

DOES TRAINING REDUCE COMPUTER ANXIETY?

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Abstract

This study uses a modified version of the Computer Anxiety Rating Scale (CARS) (Heinnsen, Glass, & Knight, 1987) to longitudinally analyze levels of student anxiety over time. We predict that computer anxiety will behave as a transitory state (Spielberger, 1970) that will respond favorably to interventions. Specifically, we predict that levels of computer anxiety will decrease after students in an introductory computer applications course complete assignments and receive training using personal productivity software tools. Further, we also plan to analyze gender differences in levels of computer anxiety. We propose that women will experience higher levels of computer anxiety than men both before and after training. We have already collected data and plan to statistically test our hypotheses and draw conclusions based on the results obtained.

Keywords: computer anxiety, gender differences, training

Introduction

Even with the introduction of computers in elementary school and often earlier, many college students still exhibit computer anxiety – that is, fear, anxiety, and frustration in computer interactions (Bozionelos, 1997). Further, even though students may show a temporary decrease in computer anxiety during the completion of a computer course or as computer experience increases (Chua, Chen, & Wong, 1999; Harris & Davison, 1999), this anxiety may tend to subsequently reappear, even after undergoing training (Gos, 1996; Safford & Worthington, 1999) or gaining more computer experience (Todman, 2000). Further, some researchers predict that computer anxiety may actually increase as technology use, experience, and skills increase (Beckers & Schmidt, 2001). It appears that computer anxiety may continue to be exhibited even after extensive training and experience with computers. Training and widespread diffusion of technology into all facets of life may not overcome the underlying anxiety experienced by individuals utilizing computers. Research is clearly needed to further analyze the nature of the computer anxiety construct.

Theoretical Background

In general, the computer anxiety literature has been fragmented and non-cumulative, with researchers using a wide variety of scales. As Chua et al. (1999) note in their meta-analysis, the scales used to measure computer anxiety are generally reliable but are not compatible with one another. A recent study (Woszczyński, 2001) completed a confirmatory factor analysis to test a modified version of the Computer Anxiety Rating Scale (CARS). Woszczyński showed that the 9-item modified CARS (CARS-mod) exhibited a good fit of the data to the model tested. Thus, we selected CARS-mod for use in the current study.

Although computer anxiety is defined in multiple ways, the results have been unclear as to the exact nature of the construct. Some researchers have argued that computer anxiety is a transitory state (Spielberger, 1970) that appears when the person interacts with computers – and that can potentially be changed with appropriate interventions, while others have suggested that computer anxiety is a long-term trait that remains consistent over time (Digman, 1990; Heinnsen, Glass, & Knight, 1987).

In this study, we have surveyed a large sample of students in introductory computer courses at two southeastern colleges. We surveyed the students at two points in time: once at the beginning of the semester, and again approximately six weeks later, after assignments had been completed using popular personal productivity tools, including word processors, spreadsheets, and databases. We predict that computer anxiety behaves as a state, that is, training will reduce computer anxiety. Therefore, we propose:

Hypothesis 1: Computer anxiety levels will decrease after students receive training in an introductory computer applications course.

In addition, by using a standard measurement tool, we plan to more closely analyze some of the inconsistent results that studies have shown over the years. In particular, a closer look at the relationship between gender and computer anxiety is warranted. Some results have reported that women tend to exhibit consistently higher levels of the computer anxiety construct as compared to men (Chou, 2001; Harris & Davison, 1999; Todman, 2000), while the meta-analysis by Chua et al. (1999) showed inconsistent results between computer anxiety and gender. Gender differences could be particularly important to determine if high levels of computer anxiety lead women to choose careers outside of information technology (IT), which is described as the “career without women” (Mayfield, 2001). Since representation of women in college computer studies has decreased from 37% of undergraduate degrees in computer science in 1984 to 20% in 1999 (Kellogg, 2001), with only 15% of the Ph.D. degrees in the computer sciences being awarded to women in 1996 (Carver, 1999), identifying obstacles to the selection of IT as a major could have substantial impacts on diversity in the IT workplace. Therefore, we propose:

Hypothesis 2: Women will exhibit higher levels of computer anxiety, both before and after training, as compared to their male counterparts.

Anticipated Methodology

We have already collected data on approximately 400 students at two southeastern colleges. We plan to conduct longitudinal statistical analyses to test our hypotheses. Specifically, we plan to use analysis of variance (ANOVA) to test Hypothesis 1, which compares the pre- and post-training groups. We also plan to use ANOVA to test for differences between levels of computer anxiety for men and women, both before and after training, as described in Hypothesis 2.

Limitations of the Study

This study was limited by several factors. First, when self-reports are used to gather data, researchers run the risk of common method variance (Woszczynski & Whitman, 2004), which is the danger that the method employed is the reason for obtaining significant results, absent any true effects. However, we plan to perform Harman’s one-factor test (Podsakoff and Organ, 1986) as one way to attempt to minimize common method bias. Further, we also plan to check for non-response bias and missing data, to see if they affect the results.

Second, we surveyed students at only two southeastern universities for our study. A broader sample might reveal differences among different regions of the country. However, we believe that we have a large enough sample (400 students) to maximize external generalizability. Further, the two universities studied have different student populations. One has a population of about 3000 students and offers limited graduate programs, while the other has approximately 7500 students and offers expanded graduate degree options.

Future Research

Including adult students along with typical college age students might provide some age based results which could be of interest. Expanding the sample to include students from all levels of the college experience could also help to determine if general training and experience received through fulfilling the typical college requirements is likely to decrease

computer anxiety, or if specific training aimed at reducing computer anxiety would be beneficial for students to receive during their college experience.

Moreover, gender differences in levels of computer anxiety could be particularly important to determine if high levels lead women to choose careers outside of information technology. If differences in levels of computer anxiety between women and men is a significant factor in the selection of IT as a major, then training programs, mentoring, and other intervention measures may potentially decrease the levels of computer anxiety among women and increase the number of women majoring in IT and ultimately moving into the IT workforce.

Conclusions

We expect to find that women will be more anxious in computer interactions than their male counterparts. We expect this to be true in pre-training as well as in post-training situations. The computer anxiety literature to date has reported conflicting results, with some studies reporting higher levels of anxiety for females, while others showed no differences between levels of computer anxiety. For example, some results have reported that females tend to exhibit consistently higher levels of the computer anxiety construct as compared to males (Chou, 2001; Harris and Davison, 1999; Todman, 2000), while the meta-analysis by Chua et al. (1999) showed inconsistent results between computer anxiety and gender.

Moreover, we also expect that training will reduce computer anxiety. Again, the computer anxiety literature has not come to a conclusion as to whether training truly reduces computer anxiety, particularly over the long-term. This study should help researchers move towards better understanding computer anxiety, training, and gender differences.

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