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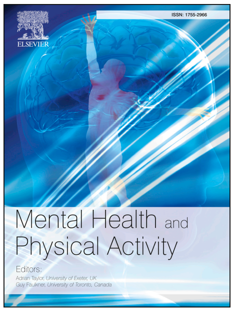


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# A step in the right direction? Change in mental well-being and self-reported work performance among physically inactive university employees during a walking intervention

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**Abstract**

*Objective*

To examine well-being and work performance changes accompanying participation in a16-week uncontrolled feasibility lunchtime walking trial.

*Method*

Participants were 75 (92% female; *M* age = 47.68) previously physically inactive non-academic employees from a large British university. Multilevel modelling analyses examined well-being and work performance trajectories from baseline to post-intervention, to four months later, controlling for group membership and trait affectivity.

*Results*

Increases in perceptions of health, subjective vitality, and work performance, and decreases in fatigue at work were observed. Changes were sustained four months after the end of the intervention. No changes were identified for enthusiasm, nervousness and relaxation at work.

*Conclusion*

Although this was a relatively small uncontrolled feasibility trial, the results suggest that participation in a walking programme may be associated with sustainable well-being benefits and improvements in perceptions of work performance.

Keywords

Physical activity, job affect, enthusiasm, subjective vitality, fatigue

**A step in the right direction? Change in mental well-being and self-reported work performance among physically inactive university employees during a walking intervention**

The effects of physical activity on the prevention and treatment of physical diseases such as coronary heart disease, stroke, diabetes, some cancers, and to a lesser extent obesity has been established for some time (Lee et al., 2012). Physical activity can also contribute to the prevention of some mental illnesses such as depression and anxiety (Teychenne, Ball, & Salmon, 2008; Camacho, Roberts, Lazarus, Kaplan, & Cohen, 1991), dementia, Alzheimer's disease and can delay cognitive decline (Blondell, Hammersley-Mather, & Veerman, 2014; Hamer & Chida, 2009). There is also extensive evidence to indicate that physical activity can improve people's self-perceptions and self-esteem, mood and subjective well-being, reduce stress and improve sleep quality (Biddle, Fox, & Boutcher, 2000; Penedo & Dahn, 2005). The Chief Medical Officer of the UK Department of Health (2011) has recommended that to achieve or maintain health and well-being, individuals should be encouraged to accumulate 150 minutes of moderate intensity activity in bouts of 10 minutes or more. However, the UK adult population remain insufficiently active (i.e., do not meet physical activity recommendations set by the UK Department of Health) to accrue health benefits (Craig, Mindell, & Hirani, 2009) and maintain low levels compared to many similar European countries (Sjöström, Oja, Hagströmer, Smith, & Bauman, 2006).

Workplace physical activity programmes are becoming increasingly popular as a means to improve public and employee health. There is evidence of some (although limited) effectiveness, with workplace walking interventions being more effective than those using other types of activity (Abraham & Graham-Rowe, 2009). However, relating to pedometer based interventions in the workplace specifically, a Cochrane review conducted by Freak-Poli, Cumpston, Peeters, and Clemes (2013) found insufficient evidence for the effectiveness of such interventions in increasing physical activity and improving health outcomes. This is despite recent reviews by Brown, Gilson, Burton and Brown (2011) and Cancelliere, Cassidy, Ammendolia and Côté (2011) have provided support for the role of workplace health promotion programmes, such as walking, in improving well-being, worker performance and productivity. However, the research examining the impact of workplace physical activity interventions is characterised by several limitations. They draw attention to the paucity of systematic investigations of the effects of workplace physical activity interventions on a range of well-being indicators that are concurrently sensitive to change and responsive to physical activity participation (Brown et al., 2011). In order to address this shortfall, in the current study, we sought well-being variables of particular relevance to work and performance, and which had also been found to be responsive to physical activity.

Job affect (referring to affective states such as enthusiasm, relaxation, exhaustion and apprehension experienced while at work), is an important predictor of work performance (Wright & Cropenzano, 2000). Changes in affective states are also one of the most consistent outcomes of participation in physical activity, including walking. For example, a meta-analysis has reported a moderate effect of physical activity on increases in energy and reductions in fatigue (Puetz, O'Connor, & Dishman, 2006). In another meta-analysis, Reed and Ones (2006) reported increases in high activation positive affect (e.g., energy) from exercise training (Cohen's $d$ = .47), which was moderated by pre-exercise scores so that those with lower energy scores showed larger effects (Cohen's $d$ = .63). With regard to walking specifically, Ekkekakis, Hall, VanLanduyt, and Petruzzello (2000) have shown that walks of self-selected intensity as short as ten minutes result in increases in pleasure. Most of the studies included in the meta-analyses reported by Puetz et al and Reed and Ones did not include employee samples, but the results suggest that physical activity may work as a means of self-regulating job-related affective states. As suggested by Hecht and Boies (2009), physical activity may work to recover psychological resources that have been depleted during the course of work.

When the research on physical activity and affect is considered overall, there is stronger evidence for an effect of physical activity on positive energy-related dimensions of affect and fatigue rather than anxiety/nervousness and relaxation related aspects (Puetz et al., 2006; Reed & Ones, 2006). This research has however mainly been conducted using non-work measures, except for one cross-sectional study employing structural equation modelling which showed a significant relationship between physical activity participation and enthusiasm at work (an indicator of positive job-related energy; Thøgersen-Ntoumani, Fox, & Ntoumanis, 2005).

Non context-specific well-being constructs such as subjective vitality and health perceptions may also be relevant to the work context. Subjective vitality, defined as available energy and feelings of aliveness available to the self (Ryan & Frederick, 1997) is conceptually distinct from, yet significantly associated with, positive and negative affect (Ryan & Deci, 2008). As reported by Penninx et al. (2000) and Ryan and Fredrick (1997), when people report high levels of subjective vitality, they are more productive, proactive, they cope better with stress and generally report greater levels of mental health and well-being. Further, perceptions of health, as a component of quality of life, have been implicated in workplace absenteeism (Collins et al., 2005), presenteeism (Hemp, 2004) and work performance (Wynne-Jones, Buck, Varnava, Phillips, & Main, 2009, 2011). Both constructs have been associated positively with physical activity participation (Rozanski, Blumenthal, Davidson, Saab, & Kubzansky, 2005; Brand, Schlicht, Grossman, & Duhnsen, 2006), but the effect on subjective vitality as a result of a workplace walking intervention has not yet been determined.

A further weakness of the body of research on this topic arises from the great range and diversity of indicators used to measure work performance (Brown et al., 2011; Cancelliere et al., 2011). More consistent use of brief, standardised and validated measures of perceived global work performance are needed for more meaningful comparisons across studies.

From public health and specifically health inequality perspectives, it is important to focus interventions on those who have health need and who stand to gain most. Few workplace physical activity interventions have targeted employees who are physically inactive (Hutchinson & Wilson, 2012). This limitation may explain the divergent findings in this area of research.

Further, few trials have examined the sustained effects of such interventions, i.e., beyond the end of the intervention period. This is critical in order to determine the sustainability of intervention effects.

Finally, workplace walking interventions usually take place in outdoor settings, and thus the lack of research examining the effects of workplace walking interventions taking place in different seasonal periods is surprising. In the only study to date examining this question in a workplace setting, we found that a 16-week lunchtime walking intervention was equally feasible during winter or summer (Author(s), in press). However, the well-being and work performance effects of this intervention were not examined. This is important as some research has shown that weather is associated with affective experiences (Keller et al, 2005), and findings could have practical implications for future programming.

In view of the above, the purpose of the present study is to examine trajectories in well-being and work performance as a result of participation in a 16-week lunchtime walking intervention with two groups receiving the intervention at different times of the year. We adopted a range of specific and general well-being indicators with potential to be responsive to physical activity participation and which are relevant to work performance. We assessed whether or not such changes could be sustained in the longer-term (up to four months later). Specifically, we hypothesised significant linear increases in perceptions of health, subjective vitality, enthusiasm, and global work performance and decreases in fatigue at work from baseline to post-intervention (week 16) and these trends to be sustained at the four month follow-up. In contrast, we did not expect significant changes in nervousness or relaxation at work. We also expected equivalence in trajectories between the two groups who completed the intervention at different times of the year. Due to established associations (Kaplan, Bradley, Luchman, & Haynes, 2009), in examining well-being changes, we controlled for the influence of trait affectivity.

## Method

### Participants

Participants were 75 (92% female; *M* age = 47.68; *SD* = 10.31; age range = 24-63) physically inactive non-academic employees from a large British university. The majority (50.7%) of participants were married, while 25.3% were single, 12% were divorced and 12% lived with a partner. All the participants were administrative or support staff with desk-based jobs. Thirty-two out of 43 University departments or corporate services were represented in the study. Thirty-four participants described themselves as being in academic-related posts (e.g., library services, pension officers), 31 worked as ‘support staff’ (e.g., secretaries within academic Schools and departments, finance officers, admissions personnel), and 10 defined themselves as working in ‘other’ positions (including marketing, counselling services, and student support services). The majority of participants were of white British origin (85.30%) with the remaining participants characterising themselves as Asian (6.70%), Black (4%), Chinese (2.70%), or “other” (1.30%). Participants were eligible to take part in the intervention if they reported engaging in *less* than the recommended levels of physical activity for health (i.e., 30 minutes of moderate intensity physical activity on most days of the week, or 150 minutes per week), worked full-time and did not have any contra-indications for physical activity (e.g., cardiac problems or mobility constraints).

**Design**

This was an uncontrolled feasibility trial of a 16-week lunchtime walking intervention in physically inactive University employees. It was designed to assess ease of recruitment, implementation and preliminary effects on physical activity participation, well-being and performance. Aspects of feasibility (recruitment, retention ) of this trial have been reported elsewhere (Author(s), in press). The intervention was implemented twice with two groups of participants who were randomly assigned to start the intervention at a) in Winter (February 2010 start) or b) Spring-Summer (May 2010 start).

**Procedures**

Following University ethical approval for the study, participants were recruited for the trial using a variety of strategies, including promotion of the study at a University workplace health fair, printed information about the study on payslip messages (distributed to all employees at the University), flyers and posters, an article in a staff magazine , and via a specially designed web-site. Following a registration of interest, potential participants were requested to complete an online survey to check for eligibility (including information on patterns of physical activity frequency, duration and intensity). Eligible participants were then provided with an information pamphlet through internal mail, invited to take part, and asked to complete and return a consent form.

The intervention was delivered in two distinct phases; the first 10 weeks consisted of three group-led 30-minute lunchtime walks and two self-initiated week-end walks per week,. In the following six weeks, all walks were self-initiated (but participants were free to use any group or individual formats; see Author(s), 2010 for a detailed description of the intervention, including a participant flow diagram). The participants were provided with unsealed pedometers (Yamax Digi-Walker 351) at the beginning of the intervention which were used as both monitoring and motivational tools. However, no baseline measure of step counts was taken.

**Measures and Instrumentation**

***Health perceptions***. Perceptions of health were measured using one item from the 36-item short-form MOS health survey (SF-36; Ware & Sherbourne, 1992). Participants were asked "in general, how would you rate your current health" with five response options ranging from 1 (*excellent*) to 5 (*poor*). The scoring of this item was reversed so higher scores reflected perceptions of better health. This item, and the full scale, is widely used in health research, and previous research has provided support for the criterion validity and reliability of the scale (Jenkinson, Wright, & Coulter, 1994).

***Subjective vitality***. Bostic, Rubio, and Hood's (2000) six-item version of the Subjective Vitality Scale was used to measure general feelings of energy available to the self. The participants were asked to report how they felt in general using items such as "*I feel energised*". The response scale ranges from 1 (*not at all true*) to 7 (*very true*) and evidence of the scale's reliability has previously been reported (Bostic et al., 2000). The reliability scores in the present study ranged from $\alpha$ = .87 to $\alpha$ = .93.

***Affect at work***. The Job Affect Scale (JAS; Brief et al., 1988) measured job affect within the past week. The scale consists of 20 items and is based on Watson and Tellegen's (1985) consensual mood structure. A confirmatory factor analysis of the scale showed that the 20 mood descriptors could best be conceptualised as four unipolar factors: nervousness (6 items), relaxation (4 items), enthusiasm (6 items), and fatigue (4 items) (Burke et al., 1989). Participants were asked to indicate the extent to which they felt each of the mood descriptors at work using a scale ranging from 1 ("very slightly or not at all") to 5 ("very much"). Ten of the items are indicators of negative affect and the other 10 items represent positive affect at work. Brief et al. (1988) did not examine the internal reliability of the scale. The reliability coefficients of each of the four sub-scales have ranged between $\alpha$ = .80 and $\alpha$ = .84 in a previous study (Thøgersen-Ntoumani et al., 2005). In the present study, the subscales of the JAS were also found to be reliable (enthusiasm: $\alpha$ = .83-.91; relaxation: $\alpha$ = .78-.86; nervousness: $\alpha$ = .86 - .94; fatigue: $\alpha$ = .87 - .88).

***Global work performance***. Global work performance was assessed via one item taken from the World Health Organisation Health and Work Performance Questionnaire (WHO HPQ; Kessler et al., 2003). The question read “How would you rate your overall performance on the days you worked during the past 7 days?”. The response scale ranged from 0 (*the worst anyone can do*) to 10 (*the very best that top workers in a job like yours can do*). This item from the WHO HPQ was chosen given its applicability to a range of occupations, and has previously been used in a study examining the relationships between physical activity, fitness and work performance (Pronk et al., 2004). The concurrent validity of the full WHO HPQ in relation to other measures of work productivity has been reported by Kessler et al. (2003).

***Control variable***. Dispositional positive and negative affect was measured using the trait version of the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988). Participants were asked how often, in *general in their life as a whole*, they experienced 10 positive (e.g., enthusiastic, determined, proud, attentive) and 10 negative (e.g., distressed, hostile, nervous, jittery) states. The scale has been widely used in previous research and evidence of the reliability and validity of this questionnaire is abundant. In the present study, the subscales were reliable (positive affect: $\alpha$ = .92; negative affect: $\alpha$ = .91).

**Data Analyses**

In addition to descriptive data analysis, we used multilevel modelling (also called hierarchical linear modelling) to analyse our data using MLWin (version 2.25; Rasbash, Browne, Healy, Cameron, & Charlton, 2012). For the main analyses, we employed intention-to-treat statistics using the baseline carried forward approach. As we did not include a control group in the study, we first explored whether any changes in the outcome variables could be explained by regression to the mean (RTM) effects by following guidelines for use in multilevel models (Gmel, Wicki, Rehm, & Heeb, 2008). Specifically, we entered a time × 'outcome variable average' interaction term as a predictor of the outcome (as well as the associated main effects). This established whether participants who reported lower average scores on the respective outcome variable increased/decreased more over the course of the study, compared to participants who reported higher average scores on the respective outcome variable. Any statistically significant RTM effects were included in the main analysis.

To explore the study hypotheses, we constructed conditional growth models for each dependent variable (i.e., health perceptions, subjective vitality, each of the affect at work components and perceptions of work performance). Predictors in these models were two "time" variables that modelled linear (coded as 0, 1, and 2) and quadratic change over the three time points. The quadratic terms allowed us to explore whether any change occurred in the temporal trends at any point in the study, such as a drop off from the end of intervention to the follow-up time point. Intervention group membership was also a predictor (0= Group 1 (Winter), 1= Group 2 (Spring/Summer)) testing group differences in the dependent variable at the beginning of the study. We also tested group × time (and quadratic time) interactions which established whether the trajectories of change were different in the two intervention groups. In the modelling, we controlled for participants' trait levels of positive and negative affectivity and the number of walking sessions attended per week, which were centred on the sample mean. In all models the intercept represents the mean value of the dependent variable for Group 1 at baseline for an individual with average values of positive and negative affectivity. Predictor variables were entered as fixed effects to aid model convergence and to keep the models as parsimonious as possible. Significance was set at $p$ <.05.

**Results**

The descriptive statistics for all outcome variables by group across the three time points are presented in Table 1. Intraclass correlation coefficients ranged from .45 to .58, indicating that between 42 and 55 percent of the variance can be attributed to the within-person level of analysis. This confirms the need take into consideration the hierarchical nature of the data (i.e., measurement points nested within participants). Examination of potential RTM effects revealed that any observed changes in vitality, enthusiasm, relaxation, nervousness, and performance could be attributed to this confounding influence, albeit the effects were small (all $b = 0.01$; $p < .05$). These significant RTM effect terms were, therefore, controlled for in subsequent analyses. No RTM effects were found for health perceptions and fatigue, hence, the relevant parameters were not included in the final models.

For all dependent variables all quadratic time terms and group × quadratic time interaction terms were either non-significant or so small that statistical significance could have been attained merely by rounding the parameters to three decimal places. This indicated that a) any change in the dependent variables was consistent over the three time points (e.g., no drop off in levels from the end of the intervention to follow up), and b) this finding was consistent across groups. As a result, we reconstructed the models without these terms included to obtain parsimonious findings. Results (see Table 2) showed that the mean levels of all variables at baseline were equivalent across both groups.

In terms of linear change over time, subjective vitality and work performance increased significantly over time, whereas fatigue at work decreased significantly. A positive linear trend in health perceptions bordered on statistical significance ($p$ = .07). The scores for work enthusiasm, relaxation, and nervousness did not change over time. All the trajectories were equivalent in both groups.

**Discussion**

In the present study we sought to examine trajectories in physical activity, well-being and work performance of previously inactive non-academic university employees taking part in a lunchtime walking intervention. Our results revealed logically patterned favourable changes in health perceptions, subjective vitality, fatigue at work and perceptions of global work performance.

Despite promising results with regard to several of the well-being outcomes, the findings revealed no significant changes in enthusiasm. On closer inspection of the items included in the enthusiasm subscale from the JAS used in the present study (including “active”, “strong”, “excited”, “enthusiastic”, “peppy”, and “elated”), it is apparent that some items may be responsive to specific situations that occur at work (e.g., excited, enthusiastic) that are unrelated to any concomitant changes in physical activity. Therefore, the scale we used to assess dimensions of work-related affect may explain our discrepant results. The fact that we measured affective states retrospectively over the past week could also have bearings on the results. Indeed, ecological momentary assessment of work-related affective states is desired as part of future research. The general decrease observed in fatigue, which is sometimes used as an indicator of lack of recovery (Van Hooff et al., 2011) may indicate that walking during the work day replenishes otherwise depleted mental resources.

Our results support recent suggestions that physical activity participation may be associated with indicators of work performance (Cancelliere et al., 2011). However, very few studies have employed the validated WHO-HPQ in assessing global work performance allowing for meaningful comparisons. One cross-sectional study conducted by Pronk et al.

(2004) found that moderate and vigorous physical activity was positively associated with self-reported work performance. Our results thus build on such cross-sectional evidence using longitudinal data. The results are particularly noteworthy in terms of the sustained changes in work performance up to four months following the intervention. Given the promising results with regards to psychological well-being in our study and a review and meta-analysis by Ford et al. (2011) demonstrating moderate positive associations between psychological well-being and work (especially task) performance, it is possible that workplace physical activity participation contributes to work performance benefits only if it also leads to positive changes in well-being. This needs to be further explored in future research. Taken together, from a well-being and performance perspective, the results supported the effectiveness of the intervention.

Our results add to the extant literature in several ways. First, we used a sample of employees who were physically inactive at baseline. Curiously, the exclusive use of such populations is relatively rare in studies examining effects of workplace physical activity interventions (Hutchinson & Wilson, 2012). Second, the findings demonstrate that the changes in perceived health, well-being and global work performance were consistent in two independent groups undergoing the intervention at different time points. This finding provides preliminary support for the replicability of the intervention. It also suggests that workplace physical activity interventions that take place outdoors may be equally effective in different seasonal periods. Third, the changes in most positive outcomes were sustained up to at least four months following the end of the intervention. Such follow-up assessments are rarely made when documenting well-being and work performance changes as a result of participation in workplace physical activity interventions (Hutchinson & Wilson, 2012). Further, the changes were independent of any influence of trait affectivity. Finally, the findings show that a walking intervention taking place during the workday may be useful in enhancing elements of both global and work-related well-being. As participation in the intervention also led to increases in global work performance, it is possible that physical activity acts to decrease fatigue in employees, thereby allowing them to feel more productive at work as per Hecht and Boies'(2009) suggestion.

There are some limitations associated with the present study. As this was a feasibility trial, we did not include a control group. This does not allow us to rule out any Hawthorne or leader effects on the results. The next step is to implement a randomized controlled trial. However, the fact that the intervention was tested with two independent groups who showed similar changes gives some confidence in the results.

The reliance on retrospective recall of well-being states represents another limitation. While work-related affective experiences can fluctuate on a daily basis (Jones et al., 2007), the JAS used in the present study examines affect in the past week, which means that the measure is not sensitive to day-level changes. In future, researchers should explore the effects of workplace physical activity interventions on fluctuations in daily work-related affect. Our assessment of work performance by self-report rather than measured objectively is a further limitation. In future, if feasible, researchers should attempt to employ supervisor-rated or peer-rated measures of work performance.

The gender imbalance of the participant pool should be addressed in future research. Despite our best efforts, we were unsuccessful in recruiting males for the intervention. However, this is not surprising given findings from a previous systematic review identifying greater participation of females compared to males in employee wellness programmes (Robroek et al., 2009). Other approaches are needed to attract males to physical activity interventions. For example, recent success in activity increases and weight loss has been reported through engaging males through football club supporters groups (Gray et al, 2013).

**Conclusion**

The findings presented suggest that a 16-week lunchtime walking intervention taking place in the workplace and targeted to individuals who are physically inactive can help them feel less fatigued at work, increase vitality, improve perceptions of health, and perceptions of work performance. Such changes can be sustained up to at least four months after the end of the intervention. Further, the results show that effects are similar when the intervention is implemented in different seasonal periods. The well-being benefits derived from such participation are also important from a health promotion perspective, as well-being is not only an outcome of physical activity participation, but also plays a motivating role in helping people to adhere to such behaviours (Williams, 2008). However, to derive firm conclusions, the present results need to be replicated as part of a larger controlled study.

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Table 1.

*Descriptive Statistics On All Dependent Variables At Baseline, Post-Intervention And At The Four-Month Follow-Up*

| | Baseline (*n*=75) | | Post-Intervention (*n*=55) | | 4-Month Follow-Up (*n*=46) | |
|---|---|---|---|---|---|---|
| | Group 1 | Group 2 | Group 1 | Group 2 | Group 1 | Group 2 |
| Dependent Variable | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* |
| Health Perceptions | 2.97 (0.82) | 3.08 (0.86) | 3.43 (0.77) | 3.52 (0.72) | 3.35 (0.81) | 3.38 (0.82) |
| Subjective Vitality | 3.61 (1.05) | 3.61 (1.03) | 4.53 (1.14) | 4.59 (1.15) | 4.32 (1.18) | 4.34 (1.40) |
| Enthusiasm | 2.54 (0.66) | 2.69 (0.82) | 2.85 (0.88) | 2.95 (0.97) | 2.75 (0.82) | 2.90 (0.93) |
| Relaxation | 2.79 (0.88) | 2.51 (0.67) | 2.81 (0.87) | 2.55 (0.95) | 2.81 (0.88) | 2.55 (0.92) |
| Nervousness | 1.69 (0.73) | 1.73 (0.83) | 1.64 (0.69) | 1.64 (0.88) | 1.79 (0.80) | 1.60 (1.13) |
| Fatigue | 2.33 (1.09) | 2.08 (0.91) | 1.80 (0.85) | 1.69 (0.71) | 1.96 (0.96) | 1.78 (0.96) |
| Global Work | 7.21 (1.65) | 7.51 (0.87) | 7.76 (1.24) | 7.94 (1.03) | 7.90 (1.79) | 7.96 (1.55) |

Performance

*Note*. Group 1=Winter; Group 2=Spring/Summer

Table 2.

*Regression Coefficients Obtained From The Conditional Growth Models Examining The Study Hypotheses*

| | Dependent Variable | | | | | | |
|---|---|---|---|---|---|---|---|
| Independent Variable | Health perceptions | Subjective vitality | Enthusiasm | Relaxation | Nervousness | Fatigue | Global work performance |
| | β(*SE*) | | | | | | |
| Intercept | 3.109(.119)*** | 3.782(.099)*** | 2.691(.065)*** | 2.690(.074)*** | 1.645(.064)*** | 2.199(.135)*** | 7.350(.118)*** |
| Positive affect | 0.281(.107)** | 0.025(.099) | 0.005(.058) | -0.004(.058) | -0.003(.048) | -0.375(.122)** | 0.006(.086) |
| Negative affect | -0.166(.107) | -0.006(.074) | 0.002(.049) | -0.003(.055) | 0.000(.054) | 0.311(.124)** | -0.016(.090) |
| Group | -0.002(.163) | -0.044(.136) | -0.052(.090) | -0.095(.103) | 0.099(.089) | -0.157(.187) | 0.146(.162) |
| Linear time | 0.009(.005) | 0.017(.005)** | 0.002(.003) | -0.005(.004) | 0.004(.003) | -0.010(.005)* | 0.017(.006)** |
| Group × time | 0.001(.007) | 0.004(.007) | 0.004(.005) | 0.007(.005) | -0.007(.005) | 0.000(.007) | -0.010(.009) |
| Ave. sessions per week | 0.067(.028) | -0.013(.020) | -0.005(.013) | 0.001(.015) | 0.002(.013) | 0.049(.032) | -0.004(.023) |
| Ave. outcome variable | - | 0.883(.083)*** | 0.915(.071)*** | 0.880(.076)*** | 0.901(.069)*** | - | 0.865(.072)*** |
| Ave. outcome variable × time | - | 0.006(.003)* | 0.006(.003)* | 0.009(.004)* | 0.007(.003)* | - | 0.009(.004)* |

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

**Highlights**

- Physically inactive employees took part in a 16-week lunchtime walking programme
- Changes in well-being and work performance were examined over a four-month period
- Improvements were seen in most well-being and performance outcomes
- Lunchtime walking may confer longer-term well-being and work performance benefits