Age and Data Entry Accuracy

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Abstract

The purpose of our research was to resolve the conflict in the research literature on the relationship between age and data entry accuracy. Some previous research has found a positive relationship, with older adults being more accurate than younger adults, whereas other research has found a negative relationship. In this study, 99 university students were given course credit to participate in our data entry study. Participants were randomly assigned to one of three data entry methods: Single-Entry, Single-Entry with Visual Checking, or Double-Entry. Each participant entered 35 data sheets (5 for practice and 30 which were later scored for accuracy). There were no significant correlations between age and data entry accuracy, either overall or for any of the three data entry methods. These results may have been due to the fact that our oldest participant was only 44 years of age. Further research should use a broader age range with a more even distribution of participants across adulthood. Such research can more effectively resolve the conflict in the research literature.

Introduction

The utilization of computers and technology for the compilation of data is increasing (Sharit et al., 1998). In addition, the working population is steadily growing older (Czaja & Sharit, 1993). The aging workforce is a major concern, as previous research has suggested that older individuals have more trouble than younger individuals when it comes to familiarizing themselves with technology and working on computer-based tasks (Czaja & Sharit, 1993). One ubiquitous computer task is data entry. Age influences both speed and accuracy of data entry tasks.

Previous research has shown a consistent negative relationship between age and data entry speed. Older individuals enter data at a slower pace than younger individuals (Czaja, Sharit, Nair, & Rubert, 1998). Furthermore, individuals in the 60 to 75 year age range enter less data in a given time span than those in the 20 to 39 or 40 to 59 year age ranges (Czaja & Sharit, 1993). Given the consistent findings in this area, we chose to focus on data entry accuracy.

Accurate data entry is a very important step in the research process. Data entry errors introduce random error to an experiment, which consequentially reduces reliability (Barchard & Pace, 2007). There are various factors that may lead to an individual entering data incorrectly. These factors include fatigue (Healy, Kole, Buck-Gengler, & Borne, 2004) and level of experience and comfort with computers (Czaja & Sharit, 1998b). Interestingly, age appears to be the dominating variable regarding data entry accuracy, because fatigue (Czaja & Sharit, 1993), and inexperience and discomfort with computers tend to increase as age increases (Czaja & Sharit, 1998b). We therefore chose to focus our research on age.

Research regarding the relationship between age and accuracy is not as consistent as the research on age and speed. On the one hand, some researchers have found that as age increases, accuracy decreases (Czaja & Sharit, 1993). As well, memory and perceptual motor skills are significant predictors of work performance, and these tend to decrease as age increases (Czaja & Sharit, 1998a). Moreover, older individuals generally express more difficulty in understanding novel information (Finken & Babcock, 1996). Thus, it is possible that older individuals may perform poorly if they do not have previous experience with entering data. On the other hand, other studies have found that older individuals had a smaller error rate than younger individuals (Czaja, Sharit, Nair, & Rubert, 1998). Additionally, there have been conflicting research on the relationship between work performance and age: Several, equally significant studies have concluded that work performance decreases as age increases, that work performance increases as age increases, and that work performance remains the same regardless of age (Rhodes, 1983). The purpose of this current study is to resolve the contradictory findings in previous research regarding the association between age and accuracy.

Method

Participants

A total of 99 (63 female, 36 male) undergraduate students participated in this study for course credit at a large western university. They ranged in age from 18 to 44 (M = 20.74, SD = 4.76). In terms of ethnicity, 40.4% identified themselves as Caucasian, 17.2% Asian, 15.2% African American, 13.1% Hispanic, 8.1% Pacific Islander, 6% other.

Procedures

The Data Entry Study is completed on a computer during a single 90-minute appointment, which is monitored by a trained study administrator. Prior to the beginning of the actual data entry task, the participants watch two video tutorials on the computer. The first video is a tutorial on the basics of using a Microsoft Excel™ spreadsheet. The second video teaches the participant how to enter data according to their randomly assigned method. These methods are Single-Entry, Single-Entry with Visual Checking, and Double-Entry.

The participants assigned to the Single-Entry method are instructed to enter the data once into a Microsoft Excel™ spreadsheet as accurately as they can. The participants assigned to the Single-Entry with Visual Checking condition are given the same instructions; the only difference is that they are told to look over their work after each data sheet is entered and visually check for errors. The participants assigned to Double-Entry are instructed to enter all data sheets twice into the spreadsheet. The spreadsheet for this condition is set up to automatically compare the two sets of data to determine if there are any mismatches between the first and second entries and to check for any values that are out-of-range. If an error has occurred within a cell, that cell will be highlighted so that the participant is alerted to the error.

Over the course of the study, the participant enters two sets of data sheets into two different spreadsheets. First, the participant opens an Excel spreadsheet labeled “Part 1” and enters a set of five data sheets in order to become familiar with the process. During Part 1, the administrator corrects the participant if they are entering the data incorrectly, such as not correcting their errors or using the mouse instead of the arrow keys to switch between cells. Upon completion of the first set, participants are instructed to save and close the current spreadsheet. Then they open the second spreadsheet, which is labeled “Part 2,” and enter a set of thirty data sheets.

The data sheets contain an ID number, sex, and four ten-item measures entitled "School Experiences," "Social Skills Test," "Family Background," and "Extraversion". The ID number entry field, the "Social Skills Test", and "Extraversion" scales had numeric responses. For the remaining measures, the participant entered numeric values in place of each field's letter responses. For the sex entry field, the participant entered the number "1" in place of the character "M" and the number "2" for the character "F". For "School Experiences," the participant entered "1" for "D", "2" for "N", and "3" for "A". For "Family Background," the participant entered "1" for "SD", "2" for "D", "3" for "N", "4" for "A", and "5" for "SA".

Measures

For each participant, accuracy was calculated as the percentage of correct entries across all entries in the second part of the study (with 30 data sheets). Age was self-reported by the participant.

Results

We correlated data entry accuracy with age in two ways. First, we correlated these two variables for all participants. This correlation was non-significant. Second, we calculated this correlation for each of the three data entry methods. The correlations were all non-significant. See Table 1.

Table 1

Correlations between Age and Accuracy for All Three Data Entry Methods

Data Entry Method	n	*r*
Single Entry	32	-.08
Visual Checking	37	.02
Double Entry	30	.16
All Entry Methods	99	-.02

Note. All correlations were non-significant: all p-values > .40.

Conclusions

The purpose of this study was to address the conflict in the research literature regarding the relationship between age and data entry accuracy. We found no statistically significant relationship between data entry accuracy and age, which is likely due to the fact that our oldest participant was only 44 years of age. Because we had restriction of age, our correlations were much smaller than anticipated. If we had included participants who were much older, our results may have been significant.

Future research in this area should make use of a sample that does not consist solely of undergraduate university students. Perhaps a corporate setting would be a more appropriate venue from which to sample. A corporate setting would make it easier to generalize findings to the workplace, and could more appropriately address our concern of the technological capabilities of an aging workforce.

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