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Computers in Human Behavior 22 (2006) 456–466

Computers in  
Human Behavior

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# The influence of computer anxiety on experienced computer users while performing complex computer tasks

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Available online 11 November 2004

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## Abstract

This study was conducted to test the hypothesis whether computer anxiety has a hindering effect on experienced computer users while performing complex computer tasks. Participants were 75 third-year psychology students taking a Delphi programming course. Prior to the course, a computer anxiety scale was filled in. Computer performance was measured in four different ways: through final course grade, predicted final grade, self-perceived programming skills, and through observed behavior while programming a computer application. The results showed that computer anxiety was found to correlate with the students' prediction of their final grade and with the perception of their own computer skills, but had no effect on actual performance as measured by the final course grade. Furthermore, there was no significant effect of computer anxiety on behavioral measures while students were programming a computer application. The findings point into the direction of a "threshold effect", where anxiety only hinders performance when this anxiety is sufficiently severe or when the context in which the task to be executed on a computer is ambiguous.

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*Keywords:* Computer anxiety; Computer programming performance; Computer skills

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## 1. Introduction

There is ample evidence that large numbers of people are hindered in their efforts to acquire computer skills because they suffer from a condition called “computer anxiety”. Computer anxiety is defined as an individual’s fear or apprehension of working directly with a computer or the anticipation of having to work with computers. An individual may feel intimidated, hostile, or worried about social embarrassment or about looking stupid (Chua, Chen, & Wong, 1999; Glass & Knight, 1988; Jay, 1987; Maurer, 1994; Meier, 1985). It is self-evident that suffering from such fear might lead people to avoid computers altogether and, hence, never acquire the skills necessary to be successful in our modern-world information age. The fear of performing poorly or be clumsy with the machine is indeed central to computer anxiety. In addition, it is generally assumed that the fear itself exacerbates performance; people who fear the apparatus may do worse on it because of this (e.g., Chou, 2001; Mahar, Henderson, & Deane, 1997; Smith & Caputi, 2001). Smith and Caputi (2001), for instance, found that those high in computer anxiety engaged in more worry (i.e., self-preoccupation, concerns about personal ability) and off-task thoughts when using computers. They concluded that the adverse effects of computer anxiety on performance may only occur because worry and other task-irrelevant thoughts interfere with the person’s ability to process and store information relevant to the task at hand, especially when this task is complex or cognitively demanding. Other authors found anxious that users were also slower in completing simple computer tasks (Mahar et al., 1997), and had a lower perception of their computer capabilities (Chou, 2001). Rozell and Gardner (2000) tested a path model of intrapersonal cognitive, motivational, and affective processes associated with computer-related performance among students who were formally instructed in word processing, spreadsheet use, and database management. Computer performance was measured by the grades on three consecutive exams. Computer anxiety turned out to be negatively related to performance by influencing the students’ judgment of their capability to use a computer (computer self-efficacy) and, henceforth, the amount of effort put into the computer-related task. Laguna and Babcock (1997) found in a study among adults that older adults (age 55+) needed more time to complete a perceptual decision task on a computer and that computer anxiety was a significant covariate.

The studies reviewed so far mainly involved inexperienced participants trying to solve simple computer tasks. It has been found that gaining more computer experience leads to lower levels of computer anxiety (Beckers & Schmidt, 2003). However, the influence of computer anxiety on more experienced users while working on more complex computer tasks is still unclear.

Perhaps one of the most complex activities while using a computer is writing a computer program. The complexity of writing a computer program results from its multifaceted aspects, such as problem representation, design, coding, and debugging (Bishop-Clark, 1995). Especially to the novice, computer programming may seem daunting and the opinion prevails that programming is not for everyone. Successful programmers are stereotyped as people who enjoy working with machines, who like technology and enjoy solving complex problems (Colley, Henry, Holmes,

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