APPLIED PSYCHOLOGY

APPLIED PSYCHOLOGY: AN INTERNATIONAL REVIEW, 2009, *58* (4), 622–652
doi: 10.1111/j.1464-0597.2008.00367.x

The Stress-Buffering Effects of Control on Task Satisfaction and Perceived Goal Attainment: An Experimental Study of the Moderating Influence of Desire for Control

Stacey L. Parker* and Nerina L. Jimmieson
The University of Queensland, Australia

Catherine E. Amiot
University of Quebec at Montreal, Canada

The purpose of the present study was to examine the extent to which Desire for Control (DFC) interacts with experimental manipulations of demand and control, and the consequences of these interactions on task satisfaction and perceived goal attainment (i.e. task performance and task mastery). It was expected that the proposed stress-buffering effects of control would be evident only for individuals high in DFC. Moreover, it was anticipated that control may have a stress-exacerbating effect for those low in DFC. These hypotheses were tested on a sample of 137 first year psychology students who participated in an in-basket activity under low and high conditions of demand and control. Results revealed that the proposed stress-buffering effect of control was found only for those high in DFC and a stress-exacerbating effect of increased control was evident for those low in DFC on task performance and task mastery perceptions. Future research directions and the implications of these findings to applied settings are discussed.

Cette recherche avait pour objet de voir dans quelle mesure le besoin de maîtriser la situation (DFC) interagit avec des manipulations expérimentales portant sur les exigences et le contrôle, ainsi que d'observer les conséquences de ces interactions sur la satisfaction liée à la tâche et à la réussite perçue (relative à la performance et à la maîtrise de la tâche). On a fait l'hypothèse que seuls les individus présentant un haut niveau de DFC verraient leur stress atténué par la possibilité de maîtriser la situation. En outre, on pensait que la maîtrise de la situation pouvait accroître le stress de ceux ayant un faible niveau de DFC. Ces hypothèses ont été mises à l'épreuve sur un échantillon

* Address for correspondence: Stacey L. Parker, School of Psychology, The University of Queensland, St Lucia, QLD, 4072, Australia. Email: s.parker@psy.uq.edu.au
The authors would like to thank Rhiannon L. Powers for her assistance with data collection.

de 137 étudiants de première année de psychologie qui subirent un in-basket test dans des conditions de haut et de bas niveaux d'exigence et de contrôle. Les résultats montrent que l'atténuation du stress par la maîtrise de la situation n'existe que pour les hauts niveaux de DFC, alors qu'une maîtrise accrue stimule le stress chez les bas niveaux, aussi bien sur la perception de la performance que sur celle de la domination de la tâche. On propose des orientations pour de futures recherches et l'on réfléchit aux retombées de ces résultats sur la vie pratique.

INTRODUCTION

In Sutherland and Cooper's (2000) review of "hot spots" for occupational stress, issues of time pressure, longer working hours, and role overload were identified as primary work-related stressors. Role overload occurs when an individual feels pressured by excessive workloads, difficult deadlines, and a general inability to fulfill organisational expectations in the time available (Peterson, Smith, Akande, & Ayestaran, 1995). It is maintained that role overload has extensive negative implications for organisational effectiveness in terms of job performance, injury, absenteeism, and turnover (see Karasek & Theorell, 1990; Sutherland & Cooper, 2000). Such stressors also have been shown to have an impact on a range of physical and psychological health outcomes (see Van der Doef & Maes, 1998, 1999). Karasek's (1979) Demand-Control Model (D-CM) was an early and very influential examination of work-related strain that examined the effects of role overload as an external demand in the stressor-strain process. However, there is inconsistent support for the model's interactive effects. The purpose of this study is to examine ways in which to best utilise control as a buffer of demands, with a specific focus on dispositional desire for control as a potential moderating variable within the D-CM.

Demand-Control Model (D-CM) of Work Strain

Essentially, within the D-CM, work-related strain and productive workplace behavior are predicted by two job characteristics: demand and control. Originally entitled the Demands-Decision Latitude Model (Karasek, 1979), the construct of decision latitude has now been reformulated as a broader construct of work control (Ganster, 1989; Ganster & Fusilier, 1989; Karasek & Theorell, 1990). Within the D-CM, demand relates to the total work expected or the total impact of requests, whereas control represents the actual or perceived ability to influence those workplace demands. The four quadrants of the model are as follows: (1) jobs high in demand and high in control are described as active jobs, whereas (2) jobs low in demand and low in control are described as passive jobs, (3) low strain jobs are those low in demand and high in control, whereas (4) high strain jobs are those high in

demand and low in control. According to Karasek, the most negative consequences for workers are associated with high strain jobs. The model proposes that the combined effects of high job demand and low control create negative emotions and associated physiological stress reactions that adversely affect health in the long term. However, within active jobs (i.e. high demands and high control), the negative effect of demand on adjustment and health outcomes is buffered by increased control and an active learning process.

Although there is strong evidence to support the main effects of demand and control on work outcomes, there is mixed support found for the stress-buffering role of control across studies using a range of designs and methodologies (de Lange, Taris, Kompier, Houtman, & Bongers, 2003; Ganster & Fusilier, 1989; Terry & Jimmieson, 1999; Van der Doef & Maes, 1998, 1999). Many reviewers of research on the D-CM suggest that the demand by control interaction is most likely to emerge in well-controlled studies using specific measures of the constructs (Ganster & Fusilier, 1989; Terry & Jimmieson, 1999; Van der Doef & Maes, 1999). This is understandable as such methodological aspects are more likely to tap into the direct and proximal effects of demand and control on relevant dependent variables. Thus, the present investigation manipulates levels of demand and control in a laboratory setting. In addition, specific and situationally relevant dependent variables such as task satisfaction and goal attainment (i.e. perceived task performance and perceived task mastery) will be the focus of the investigation. Indeed, Karasek and Theorell (1990) emphasised the need for models of the psychosocial work environment that address both stress and productive workplace behaviors. Much of the research examining the D-CM has focused on outcome variables related to well-being and health. Few studies have focused on reactions such as task satisfaction and goal attainment. However, there is increasing interest in extending the D-CM to productive workplace behaviors, such as work motivation and job challenge (de Jonge, van Breukelen, Landerweerd, & Nijhuis, 1999; de Jonge, Dollard, Dormann, Le Blanc, & Houtman, 2000).

One of the first experiments to examine the demand by control interaction in a laboratory-based setting involved participants completing a mail-sorting task under conditions where the level of demand and control was varied between participants (Perrewe & Ganster, 1989). Demand was manipulated via quantitative workload (i.e. number of letters to sort), whereas control was manipulated via experimental instructions that manipulated participants' perceived opportunity to exert behavioral control over how they completed the task. While control had no effect on physiological arousal or task satisfaction, there was an effect on perceived anxiety, whereby perceived control lessened the negative impact of work overload on anxiety. Other researchers have found similar effects using a mail sorting activity as the experimental task. Jimmieson and Terry (1998) found the interactive effect of demand by

control on the dependent variable of positive mood. However, this effect was present only when participants had high levels of task information. Searle, Bright, and Bochner (2001) showed, in a study using machine pacing as a manipulation of control, that control buffered demand on perceived task performance, but did not affect stress ratings or quantitative performance.

However, using an in-basket activity to improve realism and task complexity, the stress-buffering effects of control have been demonstrated on positive mood (Jimmieson & Terry, 1997) and task satisfaction (Jimmieson & Terry, 1997, 1999). In addition, researchers using this experimental task have revealed stress-buffering effects of control on task performance outcomes; specifically, subjective task performance (Jimmieson & Terry, 1997) and quantitative task performance (Jimmieson & Terry, 1999). Within the paradigm of these studies, demand was operationalised via time pressure, and control via similar experimental instructions to those used by Perrewe and Ganster (1989). However, in these experiments, the manipulations of control were extended, following the Jackson, Wall, Martin, and Davids (1993) dimensions of work control (i.e. task control, method control, work pacing control, work scheduling control, and environmental control). Thus, within the present study, an experimental paradigm similar to that utilised by other researchers was adopted (e.g. Jimmieson & Terry, 1997, 1999; Perrewe & Ganster, 1989; Searle, Bright, & Bochner, 1999) in order to examine the potential stress-buffering effects of control. Using an in-basket activity, the proposed main and interactive effects of demand and control within Karasek's (1979) D-CM will be assessed on dependent variables of task satisfaction, perceived task performance, and perceived task mastery. In order to examine the proposed stress-buffering effects of control outlined in the D-CM, three hypotheses were examined:

Hypothesis 1: It is predicted that there will be a negative main effect of demand on perceived task satisfaction, perceived task performance, and perceived task mastery.

Hypothesis 2: It is predicted that there will be a positive main effect of control on perceived task satisfaction, perceived task performance, and perceived task mastery.

Hypothesis 3: A two-way interaction of demand and control on perceived task satisfaction, perceived task performance, and perceived task mastery is expected, such that the negative effects of high demand on the dependent variables are reduced under conditions of high control.

Person–Environment Fit Theory

The D-CM is a situation-centered model. A limitation of the original model is that there is a lack of consideration for individual differences (i.e.

what is considered a stressful working environment for one employee may not be so for another). The concept of person–environment fit (P–E fit), or Person–Organisation fit (P–O fit), originates from interactional psychology, wherein behavior is caused by a continuous interaction between the person and the environment (Pervin, 1968; Terborg, 1981). Murray (1938) introduced the first model of P–E fit, the Needs–Press Model. Along these lines, P–E fit theorists contend that behavior is more specifically a function of an individual's personality needs or goals and the environmental pressures or affordances present (Pervin, 1992; Walsh, Price, & Craik, 1992). According to Pervin (1968, 1992), dissimilarity between a person's needs or self-concept and the affordances available in their objective environment can result in dissatisfaction and lowered performance. However, two qualifications to this are suggested: (1) the dissimilarity between the individual and the environment has to be large, and (2) the individual difference variable must be important to the person's self-concept. Essentially, the theoretical underpinning of this theory is that a mismatch between individuals' needs and the environmental affordances available becomes stressful in and of itself.

Indeed, Karasek and Theorell (1990) highlighted the importance of potential interactions between person factors and situational constraints in their revision of the D-CM. And more recently, Van der Doef and Maes (1999) theorised, in line with the propositions of P–E fit theory, that high-control situations will benefit certain individuals, whereas having low control over a situation will suit others. Furthermore, Tett and Burnett (2003) suggest that positive trait performance behaviors would be expected where evoked behaviors met workplace demands, and negative trait performance behaviors would be expected when there were distracters present (e.g. high DFC individuals desiring control in low-control conditions). Thus, it is important to consider the role of individual differences in responses to demand and control, as these individual differences may affect the emergence of the proposed stress-buffering effects of control on outcomes, such as task satisfaction and perceived goal attainment.

Desirability of Control

Many consider personal control an adaptive function, prompting actions to avoid stressful situations or manage them (Thompson, 2002). Indeed, Burger (1992) contends that a motivation to control one's environment is central to human functioning. However, instances when desired personal control is maladaptive do exist (see Burger, 1989; Shapiro, Schwartz, & Astin, 1996). As delineated by Burger and Cooper's (1979) construct of DFC, there are stable individual differences in the generalised desire to be in control of events in one's own life. In their review of the research into personal control, Shapiro et al. (1996) maintain that mismatches between

control motivations and environmental constraints can have detrimental effects for physical and psychological health. In line with a P–E fit approach, Shapiro et al. contend that these negative consequences occur in situations where there are person (i.e. control desires) and environment (i.e. opportunities to exert or maintain control) mismatches. Thompson (2002) suggests that the construct of DFC is of specific interest to research looking at the effects of control. For instance, when there is a mismatch between actual control over a situation and an individual's generalised DFC (i.e. when individuals high in DFC are placed in situations providing little to no control), theoretically, this constraint, or person–environment mismatch, will have negative consequences.

Burger (1992) has demonstrated DFC to be distinct from similarly related control-motivation variables, such as locus of control (Rotter, 1966), self-efficacy (Bandura, 1977), self-determination (Deci, 1975), Type A behavior pattern (Freidman & Rosenman, 1974), and machiavellianism (Christie & Geis, 1970). Whereas DFC directly taps into a generalised desire to have and to maintain control, to varying degrees, exercising or desiring control is an associated feature of other related control-constructs. For instance, having an internal locus of control or high levels of self-efficacy are related to the increased use of control (i.e. as individuals may be more likely to utilise control opportunities presented to them because they have experience in using control or believe they can effectively use it). In contrast, those high in DFC may utilise control opportunities because they generally desire to do so, or in order to maintain a sense of control. Another related construct that has recently been shown to moderate the stress-buffering effects of control is that of a proactive personality (Parker & Sprigg, 1999). Proactive individuals are those who engage with their environment in a proactive manner (i.e. someone who is relatively unconstrained by situational forces and who affects environmental change; Bateman & Crant, 1993). This is different to DFC, in that for those who are high in DFC, a desire to have and maintain control is paramount. Engaging with one's environment in order to bring about desired changes is a consequence of this desire. Many of these traits have similar relationships to particular outcome variables. For example, those high in self-efficacy, like those high in DFC, also have high achievement outcomes (Burger, 1992; Gist & Mitchell, 1992; Strube, Hanson, & Newman, 2003). It is likely that these constructs operate differently in the prediction of similar behaviors or outcomes, and the outcome or behavioral level is where the similarities lie.

In the context of the present study, we have focused on DFC for two reasons. First, research has revealed that this variable is related to significant life outcomes including anxiety, depression, health, and achievement in learning and work contexts (i.e. academic achievement and promotion; Burger, 1992; Gebhardt & Brosschot, 2002; Strube et al., 2003). Second, there is a common

assumption that people generally want control. However, Burger's construct of DFC demonstrates that this is not the case, and that there are stable individual differences in a desire to have and maintain control. Thus, the specific focus of the present study is on the effects of a mismatch between control desires and the level of control afforded in the environment, and we envision that this mismatch will act as a stressor at high demands.

Among other things, high levels of DFC have been linked to academic performance, generally lower anxiety and depression, better general well-being, and health-promotive behaviors (Burger, 1992; Gebhardt & Brosschot, 2002). Generally speaking, those high in DFC have a higher drive to achieve and compete, and are both dominant and not inclined to defer (Burger, 1992). It also seems that people high in DFC have a dominant conversation style, tend to have greater social control, and gravitate to leadership positions (Strube et al., 2003). Gebhardt and Brosschot (2002) described someone who is high in DFC as a dominant person with an internal locus of control, high self-esteem, and an active coping style, who, at the same time, is relatively low in perceptions of social inadequacy, negative fear of failure, trait anxiety, and trait depression. In line with these findings, it is anticipated that those high in DFC will experience a more positive perception of their performance on the task. Thus, the following is hypothesised:

Hypothesis 4: There will be positive main effects of DFC on perceived task satisfaction, perceived task performance, and perceived task mastery.

In relation to the potential two-way interactive effects of DFC with conditions of demand and control, research indicates that DFC may have interactive effects with demand and control on satisfaction and achievement outcomes like goal attainment. For instance, Strube et al. (2003) specify that the positive link between DFC and achievement is stronger when tasks are challenging yet controllable. This is analogous to the notion of an Active Job in Karasek's (1979) D-CM (i.e. high demand and high control).

Contrary to this, higher DFC has been shown to be associated with greater stress reactivity. Whereas people high in DFC generally have lower levels of anxiety (Strube et al., 2003), they are more upset by acute stress and control loss. Burger and Arkin (1980) found that after helplessness training with an aversive noise blast, high DFC individuals made greater proportions of errors on a recall task, and reported greater feelings of depression than those low in DFC. Seemingly, individuals high in DFC are better able to cope, or encounter less stress generally, but respond more reactively to isolated incidents of threat (Strube et al., 2003). This suggests that individuals high in DFC may have higher stress reactivity to situations of high demand and low control, analogous to Karasek's (1979) conceptualisation of a High Strain Job.

In the present study, negative reactions on the experimental task are expected when there is a mismatch between the person and the environment. In line with this, a series of two-way interactions are hypothesised:

Hypothesis 5: A two-way interaction of demand and DFC on perceived task satisfaction, perceived task performance, and perceived task mastery is hypothesised, such that individuals high in DFC will react more negatively to the effects of high demand on task outcomes (as compared to those low in DFC).

Hypothesis 6: A two-way interaction of control and DFC on perceived task satisfaction, perceived task performance, and perceived task mastery is hypothesised, such that individuals high in DFC will react more positively to the effects of high control on task outcomes (as compared to those low in DFC).

DFC as a Conjunctive Moderator in the D-CM

There is no research explicitly testing the role of DFC in the context of the D-CM. However, other relevant personality variables have been examined. For instance, Day and Jreige (2002) observed higher strain reactions (i.e. lower job satisfaction and greater perceived strain) when perceived control was low for individuals high in the II subscale (Impatience and Irritability) of Type A. Parkes (1991) showed in two different studies that, under conditions of high discretion, those with an externally orientated locus of control had more negative task reactivity than internals. Daniels and Guppy (1994) further showed that high levels of autonomy helped in buffering the negative effects of job demands only for those with an internally orientated locus of control. Interestingly, Jimmieson (2000) has shown, in a sample of customer service representatives, that the stress-buffering effect of work control reduced only the negative effects of work stressors on depersonalisation for employees who perceived that they had high levels of self-efficacy. Moreover, there was a stress-exacerbating effect at high levels of work control when employees perceived low levels of self-efficacy. Taken together, there is evidence that control-related dispositional states aligned with DFC do exert some influence on the demand by control interaction.

In addition to these findings, de Rijk, Le Blanc, Schaufeli, and de Jonge (1998) have examined the role of a generalised need for control in the D-CM. Using a sample of nurses, de Rijk et al. proposed that a stress-buffering effect of control on burnout would be evident only for nurses with a high generalised need for control, as availability of job control will be valued only by nurses with a high need for control. However, this was not demonstrated. Although this research finding may suggest that there is no need to examine DFC as a potential moderator of the demand by control

interaction, there are several limitations that warrant further investigation. First, a self-constructed scale to measure need for control was utilised. This scale measured valuing being in control of one's life. This was neither a highly reliable nor an established measure that contained very few items (i.e. four items). Second, as proposed by the authors, need for control may not have an impact on burnout; however, it may on other dependent variables, such as motivation and satisfaction.

Essentially, increased control may provide benefits as a stress-buffer only to those who desire it and will use it. People who have a high DFC are comfortable with enhanced autonomy. Moreover, they are likely to have experience in dealing with and utilising control opportunities. In contrast, we propose that for those low in DFC, enhanced control will be stress-exacerbating, as they are not comfortable with enhanced autonomy and are likely to have less experience in utilising control. Thus, a series of hypotheses were proposed for the three-way interaction between demand, control, and DFC:

Hypothesis 7a: It is predicted that, for those high in DFC, there will be a stress-buffering effect of high control in the high demand condition (as compared to low demand) on perceived task satisfaction, perceived task performance, and perceived task mastery.

Hypothesis 7b: Conversely, for those high in DFC, there will be a stress-exacerbating effect of low control in the high demand condition (as compared to low demand) on perceived task satisfaction, perceived task performance, and perceived task mastery.

Hypothesis 8a: It is predicted that, for those low in DFC, there will be a stress-exacerbating effect of high control in the high demand condition (as compared to low demand) on perceived task satisfaction, perceived task performance, and perceived task mastery.

Hypothesis 8b: Conversely, for those low in DFC, there will be a stress-buffering effect of low control in the high demand condition (as compared to low demand) on perceived task satisfaction, perceived task performance, and perceived task mastery.

Dimensionality of DFC

Evidence from prior research on the dimensionality of Burger and Cooper's (1979) DFC scale indicates that the measure is multidimensional (Burger & Cooper, 1979; Burger, 1992; Gebhardt & Brosschot, 2002). Gebhardt and Brosschot found that a reliable three-factor solution across samples (i.e. teachers, students, and engine drivers) was best. These subscales were "control others" (i.e. general desire to be in control or lead others), "control self" (i.e. desire to control one's own life), and "relinquish control" (i.e. desire to leave others in control). Desire to control the self is related to

desires to control one's own destiny and make one's own decisions. A desire to control others is related to desires to be in leadership roles, to be in charge, and influence others. Last, a desire to relinquish control is related to a general desire to leave control to others.

Gebhardt and Brosschot (2002) showed that each subscale was differentially related to a range of other control beliefs, personality variables, motivations, and behaviors. For example, internal locus of control was negatively related to relinquish control but not other subscales, whereas self-esteem was negatively related to relinquish control and positively related to control others, and expression of emotions was positively related only to control self. Interestingly, Gebhardt and Brosschot also demonstrated that control others was negatively related to trait anxiety, trait depression, and trait worry, whereas relinquish control was positively related to each of these and positively related to somatic complaints and burnout. Overall, the authors noted that each subscale appears to be independent of the others and relatively independent of the total DFC scale. Thus, in the present study, the proposed hypotheses will be tested with three subscales of DFC: desire to control the self, desire to control others, and desire to relinquish control.

The Present Study

In summary, the purpose of the present study is to examine the interactions of DFC with manipulated situational variables (i.e. the level of demand and the level of control over an activity), and the consequences of these interactions on task reactions. It is expected that DFC will be an important dispositional trait involved in the interrelationships between demand and control on the dependent variables of task satisfaction and perceived goal-attainment (i.e. task mastery and task performance).

METHOD

Participants

Participants were 137 first year psychology students who participated in the experiment for course credit. There were 62 per cent female participants in the sample and the mean age was 20.37 (SD = 5.71), with one participant not reporting their age.

Design

The design of the experiment was a 2 (demand: low or high) × 2 (control: low or high) between-subjects manipulation on the dependent variables of task satisfaction, perceived task performance, and perceived task mastery.

Procedures

Two female experimenters conducted the research. Experimental conditions were counterbalanced across experimenters. *T*-tests were carried out to examine if there was any impact of experimenter on the dependent variables and revealed no such effects. At commencement of the experimental session, participants received an information sheet that described what would be involved in participating in the study, yet concealed the true goals (i.e. the study ostensibly investigated decision-making processes). Participants consented to continue their involvement by removing the information sheet and commencing the first questionnaire. This Time 1 questionnaire required participants to indicate their demographic details and complete self-reported measures including a measure of DFC. Participants were then randomly assigned to one of four experimental conditions. They then completed the experimental task in the allocated time, followed by the Time 2 questionnaire which assessed their perceptions of the task they had just completed (i.e. demand and control manipulation checks) and the dependent variables of interest in the study. Once the Time 2 questionnaire was completed, the researcher thanked participants and debriefed them.

Experimental Task

Participants were to consider themselves as Pat Sneed, HR manager of Crawford Computing Company. They were to assume that they had returned briefly to their office to respond to memos from employees regarding recent performance evaluations. Participants were provided with brief written information on the broader organisational context and the performance evaluation system. Participants were told that the performance evaluation system was implemented and managed by Pat Sneed and, as such, it was their responsibility to address the issues raised in the memos. The in-basket activity consisted of 10 memos from employees with various issues related to performance appraisals. These memos were adapted from a popular teaching activity called EvalSim (Nkomo, Fottler, & McAfee, 2004). All memos were of similar length and the order in which they were presented to participants was counterbalanced across conditions to control for any potential order effects. There were four randomisedj orders of memos; one-way ANOVAs were carried out to determine if there was any effect of order on task outcomes, and no such effects were revealed.

In addition, participants were asked to complete a Behavior Management Questionnaire for a Parents and Citizens Association (PCA) meeting at their child's school as a peripheral task. The peripheral task involved responding to a brief two-item questionnaire on how to manage inappropriate

student behavior. Participants were told their responses would help in the design of a behavioral management program at their child's school.

Manipulations

Task demand was manipulated by varying the time allowed to complete the task. In the high demand condition, participants were provided a 10-minute period in which to carry out the task, whereas participants in the low demand condition were allowed 30 minutes to complete the task. Previous research suggests that time pressure influences levels of perceived task demand (Jimmieson & Terry, 1997, 1999; Searle et al., 1999, 2001).

The manipulation of task control was based on manipulations used in other D-CM experiments (Jimmieson & Terry, 1997, 1998, 1999; Perrewe & Ganster, 1989). These manipulations were based on five aspects of behavioral control that have been identified as central areas of interest in examining control at work, these being task control, method control, work pacing control, work scheduling control, and environmental control (Ganster, 1989; Jackson et al., 1993). High behavioral control was operationalised by providing conditions that heightened feelings of active participation in the procedure and fostered perceptions of autonomy. Written and verbal instructions from experimenters informed participants that they could choose the order in which they completed the in-basket task and peripheral task (high task control), the order in which they completed the 10 items contained in the in-basket activity (high method control) and the relative amount of time spent on each item (high work pacing control), as well as the allocation of rest breaks (high work scheduling control), and were given freedom to move around the room (high environmental control). Participants in low behavioral control conditions were directed to perform the tasks in a specified manner. Participants were told which task to complete first (low task control) and to complete the 10 items within the in-basket activity in the order specified (low method control). Within the low behavioral control condition, half of the participants were instructed to complete the peripheral task first to control for any potential effects emerging from the order of task completion. These participants were also instructed to maintain a consistent work pace (low work pacing control), and to continue working on the task for the entire allocated time (low work scheduling control). Moreover, they were instructed to remain seated during the task (low environmental control).

Measures

Manipulation check measures of task demand and task control were taken. Task demand was measured at Time 2 on an eight-item scale,

which assessed the perceived level of demand of the in-basket activity. Items include "*I felt very busy and under pressure throughout*". Reponses were gathered on a 7-point Likert scale ranging from 1 (hardly any) to 7 (extremely). Internal consistency for perceived task demands was $\alpha = .91$. Task control was measured at Time 2 on a seven-item scale, which assessed perceived level of control over the in-basket activity. Items included *"How much control did you have over your actions during this activity?"* Responses were gathered on a 7-point Likert scale ranging from 1 (not at all) to 7 (a great deal). Internal consistency for perceived task control was $\alpha = .83$.

Desirability of control was measured at Time 1 with a shortened version of Burger and Cooper's (1979) desirability of control scale. This measure contained 16 items with the response options ranging from 1 (the statement usually doesn't apply to me at all) to 7 (the statement always applies to me). Five of the items were reverse-scored. The items deleted related specifically to driving a car (these two items were also not utilised by Gebhardt & Brosschot, 2002), capabilities or self-efficacy, and control via active political participation. The majority of items in the scale, and the items retained for this analysis, are related to controlling more general events in one's life, and comprise higher face validity.

An exploratory factor analysis of the 16 items was conducted using Principal Axis Factoring (PAF) and an extraction criterion of eigenvalues greater than one (see Table 1). This produced a four-factor solution explaining 58.32 per cent of shared variance. Oblique rotation provided a simple structure where each factor had at least three items loading on it at above .39, and no items were split loading at above .39 (see Tabachnick & Fidell, 2001). Factor 1 accounted for 25.05 per cent of variance and related to leadership or control of others. The second factor explained 16.78 per cent of variance and related to relinquishing of control. The third factor explained 9.46 per cent of variance and related to general or self-control. These first three factors are very similar to the three-factor solution proposed by Gebhardt and Brosschot (2002) of (1) self-control, (2) others-control, and (3) relinquish-control. The fourth factor in the present analysis explained 7.03 per cent of variance and related to avoidance of dependence. This fourth factor contained three items, with one item split loading on Factor 1 at .36. Within the context of the present study, it was decided to adopt the three-factor solution presented by Gebhardt and Brosschot (2002) and, as such, the fourth factor was not considered in further analyses. The factor structure and items for each subscale can be viewed in Table 1. Internal reliabilities of each of the three subscales were acceptable, although it should be noted that the reliability for DFC Self was only just in moderate bounds: DFC Self (four items, $\alpha = .64$), DFC Others (5 items, $\alpha = .77$), and DFC Relinquish (four items, $\alpha = .73$).

TABLE 1
Pattern Matrix of Exploratory PAF on DFC Items

Desirability for Control items (Burger & Cooper, 1979)	*F1*	*F2*	*F3*	*F4*
When it comes to orders, I would rather give them than receive them	**.82**	.22	.03	.04
I would prefer to be a leader rather than a follower	**.70**	–.13	.01	–.12
I'd rather run my own business and make my own mistakes than listen to someone else's orders	**.56**	.15	.10	–.17
I enjoy being able to influence the actions of others	**.50**	–.03	.23	–.01
I would rather someone else took over the leadership role when I am involved in a group project (R)	**–.47**	.31	.07	.03
I wish I could push many of life's daily decisions off onto someone else	.09	**.70**	–.17	.00
I like to wait and see if someone else is going to solve a problem so that I don't have to be bothered by it	–.03	**.64**	–.04	–.15
There are many situations in which I would prefer only one choice rather than having to make a decision	–.11	**.63**	–.01	–.15
Others usually know what is best for me	.09	**.54**	–.05	.34
I enjoy having control over my own destiny	.06	.01	**.76**	.10
I enjoy making my own decisions	–.05	–.23	**.65**	.07
I like to get a good idea of what a job is all about before I begin	–.04	.00	**.40**	–.11
When I see a problem I prefer to do something about it rather than sit by and let it continue	.12	.00	**.39**	–.04
I prefer to avoid situations where someone else has to tell me what it is I should be doing	.05	.14	.11	**–.68**
I try to avoid situations where someone else tells me what to do	.36	–.10	–.13	**–.61**
I prefer a job where I have a lot of control of what I do and when I do it	.15	.14	.20	**–.36**

Note: *R* denotes reverse-coded item.

Task satisfaction was measured at Time 2 by seven items with different anchors (e.g. "*All things considered, how satisfying did you find this activity?*"), with response options ranging from 1 (e.g. very dissatisfying) to 5 (e.g. very satisfying). Four items were reversed-scored. Internal consistency was $\alpha = .88$.

Perceived task performance and perceived task mastery were measured at Time 2 on a nine-item measure of goal attainment adapted from the achievement goal framework (Elliot & McGregor, 2001). This measure has response options ranging from 1 (not agree at all) to 7 (very strongly agree). Three items corresponded to the perceived attainment of performance goals (e.g. "*I probably did better than most other participants*"), whereas six items corresponded to perceived attainment of mastery goals (e.g. "*I mastered the difficulties of the situation*"). Exploratory factor analysis using PAF and extraction criteria of eigenvalues greater than one, with an oblique rotation, revealed a two-factor solution explaining 76.39 per cent of shared variance. Factor 1, explaining 56.25 per cent of variance, had all six mastery items

loading highly on it, and Factor 2, explaining 20.14 per cent of variance, had all three performance items loading highly on it. There were no split loadings and all items loaded on one factor at above .60. Internal consistency for performance was $\alpha = .96$ and for mastery $\alpha = .91$.

RESULTS

Manipulation Checks

Analyses were performed to determine if perceptions of demand and control varied according to the experimental manipulations of demand and control. A two-way analysis of variance (ANOVA) on participants' perceptions of demand showed a significant main effect of the demand condition on perceptions of demand, $F(1, 133) = 8.29$, $p = .005$, $\eta^2 = .06$, indicating that participants in the high demand condition perceived the level of demand to be higher ($M = 5.37$, $SD = 1.10$) than participants in the low demand condition ($M = 4.87$, $SD = 0.90$). As expected, there was no main effect of control, $F(1, 133) = 0.33$, $p = .57$, ns, and no interaction between demand and control on demand perceptions, $F(1, 133) = 0.18$, $p = .66$, ns. A two-way ANOVA on participants' perceptions of control showed a significant main effect of the control condition, $F(1, 133) = 54.62$, $p < .001$, $\eta^2 = .29$, indicating that participants in the high control condition perceived higher levels of control ($M = 5.01$, $SD = 1.03$) than participants allocated to the low control condition ($M = 3.63$, $SD = 1.15$). There was no main effect of demand, $F(1, 133) = 1.30$, $p = .26$, ns, and no interaction between demand and control on control perceptions, $F(1, 133) = 0.00$, $p = .10$, ns.

Control Variables

As outlined in the method section, experimenter and order of in-basket tray items were counterbalanced across each of the experimental conditions, and analyses (t-tests and ANOVAs) revealed no impact of these variables on task outcomes. Preliminary analyses were also performed to determine if there was any influence of gender and age on task outcomes. These analyses revealed that females reported higher task mastery ($M = 5.21$, $SD = 1.24$) than males ($M = 4.62$, $SD = 1.10$), $t(135) = 2.78$, $p = .006$. As can be seen in Table 2, age was not significantly related to any of the task outcomes. However, to be conservative, the results reported here include these variables as statistical controls.

Descriptive Statistics

Table 2 outlines the descriptive statistics of all measured variables and the bivariate correlations between all variables. In line with the findings

TABLE 2
Descriptive Statistics and Bivariate Correlations among Focal Variables

Variables	M	SD	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1. Gender	1.37	0.49	—											
2. Age	20.37	5.72	−.01	—										
3. Demand manipulation	1.50	0.50	.09	.03	—									
4. Control manipulation	1.50	0.50	−.02	−.01	.02	—								
5. Demand perceptions	5.13	1.04	−.11	−.07	.24**	.05	(.91)							
6. Control perceptions	4.33	1.29	−.09	−.14	−.07	.54**	.04	(.83)						
7. DFC(Self)	5.70	0.81	−.12	.21*	.03	.09	−.01	.18*	(.64)					
8. DFC(Others)	4.80	1.07	.17*	.06	.09	.13	.00	.16	.28**	(.75)				
9. DFC(Relinquish)	3.53	1.13	.15	−.17*	.08	.03	.10	−.06	−.31**	−.12	(.73)			
10. Perceived task satisfaction	3.62	0.71	−.09	.10	−.01	.05	−.05	.28**	.37*	.13	−.19*	(.88)		
11. Perceived task performance	3.21	1.47	.16	.01	−.05	−.04	−.06	.02	.15	.32**	−.11	.02	(.96)	
12. Perceived task mastery	4.99	1.22	−.23**	.11	−.12	−.05	.15	.19*	.40**	.07	−.14	.35**	.46**	(.91)

Note: Internal reliabilities appear in parentheses.
* $p < .05$; ** $p < .01$.

of the EFA on the DFC Scale, the sub-dimensions of DFC demonstrated low, although significant, correlations with each other. The task outcomes are only moderately intercorrelated with each other, which supports the treatment of these variables as distinct constructs. There is no correlation between demand and control perceptions, $r = .02$, demonstrating the statistical independence of these perceptions. Demand perceptions are positively related to the manipulation of demand, $r = .24$, and control perceptions are positively related to the manipulation of control, $r = .54$.

Data Analysis Overview

Analyses were performed with between-subjects ANCOVA to test for the main and interactive effects of the experimental manipulation of demand, control, and participants' level of DFC on the task outcome variables (Hypotheses 1–8). As DFC is a continuously measured construct, each sub-dimension of DFC was split at the median, to create a low and a high group. Independent samples *t*-tests were conducted to establish that the low and high groups of DFC, created by the median split, did in fact differ significantly in their scores on the DFC measure. These analyses revealed that High DFC(Self) ($M = 5.73$, $SD = 0.61$) had a mean higher than that of Low DFC(Self) ($M = 3.99$, $SD = 0.63$), $t(1, 135) = -16.48$, $p < .001$. Moreover, High DFC(Relinquish) ($M = 4.45$, $SD = 0.61$) had a mean higher than that of Low DFC(Relinquish) ($M = 2.64$, $SD = 0.69$), $t(1, 135) = -16.56$, $p < .001$, and High DFC(Others) ($M = 6.45$, $SD = 0.38$) also had a mean higher than that of Low DFC(Others) ($M = 5.12$, $SD = 0.53$), $t(1, 135) = -17.01$, $p < .001$.

In addition, the distribution of dichotomised DFC Self, Others, and Relinquish was checked to ensure that it was spread evenly across combinations of demand and control. Moreover, in line with the suggestions of Tabachnick and Fidell (2001) for dealing with unequal *n* in experimental research, sums of squares Type 3 was used in the analyses. This method weights each cell equally regardless of its sample size. Thus, the main analyses presented here are factorial between-subjects 2 (Demand: Low/High) × 2 (Control: Low/High) × 2 (DFC Sub-dimension: Low/High) ANCOVAs (i.e. controlling for participant gender and age) on the dependent variables of task satisfaction, perceived task performance, and perceived task mastery.

Main and Interactive Effects of Demand and Control (Hypotheses 1–3)

There were no main effects of demand and control on the dependent variables. Thus, there was no support for Hypotheses 1 and 2. There were no two-way interactions of demand and control on the task outcomes, and as such there was no support for Hypothesis 3.

Main and Interactive Effects of DFC (Hypotheses 4–8)

The next section reports the main effects of each of the three DFC sub-dimensions (i.e. self, relinquish, and others) on the task outcome variables (Hypothesis 4), and examines if the DFC sub-dimensions interact with demand and control (Hypotheses 5 and 6), and if there are any three-way interactions among these variables (Hypotheses 7 and 8).

There was a main effect of DFC(Self) on participants' ratings of task satisfaction, $F(1, 126) = 10.68$, $p = .001$, $\eta^2 = .08$, such that those high in DFC(Self) rated higher levels of task satisfaction ($M = 3.85$, $SD = 0.66$) than those low in DFC(Self) ($M = 3.43$, $SD = 0.69$). DFC(Self) also had a main effect on task performance perceptions, $F(1, 124) = 6.78$, $p = .01$, $\eta^2 = .05$, such that those high in DFC(Self) rated themselves higher on performance ($M = 3.49$, $SD = 1.64$) than those low in DFC(Self) ($M = 2.97$, $SD = 1.28$). Similarly, there was a main effect of DFC(Self) on task mastery perceptions, $F(1, 126) = 14.36$, $p < .001$, $\eta^2 = .10$, such that those high in DFC(Self) rated themselves as having achieved higher levels of mastery over the task ($M = 5.45$, $SD = 1.15$) than those low in DFC(Self) ($M = 4.63$, $SD = 1.15$).

A significant two-way interaction of control and DFC(Self) on task satisfaction was also revealed, $F(1, 126) = 4.08$, $p = .046$, $\eta^2 = .03$, such that those high in DFC(Self) rated higher satisfaction with the task in the condition of high control ($M = 3.98$, $SD = 0.64$) compared to the low control condition ($M = 3.69$, $SD = 0.66$), while those low in this dimension of DFC rated higher satisfaction in conditions of low control ($M = 3.52$, $SD = 0.68$) compared to high control ($M = 3.33$, $SD = 0.70$). This is displayed in Figure 1. Simple effects analysis revealed that the difference lies at high control, $F(1, 126) = 14.16$, $p < .001$, $\eta^2 = .10$. Differences between high and low DFC(Self) task satisfaction ratings at low control were non-significant, $F(1, 126) = 0.93$, $p = .336$, ns. This lends tentative support to Hypothesis 6 that DFC would interact with control such that those high in DFC would have more positive task reactions in conditions of high control.

DFC(Relinquish) had a main effect on task satisfaction $F(1, 126) = 7.95$, $p = .006$, $\eta^2 = .06$, such that those high in DFC(Relinquish), thus low in DFC, reported lower levels of satisfaction with the task ($M = 3.44$, $SD = 0.64$) than those low in DFC(Relinquish) ($M = 3.79$, $SD = 0.73$). There was a marginally significant two-way interaction of control and DFC(Relinquish) on perceived task mastery, $F(1, 126) = 3.70$, $p = .057$, $\eta^2 = .03$, such that those low in relinquish control, and thus high in DFC, rated higher task mastery in conditions of high control ($M = 5.29$, $SD = 1.25$) rather than low control ($M = 5.04$, $SD = 1.16$), whereas those high in DFC(Relinquish), and thus low in DFC, rated high task mastery in conditions of low

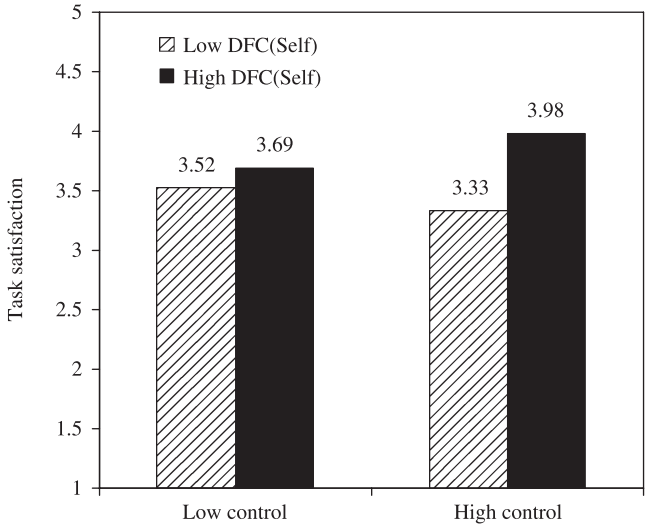

FIGURE 1. Two-way interaction of control and DFC(Self) on task satisfaction.

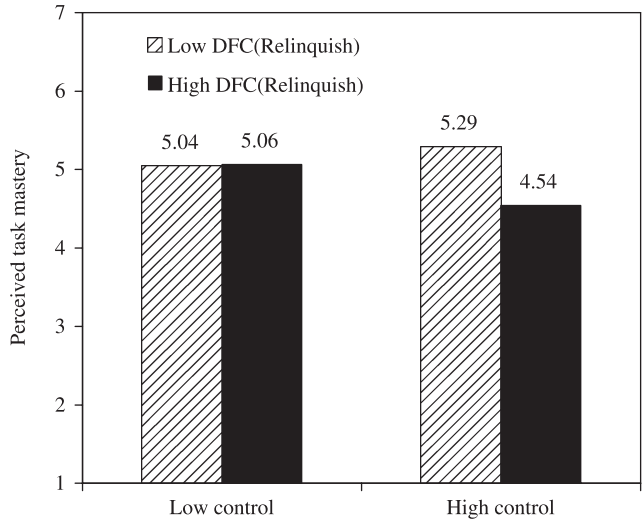

FIGURE 2. Two-way interaction of control and DFC(Relinquish) on perceived task mastery.

control (M = 5.06, SD = 1.25) than high control (M = 4.54, SD = 1.15). This pattern of findings is displayed in Figure 2. Simple effects analysis across DFC(Relinquish) revealed that the difference lies at high control, $F(1, 126) = 4.37$, $p = .039$, $\eta^2 = .03$. There is no difference in perceived task

mastery between high and low DFC(Relinquish) in the low control condition, $F(1, 126) = 0.34$, $p = .563$, ns. This lends further tentative support to Hypothesis 6.

A main effect of DFC(Others) on task performance perceptions was revealed, $F(1, 124) = 7.67$, $p = .006$, $\eta^2 = .06$, such that those high in DFC(Others) rated higher performance ($M = 3.59$, $SD = 1.49$) than those low in DFC(Others) ($M = 2.89$, $SD = 1.37$). However, there were no two-way interactions with DFC(Others) revealed. A significant three-way interaction of demand, control, and DFC(Others) emerged on task performance perceptions, $F(1, 124) = 4.56$, $p = .035$, $\eta^2 = .04$ (see Figure 3), and task mastery perceptions, $F(1, 126) = 3.94$, $p = .049$, $\eta^2 = .03$ (see Figure 4). Given the theoretical approach we adopted (i.e. examining control as a stress-buffer), we systematically conducted one set of mean comparisons across demand, as a follow-up test of three-way interactive effects revealed by ANCOVA.

Examination of Figure 3 reveals that, in support of Hypothesis 7a, the proposed interaction of demand and control, where control buffers the negative effects of demand, was evident only for those high in DFC(Others). Simple effects analysis across demand reveals that the differences for high control are non-significant for those high in DFC(Others), $F(1, 124) = 0.99$, $p = .323$, ns. This is in support of the stress-buffering effect of high control for these individuals as task performance perceptions are not lowered in high demand conditions. For those high in DFC(Others) there seems to be a stress-exacerbating effect of low control (Hypothesis 7b). Although this effect is in the predicted direction, simple effects analyses across demand showed that the differences for those high in DFC(Others) in low control conditions is non-significant, $F(1, 124) = 1.05$, $p = .306$, ns. The only significant simple effect is that for those low in DFC(Others) in conditions of high control, $F(1, 124) = 4.27$, $p = .041$, $\eta^2 = .03$. In this respect, for those low in DFC(Others), heightened control had a stress-exacerbating effect (Hypothesis 8a). For those low in DFC(Others), there is a role for low control as a stress-buffer, as ratings of perceived task performance do not decrease in conditions of high demand, $F(1, 127) = 0.02$, $p = .877$, ns (Hypothesis 8b). Thus, it can be concluded that the stress-exacerbating effect of increased control for those low in DFC has the strongest effect for perceived task performance.

In relation to perceived task mastery, examination of Figure 4 reveals support for Hypothesis 7a: the proposed stress-buffering effect of control on demand was evident only for those individuals high in DFC(Others). Once again, simple effects analyses across demand revealed that the differences for those high in DFC(Others) in high control conditions was non-significant, $F(1, 126) = 0.88$, $p = .349$, ns (Hypothesis 7a). There again is a stress-exacerbating effect of low control for these individuals (Hypothesis

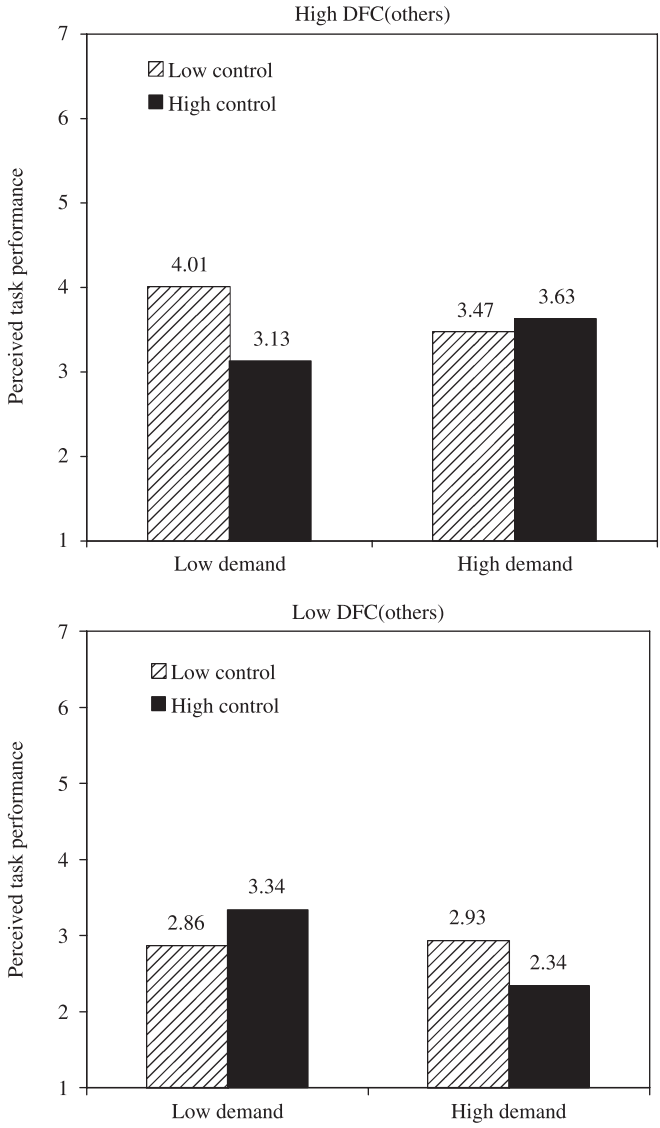

FIGURE 3. Three-way interaction of demand, control, and DFC(Others) on perceived task performance.

7b). Although the effect is in the predicted direction, it is important to note that it is non-significant, $F(1, 126) = 2.09$, $p = .151$, ns. Interestingly, yet again, the opposite effect was found for those low in this dimension of DFC, such that there was a stress-exacerbating effect of heightened control

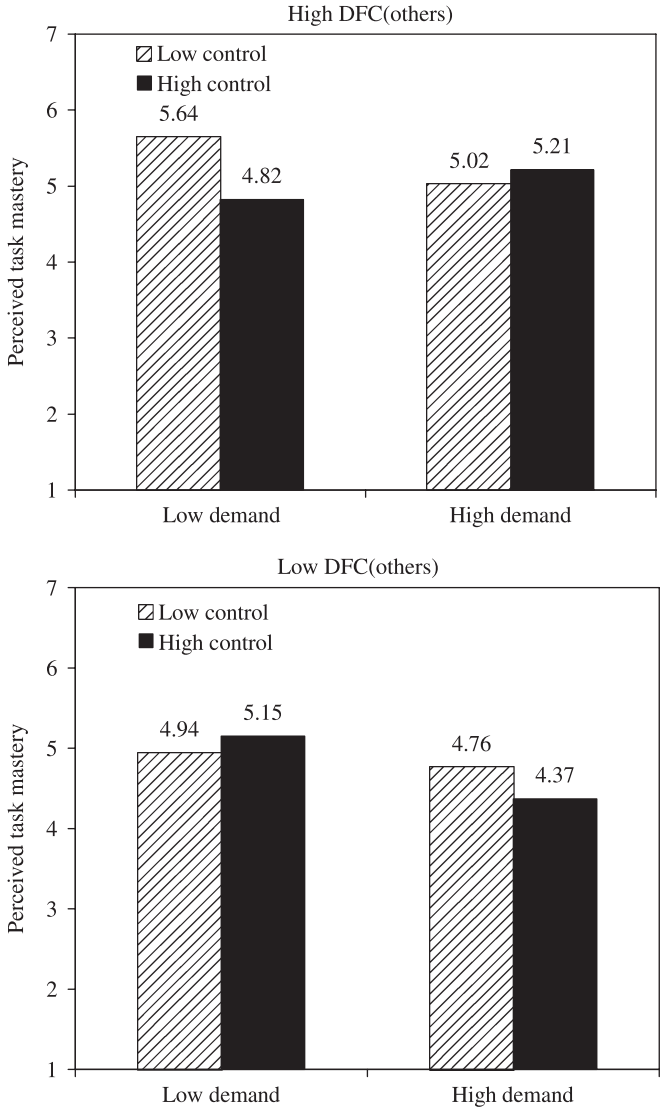

FIGURE 4. Three-way interaction of demand, control, and DFC(Others) on perceived task mastery.

(Hypothesis 8a). In support of Hypothesis 8a, simple effects analysis across demand revealed that the only significant difference was the stress-exacerbating effect of heightened control for those low in DFC(Others), $F(1, 126) = 4.12$, $p = .043$, $\eta^2 = .03$. In support of Hypothesis 8b, conditions

of low control acted as a stress-buffer for those low in DFC(Others), as the level of perceived task mastery is not changing across conditions of demand, $F(1, 126) = 0.23$, $p = .632$, ns.

DISCUSSION

In line with the premises of Karasek's (1979) D-CM, it was hypothesised that there would be main effects of demand and control on task satisfaction, perceived task performance, and perceived task mastery (Hypotheses 1 and 2), and an interaction of demand and control such that control buffers the negative effects of demand on such outcomes (Hypothesis 3). However, in the present study, the central tenets of the D-CM were not supported. Using objective manipulations of demand and control, there were no effects of demand and control on task outcomes.

However, inclusion of DFC as a moderator revealed a more complex pattern of findings. In support of Hypothesis 4, there were main effects of DFC, such that those high in DFC(Self) rated higher task satisfaction, perceived task performance, and perceived task mastery, while those high in DFC(Others) rated higher perceived task performance, and those high in DFC(Relinquish) rated lower task satisfaction. These effects are in line with previous findings, which revealed that those high in DFC seem to have higher self-esteem and self-efficacy (Burger, 1992). There was no support for Hypothesis 5, which contended that, in high demand conditions, individuals high in DFC would have more detrimental reactions to the in-basket activity. However, there was tentative support for Hypothesis 6 (i.e. in high control conditions individuals high in DFC would have more positive task reactions). Specifically, this was found for DFC(Self) on task satisfaction, and DFC(Relinquish) on perceived task mastery. This is in line with the findings and suggestions of Burger (1992) and Strube et al. (2003), who propose that those high in DFC would have negative reactions to conditions of low control (i.e. control loss or learned helplessness).

In support of Hypotheses 7 and 8, the main effects and two-way interactions were qualified by a three-way interaction of demand, control, and DFC on the task outcomes of perceived task performance and perceived task mastery. In support of Hypotheses 7a and 7b, those high in DFC(Others) experienced a stress-buffering effect of high control, and conversely a stress-exacerbating effect of low control on both perceived task performance and perceived task mastery. In support of Hypotheses 8a and 8b, those low in DFC(Others) experienced a stress-exacerbating effect of high control and, conversely, a stress-buffering effect of low control on both perceived task performance and perceived task mastery. Interestingly, the strongest effect for both task outcomes was the stress-exacerbating effect of high control for those low in DFC(Others). Across these analyses, there was little support

for Karasek's strain-hypothesis (i.e. the worst outcomes were often not in conditions of high demand and low control). Although the strain hypothesis was not supported, overall, it is important to note that for those high in DFC, the stress-buffering effects of control were in the direction predicted by the D-CM.

In light of the research findings of Gebhardt and Brosschot (2002), it was interesting to observe differential effects emerge with each sub-dimension of the Desirability of Control Scale (Burger & Cooper, 1979). According to the research presented by Gebhardt and Brosschot, the desire to control self subscale is more strongly aligned with expression of emotion as a habitual coping mechanism, whereas the desire to control others is more strongly aligned with active problem solving. In light of this, it makes sense that DFC(Self) would be associated with task satisfaction, which pertains to an individual's own personal satisfaction with the task, while DFC(Others) would be associated with perceived task performance and perceived task mastery, which involve dealing actively and successfully with the demands of the task. Similarly, Gebhardt and Brosschot contend that those high in the desire to control others sub-dimension have less trait anxiety, higher self-esteem, less fear of failing in achievement situations, higher achievement motivations, and stronger beliefs that only they themselves can determine outcomes. As such, it is not surprising that DFC(Others) was involved in the three-way interactions of demand, control, and DFC, on achievement-related outcomes of perceived task performance and perceived task mastery. The differential effects of sub-dimensions of DFC on task outcomes are also in line with the findings of trait activation researchers (Tett & Burnett, 2003; Tett & Guterman, 2000). These authors argue that certain traits become more relevant, or certain behaviors are expressed more easily, when trait-relevant situational cues are present. As such, it could be suggested that DFC(Others) is important in relation to the expression of goal attainment or achievement outcomes. One extension to these findings, in the context of the present study, was that participants' task reactions were in response to the objective environment (i.e. experimentally manipulated demand and control), and not self-reported reactions to vignette situations, as was the case in the Tett and Guterman study.

Practical Implications

Ivanevich, Matteson, Freedman, and Phillips (1990) concluded that the success of stress management interventions depends on acknowledging that stress is a combination of one or more of the following: (1) environmental stimuli/stress (described as the force applied to individuals), (2) an individual's psychological or physical response to such forces, and (3) an interaction between the two. As delineated by P–E fit theory, there is the potential for

person factors and environmental factors to interact in the prediction of strain outcomes (see Best, Stapleton, & Downey, 2005; Kieffer, Schinka, & Curtis, 2004; Pervin, 1968; Terborg, 1981). This research and the findings of the present study highlight the importance of understanding individual reactions to objective working conditions, and highlights that mismatches between people's characteristics and their work environment can result in negative outcomes for both the individual and the organisation.

The present investigation focused on goal attainment (i.e. perceived task performance and perceived task mastery) as task outcome variables. These variables have important implications for organisations and managers. It has been shown that believing you did well on a task will impact future performance (Bandura, 1986, 1997; Locke & Latham, 1990; Wood & Bandura, 1989). From the research into goal-setting theory, it has been demonstrated that setting hard yet achievable goals is one of the most successful ways of increasing motivation and performance in the workplace (Locke & Latham, 1984, 1990). The theory assumes that there are two functions of goals: (1) they provide a basis for motivation, and (2) they direct behavior to desired work-related performance. It is maintained in the goal-setting literature that self-efficacy is one of the primary predictors of the success of goal-setting interventions (Locke & Latham, 1990). Bolstering employee perceptions of self-efficacy is a primary initial stage in effectively setting hard yet achievable goals (Earley & Lituchy, 1991). Self-efficacy is built up in such interventions via completion of initially easy and achievable goals and activities. These initial achievements increase employees' perceptions of performance and mastery over the task or activity. These perceptions of performance and mastery over the task then flow onto other activities. As such, there are positive consequences of heightened perceptions of performance and mastery, especially in terms of increased self-efficacy, goal-setting, and performance. Thus, designing jobs that promote control for those who desire it is a useful strategy, especially at high demand.

Another important implication of the present research relates to workplace job enrichment programs. Interventions focused on increasing employee control may have a detrimental impact on individuals who are low in DFC, whereas such interventions may have increased positive effects on employee adjustment for those high in DFC. Increased employee autonomy is generally considered a good thing. However, it has been demonstrated in this study that this may not always be the case. It is important to note that increased control was not a positive influence on task outcomes overall and that it did in fact have a stress-exacerbating effect for those low in DFC on perceived task performance and perceived task mastery. This is directly in line with the propositions put forward by Burger (1989) that there can be situational conditions in which enhanced control is not positive.

Although it seems that those high in DFC are protected by high self-efficacy (see Burger, 1992; Gebhardt & Brosschot, 2002), and do benefit from conditions of heightened control as a buffer to the negative effects of demand on task outcomes, this does not mean that high DFC is always desirable. These individuals encountered a stress-exacerbating effect of low control. Moreover, although those low in DFC rated lower task satisfaction, perceived task performance, and perceived task mastery overall, conditions of low control did have a somewhat stress-buffering effect for these individuals, whereas the conditions of heightened control had a stress-exacerbating effect. Certain individuals may benefit from alternative worksite interventions, perhaps involving self-efficacy training for those low in DFC, focused on helping these individuals deal better and respond more positively to enhanced control opportunities in the workplace.

Limitations and Future Research Directions

An important consideration is the nature of the experimental manipulation of demand (i.e. time pressure) used in the current study. Recent research suggests that workplace demands, such as time pressure and overload, may not be a completely negative source of stress. Experimental studies and meta-analyses have shown that stressors can be conceptualised as either challenge or hindrance stressors (LePine, Podsakoff, & LePine, 2005; LePine, LePine, & Jackson, 2004). In the meta-analysis presented by Le Pine et al. (2005), challenge stressors were shown to have positive relationships with motivation and performance, whereas hindrance stressors were negatively related to well-being outcomes. The extent to which a stressor is a challenge or a hindrance is likely to depend on the type and level of demand. In line with the propositions of Lazarus and Folkman (1984), we suggest that the degree to which time pressure is perceived as a challenge or a hindrance depends on the resources available, such as the controllability of the stressor and, in addition, depends on individual differences. For instance, for an individual who perceives enhanced control in a positive way, such as someone high in DFC, high levels of control might make a situation more challenging than stressful.

Another important consideration for future research is the role of potential mediators. As per the Lazarus and Folkman (1984) tradition, we would argue that cognitive appraisals and coping strategies are two sets of mediators that might act as intervening variables in the interactive relationship among demand, control, and DFC in the prediction of task outcomes. It is possible that participants' perception of control is acting as a primary appraisal of the situation and, when the level of control manipulated in the experiment is matched to the individuals' desire for control, then there is a positive secondary appraisal (i.e. a belief that they have the resources to deal with

the demands of the task). Future experimental research is needed to directly investigate the mediating role of these appraisals in the P–E fit process. More specifically, studies in this area could examine the mediational role of the appraisals and coping strategies in a sequential manner. This could involve taking measures of perceived anxiety as an appraisal, as well as individuals' coping attempts, over time during an experimental task where levels of demand and control vary.

A limitation of the present study is that the outcome measures used were short-term affective task reactions. Use of a short-term experimental paradigm constrained the ability to examine health-related outcomes, which are dependent variables of particular significance in the D-CM literature. As such, the health implications of the model were not tested. High DFC has been implicated in health promotive behaviors, lower anxiety and depression (Burger, 1992; Gebhardt & Brosschot, 2002; Strube et al., 2003). Attempting to extend the findings of the present investigation to well-being and health-related outcomes would be worthwhile. Perrewe and Ganster (1989) investigated physiological arousal in their experimental study, finding no effects. However, the moderating influence of a person variable may reveal such relationships.

Finally, some would argue that the use of a laboratory-based paradigm does not provide high ecological validity, making it difficult to determine whether these effects would actually be replicated in an organisational context. In the present study, the use of a task in which participants completed a simulated work activity that was relatively high in complexity (i.e. designed to be similar to the type of activity people actually do in the workplace) was an attempt to improve realism. Moreover, previous research has highlighted the important role for experimental research in identifying and isolating the essential features of employee behavior in order to guide future research in the work setting (e.g. Dipboye & Flanagan, 1979; Ilgen, 1986; Locke, 1986). Indeed, Mook (1983) maintains that "the processes we dissect in the laboratory also operate in the real world" (p. 7). At this stage, only tentative conclusions can be drawn regarding the generalisability of these findings to an organisational setting. Future research should extend these findings with DFC to an applied setting, examining the effects in the organisational context with well-being and job-related outcomes.

Conclusions

The findings from the present study provide further support for the role of person variables within Karasek's (1979) D-CM. It seems that a situation-centered theory of work-strain does not tell the full story. Burger and Cooper's (1979) construct of DFC has important implications for individuals' reactions to situational constraints of demand and control.

However, it is important to look at the sub-dimensions of DFC separately as prior research and the findings of the present study indicate that the sub-dimensions are relatively independent, or at the least are differentially related to other variables (see Gebhardt & Brosschot, 2002). P–E Fit theory offers an appealing perspective in which to examine the interactions of person variables and environmental constraints; in terms of adaptive and maladaptive reactions to matches and mismatches between the person and the environment.

REFERENCES

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*, 191–215.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive view*. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.

Bateman, T.S., & Crant, J.M. (1993). The proactive component of organisational behavior: A measure and correlates. *Journal of Organizational Behavior*, *14*, 103–118.

Best, R.G., Stapleton, L.M., & Downey, R.G. (2005). Core self-evaluations and job burnout: The test of alternative models. *Journal of Occupational Health Psychology*, *10*, 441–451.

Burger, J.M. (1989). Negative reactions to increases in perceived personal control. *Journal of Personality and Social Psychology*, *56*, 246–256.

Burger, J.M. (1992). *Desire for control: Personality, social, and clinical perspectives*. New York: Plenum Press.

Burger, J.M., & Arkin, R.M. (1980). Prediction, control and learned helplessness. *Journal of Personality and Social Psychology*, *38*, 482–491.

Burger, J.M., & Cooper, H.M. (1979). The desirability of control. *Motivation and Emotion*, *3*, 381–393.

Christie, R., & Geis, F.L. (1970). *Studies in machiavellianism*. New York: Academic Press.

Daniels, K., & Guppy, A. (1994). Occupational stress, social support, job control, and psychological well-being. *Human Relations*, *47*, 1523–1544.

Day, A.L., & Jreige, S. (2002). Examining Type A behavior pattern to explain the relationship between job stressors and psychosocial outcomes. *Journal of Occupational Health Psychology*, *7*, 109–120.

Deci, E.L. (1975). *Intrinsic motivation*. New York: Plenum.

de Jonge, J., Dollard, M.F., Dormann, C., Le Blanc, P.M., & Houtman, I.L.D. (2000). The demand-control model: Specific demands, specific control, and well-defined groups. *International Journal of Stress Management*, *7*, 269–287.

de Jonge, J., van Breukelen, G.J.P., Landerweerd, J.A., & Nijhuis, F.J.N. (1999). Comparing group and individual level assessments of job characteristics in testing the job demand-control model: A multilevel approach. *Human Relations*, *52*, 95–122.

de Lange, A.H., Taris, T.W., Kompier, M.A., Houtman, I.L.D., & Bongers, P.M. (2003). "The very best of the millennium": Longitudinal research and the demand-control-(support) model. *Journal of Occupational Health Psychology*, *8*, 282–305.

de Rijk, A.E., Le Blanc, P.M., Schaufeli, W.B., & de Jonge, J. (1998). Active coping and need for control as moderators of the D-CM: Effects on burnout. *Journal of Occupational and Organizational Psychology*, *71*, 1–18.

Dipboye, R.L., & Flanagan, M.F. (1979). Research settings in industrial and organizational psychology: Are findings in the field more generalizable than in the laboratory? *American Psychologist*, *34*, 141–150.

Earley, P.C., & Lituchy, T.R. (1991). Delineating goal and efficacy effects: A test of three models. *Journal of Applied Psychology*, *76*, 81–98.

Elliot, A.J., & McGregor, H.A. (2001). A 2 × 2 achievement goal framework. *Journal of Personality and Social Psychology*, *80*, 501–519.

Freidman, M., & Rosenman, R. (1974). *Type A Behavior and your heart*. New York: Knopf.

Ganster, D.C. (1989). Worker control and well-being: A review of research in the workplace. In S.L. Sauter, J.J. Hurrell, & C.L. Cooper (Eds.), *Job control and worker health* (pp. 3–24). Chichester: Wiley.

Ganster, D.C., & Fusilier, M.R. (1989). Control in the workplace. In C.L. Cooper & I.T. Robertson (Eds.), *International review of industrial and organizational psychology* (pp. 235–280). Chichester: Wiley.

Gebhardt, W.A., & Brosschot, J.F. (2002). Desirability of control: Psychometric properties and relationship with locus of control, personality, coping, and mental and somatic complaints in three Dutch samples. *European Journal of Personality*, *16*, 423–438.

Gist, M.E., & Mitchell, T.R. (1992). Self-efficacy: A theoretical analysis of its determinants and malleability. *Academy of Management Review*, *17*, 183–211.

Ilgen, D.R. (1986). Laboratory research: A question of when, not if. In E.A. Locke (Ed.), *Generalizing from laboratory to field settings* (pp. 257–268). Lexington, MA: Lexington Books.

Ivanevich, J.M., Matteson, M.T., Freedman, S.M., & Phillips, J.S. (1990). Worksite stress management interventions. *American Psychologist*, *45*, 252–261.

Jackson, P.R., Wall, T.D., Martin, R., & Davids, K. (1993). New measures of job control, cognitive demand, and production responsibility. *Journal of Applied Psychology*, *78*, 753–762.

Jimmieson, N.L. (2000). Employee reactions to behavioral control under conditions of stress: The moderating role of self-efficacy. *Work and Stress*, *14*, 262–280.

Jimmieson, N.L., & Terry, D.J. (1997). Responses to an in-basket task: The role of work stress, behavioral control, and informational control. *Journal of Occupational Health Psychology*, *2*, 72–83.

Jimmieson, N.L., & Terry, D.J. (1998). An experimental study of the effects of work stress, work control, and task information on adjustment. *Applied Psychology: An International Review*, *47*, 343–369.

Jimmieson, N.L., & Terry, D.J. (1999). The moderating role of task characteristics in determining responses to a stressful work simulation. *Journal of Organizational Behavior*, *20*, 709–736.

Karasek, R.A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly*, *24*, 285–308.

Karasek, R.A., & Theorell, T.G. (1990). *Healthy work: Stress, productivity, and the reconstruction of working life*. New York: Basic Books.

Kieffer, K.M., Schinka, J.A., & Curtis, G. (2004). Person–environment congruence and personality domains in the prediction of job performance and work quality. *Journal of Counseling Psychology*, *51*, 168–177.

Lazarus, R., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer Publishing Company.

LePine, J.A., LePine, M.A., & Jackson, C.L. (2004). Challenge and hindrance stress: Relationships with exhaustion, motivation to learn, and learning performance. *Journal of Applied Psychology*, *89*, 883–891.

LePine, J.A., Podsakoff, N.P., & LePine, M.A. (2005). A meta-analytic test of the challenge stressor-hindrance stressor framework: An explanation for inconsistent relationships among stressors and performance. *Academy of Management Journal*, *48*(5), 764–775.

Locke, E.A. (1986). Generalizing from laboratory to field: Ecological validity or abstraction of essential elements? In E.A. Locke (Ed.), *Generalizing from laboratory to field settings* (pp. 3–9). Lexington, MA: Lexington Books.

Locke, E.A., & Latham, G.P. (1984). *Goal setting: A motivational technique that works*. Englewood Cliffs, NJ: Prentice Hall.

Locke, E.A., & Latham, G.P. (1990). *A theory of goal setting and task performance*. Englewood Cliffs, NJ: Prentice Hall.

Mook, D.G. (1983). In defense of external validity. *American Psychologist*, *38*, 379–387.

Murray, H.A. (1938). *Explorations in personality*. New York: Oxford University Press.

Nkomo, S.M., Fottler, M.D., & McAfee, B.R. (2004). *Applications in human resource management: Cases, exercises and skill builders* (5th edn.). New York: South Western.

Parker, S.K., & Sprigg, C.A. (1999). Minimizing strain and maximizing learning: The role of job demands, job control, and proactive personality. *Journal of Applied Psychology*, *84*(6), 925–939.

Parkes, K.R. (1991). Locus of control as a moderator: An explanation for additive versus interactive findings in the demand-discretion model of work stress? *British Journal of Psychology*, *82*, 291–312.

Perrewe, P.L., & Ganster, D.C. (1989). The impact of job demands and behavioral control on experienced job stress. *Journal of Organizational Behavior*, *10*, 213–229.

Pervin, L.A. (1968). Performance and satisfaction as a function of individual–environment fit. *Psychological Bulletin*, *69*, 56–68.

Pervin, L.A. (1992). Transversing the individual–environment landscape: A personal odyssey. In W.B. Walsh, K.H. Craik, & R.H. Price (Eds.), *Person–environment psychology: Models and perspectives* (pp. 71–88). Englewood Cliffs, NJ: Lawrence Erlbaum Associates.

Peterson, M.F., Smith, P.B., Akande, A., & Ayestaran, S. (1995). Role conflict, ambiguity, and overload: A 21-nation study. *Academy of Management Journal*, *38*, 429–452.

Rotter, J.B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General & Applied*, *80*(1), 1–28.

Searle, B.J., Bright, J.E.H., & Bochner, S. (1999). Testing the 3-factor model of occupational stress: The impact of demands, control and social support on a mail sorting task. *Work and Stress*, *13*, 268–279.

Searle, B.J., Bright, J.E.H., & Bochner, S. (2001). Helping people to sort it out: The role of social support in the job strain model. *Work and Stress*, *15*, 328–346.

Shapiro, D.H., Jr., Schwartz, C.E., & Astin, J.A. (1996). Controlling ourselves, controlling our world: Psychology's role in understanding positive and negative consequences of seeking and gaining control. *American Psychologist*, *51*, 1213–1230.

Strube, M.J., Hanson, J.S., & Newman, L. (2003). Personal control. In E. Chang & L. Sanna (Eds.), *Virtue, vice, and personality* (pp. 71–88). Washington, DC: American Psychological Association.

Sutherland, V.J., & Cooper, C.L. (2000). *Strategic stress management: An organizational approach*. London: Macmillan.

Tabachnick, B.G., & Fidell, L.S. (2001). *Using multivariate statistics*. New York: HarperCollins Publishers.

Terborg, J.R. (1981). Interactional psychology and research on human behavior in organizations. *Academy of Management Review*, *6*, 569–576.

Terry, D.J., & Jimmieson, N.L. (1999). Work control and employee well-being: A decade review. In C.L. Cooper & I.T. Robertson (Eds.), *International review of industrial and organizational psychology*, *14*, 95–144. Chichester: John Wiley.

Tett, R.P., & Burnett, D.D. (2003). A personality trait-based interactionist model of job performance. *Journal of Applied Psychology*, *88*(3), 500–517.

Tett, R.P., & Guterman, H.A. (2000). Situation trait relevance, trait expression, and cross-situational consistency: Testing a principle of trait activation. *Journal of Research in Personality*, *34*, 397–423.

Thompson, S.C. (2002). The role of personal control in adaptive functioning. In C.R. Snyder & S.J. Lopez (Eds.), *Handbook of positive psychology* (pp. 202–213). New York: Oxford University Press.

Van der Doef, M., & Maes, S. (1998). The job demand-control (-support) model and physical and health outcomes: A review of the strain and buffer hypotheses. *Psychology and Health*, *13*, 909–936.

Van der Doef, M., & Maes, S. (1999). The job demand-control (-support) model and psychological well-being: A review of 20 years of empirical research. *Work and Stress*, *13*, 87–114.

Walsh, W.B., Price, R.H., & Craik, K.H. (1992). Person–environment psychology: An introduction. In W.B. Walsh, K.H. Craik, & R.H. Price (Eds.), *Person–environment psychology: Models and perspectives* (pp. vii–xi). Englewood Cliffs, NJ: Lawrence Erlbaum Associates.

Wood, R.E., & Bandura, A. (1989). Impact of conceptions of ability on self-regulatory mechanisms and complex decision making. *Journal of Personality and Social Psychology*, *56*, 407–415.