Mindsets of Technology Ability, Age, and Cognition Correlates

Lawton Pybus, William C. M. Grenhart, Shenghao Zhang, Anne Collins McLaughlin, Jason C. Allaire
Department of Psychology, North Carolina State University, Gains Through Gaming Lab

BACKGROUND

- Fixed and growth mindsets are beliefs about the nature of human attributes and abilities (e.g. intelligence, athletics, leadership) that affect behavior (Dweck & Leggett, 1988). For example, someone who believes technology ability is innate (fixed) tends to have more difficulty in technology tasks than someone who believes it can be developed (growth; Pybus & Gillan, 2015).
- Mindsets are related to self-efficacy and goal setting processes, all of which have been closely linked with sense of control (Haidt & Rodin, 1999). Technology-specific attitudes, such as computer self-efficacy, have also been linked with age, education, and cognitive abilities (Czaja, Charness, Fisk, Hertzog, Nair, & Rogers, 2006).
- Tech. mindsets have not been measured in an older adult sample, although many everyday tasks involve technology and effectively navigating them is important for older adults' quality of life (Czaja & Schulz, 2006). Because most everyday tasks require interacting with constructed artifacts or technology, it is possible that technology mindsets would be related to everyday cognitive ability (Allaire & Marsiske, 1999).

SPECIFIC AIMS

1) Determine whether older adults demonstrate mindsets of technology ability, and whether they show a greater proportion of fixed or growth mindsets.
2) Determine the relationships of age, education, computer proficiency, technology mindset, sense of control, and everyday cognition.
3) Determine if technology mindset predicts everyday cognition when controlling for age, education, computer proficiency, and sense of control.

PARTICIPANTS

- Ninety-four community-dwelling adults ranging in age from 60 to 95 (M = 72.36, SD = 7.10)
- Ethnicity: 56% white and/or European American, 43% black and/or African American, 1% other
- 67% female

METHODS

Procedure

On Day 1, participants completed a cognitive battery. During this battery, they completed the everyday cognition battery (ECB) Memory test. Participants were given a form to complete at home, including sense of control, Computer Proficiency Questionnaire, and ECB Reasoning. When participants returned for their first game session, they brought back the completed form.

METHODS

Measures

Technology Mindset

3-item instrument adapted from Dweck & Leggett, 1988, to assess mindset of technology ability (Pybus & Gillan, 2015). 7-point Likert scale response (Agree to Disagree); higher scores indicate a more growth mindset.

- "Your ability to understand new technologies is something about you that you can't change very much."
- "You have a basic ability to understand new technology, and you really can't do much to change it."
- "People can learn how to use new technology, but you can't really change whether or not you understand new technologies."

Computer Proficiency Questionnaire

20-item instrument assessing computer proficiency in multiple domains, including communication and Internet (Boot, Charness, Czaja, Sharit, Rogers, Fisk, Mitzner, Lee, & Nair, 2015); higher scores indicates greater proficiency

Everyday Cognition Battery Memory Test

30-item instrument assessing declarative memory of everyday materials in medication, finance, and nutrition (Allaire & Marsiske, 1999); higher scores indicates better performance

Everyday Cognition Battery Reasoning Test

42-item instrument assessing ability to use information from everyday materials in medication, finance, and nutrition, to answer questions (Allaire & Marsiske, 1999); higher scores indicates better performance

Sense of Control

4-item instrument assessing perception of factors beyond one's control that prevent goal achievement (Lachman & Weaver, 1998); higher score indicates greater individual control

RESULTS

Specific Aim 1

Mindset scores ranged from 3 to 21. With the mean above the midpoint of 12 (M = 13.77, SD = 5.05), the sample, on average, reported a more growth than fixed mindset.

RESULTS

Specific Aim 2

Table 1

Correlation Matrix for Variables in Regression Analyses

Variable	1	2	3	4	5	6	7
1. Age	—	.15	-.37*	-.11	-.14	-.03	-.09
2. Education		—	.17	.35*	.23*	.31*	.35*
3. Comp. Proficiency			—	.19	.32*	.42*	.38*
4. Tech. Mindset				—	.36*	.39*	.38*
5. Sense of Control					—	.44*	.21*
6. ECB Reasoning						—	.54*
7. ECB Recognition							—

* $p < .05$

Specific Aim 3

Table 2

Summary of Regression Analyses for Variables Predicting Everyday Cognition (Reasoning and Memory; N = 94)

	ECB Reasoning			ECB Memory		
Variables	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Age	.06	.09	0.7	.01	.07	.02
Education	.25	.20	.13	.33	.14	.25*
Comp. Proficiency	.10	.04	.29*	.06	.02	.25*
Sense of Control	.15	.07	.25*	0	.05	.01
Tech. Mindset	.25	.13	.21	.22	.09	.28*
R^2		.36			.30	
F		7.86*			5.87*	

* $p < .05$

CONCLUSIONS

- Older adults demonstrated a slightly more growth mindset on average. However, people assessed from a more general population tend to show an even more growth mindset on average (Pybus & Gillan, 2015). We did not test the significance of this difference.
- Technology mindset was a significant predictor of ECB Memory when controlling for age, education, computer proficiency, and sense of control.
- Poorer performance on technological task may then be a function of older adults' beliefs about technology ability, related beliefs, the strategies they choose, and cognitive abilities. No performance data were included in these analyses.
- Researchers should consider assessing mindset in technology studies to better understand cognitive differences among participants.

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