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ScienceDirect
Computers in Human Behavior 23 (2007) 1258–1272
Computers in Human Behavior
www.elsevier.com/locate/comphumbeh

Does computer anxiety reach levels which conform to DSM IV criteria for specific phobia?

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Available online 28 January 2005

Abstract

Fear of technology in general and of computers in particular has been shown to be prevalent in the population. This study sets out to explore the experience of computer anxiety and is in two parts. The first part examines computer anxiety in the context of DSM IV criteria for specific phobia by comparing the incidence of underlying beliefs of those high in computer anxiety with people with spider phobia and with a non-anxious group. 185 Participants filled in questionnaires concerning general and specific measures of anxiety. Results provide tentative support for the claim that computer anxiety may reach clinical levels, that some cognitions held by the computer anxious are held in common with the cognitions of those suffering from spider phobia who conform to DSM IV criteria for specific phobia, and that a case may be made for computer anxiety to enter into the framework of problematic fears. However, several of the cognitions core to the experience of spider phobia were not found in the computer anxious participants. Examination of individual cognitions revealed that the kinds of concerns being expressed were more akin to social or test anxiety ('I would make a fool of myself') than to specific phobia ('I would scream', 'I would become hysterical'). In a further exploration of this, the second study with 164 participants compared aspects of computer anxiety and avoidance with measures of social, performance, and test anxiety. These were found to be significantly related to each other. The implications and limitations of the studies are discussed.
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doi:10.1016/j.chb.2004.12.006

Keywords: Computer anxiety; Technophobia; Computerphobia; Test anxiety; Social phobia

1. Introduction

It fairly well established that a fear of technology in general (mobile phones, video recorders, microwave ovens and so on), and of computers in particular, exists (see Brosnan, 1998a, for a review) and constitutes 'a real phenomenon' (Moldafsky & Kwon, 1994, p. 301). There is evidence that this anxiety is more prevalent in females than in males (e.g., Abdelhamid, 2002; Brosnan, 1998b, 1998c, 1999a; Durndell & Haag, 2002; Igbaria & Chakrabarti, 1990), though Rosen and Maguire (1990) found no evidence for this. Increasing familiarity with technology often relates to lower levels of computer anxiety (Choi, Ligon, & Ward, 2002; Maurer, 1994; Shashaani, 1997) but can also exacerbate it (Carlson & Wright, 1993). Rosen and Maguire (1990) highlight that although an inverse relationship tends to exist between computer experience and anxiety this is confounded by highly anxious individuals actively avoiding computer interaction. Thus in a sub-set of the computer anxious, it remains a problem and extends beyond the fear of the technology to a distrust and fear of computer experts and 'technocrats' (Wilson, 1999). There is however increasing evidence that the nature of the experience with technology determines its impact upon computer anxiety and that such anxiety is amenable to change by brief, well-structured, intervention programmes (Rosen, Sears, & Weil, 1993; Shashaani, 1997; Wilson, 1999; Brosnan & Thorpe, in press).

The prevalence rates for computer anxiety are obscured by the fact that it is described in different ways using different titles – computer anxiety, techno anxiety, technophobia, computer aversion, cyberanxiety and computerphobia (for a discussion of this see Choi et al., 2002). However, virtually every population tested (such as the Police, Teachers, Office workers, College students and School children) report that between a quarter and a half of those sampled report some level of anxiety when faced with information technology (Brosnan, 1998a). Lee (1970) is frequently credited with the first analysis of an emerging computer anxiety. In over three decades since this initial study there has been an exponential expansion of technology in leisure, work and educational environments. However, studies spanning these decades report consistent proportions of computer anxious individuals (Durndell & Thomson, 1997). The prevalence rates are also consistent across the USA and Europe (Rosen & Weil, 1995; Weil & Rosen, 1995) the Middle East (Omar, 1992) and the far East (Brosnan & Lee, 1998). The proliferation of technology has shifted the strategies of the computer anxious from avoidance (as this became increasingly untenable) to a strategy of minimising interaction with technology and suffering an aversive state during this interaction (Marcoulides, 1988; Rosen, Sears, & Weil, 1987). The addition of the suffix 'phobia' in this context has lead to misunderstanding, carrying with it as it does the suggestion of people rearing back in alarm at the sight of a palm pilot or a computer monitor, as those people with a specific phobia of snakes for

instance may do. Research examining the extent of aversive reactions to technology highlights a sliding scale from 'uncomfortable user' through to 'phobic' (Meier, 1985; Rosen et al., 1993) with around 5% falling into this latter category, reporting symptoms such as sweaty palms and heart palpitations (Rosen et al., 1993). A formal investigation of computer anxiety as psychopathology has not yet been undertaken however, and forms the rationale for the present study which seeks to explore the links between computer anxiety and specific phobias as defined by DSM IV criteria (American Psychiatric Association, 1994).

Definitions of computer anxiety have varied according to the context in which they are being discussed. Jay (1981) for example, characterised it as a resistance to talking about computers, fear or anxiety about them, and hostile or aggressive thoughts about them. Rosen and Weil (1990) noted that concerns included anxiety about current or future interactions, negative global attitudes, anxiety about operating computers successfully, kinds of impact they may have on society, and/or 'specific negative cognitions or self-critical internal dialogues during actual computer interaction or when contemplating future computer interaction' (Rosen & Weil, 1990, p. 276). Brosnan summarizes these (and other) definitions thus: 'an irrational anticipation of fear evoked by the thought of using (or actually using) computers, the effects of which result in avoiding, or minimizing, computer usage' (Brosnan, 1998a, p. 17). Although this definition of computer anxiety was arrived at by synthesizing the literature on computer anxiety it appears to overlap with some of the DSM IV diagnostic criteria for anxiety disorders. However, definitions of phobias in a clinical context usually include measures of distress, of interference in daily life and of avoidance of situations in which the feared object or situation may be found, all of which domains remain under-explored in relation to computer anxiety. Additionally, the propensity to suffer from computer anxiety may be related to social or performance fears or to test anxiety rather than to fears of specific stimuli: if this were indeed the case, cognitions found in those who evince anxiety in the presence of computers may be more akin to those found in the spectrum of social anxieties rather than those found in people who are afraid of specific objects or situations. Possible support for this hypothesis has come from the finding that the mere presence of others has been found to accentuate self-perceptions of computer-related anxiety (Gist, Schwoerer, & Rosen, 1989; Robinson-Staveley & Cooper, 1990). This would lead to manifestly different behaviours in the computer anxious from those found in people with a specific fear: a spider phobic for example may be reassured in the presence of someone who might help while the computer anxious person may find the presence of someone more anxiety provoking although the use of others for support has also been noted (Brosnan, 1998b).

The rationale for the study was given further support by contact with members of the public who, during initial investigations while speaking about their fear of technology, volunteered the following:

> I believe I am absolutely, wildly, technophobic. Even when I hear people on the telephone telling me to do various things, I cannot do it. I cannot do my video.

> I have never used my cash card in the bank and I do not know how to use a computer, I am absolutely terrified – don't even know what the mouse is. (C.V.).

> I am 56 years old and have been using a P.C. at work for sometime. I am O.K. as long as everything is set up but to have to do something new – I can't do it. We have an intranet and I can't surf it or the internet. To set up a work sheet is like climbing mount Everest. I write everything down but this takes ages and people showing you more than once get fed up with you. I work in accounts and have been a supervisor for years so I can't be completely daft. I've had a video for years and I only play videos. Also I have a microwave oven for a Christmas present and it's not been used yet. (K.G.).

> I hated computers but this year, as I have started to study for a degree, I had to face the reality of the monsters, computers. I have been very stressed and often crying in front of a computer screen. I am learning to use them but I still hate them. Why does it have to be like that? I bought a mobile phone the other day and the technology involved in it scared me, why does this technology have to make our life so painful? (A.M.).

In sum, the present study seeks to explore the issue from a novel perspective, by comparing computer anxiety to an extensively studied phobia which has clear criteria laid down by a recognized diagnostic system and which is common in all populations – spider phobia. The field so far has suffered from the liberal use of the terms 'technophobia' and 'computerphobia' without there being any real evidence of psychopathology. If computer anxiety is comparable in terms of amount of distress, range of underlying cognitions, and is associated with the kinds of escape/avoidance behaviour patterns found in specific phobia (Thorpe & Salkovskis, 1998) then it should share some of the underlying beliefs found in these phobias and should be equally susceptible to those treatment strategies found to be successful with people who have specific phobias. It should also be taken seriously. The present paper therefore describes two studies designed to explore these issues. The first study addresses the question as to whether high levels of computer anxiety conform to psychopathological standards i.e. – are people afraid of technology – in this instance computer technology – to a comparable extent to the fear felt by those who meet DSM criteria for specific phobia? It then goes on to identify underlying cognitions relating to computer anxiety and explores the possibility that they may either be comparable to those found in people with a specific phobia or may be more akin to those cognitions found in people with social, performance or test anxiety.

The second study is an exploratory study of the relationship between the types of cognition found in computer anxiety and those found in social/performance anxiety and test anxiety. It was anticipated that this may extend knowledge of what may become an increasingly important problem for a significant minority of people (as computers become all-pervasive and underpin all daily functioning) and may additionally provide information of possible use in an educational or therapeutic context.

2. Method

2.1. Study 1

2.1.1. Participants

185 Participants (101 non-anxious, 51 computer anxious and 33 spider phobics) were drawn from a variety of sources, including members of the public responding to an article in a local paper or to posters in local libraries, undergraduate students, and spider phobics volunteering for experiments in return for treatment. Participants were allocated to the computer anxious group if their scores on the visual analogue anxiety scale were within one standard deviation of the scores of the people with spider phobia on their comparable scale to do with spiders. Of those participants who provided their demographic details, 82% were female and 18% male. Mean age of the non anxious group was 23.88, (range 18–72, SD 11.23), the computer anxious group was 26.79 (range 18–70, SD 13.87) and the spider phobics was 23.3 (range 18–51, SD 6.40).

2.1.2. Procedure

Participants volunteered after becoming aware of the research via adverts in local libraries, an article in the local paper or as part of the University Research Participation Scheme. They contacted the researchers and were either sent the questionnaires and asked to return them in a prepaid envelope, or were asked to fill them in during a teaching session. Participants with spider phobia filled in the questionnaires when they attended an extended experimental session prior to receiving treatment for their phobia. All fulfilled DSM IV criteria for specific phobia.

2.1.3. Materials

1. The demographic details questionnaire collected information about age, sex, extent of previous computing experience in years, whether they were 'especially afraid of' animals, heights, closed spaces, or blood/injury. They were asked to write down anything else of which they were afraid.
2. Phobic beliefs (Thorpe & Salkovskis, 1995). This was initially based on the Chambless Agoraphobic Cognitions Questionnaire. The initial question concerned how 'confident are you that you would be able to tolerate being in the same room as a spider right now'. The scale ranged from 0 (not at all confident) to 100 (totally confident). Next, participants rated how much they believed each of 31 statements to be true on a scale of 0 (I do not believe this thought at all) to 100 (I am completely convinced this thought is true) while imagining that their phobic object was in the room with them. Questions belonged to three categories: harm (e.g., "I would have a heart attack"); coping (e.g., "I would not cope with it"); and disgust (e.g., "I would find it repulsive"). For the non-anxious and computer anxious participants, the word 'computer' was substituted for 'spider'.

3. Spielberger STAI y-1 self-evaluation questionnaire (present state anxiety) and the Spielberger STAI y-2 self-evaluation questionnaire (general trait anxiety) (Spielberger, 1983).
4. Watts and Sharrock Spider Phobia Questionnaire (1984).

5a. Measures of anxiety, avoidance and distress were gathered using 3 visual analogue Likert-type scales rated on a scale of 0–100 where the anchors were 'strongly agree' and 'strongly disagree'. Statements were as follows: (a) I always feel anxious when using computers; (b) I go out of my way to avoid computers; (c) My anxiety about computers bothers me.

5b. As the straight substitution of 'spider' for 'computer' did not make sense, (computer anxiety involving *use* of computers rather than being in the mere presence of them) participants with spider phobia had a comparable visual analogue containing 3 items paralleling those above but which were spider-relevant. Participants were asked to rate the items (while imagining they were in the room with a spider) on a scale of 0–100 where the anchors were again 'strongly agree' and 'strongly disagree'. Items were as follows: (a) I feel extremely anxious; (b) I want to escape very much; (c) I cannot cope with my anxiety about spiders. These measures were assessed independently by raters as being comparable in terms of measuring anxiety, avoidance and distress.

2.2. Results

2.2.1. Study 1

2.2.1.1. Overview. Data exploration began with an examination of demographic data relating to the three groups – participants who were non-anxious, computer anxious and spider phobics. Following this, data were checked for assumptions of normality. Data concerning anxiety responses and beliefs relating to the phobic object (computers or spiders) were found to be skewed so transformations were carried out to normalise the data before analysis. As not all participants filled in all questionnaires, and many exercised their right to withhold demographic details, numbers in the subsequent analyses fluctuate.

Data analysis then proceeded as follows:

1. Comparisons of age, state and trait anxiety scores in the three groups.
2. Spider phobics' scores on the DSM IV-derived visual analogue scales relating to anxiety, avoidance and distress were compared with scores relating to computer anxiety, avoidance and distress in the other two groups. This was done to check whether the computer anxious were reaching comparable levels of reaction to computers as the spider phobics were to spiders (who were all diagnosed as suffering from phobia and who were seeking treatment) and that both groups were different to the reactions of the non-anxious.
3. Scores of individual participants were examined and percentages of individuals with beliefs held at a phobic level (in line with Thorpe & Salkovskis, 1995) were compared in the computer anxious and spider phobia groups, and examined in relation to those judged to be most crucial to the experience of spider phobia.

2.2.1.2. Age, and state and trait anxiety scores. First, a one way analysis of variance was performed on age. There was no significant difference between the groups ($F_{2,134} = 1.085$, $p = 0.342$). Second, a one way analysis of variance was performed on state and trait anxiety scores. There was a significant between groups difference in state anxiety scores ($F_{2,142} = 4.933$, $p = 0.008$) and trait anxiety scores ($F_{2,140} = 5.193$, $p = 0.007$). Tukey's test revealed that in the case of trait anxiety scores, there were two homogenous subsets which consisted of: (a) the non anxious and spider phobic and then (b) the spider phobic and the computer anxious, indicating that the spider phobic participants' scores lay between the non-anxious and the computer anxious participants and were not significantly different from either group. For state anxiety scores, Tukey's test revealed that the non anxious group were significantly different to both the computer anxious and the participants with spider phobia. These two latter groups did not differ from each other.

2.2.1.3. Anxiety, avoidance and distress: spiders and computers. Scores derived from the visual analogue scales were subjected to one way analyses of variance. There was a significant between group difference on anxiety scores ($F_{2,168} = 171.07$, $p < 0.0001$), on avoidance scores ($F_{2,167} = 101.79$, $p < 0.0001$) and distress scores ($F_{2,167} = 47.34$, $p < 0.0001$). Tukey's test revealed that the difference in anxiety and distress scores was between the non-anxious group, and both the spider phobic and computer anxious groups, who did not differ from each other. The specific avoidance scores differed in that all groups were significantly different to each other, with spider phobic participants expressing higher levels of avoidance (of spiders) than computer anxious participants (of computers), who in turn were more avoidant than the non-anxious (of computers).

Table 1 shows means of measures of state and trait anxiety, phobic anxiety and phobic avoidance in the 3 groups – in the spider phobics this is related to spiders, in the other two groups to computers. Note that higher state and trait anxiety scores, indicate the more anxiety, where the specific anxiety scores run the other way, so that *lower* scores denote higher anxiety and avoidance.

2.2.1.4. Belief scores. In order to examine the hypothesis that computer anxious people would endorse negative beliefs about computers at a level similar to those found in spider phobia, the number of people endorsing beliefs at this level (in line with Thorpe & Salkovskis, 1995) was calculated for each group (non-anxious,

Table 1
Means of measures of anxiety, avoidance and distress

Group	State anxiety	Trait anxiety	Specific anxiety (computers or spiders)	Avoidance (computers or spiders)	Distress (computers or spiders)
Non anxious	35.65 (8.84)	37.36 (9.51)	86.44 (10.88)	87.36 (18.83)	87.33 (19.18)
Computer anxious	42.24 (9.82)	44.39 (8.49)	36.27 (19.17)	51.00 (31.44)	50.39 (28.14)
Spider phobic	41.94 (15.02)	40.91 (9.63)	40.30 (25.68)	21.82 (21.72)	60.30 (27.66)

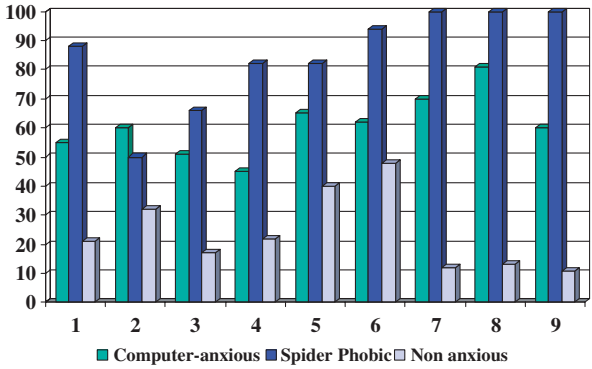

Fig. 1. Percentage of participants endorsing beliefs at phobic level. Legend: I would **1** not stay calm; **2** make a fool of self; **3** not be able to cope; **4** not try deal with it; **5** not slowly lose fear; **6** find someone to help; **7** not be at ease; **8** not feel fine; **9** feel trapped.

computer anxious and spider phobic). Compared to the non-anxious group, a relatively high number of those in the computer anxious group appear to have comparatively high levels of belief that harm will ensue in the presence of computers. Fig. 1 shows the percentage of computer anxious participants who endorsed beliefs held at a phobic level (in line with Thorpe & Salkovskis, 1995), compared with participants in the non computer anxious and spider phobia groups. However, those with spider phobia also endorsed the following beliefs – more specifically concerning the possibility of physical harm – which did not figure in the computer anxious group. These were: I would come to physical harm; go mad; feel faint; lose control of myself; be paralysed; be hysterical; be unable to escape; have a heart attack; scream. It appears that though some core beliefs are shared, they are not those most central to the experience of specific phobia, as discussed by Thorpe and Salkovskis (1995). As a final check on the utility of examining computer anxiety in relation to social/performance anxiety, scores of the computer anxious and spider phobic participants were compared on a single item from the beliefs scale possibly relevant to fear of judgement in the social realm: 'I would find someone to help'. Spider phobic participants were significantly more likely to find someone to help than were the computer anxious ($T_{1,70} = -2.903$. $p = 0.005$).

3. Study 2

The identifying of avoidance and distress in addition to social aspects as salient factors in the experience of anxiety, mirrors research that has been conducted within the social anxiety literature. In the light of the findings from study 1, study 2 was designed to address the question as to whether the beliefs held by those afraid of computers were more akin to those found in social anxiety, performance anxiety or test anxiety than to those found in specific phobia.

3.1. Study 2 Method

3.1.1. Participants

164 Volunteers took part in this study as part of a research participation scheme, of whom 129 were female and 35 male, with a mean age of 22.15 (range 18–43, SD 5.66). All were university students.

3.1.2. Materials

1. Demographic details questionnaire, collecting data about age, sex, extent of previous computing experience (a little experience, a medium amount of experience, a lot of experience) and how confident they felt about using computers.
2. Visual analogue Likert-type scales containing six items rated on a scale of 0–100 where the anchors were 'strongly agree' and 'strongly disagree'. Statements were as follows: 'I always feel anxious when using computers'; 'I go out of my way to avoid computers'; 'It is easy for me to use computers'; 'It is important for me to be able to use computers'; 'My anxiety about computers bothers me'; 'I am more anxious about computers than I should be'. Factor analysis of these items reveals 2 factors: Computer anxiety (5 items) and Importance (1 item) (Brosnan & Rosen, submitted).
3. Liebowitz Social Anxiety Scale (LSAS) (Liebowitz, 1987). Twenty-four items evaluating situations which are difficult for individuals with social phobia. 11 items are concerned with performance anxiety and 13 items with social situations. Each item is rated separately for fear (0–3 none, mild, moderate, severe) and avoidance (0–3 never, occasionally, often, usually) which together provide scores on 4 subscales: performance fear and avoidance, and social fear and avoidance. The scale has good psychometric properties.
4. Phobic beliefs scale (Thorpe & Salkovskis, 1995). See above for details.
5. Test Anxiety Questionnaire (TAQ) Nist and Diahl (1994). This is a short, freely available and widely used questionnaire which consists of ten statements specifically related to test-taking such as 'I feel nauseated before a test', 'I panic before and during a test', 'I remember answers that I blanked on once I get out of the testing situation'. Its psychometric properties have not yet been established.

3.2. Results

3.2.1. Overview

Demographic details relating to sex, amount of experience with computers and confidence in competence were explored. Following this, the relationship between measures of beliefs about harm, coping and disgust, social anxiety and test anxiety were explored using the correlational method. Finally, multiple regression analyses examined the relative contribution of a variety of factors concerning social and performance anxiety to measures of computer anxiety.

3.2.2. Gender differences

Amount of computing experience and confidence in competence were explored. No differences were found between the sexes on amount of experience ($t < 1$) or confidence ($t < 1$).

3.2.3. Anxiety, avoidance, distress and beliefs

First, the relationship between scores on the visual analogue scales was explored in relation to global measures of social anxiety and avoidance, and performance anxiety and avoidance (as measured by the LSAS) and test anxiety (as measured by the TAQ). Overall these scales correlated with all the computer anxiety items but not the importance item. Additionally, test anxiety showed no relationship with computer avoidance. Table 2 shows these results in full.

3.2.4. Beliefs

Next, the relative contribution of the different subscales of the LSAS (performance fear or avoidance and social fear or avoidance), of the TAQ, and of harm and coping cognitions, to computer anxiety, avoidance and distress (as measured by the visual analogue scales pertaining to 'my anxiety about computers bothers me' and 'I am more anxious about computers than I should be') were examined using a stepwise multiple regression. Very few of the variables had any specifically explicative value. Performance fear entered into only one of the models (concerning computer anxiety), social fear only enters two of the models (concerning the variables 'anxiety about computers bothers me' and 'more anxious about computers than I should be') and test anxiety did not enter into any of the models. Beliefs concerning coping and harm appear to be of some importance in predicting the strength of the targeted variables but the amount of variance accounted for varies between 25% and 40%. Results are shown in Table 3.

4. Discussion

The aim of the present study was twofold: to explore the possibility that computer anxiety would be present in levels similar to those found in specific phobia and would reach DSM IV criteria for specific phobia: and having found some evidence to suggest that computer anxiety was akin to social anxiety, the second aim was then to explore the hypothesis that computer anxiety would be related to social/performance/test anxiety.

Results provide tentative support for the claim that computer anxiety could reach clinical levels, that some computer anxious beliefs/cognitions are held in common and at comparable levels to the cognitions of those suffering from a phobia conforming to DSM IV criteria, and that a case may be made for computer anxiety to enter into the framework of problematic fears. The scores of spider phobic and computer anxious groups were similar in respect of computer anxiety and distress, though spider phobics showed a significantly higher level of avoidance of their phobic object than did computer anxious participants. However, several of the cognitions core

Table 2
Relationship between measures of computer items and measures of social/performance anxiety and avoidance and of test anxiety

$N = 164$	Computer anxiety	Computer avoidance	Ease of use	Importance	Bothered by anxiety	More anxious than should be
Performance fear/anxiety	0.340**; $p < 0.0001$	0.158*; $p = 0.022$	−0.329**; $p < 0.0001$	−0.044; $p = 0.288$	0.404**; $p < 0.0001$	0.367**; $p < 0.0001$
Performance avoidance	0.254**; $p = 0.001$	0.221**; $p = 0.003$	−0.247**; $p = 0.001$	−0.039; $p = 0.313$	0.370**; $p < 0.0001$	0.286**; $p = 0.001$
Social fear	0.280**; $p < 0.0001$	0.149*; $p = 0.028$	−0.252**; $p = 0.001$	−0.054 $p = 0.247$	0.418**; $p < 0.0001$	0.342**; $p < 0.0001$
Social avoidance	0.164**; $p = 0.019$	0.153**; $p = 0.027$	−0.173**; $p = 0.015$	−0.052; $p = 0.256$	0.278**; $p < 0.0001$	0.206**; $p = 0.005$
TAQ	0.192*; $p = 0.014$	0.037; $p = 0.638$	−0.194*; $p = 0.014$	0.067; $p = 0.394$	0.358*; $p < 0.0001$	0.297**; $p < 0.0001$

Table 3
Multiple regression: models for measures of computer related anxiety

Target variables, predictor variables in order of entry to model		Cumulative % variance explained by variables
Computer anxiety		
1st: Coping cognitions	$F_{1,154} = 43.50$, $p < 0.0005$	21
2nd: Performance fear	$F_{2,153} = 25.87$, $p < 0.0005$	25
Computer avoidance		
1st: Coping cognitions	$F_{1,154} = 54.95$, $p < 0.0005$	26
Anxiety about computers bothers me		
1st: Harm cognitions	$F_{1,154} = 56.36$, $p < 0.0005$	26
2nd: Coping cognitions	$F_{2,153} = 45.95$, $p < 0.0005$	37
3rd: Social fear	$F_{3,152} = 35.58$, $p < 0.0005$	40
More anxious about computers than I should be		
1st: Coping cognitions	$F_{1,154} = 80.93$, $p < 0.0005$	34
2nd: Social fear	$F_{2,153} = 48.32$, $p < 0.0005$	38
3rd: Harm cognitions	$F_{3,152} = 35.22$, $p < 0.0005$	40

to the experience of (in this case) spider phobia (I would come to physical harm; go mad; feel faint; lose control of myself; be paralysed and so on) were not found in the computer anxious participants. Examination of individual cognitions revealed that the kinds of concerns being expressed were more akin to those commonly associated with social or performance anxiety ('I would make a fool of myself') than to specific phobia ('I would scream', 'I would become hysterical'). In further support of this claim, George and Camarata (1996), in an examination of anxiety in teaching staff who were required to use computing, suggest "the cyberanxious instructor who seeks isolation from the group is not rejecting the learning or even the technology, but rather more than likely attempting to avoid the scrutiny and possible disapproval of (presumably more informed/experienced) peers and students alike" (p. 49).

Following on from this, the second study explored the relationship between the six measures of computer anxiety, social anxiety/avoidance, and test anxiety. Social and performance anxiety and avoidance were significantly related to all the measures of computer anxiety, but not to whether or not the use of a computer held any importance for the respondent. Test anxiety was not significantly related to this variable also, and in addition was not related to the measure of computer avoidance.

The relative contribution of beliefs, social fear, social avoidance, performance fear, performance avoidance and test anxiety to measures of specific computer anxiety, avoidance and distress was investigated using multiple regression. This revealed that of all the possible variables, beliefs concerning (in)ability to cope were most central to the experience of computer anxiety, while social fear, performance fear and beliefs relating to harm were differentially important to the amount of anxiety, avoidance and distress experienced. It may be that in the pantheon of phobias, computer anxiety (at a phobic level) may be best understood under the aegis of social, rather than specific, phobia, sharing as it does some concerns particular to that disorder (Clark & Wells, 1995).

So the perception of ability to stay calm, feel at ease and be able to cope with a situation rather than anything inherently threatening in the situation itself seems to be implicated in the framework of computer anxiety. According to Beck (1976) the perceived ability to cope multiplied by rescue factors mediates the amount of distress and perception of danger in the formation of anxiety. It is therefore of interest to note that computer anxiety seems to be somewhat dependant on the individual's perception of their ability to cope.

This study is exploratory and suffers from limitations, the most obvious of which are the scales used to differentiate computer anxious people from non anxious people, which – though derived from DSM IV criteria – are no substitute for a diagnostic interview. These scales also suffered by being marginally different in their wording depending on whether they were being addressed to participants with spider phobia or with computer anxiety. The renders them open to criticism as statistically comparable for the two groups.

The question also remains as to whether this problem will remain one worthy of study, as computers (and other types of technology) become ever more ubiquitous. As children begin to use new technologies from the beginning, will this problem naturally fade along with universal usage? The evidence suggests that it will not: young children today report similar levels of computer anxiety (Brosnan, 1998d, 1999b): after all, despite universal education and the omnipresence of the written word, illiteracy rates remained at around 4.8% in the USA as recently as 1973 (Vogt, 1973). The evidence from research in social phobia suggests that computer anxiety will remain a problem in a small minority, but for this subgroup the fear will be disadvantageous in a similar way to those who are afraid of writing in public, or who cannot read and are afraid of beginning to try (e.g., Johnson, Shenoy, & Gilmore, 1982; Martin, 1997).

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