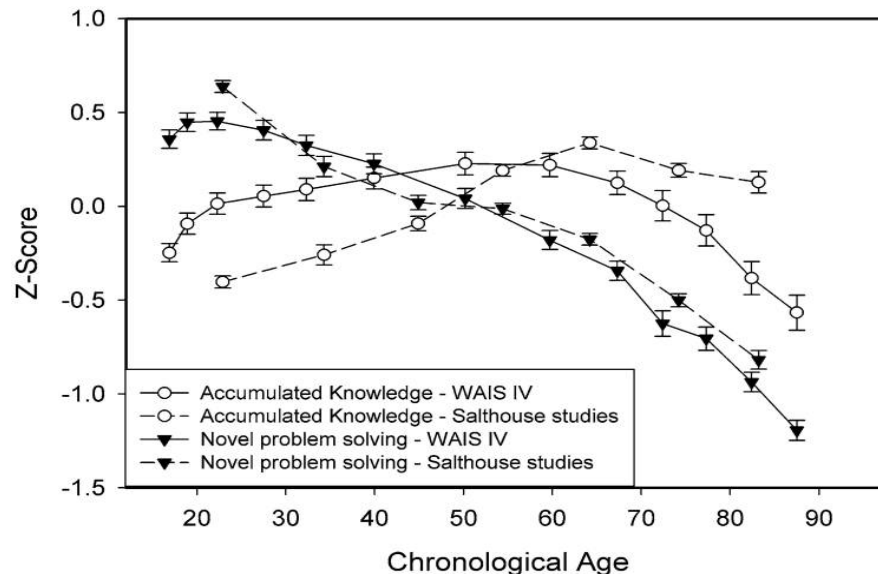
Center on Aging

University of Miami Miller School of Medicine

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# Background

- Aging is generally associated with changes in cognitive abilities including changes in:
  - Memory (working memory, prospective memory, episodic memory)
  - Attention, Processing Speed
  - Executive Functioning
  - Reasoning, Problem Solving, Decision Making



(Salthouse, 2011)

# Background

- Older adults often experience challenges in everyday activities such as medication and financial management, driving, use of technology systems and learning new skills.
- Cognitive abilities have been found to be linked to performance on a wide variety of tasks that are important to everyday living and independence:
  - Medication management
  - Financial management
  - ADLs
  - Driving
  - Use of technology systems and applications
  - Work-related activities
  - Learning of new skills

# Cognitive Abilities and Task Performance

<b>Authors</b>	<b>Task/Activity</b>	<b>Cognitive Abilities</b>
Diehl, Willis, & Schaie (1995)	Everyday problem solving	Processing speed, memory span, vocabulary
Morrow & Colleagues (1998)	Health appointment attendance	Vocabulary, memory, processing speed
Park & Colleagues (1994); Stilley & Colleagues (2010)	Medication adherence	Prospective memory, working memory, reasoning; attention
Ball & Colleagues (1999; 2004); Edwards & Colleagues	Driving	Attention, processing speed, working memory
Czaja, Sharit & Colleagues (1999, 2001, 2004)	Technology-Based Work Related Tasks	Processing speed, attention, visuo-spatial abilities, working memory, reasoning,

# Cognitive Abilities and Task Performance

<b>Authors</b>	<b>Task/Activity</b>	<b>Cognitive Abilities</b>
Hunter & Schmidt (1998) Schmidt & Hunter (2004)	Aspects of work performance	General cognitive ability
Demaree et al., (2010);	Aspects of decision making	Cognitive intelligence (WASI)
Czaja et al., (2006)	Technology Adoption	Fluid abilities (Processing speed, attention, working memory, reasoning)
Sharit et al (2008); Czaja et al., (2010)	Internet-based information seeking	Working memory, processing speed, reasoning
Taha et al (2013)	Use of EMRs	Working memory, processing speed, reasoning, verbal abilities

# Background

- Cognition is clearly important to everyday functioning but cognition alone does not account for performance variability on everyday tasks.
- The performance of everyday activities involves a combination of cognitive abilities, knowledge/experience and is shaped by other factors such as emotions, health status, social and environmental contexts.
- There are numerous examples in the literature that demonstrate a discrepancy between performance on standardized measures of cognitive abilities and performance on well-learned everyday activities.

# Pressing Issues

- The development of efficacious strategies to remediate challenges or difficulties associated with everyday tasks is dependent on understanding:
  - how age-related changes in cognition impact on the ability of older adults to meet the demands associated with everyday tasks
  - the specific types of challenges older adults encounter when performing these activities
- This in turn requires outcome/performance measures that capture the relevant and critical aspects of real-world tasks, behaviors and environments.

# Current Assessment Protocols

- Standardized neuropsychological tests
  - Fail to capture the complexity of everyday living tasks and situational contexts
- Informants' ratings (e.g., ADL, IADL scales)
- Self ratings of performance
- Observational measures ( Observed Tasks of Daily Living – Diehl et al, 1995, 2005)
- Paper and pencil tests that assess real world activities (e.g., Everyday Problems Test – Willis et al., 1996)
- Simulations of everyday tasks



# Functional Assessment Battery

- Encompasses a wide range of real world activities:
  - Medication Management
  - ATM/banking
  - Prescription refill via voice menu
  - Kiosk Ticket Purchase and way-finding
  - Online Forms Completion
  - Shopping
- High ecological validity – simulations are based on real world systems and tasks
- Computer-based/multimedia format

# Functional Assessment Battery

- Real time performance data
- Remotely deliverable
- Can be easily translated for other cultures and languages
- Can be easily adaptable for alternative forms

Please use the ATM below to check the balance in your checking account. Your Account PIN is 1234.

Por favor, use el cajero automático para verificar el saldo de su cuenta de cheques. El PIN de cuenta es 1234.

See summary of accounts

See account details



COA

CASH

ACCOUNT INFORMATION

DEPOSIT

TRANSFER OF PAYMENT

PREFERENCE

EXIT

Exit Task



You need to provide some basic information about yourself by completing a form using the computer. Please click on the button labeled "Complete Form in English" to complete the form in English.

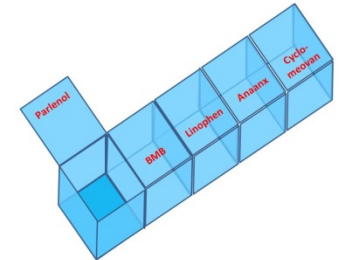
Complete Form in English

Usted necesita proveernos algunas de sus informaciones básicas llenando un formulario usando la computadora. Por favor oprima el botón que dice "Completar el formulario en Español" para completar el formulario en Español.

Completar el formulario en Español

Make a selection from the options below:

- A Buy EASY Card  
The card is valid for three years  
-Load it with 1-Day Pass, 7-Day Pass, or a 1-Month Pass and/or cash value of up to \$150  
-Buy an EASY card if you are loading a 1-Month Pass or a 1-Month Pass with a monthly Metrorail Parking permit.  
-Can be registered for balance protection.
- B
- C Buy EASY Ticket  
-Ideal for short-term use.  
-The ticket expires 60 days from date of purchase.  
-Load it with a 1-Day Pass, 7-Day Pass or cash value of up to \$40
- D
- E
- F
- G
- H



Click Image To Enlarge

- Parlenol
- BRB
- Linophen
- Anaanx
- Cyclomeovan



- Parlenol
- BRB
- Linophen
- Anaanx
- Cyclomeovan

Continue

# Task Performance

	Sample	Mean	Std. Deviation
ATM Task: Total Incorrects**	Non-impaired	2.85	2.21
	Patients	5.37	5.08
Prescription Task: Incorrect and Invalid	Non-impaired	2.32	2.74
	Patients	3.47	3.46
Form Task: Time in secs***	Non-impaired	159.75	138.47
	Patients	300.58	200.32
Doctors Task: Percent Correct***	Non-impaired	67.39	17.94
	Patients	45.58	21.21

\*\*\* p < .001; \*\* p < .01

# Correlations

	TMT	BACS	HVLT	LNST	Fluency	ATM (time)	ATM - Efficiency	Form (time)	Prescription (time)	Prescription (# of correct)	Doctor (time)	Doctor (# of correct and valid)
UPSA	.404**	.645**	.480**	.616**	.331**	-.411**	.344**	-.584**	-.434**	.446**	-.383**	.645**
TMT		.539**	.405**	.521**	.231*	-.154	.178	-.192	-.301*	.157	-.210	.236
BACS			.460**	.483**	.282*	-.454**	.383**	-.523**	-.419**	.362**	-.254	.300*
HVLT				.533**	.252*	-.281*	.409**	-.406**	-.338**	.278*	.005	.321*
LNS					.258*	-.068	.230	-.164	.015	.378**	-.110	.331*
Fluency						.015	.077	-.131	-.072	.205	.142	.143
ATM (time)							-.362**	.718**	.560**	-.079	.513**	-.272
ATM - Efficiency								-.279*	-.251	.416**	-.022	.407*
Form (time)									.630**	-.230	.503**	-.398**
Prescription (time)										.106	.295*	-.249
Prescription Performance											-.188	.411**
Doctor (time)												-.128

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

# Correlations – Non-Impaired

	TMT	DS	HVLT	LNST	Fluency	ATM (time)	ATM - Efficiency	Form (time)	Prescription (time)	Prescription (# of correct)
UPSA	.205	.518**	.339	.666**	.367	-.191	-.031	-.429	-.447	-.116
TMT		.611**	.368	.516**	.268	-.537**	.326	-.387	-.502*	-.391
Digit-Symbol (DS)			.459*	.567**	.307	-.557**	.358	-.397	-.539*	-.428*
HVLT				.665**	.350	-.401	.357	-.462*	-.440*	-.222
Letter Number Set					.570**	-.290	.445*	-.418	-.434*	-.506*
Fluency						-.056	.172	-.066	-.264	-.448*
ATM (time)							-.623**	.436*	.644**	-.065
ATM - Efficiency								-.171	-.514*	-.434*
Form (time)									.440*	-.439*
Prescription (time)										.080

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



My Medical  
Record ▶

Message  
Center ▶

Appointments ▶

Billing &  
Insurance ▶

Address &  
Settings ▶

Customer  
Service ▶



## CREATE Patient Portal Simulation

Welcome to the CREATE Patient Portal Simulation! Using this website you can schedule appointments with your doctor, see the information contained in your medical history, find information about the medications you take, and find valuable resources for information about your medical conditions.

### Links to Useful Information

- [Diabetes](#)
- [High Blood Pressure](#)
- [Cholesterol](#)
- [Heart Disease](#)
- [Asthma](#)
- [Cancer](#)

CREATE Patient Portal Simulation

# Results: Hierarchical Regression Models

	<i>R</i> <sup>2</sup>	<i>Adj. R</i> <sup>2</sup>	$\Delta R^2$	$\Delta F$	<i>DF</i>	<i>p-value</i>
<b>Overall Performance</b>						
Model 1 <sup>a</sup>	0.058	0.040	0.058	3.184	2, 104	0.046
Model 2 <sup>b</sup>	0.290	0.270	0.233	33.761	1, 103	0.000
Model 3 <sup>c</sup>	0.585	0.561	0.295	23.734	3, 100	0.000
Model 4 <sup>d</sup>	0.621	0.594	0.036	9.323	1, 99	0.003
Model 5 <sup>e</sup>	0.651	0.623	0.030	8.495	1, 98	0.004
<b>Simple Tasks</b>						
Model 1 <sup>a</sup>	0.086	0.068	0.086	4.867	2, 104	0.010
Model 2 <sup>b</sup>	0.246	0.224	0.160	21.869	1, 103	0.000
Model 3 <sup>c</sup>	0.495	0.465	0.249	16.447	3, 100	0.000
Model 4 <sup>d</sup>	0.508	0.473	0.013	2.606	1, 99	0.110
Model 5 <sup>e</sup>	0.515	0.475	0.007	1.415	1, 98	0.237
<b>Complex Tasks</b>						
Model 1 <sup>a</sup>	0.041	0.023	0.041	2.243	2, 104	0.111
Model 2 <sup>b</sup>	0.274	0.253	0.233	33.045	1, 103	0.000
Model 3 <sup>c</sup>	0.544	0.516	0.269	19.668	3, 100	0.000
Model 4 <sup>d</sup>	0.590	0.561	0.047	11.312	1, 99	0.001
Model 5 <sup>e</sup>	0.627	0.597	0.037	9.644	1, 98	0.002

**Model 1<sup>a</sup>**  
Education

**Model 2<sup>b</sup>**  
*a* + Internet  
experience

**Model 3<sup>c</sup>**  
*b* + Trails B +  
Shipley + Letter  
sets

**Model 4<sup>d</sup>**  
*c* + Objective  
numeracy

**Model 5<sup>e</sup>**  
*d* + Age



# Recommendations

There is a need:

- for a greater understanding of the link between component cognitive abilities and performance of everyday activities among diverse populations of older adults.
- for a greater understanding of the role of other factors such as emotional cognition and social factors on the performance of everyday activities.
- to understand the types of challenges older adults encounter when performing everyday activities.
- for more robust measures of functional/everyday performance that are ecologically valid and capture the complexities of tasks, behaviors and environments.
- to validate these measures on diverse samples of older people.