

Technology, Aging & Cognition: Can Older Adults Adapt to New Technology?

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Critical Question

- ◆ **Given age-related changes in functional abilities, will older people be able to access and successfully adapt to new information technologies?**
- ◆ **Use of Technology is Pervasive in Everyday Life**
 - Workplace
 - Communication (e-mail; cellphones)
 - Transportation (GPS systems; ticket kiosks)
 - Learning and Education
 - Government Services
 - Healthcare





Medicare

The Official U.S. Government Site for People with Medicare

My.Medicare.gov

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Password:

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Prescription Drug Plan **NEW!**

Medicare & You 2006

Medicare Billing ▶

Medicare Appeals ▶

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Preventive Services ▶

Address Change

Replacement Card

Medicaid Enrollment

Provider Information

Ombudsman Center

Hurricane Information

Glossary

Medicare Spotlights [Site Updates](#)

RSS

Medicare Prescription Drug Coverage

- ▶ [Compare Medicare Prescription Drug Plans](#)
- ▶ [Learn More About Plans in Your Area](#)
- ▶ [Medicare Prescription Drug Plans by State for 2007](#)
- ▶ [Formulary Finder](#)
- ▶ [Lower Your Costs During the Coverage Gap **NEW!**](#)

[Medicare & You 2007 **NEW!**](#)

[More Medicare Spotlights...](#)

My Medicare Tools

If you are already enrolled in a drug plan and have questions, [help is here.](#)

Prescription Drug Plans

- ▶ [Compare](#)
- ▶ [Check Current Enrollment](#)
- ▶ [Add/Update Drug & Pharmacy Information](#)

Search Tools

- ▶ [Compare Medicare Prescription Drug Plans](#)
- ▶ [Compare Health Plans and Medigap Policies in Your Area](#)
- ▶ [Compare Hospitals in Your Area](#)
- ▶ [Compare Nursing Homes in Your Area](#)
- ▶ [Find a Medicare Publication](#)
- ▶ [Find Out if You Are Eligible for Medicare and When You Can Enroll](#)

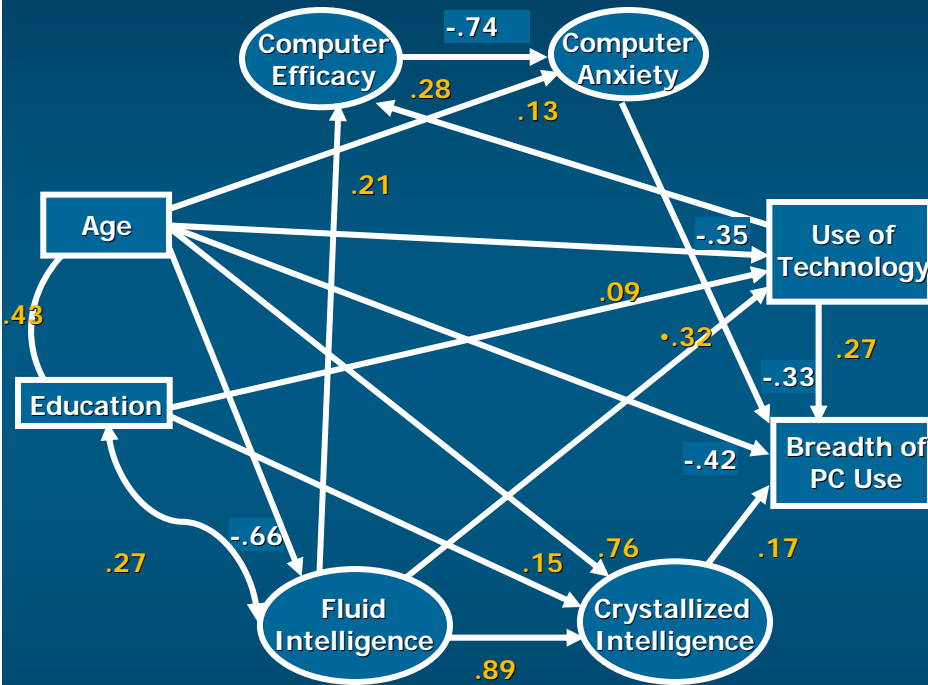
Relevance of the Question

- ◆ Use of technology requires learning new concepts, a new lexicon and new procedures
- ◆ Human-technology interaction involves information processing that places demands on memory and other cognitive functions
- ◆ Current data suggests age-related disparities in technology access and use

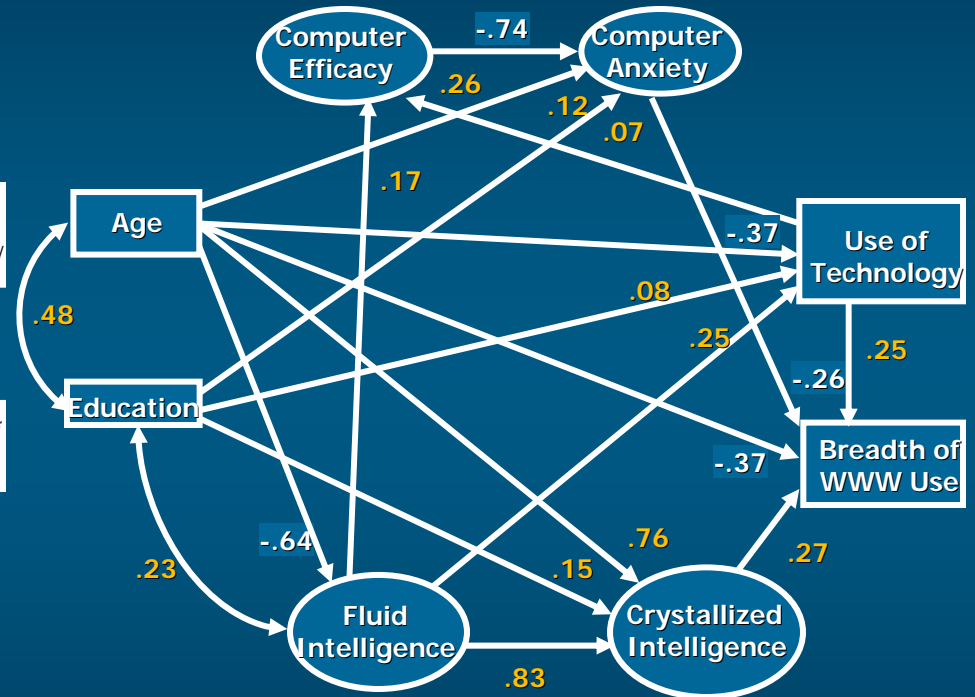
Health information seeking is a complex process involving special knowledge and skills:

- ◆ **Domain Expertise:** Basic knowledge of the problem domain (e.g., diabetes) and credible sources of information
- ◆ **System Expertise:** Basic facility with the physical interface to the search system (basic computer skills)
- ◆ **Information-seeking Expertise:** Knowledge concerning the configuration of information and of information seeking methods (e.g., use of links, search boxes, knowledge of reliable sites)

Breadth of PC Use



Breadth of WWW Use

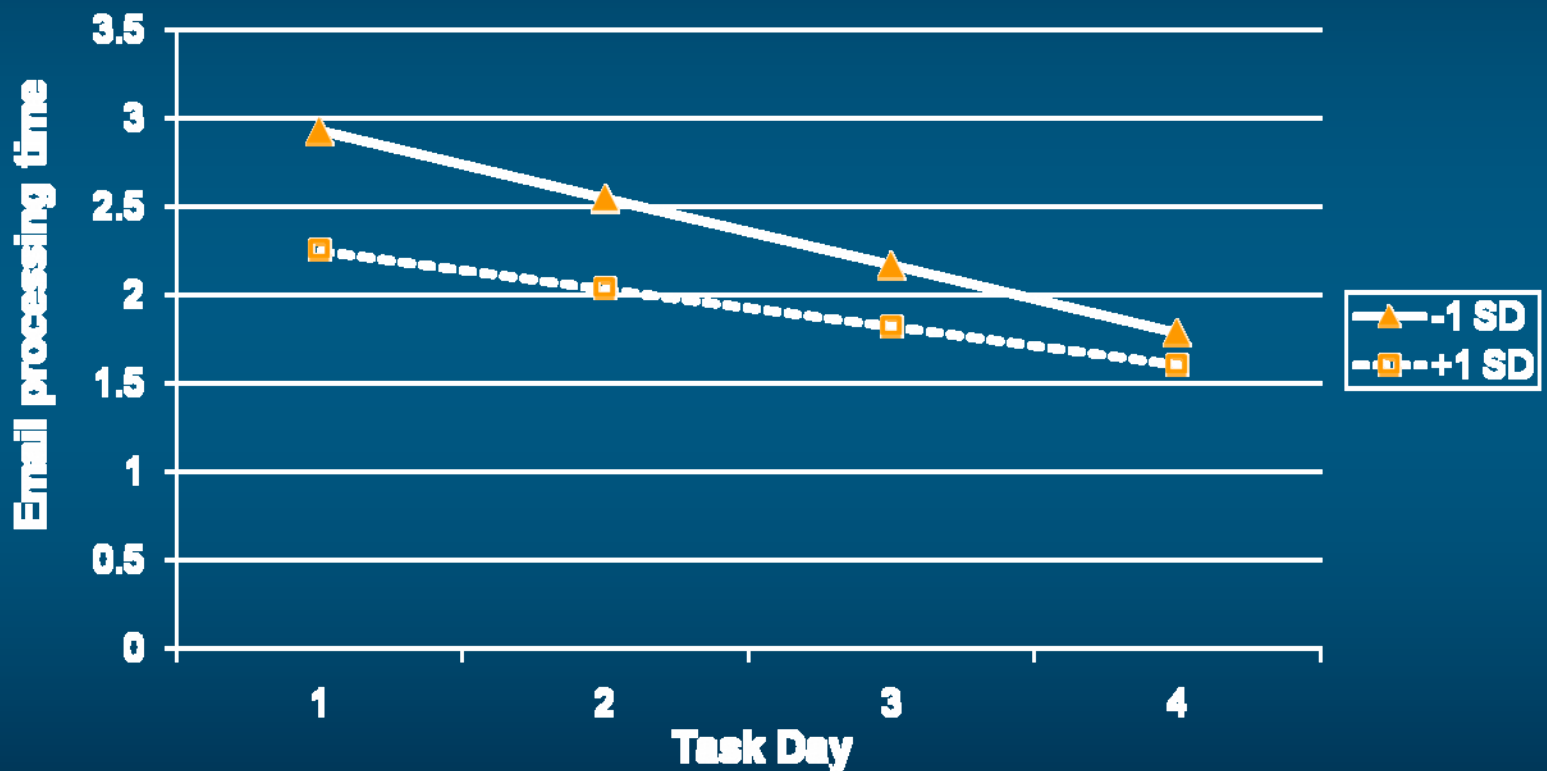


(Czaja, Charness, Fisk, Hertzog, Nair, Rogers, & Sharit, *Psychology and Aging*, 2006)

Cognitive Abilities Important to Performance of Technology-Based Tasks

Authors	Computer Application	Cognitive Abilities
Seagull & Walker (1992)	Information search and retrieval	Perceptual speed, visualization ability
Lohse (1997)	Graphical aids	Working memory
Morrow, Carver, Leirer, & Tanke (1998)	Health appointment attendance	Vocabulary, memory span, and processing speed
Czaja & Sharit (1999)	Data entry	Psychomotor skills and visuo-spatial abilities
Czaja & Sharit (2001)	Information search and retrieval	Processing speed, memory, attention
Sharit, Czaja, et al. (2004)	Interactive telephone menu systems	Working memory, spatial memory
Sharit, Hernandez, Czaja, & Pirolli (in press)	Internet-based information seeking	Working memory, processing speed, reasoning

Crystallized Intelligence and E-mail Processing Performance



Source: Nair, Czaja, and Sharit, *Journal of Gerontology* (2007)

Proportion of Between-Subjects Variance in E-mail Processing Performance

		Rate of Correct Emails	Email Processing Time	Navigational Efficiency
Model 1	Prior experience	0.282	0.276	0.293
Model 2	Prior experience Cognitive abilities	0.558	0.422	0.388
Model 3	Prior experience Cognitive abilities Age	0.646	0.524	0.396

Source: Nair, Czaja, and Sharit, *Journal of Gerontology* (2007)

Consequences of the “Digital Divide”

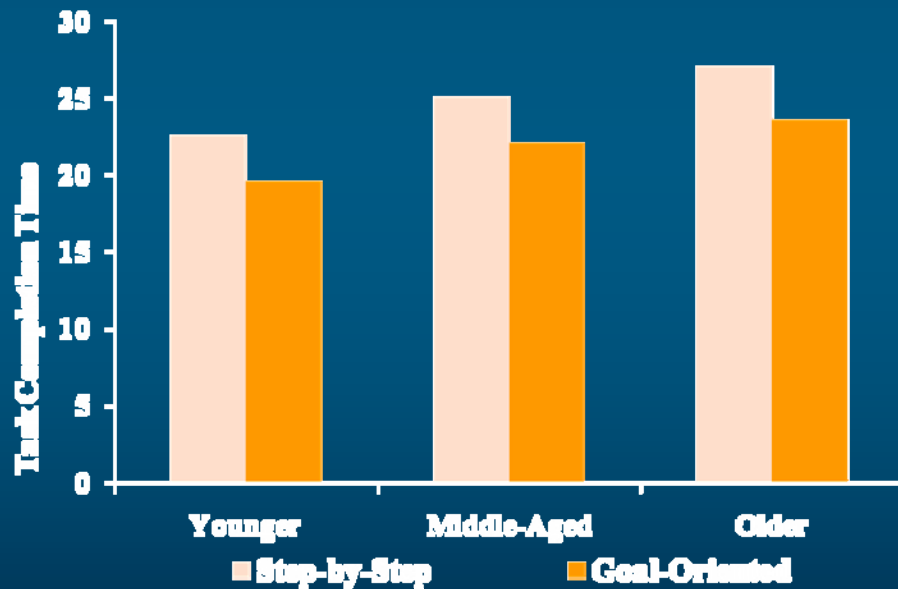
- ◆ Less access to health care services and health information
- ◆ Reduced ability to live independently at home
- ◆ Reduced access to government and other services
- ◆ Reduced opportunities for informal support

Interventions Do Help

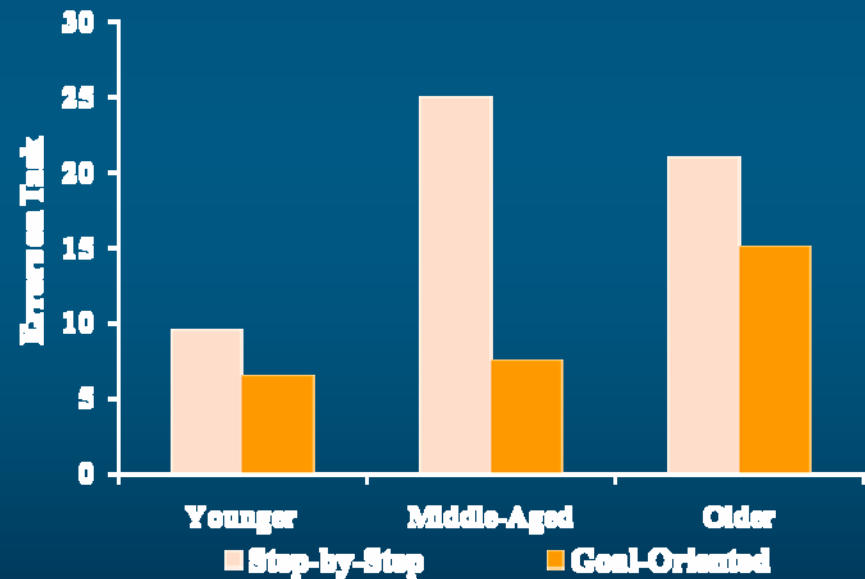
- ◆ Training
- ◆ Interface Design
- ◆ On-line Aiding

Text-Editing Performance as a Function of Age and Training Strategy

Task Completion Time by Age Group & Training Condition



Errors on Task by Age Group & Training Condition



Source: Czaja et al., 1989

Future Directions

- ◆ Information on the relationship between specific cognitive abilities and performance on technology tasks
- ◆ Development of effective training strategies especially for technology-based learning formats
- ◆ Answers to questions about transfer of training

Future Directions

- ◆ Empirical data on the efficacy of cognitive design aids
- ◆ Answers to questions regarding how technology can be used to augment or compensate for diminutions in cognitive abilities