Computers in Human Behavior 67 (2017) 106–112

Contents lists available at ScienceDirect

Computers in Human Behavior

journal homepage: www.elsevier.com/locate/comphumbeh

Full length article

Predicting computer proficiency in older adults

Shenghao Zhang, William C.M. Grenhart, Anne Collins McLaughlin, Jason C. Allaire*

Department of Psychology, North Carolina State University, Campus Box 7650, Raleigh, NC 27695-7650, United States

ARTICLE INFO

Article history:
Received 28 July 2016
Received in revised form
31 October 2016
Accepted 7 November 2016

Keywords:
Computer proficiency
Aging
Cognition
Sense of control
Positive affect

ABSTRACT

Continued growth in older adults' computer and internet use has led to the need to better assess their competencies and skills. The aim of the current study was to expand on this literature by examining sources of individual differences in older adults' computer and internet proficiency. Ninety-seven adults ranging in age from 60 to 95 completed the Computer Proficiency Questionnaire (CPQ) along with a battery that measured demographic information, socio-emotional variables such as sense of control and affect, and cognitive abilities such as reasoning and speed of processing. Hierarchical regression analyses examined the predictors of CPQ Total score as well as the three CPQ subscales (e.g., Internet and Email Use, Communication and Calendaring, and Computer Basic). Age, education, affect, sense of control, inductive reasoning, perceptual speed, and psychomotor speed were associated with at least one domain of computer proficiency. Positive affect uniquely predicted Communication and Calendaring. While sense of control, inductive reasoning, and psychomotor speed uniquely predicted Computer Basic. Discussion focuses on implications for CPQ use and computer proficiency training in older adults.
© 2016 Elsevier Ltd. All rights reserved.

1. Introduction

Computer and internet usage by older adults has grown dramatically over the last decade and will continue to grow as the Baby Boom generation enters retirement age. As of 2013, 65% of American adults over the age of 65 owned a computer, compared to 34% eight years before (File & Ryan, 2014). A more recent national survey showed that 58% of Americans in this age group were online, compared to 28% a decade ago (Perrin & Duggan, 2015). Both surveys identified older adults as the most rapidly growing group in computer and internet adoption. This growth in use has led to an interest in assessing and quantifying older adults' computer and internet competencies and skills (Boot et al., 2015). The goal of the current study was to expand on this literature by examining sources of individual differences in older adults' computer/internet proficiency.

Previous research has found that computer and internet use by older adults fosters communication with distant family members and friends (Braun, 2013; Vroman, Arthanat, & Lysack, 2015), provides access to health and medical information (Mitzner et al., 2010), and improves performance in everyday activities such as shopping and banking (Wagner, Hassanein, & Head, 2010). These technologies can enrich social life (Leist, 2013) as well as compensate for prospective memory failures and cognitive declines (Charness & Boot, 2009). The benefits to be gained from these technologies is linked to the users' proficiency.

1.1. Computer proficiency in older adults

Computer proficiency refers to skills related to human-computer interaction, and is distinct from previous computer experience and frequency of use (Smith, Caputi, & Rawstorne, 2000). Compared with computer experience, computer proficiency is more predictive of actual computer performance (Arning & Ziefle, 2008), and computer experience and computer proficiency have differential effects on technology adoption (Varma & Marler, 2013). Computer proficiency can be broken down into various domains of computer activities (e.g., email and internet use, calendaring and communication software use, and basic interactions with computers) to best guide training and application, such as, identify areas that need most training for each individual (Boot et al., 2015). Previous research shows that computer proficiency was also positively correlated with the use of advanced technologies (Boot et al., 2015; Sengpiel & Dittberner, 2008), computer attitude and computer self-efficacy while negatively correlated with computer anxiety (Sengpiel & Jochems, 2015), indicating that socio-emotional variables, such as self-efficacy and affect, might influence computer proficiency. Moreover, Sengpiel

* Corresponding author.
E-mail address: jcallair@ncsu.edu (J.C. Allaire).

http://dx.doi.org/10.1016/j.chb.2016.11.006
0747-5632/© 2016 Elsevier Ltd. All rights reserved.

and Jochems (2015) found that computer proficiency was correlated with spatial abilities which are relevant to navigations in virtual spaces, indicating that cognition may also play a role in computer proficiency in older adults.

Cognitive abilities and attitudes, such as computer self-efficacy and computer anxiety, are also important predictors of computer and technology adoption as indicated by both descriptive and experimental studies (e.g., Czaja, Sharit, Hernandez, Nair, & Loewenstein, 2010; Czaja et al., 2006; Gatto & Tak, 2008; Lee, Chen, & Hewitt, 2011; Mitzner et al., 2010, 2014). Czaja et al. (2006) explored individual differences in general technology use in a large sample of American adults ranging in age from 18 to 91 years old. People who were younger, better educated, had higher levels of computer efficacy, and lower level of computer anxiety used more types of technology. Higher level of fluid intelligence and crystallized intelligence, which were assessed using broad range of tests (perceptual speed, psychomotor speed, inductive reasoning, episodic memory, spatial abilities and executive function), were also associated with greater *technology use*. Czaja et al. (2006) also identified education, ethnicity, fluid intelligence and computer anxiety as mediators in the relationship of age and *computer use*.

1.2. The current study

While computer use and adoption by older adults has been broadly studied, few studies have examined individual difference in older adults' computer proficiency. Therefore, in the current study factors contributing to individual difference in computer proficiency in an ethnically heterogeneous older adult sample were examined. Demographic, socio-emotional, and cognitive variables that predicted computer usage and technology adoption based on previous literature were hypothesized to be relevant to computer proficiency. Specifically, the current study intended to: (1) examine the correlational relationship between age, ethnicity, education, affect, self-efficacy processing speed, reasoning, episodic memory, spatial abilities, executive function and computer proficiency; and (2) determine the extent to which these factors predict individual difference in computer proficiency in general and in sub-domains of computer proficiency.

2. Method

2.1. Participants

The sample consisted of 97 independently living older adults ranging in age from 60 to 95 with a mean age of 72.56 years ($SD = 7.14$). Sixty-seven percent of the participants were female and 41.2% were African Americans. Participants received an average of 15.81 years of education ($SD = 3.05$). The median income level was $55,000.

2.2. Design and procedure

Participants were recruited from local communities and religious centers in the Raleigh, North Carolina metropolitan area to participate in a cognitive intervention study (pre-test/post-test treatment control group design). Participants completed a battery of cognitive tests and then were given a packet of take-home self-administered measures of demographic and affective measures which they returned at the first training session. Data for the current study come from participants who completed pre-test sessions along with questionnaires in the take-home package.

2.3. Measures

2.3.1. Computer proficiency questionnaire (CPQ; Boot et al., 2015)

CPQ assessed proficiency of computer and Internet use for older adults with a range of abilities from non-computer users to frequent users. Factor analysis showed 3 main factors of proficiency related to Internet and Email Use (11 items; $\alpha = 0.96$); Communication and Calendaring (6 items; $\alpha = 0.92$); and Computer Basic (3 items; $\alpha = 0.88$). Participants rated their ability to perform a number of computer-related tasks (e.g., I can: use search engines; I can: make purchases on the Internet) on a 5-point scale (1 = *Never tried*, 2 = *Not at all*, 3 = *Not very easily*, 4 = *Somewhat easily*, 5 = *Very easily*). The three subscales of CPQ are scored by computing the mean response for the questions in each factor and the CPQ scale is scored by summing the three subscale scores, with a higher score reflecting higher proficiency.

2.3.2. Socioemotional measures

Affect was measured by Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) which includes 10 positive (e.g., enthusiastic, active) and 10 negative (e.g., distressed, scared) adjectives describing mood states. Participants rated the extent to which they had experienced each emotion during the past 24 h on a scale ranging from 0 (not at all) to 4 (very much). Separate composite scores were made for positive affect (PA; $\alpha = 0.91$) and negative affect (NA; $\alpha = 0.90$) with higher scores indicating higher PA and NA respectively.

Control beliefs were measured by the Sense of Control Scale (Lachman & Weaver, 1998). The sense of control scale has two dimensions: personal mastery ($\alpha = 0.70$) and perceived constraints ($\alpha = 0.84$). Personal mastery refers to one's sense of efficacy or effectiveness in carrying out goals. Perceived constraints indicates to what extent one believes there are obstacles beyond one's control that interfere with reaching goals. Participants rated the extent to which they agree or disagree with the statement on a 7-point scale, with 1 representing strongly agree and 7 representing strongly disagree. The Sense of Control scale was scored by summing all the items scores, with personal mastery items reverse coded. Higher scores indicate a higher sense of control.

2.3.3. Cognition

Perceptual speed was measured by the Number Comparison Test (Ekstrom, French, Harman, & Dermen, 1976). Participants were asked to compare two numbers and decide whether or not they were the same as quickly as possible. The task was administered on a computer and participants responded through pressing the keyboard, with "Q" standing for "same" and "P" standing for "different." The task was scored by the number of correctly answered items within 90 s.

Psychomotor speed was measured by simple and choice reaction time tests. For simple reaction time, participants were asked to press a key on the keyboard when they saw a stimuli on the screen. For choice reaction time, participants were asked to press "z" when they saw the stimuli on the left side of the screen and press "/" when they saw it on the right side. Both of the tasks were scored by the median reaction time of all trials.

Inductive reasoning ability was measured by Letter Series Test (Thurstone, 1962). Participants were asked to choose one of the five letters that would come next on the series of letters (e.g., a b a b c d c d __). The task was administered on a computer in a multiple choice question format. Participants responded to the question by pressing 1 to 5 on the keyboard. The test was scored by the number of correctly answered items within 4 min.

Episodic memory was measured by the Paired-associates Paradigm (Naveh-Benjamin, 2000). Participants were asked to

دریافت فوری ← متن کامل مقاله

ISIArticles
مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات