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Work Factors, Work- Family Conflict, the Theory of Planned Behaviour and Healthy Intentions: A Cross-Cultural Study

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Abstract

The present study examined the roles of work factors (i.e. job demands, job resources), work-family conflicts and culture on predictors of healthy intentions (fruit and vegetable consumption, low-fat diet, physical activity) within the framework of the Theory of Planned Behaviour (TPB). Employees from the UK (N = 278) and Malaysia (N = 325) participated in the study. Results indicated that higher job demands were significantly related to lower intentions to eat a low-fat diet. Females reported higher intentions to eat a low-fat diet than males did, while participants from the UK had lower intentions to engage in physical activity compared to those from Malaysia. The efficacy of TPB variables in explaining intentions was verified, with perceived behavioural control (i.e. self-efficacy), attitudes and descriptive norms combined with past behaviour predictive across the samples. The results also suggest the roles of culture and work interference with family variables in moderating TPB-intention relationships and confirm that TPB variables mediate the effects of job demands and job resources on intentions. Practically, to promote health, identifying strategies to reduce stress factors; specifying important cognitive factors affecting work factors and thus, healthy intentions; and acknowledging cultural-specific determinants of healthy intentions are recommended.

Keywords

work factors; work-family conflict; healthy intentions; cross-cultural; Theory of planned behaviour (TPB)

Introduction

Evidence suggests that stressors (including work stress) trigger unhealthy behaviours, including increased consumption of calories, fat- and sugar-based diets (e.g. Adam & Epel, 2007) and lower physical activity levels (e.g. Hellersterdt & Jeffery, 1997; Payne, Jones, & Harris, 2002). However, the stress-health behaviour relationship is not straight forward and may depend on both the nature of the stressor and the behavioural outcome. A few studies have proposed socio-cognitive variables (e.g. Theory Planned Behaviour: TPB) as possible mediators by which stressors influence health behaviours (Budden & Sagarin, 2007; Louis, Chan, & Greenbaum, 2009; Payne, Jones, & Harris, 2002; 2005). Nevertheless, research within this area has generally focused upon models of work-related stress. Until now, little or no attention has been paid to the effect of work-family conflict, despite the fact that health behaviours span the barrier between work and home environments and are likely candidates for the compromising effects of work-family conflict. Furthermore, almost no work has been reported to date from non-Western countries.

The present research extends the existing literature by examining the effects of work factors based on the Job Demands and Resources Model (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001) and work-family conflict together with the Theory of Planned Behaviour (TPB: Ajzen, 1991) on intentions to engage in healthy behaviours in the UK and Malaysia, representing individualistic and collectivistic cultures, respectively. Given that intention is the key

determinant of behaviour according to the TPB (Ajzen, 1985), the present study focuses on intentions for three healthy behaviours (low fat consumption, fruit and vegetable consumption and physical activity), which the literature suggests are vulnerable to the deleterious effects of stress (Ng & Jeffery, 2003) and may thereby affect behaviour and health.

Modelling Work Factors, Work-Family Conflict and Healthy Behaviours

Existing research examining the effect of work factors on healthy behaviours within the TPB framework is limited and has produced mixed results. For example, Payne et al. (2002) found a direct effect of stress on healthy intentions in that work-related stress was found to reduce healthy eating and physical activity, although this effect did not apply to intentions for fruit and vegetable intake (Payne et al., 2005). While existing research primarily used the Demand-Control Model (Karasek, 1979) to explain work-related variables, the present study goes beyond the Demand-Control Model to test a more inclusive approach, the Job Demands Resources Model (Demerouti et al., 2001), to explain how two aspects of working conditions (i.e. job demands and resources) may impact health behaviours.

Recently, the Job Demands and Resources model has gained attention as a model describing psychosocial work characteristics, job demands and job resources, as the antecedents of health-related and motivational outcomes. There is increasing evidence that the model provides a better explanation of the relationships among work characteristics and wellbeing than the Demand Control Model (van Veldhoven, Taris, De Jonge, & Broersen, 2005). In this model, *job demands* refer to 'physical, social, or organizational aspects of the job that require sustained physical and/or psychological (cognitive or emotional) efforts on the part of the employee, and are therefore associated with certain physiological and/or psychological costs' (Bakker & Demerouti, 2007, p. 312). *Job resources* refer to 'those physical, psychological, social, or

organizational aspects of the job that either/or: are functional in achieving work goals; reduce job demands and the associated physiological and psychological costs; and stimulate personal growth, learning, and development' (Bakker & Demerouti, 2007, p. 312). In the context of the current research, a strain process (Brough et al., 2013) produced by high job demands may lead employees to feel a lack of control, experience negative emotions (Van Den Broeck, Cuyper, Witte, & Vansteenkiste, 2010) and adopt an emotion-focused coping style (Folkman & Lazarus, 1985), which may disrupt their intentions to engage in healthy behaviours. By contrast, motivational processes (Brough et al., 2013) assist employees to engage in healthier intentions when sufficient job resources are available. We tested the following hypothesis:

Hypothesis 1a: High job demands will decrease healthy intentions, whereas job resources will increase healthy intentions.

Previous research has revealed that job characteristics proposed by the Job Demands Resources model were associated with work-family conflict (Butler, Grzywacz, Bass, & Linney, 2005). Work-family conflict occurs when efforts to fulfil work role demands interfere with the ability to fulfil family demands and vice versa (Greenhaus & Beutell, 1985). Work-family conflict is bidirectional: work interferes with family (WIF) and family interferes with work (FIW; Allen & Armstrong, 2006). Past research that focused specifically on healthy behaviour found that work-family conflict is linked to reduced physical activity (Allen & Armstrong, 2006; Grzywacz & Marks, 2001) and unhealthy eating habits (e.g. Lallukka et al., 2010; Roos et al., 2007). Moreover, most published research suggests that WIF and FIW may have different behavioural effects. For instance, Roos et al. (2007) found that food habits are related more to FIW conflict, whereas physical activity is related more to WIF conflict. Because work-family conflict has to do with insufficient time and physical and psychological strains (Allen, Herst,

Bruck, & Sutton, 2000; Allen & Armstrong, 2006), it may have a significant impact on healthy behaviour intentions. Therefore, we posit the following hypothesis:

Hypothesis 1b: High WIF and high FIW will decrease healthy eating and physical activity intentions.

Utility of the TPB

The TPB (Ajzen, 1991) is one of the most widely applied social cognitive frameworks in health behaviour research (McEachan, Conner, Taylor, & Lawton, 2011). Considerable research has focused on applications of the TPB to healthy eating, including fruit and vegetable and/or low fat consumption (e.g. Hamilton, Vayro & Schwarzer, 2015; Kothe, & Mullan, 2015; Povey, Conner, Sparks, James & Shepherd, 2000) and physical activity (see Hagger, Chatzisarantis, & Biddle, 2002 for a review). According to the TPB, the proximal determinant of behaviour is a person's intention to perform the behaviour. This construct represents a person's motivation: the more one intends to engage in a particular behaviour, the more likely it is to occur. In turn, intention is theorized to be predicted by three social-cognitive concepts: attitudes (i.e. the individual's positive or negative evaluation of the behaviour), subjective norms (i.e. perceived social pressure to behave, stemming from predictions regarding social approval or disapproval of the behaviour) and perceived behavioural control (PBC: i.e. the individual's perception of the extent to which performance of the behaviour is easy or difficult; Ajzen, 1991). According to Ajzen (2002), PBC is also used as a two-dimensional construct comprising self-efficacy (i.e. the extent to which performance of the behaviour is perceived as easy or difficult for the individual) and perceived control (i.e. the extent to which the individuals perceive the performance of the behaviours to be within his or her control). Furthermore, subjective norms have been distinguished as injunctive norms (i.e. what significant others think the person ought to do) and

descriptive norms (i.e. what significant others do themselves) because these are separate sources of motivation (Rivis & Sheeran, 2003). Acknowledging the fact that the source's subjective norms (i.e. subjective and descriptive) and PBC (i.e. self-efficacy and perceived control) are important in behavioural interventions, the present study sought to test if these variables had independent effects on intentions. Given that studies have found past behaviour to be the strongest predictor of intention and behaviour (e.g. Conner & Armitage, 1998; Oullette & Wood, 1998), and that it tends to attenuate the influence of other TPB variables (e.g. Norman et al., 1999), this study also considers the additional predictive utility of past behaviour. The present study used the TPB model to identify the socio-cognitive determinants of healthy behaviours that may provide some explanation of the processes that account for the stressor-intention relationship.

Hypothesis 2: The TPB constructs (i.e. PBC, attitudes and subjective norms) will be predictive of healthy behaviour intentions and the addition of past behaviour will increase the amounts of variance explained in intentions.

A number of studies (Louis et al., 2009; Payne et al., 2002, 2005) have focused on the moderating effect of stressors on TPB constructs in relation to health behaviours. The TPB identifies three distinct socio-cognitive paths by which vulnerability to unhealthy behaviour under stress can be modelled using moderation analyses (see Louis et al., 2009 for details). Louis et al. (2009) found an additional 6% of the variance in unhealthy eating intentions was accounted for by the effect of high stress in attenuating the effect of perceived control and eliminating the effect of subjective norms. Thus, the present study further examines job demands, job resources, WIF and FIW as potential moderators of the TPB-intention relationship. We tested the following hypothesis:

Hypothesis 3: Job demands, job resources, WIF and FIW will moderate TPB-intention relationships.

Based on the tenets of the TPB, the effect of distal factors (e.g. work variables) on intentions should be mediated by the TPB variables (Armitage, Norman, & Conner, 2002). Given that work variables have the ability to disrupt the cognitive components (e.g. lowering one's efficacy and changing attitudes) related to certain behaviour, it is possible that such variables may influence intentions via changing the components of PBC and attitudes of the TPB. The key question is whether specific socio-cognitive variables mediate such relationships since they would be potential targets for health interventions. Yet, such mediation models have rarely been tested (Payne et al., 2002). Hence, this present study attempts to further examine the cognitive mechanisms by which work-related variables and work-family conflict may affect intentions.

Hypothesis 4: The effects of job demands, job resources, WIF and FIW on intentions will be mediated by the TPB variables.

Role of Culture

As stated above, most studies examining the effect of stress on health behaviours using the TPB have focused on Western populations. Cross-cultural research adopting the individualistic and collectivistic framework, however, could shed light on how cognition and motivation might determine healthy behaviours in different cultures (Markus & Kitayama, 1991). As Markus and Kitayama note, people from individualistic cultures are more likely to refer to themselves as independent, self-contained and more differentiated from others, so their cognitions might be expected to regulate their behaviours. In contrast, in collectivist cultures, where motives may be significantly shaped and governed by a consideration of the reactions of others, individuals may be driven more by social considerations. However, individualistic and

collectivistic constructs are complex and involve both inter- and intra-cultural variability (Lavee & Katz, 2003). Meta-analytic evidence (Oyserman et al., 2002) has shown the relative degree of individualism and collectivism observed in specific national and cultural groups. For example, Hofstede (2001) showed that individualism tends to be higher in Western cultures including the UK, while Eastern countries such as Malaysia are predominantly collectivist cultures. Such cultural differences may provide a good context to examine possible differences in the relative weights of the predictors of healthy intentions.

Several cross-cultural studies (e.g. Blanchard et al., 2008, 2009; Van Hooft & De Jong, 2009) examined culture as a potential moderator of the effects among the TPB constructs. Specifically, a few authors (Hagger et al., 2007; Lee, Hubbard, O'Riordan, & Kim, 2006) have hypothesized that the TPB would exhibit minimal variation across samples, but that cultural orientation may serve as a potential moderator of the TPB constructs. There may be some variation in the hypothesized effects of attitudes, PBC and subjective norm constructs on health-related behaviours across individualistic and collectivistic contexts (Hagger et al., 2007; Lee et al., 2006). If this is the case, the socio-cognitive variables best targeted by healthy behaviour interventions may differ based on cultural orientation.

> *Hypothesis 5:* Culture will moderate TPB-intention relationships, with people from a collectivistic culture (i.e. Malaysia) being more attentive to social norms (i.e. subjective norms) and people from an individualistic culture (i.e. the UK) placing more emphasis on personal evaluations (i.e. attitudes and PBC).

Method

Sample and Procedure

There were 603 participants, 278 (129 males and 149 females) from the UK (46.1%) and 325 (154 males and 171 females) from Malaysia (53.9%), employed in various occupational fields (modern professional occupations; clerical and intermediate occupations; managerial, routine and semi routine manual occupations; and traditional professional occupations). The UK sample (M = 40.0 years, SD = 11.1) was significantly older than the Malaysian sample (M = 34.0 years, SD = 8.5; $t(599) = 39.50$, $p < .001$). Furthermore, Malaysian participants were more likely to work as professionals (professional vs. non-professional: $\chi^2(1) = 9.22$, $p < .001$) and to have children (≥1 child: $\chi^2(1) = 23.56$, $p < .001$) compared to the UK sample.

Participants were recruited via two procedures. For the first procedure, the researcher sent emails to a contact person (e.g. human resources officer, departmental secretary) in several sectors, including local government administration offices, private companies and educational institutions. Then, the officer in charge would forward the emails to potential participants (N = 311, 51.6%). The second procedure involved recruiting participants at their workplaces after holding informative meetings with management representatives (N = 292, 48.4%). Similar recruitment procedures were used for both the UK and Malaysian samples. Ethical approval was given by the Ethics Committee of the Institute of Psychological Sciences, University of Leeds, UK.

Measures

A structured questionnaire was used to collect data for the study. Measures included socio-demographic characteristics (i.e. nationality, age, gender, number of children, marital status and occupation). Since Malay is the first language spoken by the Malays, with English as a second language, bilingual questionnaires were administered among the Malaysian sample. The questionnaire was translated using a back-translation method by two linguists proficient in both

languages, with in-depth experience in culture, jargon, idiomatic expressions and emotional terms in the original and translated languages. As part of the content validation procedure, consultation with experts to determine the representativeness, specificity and clarity of the questionnaire was used (see Haynes, Richard, & Kubany, 1995).

Job demands and resources. Demerouti et al.'s (2001) 16-item measure of *job demands* (cognitive workload, task variety, environmental conditions, shift work, demanding contact, time pressure and physical workload) was included. Items measuring *emotional demands* were based on Van Veldhoven & Meijman (1994). The 17-item version (Demerouti et al., 2001) was utilised as a composite measure of *job resources,* including control, job security, feedback and participation in decision-making, supervisor support, rewards and learning opportunities subscales. Items related to *social support* (Karasek, 1985) were also added. Items were scored on a 4-point scale ranging from *does not apply at all* (1) to *applies completely* (4). The reliabilities of the scales were acceptable: .77 and .76 for job demands and .79 and .71 for job resources in the UK and Malaysian samples, respectively. These reliabilities are slightly lower than those in past research (Brough et al., 2013) that compared the applicability of this model using a cross-cultural design.

Work-family conflict. An eight-item scale developed by Gutek, Searle and Klepa (1991) was used to measure the two types of *work- family conflict* (4 items each for WIF and FIW). Participants responded on a 5-point scale ranging from *strongly disagree* (1) to *strongly agree* (5); high scores denote high levels of conflict ($\alpha = .78$ and $\alpha = .72$ in the UK and Malaysian samples, respectively).

TPB. In accordance with the TPB guidelines (e.g. Ajzen, 1991; Conner & Norman, 2005), the TPB constructs were measured on 7-point response scales[1]. *Intentions* were measured as the mean of two items (e.g. I intend to eat a low-fat diet over the next week; α = .84 to .88 for the UK sample and α = .80 to .84 for the Malaysian sample). *Attitude* was assessed as the mean of four items (e.g. eating a low-fat diet over the next week would be worthless/valuable, not enjoyable/ enjoyable, harmful/ beneficial, unpleasant/pleasant; α = .89 to .91 for the UK sample and α = .86 to .88 for the Malaysian sample). *PBC* was measured by two items: one assessed self-efficacy (e.g. I am confident that I could eat a low-fat diet over the next week) and the other assessed perceived control (e.g. I have control over whether or not I eat a low-fat diet over the next week). *Injunctive norms* (e.g. people who are important to me think I should eat a low-fat diet over the next week) and *descriptive norms* (e.g. I think the people most important to me will eat a low-fat diet over the next week) were each assessed using a single item. *Past behaviour* (i.e. eating five portions of fruit and vegetables a day; eating a low-fat diet; engaging in 30 minutes of moderate-intensity exercise 3–5 times a day) were each measured by a single item.

Statistical Analyses

Correlations and regression analyses were used to predict intention to engage in healthy eating and physical activity. Interaction terms were constructed (Baron & Kenny, 1986) and a stepwise regression method was used[2]. Given the exploratory nature of these analyses, only interactions that had significant betas for entry into the equation (after controlling for all

[1] This questionnaire also used the TPB constructs to assess other behaviours including smoking and alcohol consumption. Hence, the use of multiple items for each TPB construct would have placed an excessive burden on respondents.

[2] The moderation effect of gender in the TPB-intention relationship was also examined. However, there was no evidence that gender moderates any TPB relationship.

variables under consideration)[3] are reported. The simultaneous effects of more than one interaction were not considered to protect against multicollinearity. To test whether TPB constructs potentially mediate the link between job demand, job resources and intentions, the bootstrapping method based on 5000 samples was used to assess the indirect effects with multiple mediators (Preacher & Hayes, 2008). This method is also used to determine specific indirect effects that are the most important among potential mediators being examined.

Results

Table S1 presents the descriptive statistics by culture and gender for the stress measures and healthy behaviours intentions. Means and standard deviations are reported for both the UK and Malaysian samples.

INSERT TABLE S1 HERE

Predicting Intention of Fruit and Vegetable Consumption

Table S2 reports intercorrelations, means and standard deviations for all fruit and vegetable measures. All TPB variables were positively correlated with fruit and vegetable consumption intention, as predicted. Job resources and culture showed significant positive correlations with intention, with the UK sample indicating greater intention to eat more fruit and vegetables (M = 4.99, SD = 1.63) than the Malaysian sample (M = 4.44, SD = 1.59). Table 1 presents the regression model predicting intention of fruit and vegetable consumption. The TPB

[3] We considered the following variables as control variables in all analyses: age, marital status, number of children, occupation, gender and culture. However, only variables with significant effects based on correlations and regression analyses are reported (i.e. culture, gender).

variables accounted for a statistically significant proportion of the variance of fruit and vegetable intention, $R^2 = .60$; $F(5, 584) = 175.74$, $p < .001$, with all the TPB variables emerging as significant predictors. The addition of job demands, job resources, WIF, FIW, gender and culture at step 2 failed to improve the model, $\Delta R^2 = .00$, $F(6, 578) = 1.39$, n.s, with all the TPB variables remaining as significant predictors. Interaction terms were entered at step 3, but none of these were significant. The addition of past behaviour at the final step produced a further small increase in the amount of variance explained in fruit and vegetable intention, $\Delta R^2 = .08$, $F(1, 577) = 153.07$, $p < .001$. All the TPB variables except perceived control, along with past behaviour emerged as significant predictors in the final model.

INSERT TABLE 1 & S2 HERE

Predicting Low-Fat Diet Intention

All TPB variables were significantly correlated with low-fat diet intention (Table S3). Job demands (negative direction: higher job demands were associated with lower low-fat diet intentions) and gender were significantly correlated with a low-fat diet. Females were more likely to intend to eat a low-fat diet ($M = 5.11$, SD = 1.42) than males ($M = 4.74$, SD = 1.56). Based on regression analyses (Table 2), step 1 explained a statistically significant proportion of the variance of low-fat diet intention, $R^2 = .52$, $F(5, 582) = 127.73$, $p < .001$, with all the TPB variables except perceived control emerging as significant predictors. Step 2 produced a statistically significant increase in the explained variance, $\Delta R^2 = .01$, $F(6, 576) = 4.00$, $p < .01$, with gender, job demands (negative relationship) and TPB variables, except perceived control,

having significant beta weights. At step 3, the addition of the WIF × injunctive norm interaction term produced a significant improvement in the model, $F(1, 575) = 8.20$, $p < .01$. The direction of the beta weight ($\beta = -.38$, $p < .01$) indicates that the injunctive norm-intention relationship became weaker as WIF increased. Decomposition of the interaction showed that injunctive norms were found to be a significant predictor of intention at low ($r = .60$, $p < .001$; $\beta = .24$, $p < .001$) but not at high ($r = .36$, $p < .001$; $\beta = .01$, n.s) WIF levels. Past behaviour, entered at step 4, accounted for an increase of 8% of the explained variance, $F(1, 574) = 125.84$, $p < .001$.

INSERT TABLE 2 & S3 HERE

Predicting Physical Activity Intention

Table S4 reports the means, standard deviations and correlations for physical activity intention. All TPB variables were significantly correlated with physical activity intention. Job demands and culture were also correlated with physical activity intention. UK participants were less likely to intend to engage in physical activity ($M = 4.82$, SD = 1.62) than Malaysians were ($M = 5.10$, SD= 1.31). Regression analyses (Table 2) showed that at step 1, all the TPB variables except injunctive norms were significant predictors of intention, $R^2 = .52$, $F(5, 585) = 128.99$, $p < .001$. Step 2 produced a significant increase in explained variance, $\Delta R^2 = .01$, $F(6, 579) = 2.62$, $p < .05$, with TPB variables (except injunctive norms), job demands and culture, as significant predictors. However, the difference in the direction of the job demands-physical activity intention relationship ($r = -.08$, $p < .05$, $\beta = .07$, $p < .05$) based on correlation and regression

analyses may suggest that they were merely statistical artefacts[4]. Interaction terms were entered in the next step and two significant interactions were found. The interaction between culture and attitude produced a significant beta weight (β =.83, $p < .001$), increasing the explained variance by 1.5 %, $F(1, 578) = 19.34$, $p < .001$. Further analyses revealed that attitude was a significant predictor of physical activity for UK participants ($r = .52$, $p < .001$; $\beta = .20$, $p < .001$), but not for Malaysians ($r = .37$, $p < .001$; $\beta = .04$, n.s.). The interaction term between culture and descriptive norms was also significant ($\beta = -.25$, $p < .05$), suggesting that descriptive norms were significant predictors of physical activity intention only for Malaysians ($r = .36$, $p < .001$; $\beta = .18$, $p < .001$). No effect was found for the UK sample ($r = .23$, $p < .001$; $\beta = .07$, n.s.). Finally, past behaviour significantly increased the percentage of the variance explained in intention by 10.5% and was the strongest predictor of intention, greater than any TPB variable.

INSERT TABLE S4 HERE

Mediation Analyses

TPB as a mediator between job resources/job demands and intentions. Results of the analyses confirmed the mediating role of the proposed TPB mediators (i.e. attitude, PBC) in the relationship between job resources and all intentions being examined in the current study. First, a full mediation effect emerged as the direct effect of job resources on intention to eat fruit and

[4] Because of the high correlation between job demands and WIF ($r = .44$, $p < .001$), the hierarchical regression was repeated by entering all the variables excluding WIF at the appropriate steps. The results of the analyses showed that job demands were no longer significant, suggesting the effect of multicollinearity may have influenced the results.

vegetables (total effect = .0232, $p < .05$) became non-significant (direct effect = -.0024, n.s.), after controlling for the mediators in the model (indirect effect B = .0256; CI = .0096 to .0410). Examination of specific indirect effects showed that attitude (path = .0075; CI = .0019 to .0142), self-efficacy (path = .0139; CI = .0025 to .0254) and perceived control (path = .0042; CI = .0007 to .0093) were significant mediators. With regard to the effect of job resources on low-fat diet intention, a full mediation model (total effect = -.0242, $p < .05$ and direct effect = .002, n.s.) was supported with an indirect effect of (B = .0239; CI = .0098 to .0380). Two significant mediators were found: attitude (path = .0099; CI = .0032 to .0186) and self-efficacy (path = .0123; CI = .0040 to .0228). Next, the total indirect effect of job resources on physical activity intention through the proposed TPB mediators was significant (B = .0292; CI = .0174 to .0420). Attitude (path = .0178; CI = .0017 to .0111), self-efficacy (path = .0178; CI = .0089 to .0281) and perceived control (path = .0058; CI = .0023 to .0112) were significant mediators. The total effect (B = .0285, $p < .05$) became non-significant when the TPB mediators were controlled (direct effect B = .000, n.s.), which reflects full mediation.

Finally, the effect of job demands on low-fat diet intention was partially mediated by TPB constructs (total effect = -.0422, $p < .001$ and direct effect = -.0201, $p < .05$), after controlling for the mediators (indirect effect B = -.0224; CI = -.0341 to -.0099). Attitude (path = -.0085; CI = -.0158 to -.0024) and self-efficacy (path = -.0130; CI = -.0220 to -.0058) emerged as significant mediators; suggesting that the two variables partially mediate the effect of job demands on low-fat diet intentions.

Discussion

The purpose of this study was to examine the relationships between work factors, work-family conflict, TPB constructs and healthy behaviour intentions in collectivist Malaysian and

individualistic UK cultures. To our knowledge, this is the first study to use the Job Demands Resources model and work-family conflict in relation to the TPB framework. The results showed that females reported higher intentions to eat a low-fat diet compared to males, while the UK sample had lower intentions to engage in physical activity than did the Malaysian sample. Our results suggest that, job demands were predictive of low-fat diet intention, in that higher job demands were associated with a lower intention to eat a low-fat diet, partially supporting Hypothesis 1a. This concurs with the results of previous research (e.g. Adam & Epel, 2007) where stress was related to a higher consumption of highly palatable and nutrient-dense foods, as they are perceived as hedonically rewarding (Ng & Jeffery, 2003).

Consistent with Hypothesis 2, the TPB variables played a relatively strong role, explaining 52% and 60% of the variance in healthy intentions. Among the TPB variables, self-efficacy, attitudes and descriptive norms remained predictive. Hence, increasing the salience of these constructs across samples may be one way to increase motivation to engage in healthy behaviours. Perceived control and injunctive norms, on the other hand, were found to produce weaker effects, confirming the evidence presented by previous reviews (e.g. Armitage & Conner, 2001). Importantly, the findings were consistent with a growing numbers of studies that consider different sources of control (e.g. Armitage & Conner, 2001; Povey et al., 2000) and normative influences (e.g. Rivis & Sheeran, 2003) when examining people's intentions. Furthermore, past behaviour was found to be the strongest predictor of intentions, after controlling for the variables already included in the TPB. Consistent with previous studies (Conner & Armitage, 1998; Oullette & Wood, 1998), the current study showed that past behaviour tends to attenuate the other TPB variables. This finding reflects that healthy eating and physical activity intentions may be largely determined by habits that are repeated on a daily basis and require less mental effort

and conscious control (Norman & Conner, 2006; Oullette & Wood, 1998). It should be noted, however, that past behaviour is not the same as habitual behaviour (Ajzen, 2002; Brug de Vet, de Nooiijer, & Verplanken, 2006). Nevertheless, the theoretical notion of promoting and (re)establishing healthful habits should be highlighted in intervention programs as habit formation is strongly linked to the frequency of past behaviour (Aarts, Paulussen, & Schaalma, 1997).

In line with our prediction (Hypothesis 3), the current study also found that WIF moderated the relationship between injunctive norms and low-fat intentions, such that injunctive norms had a beneficial impact only for participants with low WIF; while a high level of WIF diminished the effect of norms on low-fat diet intentions. Based on a self-regulation explanation (Baumeister, Bratslavsky, Muraven, & Tice, 1998), Louis et al. (2009), offered a possible reason for this trend: stress weakens self-regulation, which in turn, reduces motivation in response to external normative pressure. Hence, it is not surprising that the pressure of a social norm to choose healthy food (i.e. low-fat diet) is more likely to be ignored than personal factors (e.g. attitude, control) under stressful conditions. Overall, this finding suggests that persuasive communications relying on social pressure may be an inefficient method to help stressed individuals to adopt healthy habits. Alternative strategies may be more effective. For example, it may be useful to target beliefs about the outcomes of unhealthy food choices or focus on increasing self-efficacy to avoid unhealthy eating in response to stressful conditions.

In addition, the present study found support for the moderating effect of culture on the relationship between TPB constructs and physical activity intentions (Hypothesis 5 was supported in relation to physical activity, but not for other health behaviours). Specifically, attitude significantly predicted physical activity intentions only in the UK sample and not among

the Malaysians, whereas descriptive norms significantly predicted physical activity intentions only in the Malaysian sample. These results concur with other studies (Hagger et al., 2007; Lee et al., 2006) that found a few variations in the relative salience of certain TPB variables (i.e. personal attitudes vs. normative influence) within individualistic and collectivistic cultural frameworks. Such results provide evidence that specific TPB measures may vary as a function of culture. However, overall, it is reasonable to draw conclusions similar to previous research (Hagger et al., 2007), suggesting the generalizability of the TPB model across cultures since the moderating effect of culture added very little to the model explaining intentions in the current study.

Finally, the mediation analyses showed that attitudes and PBC, mainly via self-efficacy, mediated the effect of job resources (fully) and job demands (partially) on intentions (supporting Hypothesis 4). In line with the basic Job Demands and Resources assumptions (Demerouti et al., 2001; Brough et al., 2013), the current study found that the motivational processes associated with high resource factors were linked to increased intentions with regard to fruit and vegetable consumption, low-fat diet and physical activity, mediated by the changes in attitudes and PBC. On the other hand, higher job demands lead to higher fat consumption through attitudes and PBC, suggesting a negative effect of strain processes produced by (usually negative) job demands. Given that this is the first study to demonstrate the cognitive mechanisms by which work factors (based on the Job Demands Resources model) are related to intentions; further research is needed to validate the findings.

Limitations

There were methodological limitations in the present study. First, since it was a cross-sectional study providing a subjective snap shot of the relationship between variables, it is not

possible to suggest causality. Second, the study used self-report measures. Objective measures would have provided a more truthful indicator. For practical reasons, a few TPB constructs were measured as a single item. While the majority of the TPB studies have used single item measures, it must be noted that these measures could be affected by measurement error. Further studies might usefully include reliable multiple-item measures. The study was also limited by the fact that we did not establish the extent to which each selected country represented individualistic and collectivistic cultural frameworks. Including a measure of the actual cultural dimensions in future studies would be desirable. Finally, there may have been selection bias in the samples due to convenience sampling. Thus, the lack of randomization in the selection process of participants affects the generalizability of the study findings.

Implications

Theoretically, the study proposed that the TPB model could be expanded to include a stress component when modelling the antecedents of healthy intentions. Secondly, we consider our findings noteworthy in their suggestion that job demands impair healthy eating intentions either directly or indirectly, via the TPB components. Building on this knowledge, organizations may help employees to develop strategies to reduce specific stressors and provide sufficient resources. Intervention efforts should also focus on increasing control and motivation to maintain healthy lifestyles by creating workplace environments that facilitate healthy choices, such as physical activity and healthy food environments (Sallis & Glanz, 2009). Such supportive work environments may also help to establish stronger healthy habits, which are often triggered by environmental cues (Brug et al., 2006).

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Table 1. Hierarchical regression analysis predicting fruit and vegetable intentions.

		Predicting fruit and vegetable intentions		
Step	Predictors	Step 1	Step 2	Step 3
1	Perceived control	.05*	.05*	.03
	Self-efficacy	.43***	.42***	.27***
	Attitude	.19***	.19***	.18***
	Injunctive norm	.06*	.06*	.07*
	Descriptive norms	.27***	.26***	.16***
2	WIF		-.05	-.02
	FIW		.02	.01
	Demands		-.02	-.02
	Resources		-.01	.00
	Culture		.01	.01
	Gender		.04	.04
3	Past behaviour			.37***
	R^2	.60***	.60	.68***
	ΔR^2	.60***	.00	.08***

Note. Standardized regression coefficients are presented. WIF = work interference with family; FIW = family interference with work. *p <.05, **p <.01, ***p <.001.

Table 2: Hierarchical regression analysis predicting low fat diet and physical activity intentions.

		Predicting low fat diet intentions				Predicting physical activity intentions			
Step	Predictors	Step 1	Step 2	Step 3	Step 4	Step 1	Step 2	Step 3	Step 4
1	Perceived control	.01	.01	.01	.02	.14***	.15***	.16***	.13***
	Self-efficacy	.34***	.33***	.33***	.18***	.47***	.47***	.46***	.28***
	Attitude	.21***	.21***	.21***	.16***	.12**	.15***	.14**	.14**
	Injunctive norm	.14***	.14***	.13***	.11***	.06	.05	.05	.06
	Descriptive norms	.23***	.22***	.21***	.14***	.13***	.11**	.11**	.11**
2	WIF		.01	.01	.01		-.06	-.06	-.00
	FIW		.02	.02	.01		.04	.03	.01
	Demands		-.09**	-.08**	-.07**		.07*	.07*	.01
	Resources		-.02	-.02	-.01		.00	-.00	-.01
	Culture		-.03	-.03	-.02		-.08**	-.73***	-.56***
	Gender		.10***	.09**	.07**		.00	.00	.01
3	Culture x attitude							.83***	.76***

	Culture x descriptive norm							-.25**	-.20*
	WIF x injunctive norm			-.38**	-.25*				
4	Past behaviour				.36***				.39***
	R^2	.52***	.54**	.54**	.63***	.52***	.53***	.55***	.66***
	ΔR^2	.52***	.01**	.00**	.08***	.52***	.01*	.02***	.10***

Note. Standardized regression coefficients are presented. WIF = work interference with family; FIW = family interference with work.

*p <.05, **p <.01, ***p <.001.