PERGAMON

Computers in Human Behavior 16 (2000) 575–590

Computers in Human Behavior

www.elsevier.com/locate/comphumbeh

Computer training, frequency of usage and burnout: the moderating role of computer self-efficacy

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Abstract

The main aim of this paper is to test the moderating role of computer self-efficacy in the relationship among computer training, frequency of usage and burnout (i.e. exhaustion and cynicism). The sample was made up of 140 workers using computer-aided technology in their jobs. Hierarchical multiple regression analyses were carried out. Results show that frequency of usage and computer training are positively associated with computer self-efficacy. Futhermore, we found interaction effects between computer training×computer self-efficacy on both indicators of burnout as outcomes. Computer self-efficacy moderated the relationship between computer training and burnout. Limitations of the study and practical implications of these findings are discussed.

Keywords: Computer training; Frequency of usage; Computer self-efficacy; Burnout

1. Introduction

Computer-aided technology is becoming increasingly prevalent in the workplace. In fact, its initial introduction and continuos implementation is commonplace in firms fighting for survival in such a competitive world. However, although the main aim of the use of this technology is to improve work and company performance, its implementation can have negative consequences on workers' health, which need to be controlled. With regard to this, recent empirical work on the effects of computer-aided technology has found that exposure to this technology may have both positive and negative influences on users' mental health.

Most studies agree that high exposure to technology (i.e. frequency of usage, computer training, computer game experiences, etc.) is related to a decrease in

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0747-5632/00/$ - see front matter
PII: S0747-5632(00)00028-5

anxiety (Bohlin & Hunt, 1995; Colley, Brodzinski, Scherer & Jones, 1994; Crable, Brodzinksi, Sherer & Jones, 1994; Igbaria & Chakrabarti, 1990; Jones & Wall, 1990; Kalimo & Lepeenen, 1985; Kay, 1990; Okebukola, Smith, Caputi & Rawstorne, 2000; Okebukola, Summamopouw & Jegede, 1992; Todman & Monaghan, 1994).

However, other studies stress that the mere exposure to technology is not responsible per se for its consequences on users' health. Instead, types of exposure and mediating variables (such as job characteristics and appraisal of exposure) influence their mental health (Chua, Chen & Wong, 1999; Korunka & Vitouch, 1999; Leso & Peck, 1992; Majchrzak & Borys, 1998; Rousseau, Jamieson, Rogers, Mead & Sit, 1998; Salanova & Schaufeli, 2000; Woodrow, 1991).

It seems, therefore, that the relationship between technology exposure and workers' well-being is complex. Related to this, Salanova and Schaufeli (2000) in a study on technology exposure and burnout in 202 Spanish workers using computer-aided technology, found that types of exposure (time and frequency of usage) do not have a direct effect on burnout, as it depends on the user's appraisal of the exposure. In this study, the authors found by using Structural Equation Modelling (SEM), that neither time nor frequency had a direct effect on burnout (i.e. exhaustion and cynicism) but rather that it was mediated by appraisal. Nevertheless, results of meta-analysis of the correlates of computer anxiety carried out by Chua et al. (1999) show that computer anxiety is inversely related to computer experience, but the evidence for the strength of this relationship remains inconclusive. These results show that exposure to computers can reduce computer anxiety, although that depends on the type of exposure. For example, participation in a programming course did not reduce computer anxiety (Leso & Peck, 1992; Woodrow, 1991). Smith, Caputi and Rawstorne (2000) found that the amount of computer experience and opportunity to use computers had a significant negative correlation with anxiety/frustration and negative performance appraisal, and a significant positive correlation with autonomy and enjoyment/uselfulness. Also, training had a significant negative correlation with computer anxiety. So far, it seems that more research on types of exposure is needed in order to clarify the relationship between technology exposure and users' well-being. To this end, the present study takes two types of technology exposure into account, i.e. frequency of usage and computer training. These are the most frequently used measures of exposure according to Chua et al., Salanova and Schaufeli, and Torkzadeh, Pflughoeft and Hall (1999).

Moreover, recent research on computer-aided technology has stressed the relevant role played by computer self-efficacy. Based on Bandura's (1982, 1986, 1997) theory of self-efficacy, it follows that the easier a system is to use, the greater one's perception of self-efficacy and personal control over computer-related knowledge and skills should be. Bandura (1986, p. 391) defines self-efficacy as a "generative capability in which cognitive, social, and behavioral subskills must be organized into integrated courses of action to serve innumerable purpose". Murphy, Coover and Owen (1989) define computer self-efficacy as one's perception of one's capabilities regarding specific computer-related knowledge and skills. According to Bandura (1986) one's self-efficacy beliefs significantly determine performance outcomes, and are not necessarily determined by the underlying skills that one possesses with regard to the task.

For example, even a computer-proficient individual might perform a job poorly and quit at the first sign of difficulty, or avoid computer usage, because he or she lacks the confidence that comes from self-efficacy beliefs. Studies have shown that self-efficacy influences choice of behavioural activities, effort expenditure, persistence, and task performance (Multon, Brown & Lent, 1991).

However, research on types of exposure and self-efficacy is still inconclusive. For instance, Coffin and MacIntyre (1999) found that previous experience with computers was an important factor in determining self-efficacy with regard to computers. More specifically the results show that as students gain more experience with computers their perceptions of computer-related self-efficacy increase. On the other hand, taking into account time of system usage, Rousseau et al. (1998) found that perceived efficacy with the system was not simply a function of the technology exposure (i.e. number of times the system had been used) and it appears that technology exposure is a necessary but not sufficient condition for expertise. They conclude that since merely exposing people to the system does not increase perceived efficacy, training people how to use the more advanced commands could improve their search skills. Through training, users may become both more proficient and efficient. Regarding this, Torkzadeh et al. (1999) showed that computer training significantly improved the computer self-efficacy of respondents. Respondents entered computer training with moderate level of computer self-efficacy and that after the computer training, students' self-efficacy level significantly improved. Also Smith et al. (2000), found that computer confidence had a significant positive correlation with previous training/education in a sample of 179 psychology undergraduate students. However, despite the fact that most of the studies use computer self-efficacy as an outcome variable, research has shown that self-efficacy is also an important moderating variable in the stress process (Bandura, 1997; Grau, Salanova & Peiró, 2000; Jex & Bliese, 1999; Schwarzer, 1999; Speier & Frese, 1997). In the present study we include "computer training", "frequency of usage" and "computer self-efficacy" in order to clarify their relationships using computer self-efficacy both as outcome and moderating variable.

The literature also suggests gender and age differences in computer self-efficacy. Hence, these variables could have a confounding effect in the relationships between technology exposure and computer self-efficacy. Generally speaking, research has found that males have significantly higher computer self-efficacy than females (Carlson & Grabowski, 1992; Hattie, 1990; Jorde-Bloom, 1988; Miura, 1987). However, some studies found no significant differences in gender computer self-efficacy (Torkzadeh et al., 1999; Loyd & Gressard, 1984; Lewis, 1985), and other studies found that the gender differences depend on the complexity of the task. Results show that men report higher levels of self-efficacy for complex tasks, but not for simple tasks (Busch, 1995; Murphy et al., 1989; Torkzadeh & Koufterous, 1994).

Regarding age, there has been little examination of the psychological effects of computerization between age groups (Birdi & Zapf, 1997). The evidence concerning the relationship between age and computer self-efficacy is not direct but rather indirect. So far, evidence indicates that computer-based tasks may be stressful for older people, though hardware design, job demands and a lack of computer

experience prove too much for their capabilities (Czaja & Sharit, 1993; Salthouse, 1991; Warr, 1994). As we mentioned before, experience with computers has been stressed as an important predictor of the extent of ease felt towards computers and related to computer anxiety (Chua et al., 1999). This lack of computer experience can make older people more apprehensive about computers (Bandalos & Benson, 1990). Also, research stresses that older people have a general negative affective orientation to new technology and higher error production (Birdi & Zapf, 1997; Birdi, Pennington & Zapf, 1997). Regarding the production of errors and having negative experiences on specific task, Bandura's (1982, 1986, 1997) social cognitive theory stresses that the most influential source of self-efficacy beliefs is the interpreted outcome of one's purposive performance or mastery experience. Individuals gauge the effects of their actions, and their interpretations of these effects help create their efficacy beliefs. Outcomes interpreted as successful raise self-efficacy, those interpreted as erroneous lower it. In summary, each of these factors mentioned are indirect evidence on age differences in computer self-efficacy, and may contribute to adverse consequences in computer self-efficacy of older workers compared with younger ones when faced with computer tasks.

Finally we use "professional burnout" as outcome measure that is supposedly related to frequency of usage and computer training. Burnout was originally almost exclusively studied in human services (for reviews see Lee & Ashforth, 1996; Schaufeli & Enzmann, 1998), but recently a shift towards other occupational fields has occurred. An important impulse comes from a recently developed self-report questionnaire that can be used to assess burnout outside the human services: the Maslach Burnout Inventory-General Survey (MBI-GS; Schaufeli, Leiter, Maslach & Jackson, 1996). Analogously to the original MBI-Human Services Survey (Maslach & Jackson, 1986) the MBI-GS contains three subscales: exhaustion (i.e. the draining of energy due to excessive efforts spend at work); cynicism (i.e. an indifferent, detached, and distant attitude towards one's work); and professional efficacy (i.e. a sense of accomplishment and job competence). High levels of exhaustion and cynicism and low levels of professional efficacy are indicative of burnout.

Burnout not only includes an affective response (i.e. exhaustion) that is similar to an orthodox job strain variable, but it also includes a cynical and skeptical attitude towards work as well as an evaluation of one's efficacy at the job. Hence, it offers the possibility of studying the relationships with three different aspects of worker's health and well-being: strain, negative job attitude, and perceived level of competence. In the present study, we will focus on the first two dimensions of burnout (i.e. exhaustion and cynicism) as indicators of burnout. These dimensions are considered the "core of burnout" (Green, Walkey & Taylor, 1991, p. 463). In addition to this, Leiter's (1993) theoretical model assumes that the third component of burnout — professional efficacy — develops largely independently from exhaustion and cynicism. The results from a recent meta-analysis confirm the independent role of professional efficacy (De Rijk, Le Blanc, Schaufeli & de Jonge, 1998). It has been suggested that professional efficacy reflects a personality characteristic akin to self-efficacy rather than a genuine component of burnout reaction (Cordes & Dougherty, 1993). On the other hand, only two studies have been conducted on computer-aided

technology and burnout (Salanova & Schaufeli, 2000; Schaufeli, Keijsers & Reis Miranda, 1995). In the first study among ICU-nurses, a positive relationship was found between burnout and technology usage (in this case, complex mechanical ventilation equipment). In the last study it was found that appraisal of computer experience had a mediating role between frequency and time of use, and burnout. However, more studies about different types of technology exposure are needed in order to clarify its relation with burnout.

The aim of the present study is to test the moderating role of computer self-efficacy in the relationship between types of technology exposure (i.e. frequency of usage and computer training) and levels of burnout (i.e. exhaustion and cynicism). Specifically our hypotheses are:

- *Hypothesis 1*: We expect that frequency of usage and computer training will be positively associated with computer self-efficacy, after controlling for age and gender.
- *Hypothesis 2*: We expect an interaction effect between types of technology exposure (i.e. frequency of usage and computer training) and computer self-efficacy on levels of exhaustion. Workers with low computer self-efficacy will have an increased level of exhaustion when frequency of usage and computer training are high. Workers with high computer self-efficacy will experience a decrease in theirs levels of exhaustion when frequency of usage and computer training are high.
- *Hypothesis 3*: We expect an interaction effect between types of technology exposure (i.e. frequency of usage and computer training) and computer self-efficacy on levels of cynicism. Workers with low computer self-efficacy will have an increased level of cynicism when frequency of usage and computer training are high. Workers with high computer self-efficacy will show a decrease in theirs levels of cynicism when frequency of usage and computer training are high.

2. Method

2.1. Procedure and participants

The sample was made up of 140 workers (64 females [46%] and 76 males [54%]) from five different Spanish companies from the tile sector and public administration. Ninety-five participants of the study belonged to the three companies from the tile sector and 45 to the two offices in the public sector. Their work consisted of jobs such as sales, administration, production line, computers and customer orientation. The main occupational groups were production (11%), laboratory (13%), administration and clerical jobs (which include Computer Department, Human Resources Department, Accounting and Finance Department — 47%), sales (15%) and customer orientation (14%). The common characteristic throughout the sample was that they all used computer-aided technology in their jobs. Most of the workers used

computing tools such as word processors, or other software — 91%. The other 9% used Advanced Manufacturing Technology (AMT) (i.e. computer-aided design [CAD], and computer numerical control [CNC]). Ages ranged from 20 to 56 years; the mean age of the sample was 32.8 years (S.D. = 8.05).

Subjects were asked to answer a set of self-report questionnaires. Risk prevention experts in each firm were made responsible for the distribution of the questionnaires, which were delivered in an envelope. A covering letter explained the purpose of the study, that participation in the study was voluntary, and confidentiality guaranteed. Respondents were asked to return filled questionnaires inside the sealed envelope either to the person who had distributed them or directly to the research team.

2.2. Measures

2.2.1. Types of technology exposure

We used two types: frequency of usage and computer training. The frequency of usage was measured by asking workers the percentage of time per week (from 0 to 100) that they were using computer-aided technology at work. Afterwards the variable was transformed to range from 0 to 10 in order to fit in with the range of the other variables in the study. Computer training was measured by asking workers if they had had specific training regarding the computer-aided technology that they were using.

2.2.2. Computer self-efficacy

Computer self-efficacy was assessed by a self-constructed scale and validated in a previous study (Beas, Agut, Salanova & Grau, 1999). An example of one item is "I feel very competent using computer aided technology". The alpha coefficient of the scale was 0.79.

2.2.3. Burnout

Burnout was assessed on two MBI-GS subscales (Schaufeli et al. 1996): exhaustion (five items) (e.g. "I feel emotionally drained by my work"), and cynicism (four items) (e.g. "I have become more cynical about whether my work contributes anything"). Item 13 from cynicism sub-scale was deleted because of its insufficient factorial validity shown in other studies (Leiter & Schaufeli, 1996; Salanova & Schaufeli, 2000; Schaufeli et al., 1995; Shutte, Toppinen, Kalimo & Schaufeli, 2000). Shutte et al. stressed that this item should be removed in order to increase the internal consistency beyond the criterion of 0.70. This might be caused by the ambivalence of the particular item ("I just want to do my job and not be bothered"). Alpha coefficients of 0.89 for exhaustion and 0.87 for cynicism were reported.

2.3. Data analysis

Hierarchical multiple regression analysis was carried out in order to test the hypothesis of this study. The first regression analysis was performed in order to test the main effects of types of technology exposure (frequency of usage and computer

training) on computer self-efficacy. Further hierarchical multiple regression analysis were performed to detect main effects and interaction effects of types of technology exposure (frequency and training) and the moderator (computer self-efficacy) on each of the two burnout scales. Cross-product terms of standardized independent variables were computed in order to test interaction effects (cf. Cohen & Cohen, 1983; Kleinbaum, Kupper & Muller, 1988).

3. Results

Table 1 shows the empirical ranges, means, standard deviations, alpha coefficients and zero-order correlation of the studied variables. The alpha coefficients are sufficiently internally consistent since Cronbach's alpha (α) meets the criterion of 0.70 (Nunnaly, 1978). Further zero-order correlations were performed to control for gender and age. Regarding gender, results do not differ with and without controlling for gender with the exception of the correlation between computer self-efficacy and cynicism. The correlation coefficient increased from $r = -0.13$ (n.s.) to $r = -0.17$ ($P < 0.05$) when controlling for gender. Finally, controlling for age, also the correlation coefficients are similar except for the correlation between computer training and computer self-efficacy. The correlation coefficient increased from $r = 0.07$ (n.s.) to $r = 0.24$ ($P < 0.01$) when controlling for age.

3.1. Regression analysis

3.1.1. Computer self-efficacy

In order to test hypothesis 1, the independent variables were entered into the regression equation in two successive steps (Table 2). In the first step, age was entered to control for possible confusing effects due to the significant correlation coefficient ($r = -0.42$, $P < 0.01$) between age and computer self-efficacy (i.e. the criterion in this regression equation). In the second step, frequency of usage and computer training

Table 1
Range, means, standard deviations, internal consistencies (Cronbach's α) and zero-order correlations ($n = 140$)

Variable	Range	*M*	DT	Alpha	2	3	4	5	6	7
1. Age	20–56	32.8	8.05	–	−0.23**	−0.15	0.32**	−0.42**	0.02	0.11
2. Gender	1–2	1.4	0.50	–	–	0.28**	−0.01	0.09	0.06	0.13
3. Frequency of usage	0–10	6.2	2.70	–	–	–	−0.09	0.20*	0.06	0.04
4. Computer training	1–2	1.5	0.49	–	–	–	–	0.07	0.05	0.06
5. Computer self-efficacy	1–7	5.6	1.02	0.79	–	–	–	–	−0.17*	−0.13
6. Exhaustion	0–6	1.8	1.02	0.82	–	–	–	–	–	0.54**
7. Cynicism	0–6	1.2	1.23	0.86	–	–	–	–	–	–

*$P < 0.05$.
**$P < 0.01$.

Table 2
Hierarchical multiple regression analysis of types of technology exposure on computer self-efficacy ($n = 140$)[a]

	B	R^2 change
1. Age	−0.47***	0.17***
2. Frequency of usage	0.15*	0.07**
Computer training	0.23**	
Multiple R	0.50	
R^2	0.24	
F	14.14***	

[a] The B values are the coefficients from the final stage of the regression analysis; due to rounding off, R^2 differs 0.01 from the sum of R^2 change.
*$P \leqslant 0.05$.
**$P \leqslant 0.01$.
***$P \leqslant 0.001$.

were entered. In order to interpret the a priori standardized variables as correctly as possible, nonstandardised regression coefficients were performed.

A significant multivariate test value was found. The results show that both frequency of usage and computer training are positively associated with computer self-efficacy, and supported the first hypothesis.

3.1.2. Burnout

The independent variables were entered into the regression equation in four successive steps. In the first step, (1) frequency of usage and computer training, (2) the moderator (computer self-efficacy), (3) the two-way interaction term (frequency×moderator and training×moderator, and (4) the three-way interaction term (frequency×training×moderator) were entered, respectively. In total, two hierarchical multiple regression analysis (i.e. by exhaustion and cynicism) were performed. The significant interaction effects are graphically shown. Following Cohen and Cohen (1983) and Jaccard, Turrisi and Wan (1990) regression lines were performed separately from the regression equation, in order to show the relationship between types of technology exposure and burnout dimensions in high levels (+1 S.D.) and low levels (−1 S.D.) of the modulator variable.

3.1.3. Exhaustion

A hierarchical multiple regression analysis was performed on exhaustion as a dependent variable (Table 3). No significant values (but close to being significant) in the multivariate test were found ($F = 2.00$, $P = 0.09$). An interaction effect between computer training and computer self-efficacy was significant ($P = 0.04$) which was not the case of the interaction between frequency of usage and computer self-efficacy. So far, although this regression model was not significant, we found a specific interaction effect. Thus in one way, our second hypothesis is supported for one type of technology exposure (i.e. computer training).

Table 3
Hierarchical multiple regression analysis of types of technology exposure and computer self-efficacy on exhaustion ($n = 140$)[a]

Moderator	Computer self-efficacy	
	B	R^2 change
1. Frequency of usage	0.01	0.01
Computer training	0.91*	
2. Moderator	0.03	0.04*
3. Frequency×moderator	0.09	0.04
Training×moderator	−0.93*	
4. Frequency×training×moderator	0.001	0.01
Multiple *R*	0.28	
R^2	0.08	
F	2.00	

[a] The *B* values are the coefficients from the final stage of the regression analysis; due to rounding off, R^2 differs 0.01 from the sum of R^2 change.
*$P < 0.05$.

The significant interaction effect of computer training and computer self-efficacy is graphically represented in Fig. 1, following the method recommended by Aiken and West (1991) and Jaccard et al. (1990). Values for the moderator were chosen 1 S.D. below and above the mean. Entering these values in the regression equation generated simple regression lines. The results for workers with low computer self-efficacy (1 S.D. below the mean score) showed that when computer training is high their levels of exhaustion increase. A different picture was shown for workers scoring high in computer self-efficacy (1 S.D. above the mean score). In this case, high levels of computer training were associated with a decrease in exhaustion.

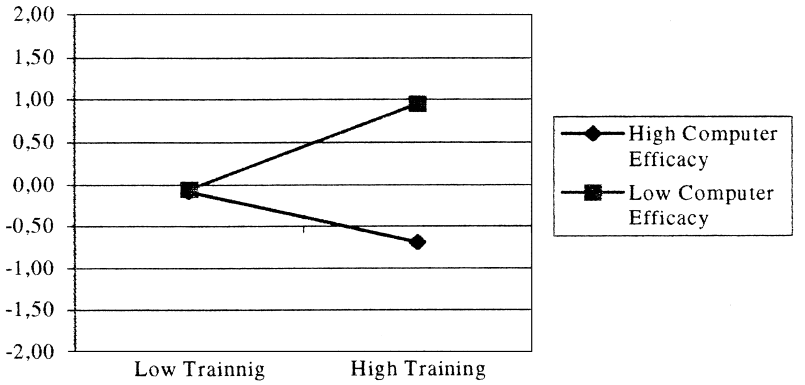

Fig. 1. Two-way interaction effect of computer training and computer self-efficacy on exhaustion (levels of exhaustion on *y*-axis).

3.1.4. Cynicism

In order to test hypothesis 3, a new hierarchical multiple regression analysis was performed on cynicism as a dependent variable (Table 4). In the first step, gender was entered to control for possible confusing effects due to the significant partial correlation coefficient ($r = -0.17$, $P < 0.05$) found between gender and cynicism (i.e. the criterion in this regression equation). A significant multivariate coefficient (test) was found. Results show that computer training and computer self-efficacy have a significant interaction effect on cynicism, and thus, our third hypothesis was supported for computer training. Moreover, computer training was positively associated with cynicism, while frequency of usage and self-efficacy did not have a significant main effect.

The significant interaction effect of computer training and computer self-efficacy is graphically represented in Fig. 2. In the same way as for exhaustion, the results for workers who have low computer self-efficacy (1 S.D. below the mean score) showed that their levels of cynicism increase when computer training is high. A different picture was shown for workers with high computer self-efficacy (1 S.D. above the mean score). For these workers, a high level of computer training was associated with a decrease in cynicism.

4. Discussion

The current study investigated the moderating role of computer self-efficacy in the relationship between types of technology exposure (i.e. frequency of usage and computer training) and burnout (i.e. exhaustion and cynicism). We expected

Table 4
Hierarchical multiple regression analysis of types of technology exposure and computer self-efficacy on cynicism ($n = 140$)[a]

Moderator	Computer self-efficacy	
	B	R^2 change
1. Gender	0.09	0.02
2. Frequency of usage	−0.15	0.01
Computer training	1.43***	
3. Moderator	0.07	0.03*
4. Frequency×moderator	0.40	0.10***
Training×moderator	−1.60***	
5. Frequency×training×moderator	0.20	0.01
Multiple *R*	0.41	
R^2	0.17	
F	3.75***	

[a] The *B* values are the coefficients from the final stage of the regression analysis; due to rounding off, R^2 differs 0.01 from the sum of R^2 change.

*$P < 0.05$.

***$P < 0.001$.

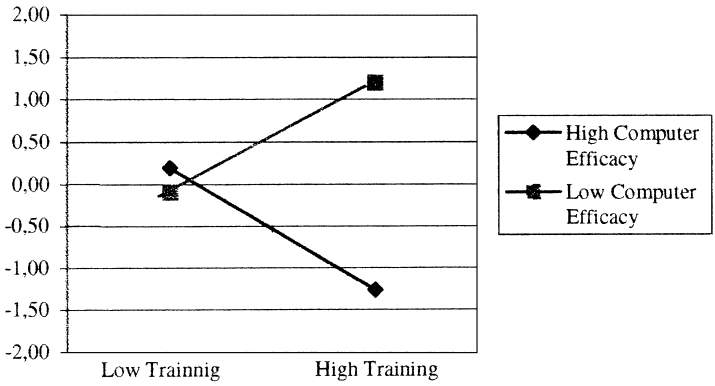

Fig. 2. Two-way interaction effect of computer training and computer self-efficacy on cynicism (levels of cynicism on y-axis).

interaction effects between types of technology exposure and computer self-efficacy on burnout. Results supported our hypothesis for computer training, but not for frequency of usage. Workers with low computer self-efficacy showed an increase in their burnout levels (i.e. exhaustion and cynicism) when computer training is high. Workers with high computer self-efficacy showed a decrease in their burnout levels when computer training was high. In this respect, our results support the idea that the effects of technology exposure on affective outcomes are better explained when different types of exposure were taken into account (i.e. frequency of usage and participation in training courses, in our study) and the intervening role of psychosocial variables (i.e. computer self-efficacy).

The present study supports the results of previous research which points out that the effect of technology exposure on affect outcomes depends on the different types of exposure (Chua et al., 1999; Korunka & Vitouch, 1999; Leso & Peck, 1992; Majchrzak & Borys, 1998; Rousseau et al., 1998; Salanova & Schaufeli, 2000; Woodrow, 1991). Generally speaking, results show that the relationships between technology exposure and burnout were only found under a certain "type" of technology exposure. Hence, more frequency of usage was not associated with burnout, while computer training was associated with an increase in burnout (but only in the case of low self-efficacy). When workers have more computer training they feel more burnout as a result of their jobs. However, the hierarchical multiple regression analysis on technology exposure (i.e. frequency of usage and computer training) as predictors and self-efficacy as criterion, showed that both frequency and training increase levels of workers' self-efficacy. These results correspond with those of Coffin and McIntyre (1999), Murphy et al. (1989), Rousseau et al. (1998) and Torkzadeh et al. (1999). They found that technology exposure is positively associated with increasing computer self-efficacy. However, it works in a different way in the case of burnout (as a criterion variable) and its relationship to technology exposure indicators. Regarding frequency of usage, previous research (Salanova & Schaufeli, 2000) has shown that there is not a direct effect between time and frequency of usage on

burnout, but depends on appraisal of technology experience as a mediating variable. However, as far as we know, there are no previous studies that investigate the relationship between computer training and burnout. In this vein, our results show that more computer training is associated with more burnout, but only when workers have a low computer self-efficacy.

At first glance, ours results could be a result of ineffective computer training, or due to workers having negative appraisal of their training experiences. It seems that computer training could be a stressful situation for workers. However, our results also show that computer training does not have a significant correlation with both dimensions of burnout but it is positively related to computer self-efficacy (when controlling for age). We also found interaction effects of computer training and computer self-efficacy on both dimensions of burnout. In this way, workers low in computer self-efficacy showed that when computer training is high, their levels of burnout increase. On the other hand, for workers who are high in computer self-efficacy the opposite effect was found: high computer self-efficacy tended to decrease burnout as a result of computer training. Thus, this study shows that computer self-efficacy acts as a stress buffer, as it attenuates possible burnout resulting from computer training. These results support Bandura's (1982, 1997) theory of self-efficacy and the moderating role of self-efficacy in the stress process (Bandura, 1997; Grau et al., 2000; Jex & Bliese, 1999; Schwarzer, 1999; Speier & Frese, 1997). Therefore, people with high level of computer self-efficacy will even experience a drop in burnout level when they participate in training courses.

4.1. Limitations

The main limitation of this study is the use of a cross-sectional design. This methodology implies the results need to be interpreted with caution, as no causal inferences should be made. However, some longitudinal studies have shown that types of exposure had causal predominant relationships with affective outcomes in the same way as in our study. Hence, the outcomes tended to occur after types of exposure (Chua et al., 1999). In our regression models, types of exposure appear as predictors, and outcomes (i.e. burnout and self-efficacy) as criteria.

4.2. The "return effect" of computer self-efficacy and recommendations

Regarding computer self-efficacy, our results show a "*return effect*" between computer training — computer self-efficacy — and computer training, again. Computer training seems to increase computer self-efficacy (when it is controlled for age). Furthermore, workers with computer training and more computer self-efficacy will have a lower level of burnout than those with low levels of computer self-efficacy. For this last group, the experience of computer training could be very stressful and even increase their previous levels of burnout.

Computer training is one of the strategies most commonly used by the companies when faced with the need to make changes, specifically those related to the implementation of computer-aided technology, in order to control potential stressors

(Salanova, Cifre & Martín, 1999). As Salanova and Grau (1999) point out, a prospective approach to the training process is needed in order to face technological change. In this way, according to our results which show that computer training is a relevant variable to explain affective workers outcomes, researchers should test different indicators of computer training (i.e. types of courses, hours of courses, training design, etc.) and the relationships with affective and cognitive outcomes in order to plan the training courses properly. In this way, the current study shows that a suitable approach for burnout prevention among workers using computer-aided technology is to increase the computer self-efficacy *before* the computer training. Trainers and designers of computer training should take into account the previous level of computer self-efficacy of trainees in order to guarantee the success of computer training and avoid increasing the post-training levels of burnout. Even during the first stages of computer training it would be possible to enhance self-efficacy. To achieve this aim, training should include a variety of components which are consistent with theoretical cues for self-efficacy building (Bandura, 1986, 1997). These clues include role-plays to provide successful experiences (enactive mastery), models of performance (vicarious experiences), coaching and encouragement (verbal persuasion) and reducing the emotional threats of rejection (managing physiological states).

Acknowledgements

The authors wish to thank Wilmar B. Schaufeli for his useful comments on an earlier draft of this paper. The research was made possible with the help of a grant from Bancaixa and Jaume I University (#P1B98-10).

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