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Minimal exercise, maximum benefit? Comparing incidental physical activity with structured exercise participation on three measures of well-being in a group of corporate employees

Warwick J. McGlone
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Running head: MINIMAL EXERCISE MAXIMUM BENEFIT

Minimal Exercise, Maximum Benefit? Comparing Incidental Physical Activity with
Structured Exercise Participation on Three Measures of Well-Being in a Group of
Corporate Employees.

Warwick J. McGlone

Edith Cowan University

A Report Submitted in Partial Fulfilment of the Requirements for the Award of Bachelor
of Science Honours, Faculty of Computing, Health and Science,
Edith Cowan University. (October, 2007)

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Abstract

In response to increasingly sedentary workplaces, many organizations utilise employee well-being programmes that include physical activity. Physical activity is purported to have physiological benefits and improve overall mental well-being and is assumed will benefit the organization through reduced absenteeism rates and enhanced job satisfaction. Whilst research found associations between engagement in exercise and increased levels of well-being, conflicting support exists for reduced absenteeism and little support was found for enhanced job satisfaction. Much research has also failed to consider any mediating effects that stress may have had on the outcome. In addition, there exists little research that compared the effects of general physical activity with structured exercise participation on reports of well-being, which may be of use for well-being programme policy. This paper will review the literature regarding exercise and physical activity and the effects on factors of subjective well-being, job satisfaction and stress. Weaknesses as well as strengths in the body of knowledge will be reviewed, it will be suggested that it is timely and important to further investigations in this area.

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Submitted: August 2007

Minimal Exercise, Maximum Benefit? Comparing Incidental Physical Activity with Structured Exercise Participation on Three Measures of Well-Being in a Group of Corporate Employees.

The need for increased physical activity to reduce morbidity and mortality is largely undisputed (World Health Organisation [WHO], 2007; Warburton, Nichol & Bredin, 2006). Increasing physical activity through exercise has been shown to have a positive effect on both physical and mental health (Thogersen-Ntoumani, Fox & Ntoumanis, 2005). Purported benefits from exercise engagement include; increased ability to cope with life stress (Brown, 1992), lowered cardiovascular health risks (Manca, 2006) and increased positive mood (Giacobbi, Hausenblas & Frye, 2005). Despite wide promotion of the need to increase physical activity (Department of Health, 2002; Commonwealth of Australia, [COA], 1999), many Australians fail to achieve an adequate level of activity for health benefits (Australian Bureau of Statistics, [ABS], 2006).

In the workplace, physical activity as an integral part of employment is becoming greatly reduced. An increasingly large number of work duties may be accomplished with a personal computer, leaving many employees desk-bound and inactive for a large part of their working day. Many organizations have acknowledged the need for increased activity for both employee physical health and mental well-being. Attempts to address this issue may be through implementation of health education (Anderson & Anderson, 1994) or, more commonly, workplace exercise and well-being programmes (Shephard, 1999).

Physical exercise has also been linked to reduced absenteeism (Lechner & De Vries, 1997; Jacobson & Aldana, 2001) but conflicting research has not allowed this

claim to be fully supported (Alchiler & Motta, 1994; Brox & Froystein, 2005). The cost to the employer in reduced productivity, and remuneration of sick employees can be extremely expensive. Costs have been estimated at over \$150 million dollars per year in the USA (Donatelle & Hawkins, 1989) making an intervention to reduce absenteeism profitable. Research about the effects of exercise interventions on well-being, job satisfaction and stress (e.g. Thogersen-Ntoumani et al., 2005; Rejeski et al., 2001; Wijndaele et al., 2007) makes a sound case for the utilisation of organisational exercise programmes.

It has been suggested that whilst employee physical health improves from participation in an employee well-being programme, there are also benefits to the organization. These may be manifested through reduced absenteeism (Jacobson & Aldana, 2001; Lechner & De Vries, 1997), as well as reduced turnover, which has been attributed to increased job satisfaction (Egan, Yang, & Bartlett, 2004). When deciding on the type and intensity of an exercise programme, it is important to consider the physical and mental workload of the workplace. This is to ensure that the exercise programme does not overly tax the employees negating any potential benefit. That is not to over strain sedentary employees and not to over burden those who engage in much physical activity as part of their job.

Not all exercise participation has been shown to be beneficial for health. Where a physical or mental workload may exceed the individual's ability to cope, a negative condition, often referred to as "burnout" or "overtraining," can occur (Goodger, Gorely, Lavalley, & Harwood, 2007). Over time, an excessive workload can lead to susceptibility to stress, which may result in illness if maintained (O'Leary, 1990).

Research on exercise interventions has investigated positive and negative effects of

exercise. However, there exists little research to compare exercise participation with general lifestyle physical activity such as gardening, or walking, on factors of well-being and also investigating the mediating effect of stress.

The current paper will review relevant literature on exercise and the effects on subjective well-being, job satisfaction and stress. The present state of physical activity and its effects in Australia will be outlined. Employee well-being programmes will be introduced to highlight factors that should be considered in the effective implementation of physical activity for a workforce. The success of exercise interventions to enhance well-being, job satisfaction, and effects on absenteeism will be presented. The negative effects of excessive exercise will also be discussed. Further, the success of exercise interventions to combat stress, and why this is an important consideration for exercise research will be highlighted.

It will be shown that although much research has been conducted on exercise and various aspects of well-being, there exists little research on the differences that may be found when comparing general physical activity to regimented exercise participation. It will be shown that whilst research indicates that exercise enhances various components of subjective well-being, the possibility that similar benefits may be obtained from physical activity in general is largely ignored.

Physical Activity in Australia

Australian National Physical Activity guidelines (COA, 1999), recommend a minimum of 30 minutes of daily exercise, including additional high intensity exercise on a regular basis. This recommendation is to ensure that the individual will improve and maintain physical health, reducing the risk of morbidity and mortality. ABS (2006) data indicated that 70% of Australians over 15 years of age were classified as sedentary. The

need for increased physical activity for health is not localised to Australia as it has been recognised in many societies (WHO, 2007).

Physical activity has been declining, particularly over the last ten years in Australia (ABS 2006). This has had a large impact on the community in terms of healthcare. In 2000, estimated healthcare costs in Australia purely from physical inactivity, were approximately \$377,000,000 (Stephenson, Bauman, Armstrong, Smith & Bellew, 2000), and is likely to be even higher today. Physical inactivity is a factor that strains resources, already burdened by health issues such as smoking, obesity and alcohol consumption. Increased reliance on technology for daily living has reduced opportunities for physical activity, and modified the lifestyle of many individuals, particularly in the workplace. This may be compounded as a result of time constraints or inability to engage in regular physical activity. Many organisations have attempted to address a lack of physical activity for their employees by establishing employee well-being programmes (Shephard, 1999).

Employee Well-Being Programmes

Employee well-being programmes that include physical activity have been promoted worldwide for their potential benefits to the organisation in terms of reduced absenteeism and enhanced job satisfaction. Such campaigns took place in the UK (Health Promotion Agency for Northern Ireland, 2006) and the USA (New York State Department of Health, 2001). Many organisations promote their own well-being programme to prospective staff as a point of distinction compared with competing organisations (DiNubile & Sherman, 1999).

The presence of a well-being programme does not mean that the employees who participate will actually reap the potential benefits. Rice, Gentile, and McFarlin, (1991)

found that the attitude of the employee was a significant factor, suggesting that an overall well-being programme may only prove useful if the employee values it as such.

The importance of communication between the needs of the staff and the tasks engaged in the role must be considered for an effective exercise well-being programme.

According to Hendrix, Troxler and Ovalle (1985), an organisation may have greater success using a participatory style with employees contributing to the programme itself. Additionally, O'Reilly (2006) has indicated that the programme should be tailored to the organisation to gain the most benefit for the employees.

Whilst a core concept of a well-being programme is to increase physical activity, the working tasks of the staff must be considered. A desk-based workforce may have different requirements compared to their physically active counterparts. Indeed, if the level of physical activity is too intensive it may be harmful to the employees, and if is not intense enough the purported benefits on health may not be achieved. The purported benefits from exercise participation will now be reviewed.

Exercise Participation

It has been widely promoted that increasing physical activity can lead to positive changes in health and lower risk of mortality (Lloyd & Foster, 2006). Exercise or physical activity can be viewed from a multidisciplinary perspective including medicine, psychology, sociology and economics. Improvement of physical health is related to such factors as reduced overall body weight, body fat percentage or blood pressure, (Bauman, 2004). Improvement of mental factors include reduced stress (Brown, 1992), and enhanced sense of well-being (Danna & Griffin, 1999). Social factors include increased sociability by engaging in sport play or team activities (Wijndaele et al., 2007)

Economic issues are related to improving employee productivity, reduced absenteeism,

increased job satisfaction, healthier working practices and increased allegiance to the company (Grawitch, Gottschalk & Munz, 2006). Exercise engagement and the effects on well-being will now be presented.

Well-Being

It is often reported that an improved mood can be attributed to exercise engagement (Giacobbi et al., 2005). Exercise participation has been shown in many studies to have a relationship with psychological improvements besides physical fitness (Rejeski et al., 2001; Reed & Ones, 2006) but identification of the actual process responsible for these mental benefits has not been well documented (Scully, Kremer, Meade, Graham, & Dudgeon, 1998). Reported effects of exercise on mental improvements have been suggested to be mediated by increased positive affect (Reed & Ones, 2006) and emotional states (Kerr & Kuk, 2001; Steinberg et al., 1998), enhanced ability to cope with stress (Brown, 1992; Wifley & Kuncze, 1986) and satisfaction with ones appearance (Rejeski et al., 2001; Thogersen-Ntoumani et al., 2005). A common factor between these outcomes is that they all indicate a positive benefit from exercise participation for the individual. These improvements may then lead to a more positive perspective on life which was a factor in the concept of subjective well-being identified by Diener (1984).

Diener (2000) proposed subjective well-being (SWB) to be an internally judged evaluation of the individual's life. This evaluation was composed predominantly of three factors. These were firstly subjectivity, referring to the individuals experience, secondly, positive conditions or affect (not merely absence of negative affect) and thirdly a wider assessment including affect and life satisfaction (global well-being) in general (Diener, 1984). Diener (2000) suggested that SWB could be described as "happiness" in lay

terms. These components of SWB are interrelated, thus an individual may have high overall SWB when they report being fairly satisfied with life, and having a higher ratio of positive emotions, such as contentment, compared to negative emotions, such as anger (Biswas-Diener, Diener, & Tamir, 2004). These factors may be studied together, (providing an overall measure of SWB), or independently. This may be achieved by concentrating only on individual components such as global well-being or positive affect. The overall well-being reported from engagement in physical activity or exercise will now be reviewed.

Giacobbi et al. (2005) found that in a sample of 106 students, increased level of exercise led to a significant reduction in negative mood, and an increase in positive mood states. This positive enhancement in mood may be reinforcing, and thus increasing the likelihood of exercise participation. Much research is targeted towards assessing how successful an exercise or physical activity intervention may be on improvement of physical or mental factors. This approach often does not consider what effect general lifestyle activity may contribute to the findings. General lifestyle activity may result from commuting to work, walking a pet or gardening. It is important therefore to consider the contribution of general activity in overall physical activity reports which was investigated by Thogersen-Ntoumani et al. (2005).

Thogersen-Ntoumani et al. (2005) compared 312 corporate employees across five levels of increased activity intensity. They compared the contribution of exercising (sport activity), with those of overall physical activity (work, sport and leisure) on reports of global well-being. Their results showed a significant difference in global well-being among the total physical activity reports, but not for the exercise reports across the activity levels. The researchers did not offer an explanation for this finding although it is

interesting to explore. It may be that a hidden factor is mediating the exercising reports on measures of global well-being, or conversely, it could be that when total activity from three domains are measured, that global well-being is more pronounced across activity levels. Thogersen et al.'s findings indicated higher activity levels showed a significant effect on increased global well-being in both exercise and total physical activity reports. However, it may be prudent to look further to those findings across the activity intensity levels to investigate potential variables and consider if the study design could be modified to allow this finding to be better understood.

Rejeski, et al., (2001) investigated the effects of a randomized controlled exercise intervention on subjective well-being in 854 participants over a two year period. They observed a significant increase in subjective well-being from baseline measures. This pattern of increase was maintained also when measured at six and twenty four months post intervention. Rejeski et al's study, however, utilized behaviour change classes as well as follow-up counseling, which may have contributed to the temporal stability of their findings. Anderson and Anderson (1994) found positive results over a 14 week behaviour modification programme that had no physical activity component in a corporate setting. Their findings indicated a significant increase of exercise engagement and reduced blood pressure observed in the 44 participants who completed the programme. It may be argued that for a successful intervention, education as well as intervention should be considered.

For an employee programme to be successful, both the likelihood of employees engaging in exercise and the type of activity necessary for physical benefit should be considered. This may take the form of group sporting activities, high or low intensity exercise sessions and aerobic or anaerobic conditioning to ensure that the required level

of activity is likely to be attained. It also cannot be assumed that an active workforce is physically fit. Ruzic, Heimer, Misigoj-Durakovic, and Matkovic (2003) found that with 494 male workers, high levels of activity at work did not reflect being physically fit according to fitness measures. They postulated this was due to the duration and intensity of the workplace activity not being sufficient to provide the necessary physiological change.

Research has also indicated that for many individuals, although fully aware of potential physical benefits and reduced risk factors for disease, these factors were not sufficient to increase their level of physical activity (O'Brien Cousins, & Gillis, 2005). It may be suggested that those individuals who do choose to engage in physical activity have a different perspective on life which leads to the purported mental benefits rather than the exercise per se. This was observed by Thogersen-Ntoumani and Ntoumanis (2006) in self determined exercise reports from 375 individuals. Their findings suggested that individuals who assumed personal responsibility for their lives engaged in increased physical activity. A high level of intrinsic motivation strengthened their intention to maintain levels of physical activity over time. In contrast those who presented a more external locus of control engaged in less physical activity and showed less benefits.

The perception of the individual may be a determining factor in the effectiveness of physical activity on enhancing well-being. Kahan, Fogelman, and Bloch (2005) conducted a telephone survey with a random sample of 406 respondents investigating physical activity levels. When asked if they performed regular physical activity, many respondents answered yes, however, this was often not directly corroborated by the measures of activity levels in three domains of work exercise and leisure. Their

investigation thus suggested that a differentiation between these three domains would facilitate better accuracy in assessing physical activity which was also observed in the study design of Thogersen-Ntoumani et al. (2005).

This may also have an effect in reverse, if a participant indicates that they do not partake in regimented exercising, they may indeed be more regularly active in their leisure activities, than an individual who takes one exercise session per week, but little activity in leisure time. Kahan et al. (2005) proposed that individuals self perception was an important factor in assessing activity levels. The prominence of self perception in this domain may confound qualitative studies regarding physical activity. Such studies may benefit by also enabling participants to describe the actual levels of activity in the domains of work, leisure and exercise.

Engagement in physical activity has been presented to provide mental improvements for the individual in terms of mood (Giacobbi et al., 2005) and well-being (Rejeski et al., 2001; Thogersen-Ntoumani et al., 2005). This evidence supports the inclusion of physical activity in a workplace well-being programme for improvement of these factors. However, the perception, or attitude of the individual has been shown to be influential in engagement in physical activity which may be mediated by inclusion of health related education. Another purported benefit from physical activity for the employee that has been evidenced in research is enhanced job satisfaction, which will be reviewed next.

Job Satisfaction

Increased job satisfaction has been suggested can lead to an improvement in the relationship between the customer and the employee, and thus the economics of the business, through more efficient employees (Homburg, & Stock, 2005). Locke's (1976)

definition of job satisfaction is the most widely applied in many published studies.

Locke indicates that job satisfaction may be defined “as a pleasurable or emotional state resulting from the appraisal of one's job or job experiences” (p.1300). The individual considers both past and present factors of their experience in this appraisal.

It has been suggested that increased job satisfaction can lead to reduced turnover (Egan, Yang, & Bartlett, 2004). Exercise is assumed to indirectly affect job satisfaction through increased global well-being (Wright & Bonett, 2007). Conflicting research, however, has been observed particularly for absenteeism rates and improvement of job satisfaction as a result of exercise interventions.

Altchiler and Motta (1994) investigated the effects of increased aerobic activity on job satisfaction, as well as absenteeism rates in 43 participants over an eight week intervention using three sessions per week. Their findings indicated no effect on job satisfaction reports or absenteeism rates. These findings may also have resulted from implementation of an inappropriate exercise intervention or as commonly reported; initial discomfort from the activity itself (Shephard, 1999). Brox and Froystein (2005), however, conducted a randomised controlled study on 129 nursing home employees using a one hour per week exercise regimen, and also found no support for reduced absence from the workplace over a six month period. Both these findings indicate that the duration of the sessions is an important consideration for implementation of a physical activity programme.

Jacobson and Aldana (2001) compared annual illness-related absenteeism in 79,070 US workers, from 250 related worksites on health profile questionnaire reports. Their results indicated that one day of exercise activity was associated with lower absenteeism rates compared to no exercise. Also two days of exercise was associated

with lower absenteeism rates to one day of exercise but not significant for any higher daily sessions of exercise. Thus it may be assumed that there is a ceiling effect present for the most benefit of exercise on absenteeism rates according to their findings. Lechner and De Vries (1997) found for 884 participants, over three worksites (police force, chemical and banking industries), engaging in a high activity level in a fitness programme showed a significant decline in absenteeism rates compared to low participation or control. These findings indicate the need to identify where the most benefit for the workforce can be gained using the appropriate level of physical activity.

Thogersen-Ntoumani et al. (2005) found no support for improvement of job satisfaction as a result of physical activity in 312 corporate employees. They used reports of overall physical activity (work exercise and leisure) rather than using an intervention, which was one of the strengths of their study. Brand, Schlicht, Grossmann, and Duhnsen (2006) conducted a 13 week exercise randomised, controlled, exercise intervention with 110 participants and also failed to find a significant effect on job satisfaction reports. DeGroot and Kiker (2003) indicated that in a meta-analysis of 22 studies, little support existed for well-being programmes on job satisfaction. Thus, with limited support for the effect of exercise on job satisfaction the assumption that engaging in a well-being programme is not robust. It may also be postulated that job satisfaction could be accounted for by more than just participation in physical activity, and may be mediated by other factors within the workplace.

Egan et al. (2004) found that an increased level of job satisfaction was obtained in a workplace as a result of the workplace culture. They indicated that in order to improve job satisfaction, important areas to focus on may be; assistance in the workplace from management, open communication forums, clear channels to inform of

future management strategies, and effective group practices (Egan et al., 2004)

Conversely, Dormann, and Zapf (2001) suggested a main contributor to job satisfaction, was the personality factors of the individual. They indicated individuals chose the most appropriate workplace according to their personality and that a poor match resulted in reduced job satisfaction for the worker. Levy and Williams (1998) found that a high level of work knowledge led to enhanced job satisfaction. Job satisfaction has also been shown to be affected by environmental factors such as life and job stress (Hendrix et al., 1985). It may be assumed that a lower report of job satisfaction or well-being could arise as a result of stressors, such as increased workload (Ganster, Dwyer, & Fox, 2001) or perceived lack of support from management (Baard, Ryan, & Deci, 2004). Thus as was observed in the case of well-being, job satisfaction is a complex construct that is affected by various variables.

An employee well-being programme must also consider the accumulating effects of life stresses, such as financial issues, interpersonal difficulties or family and work matters. These issues in combination may have a greater impact on the individual (Meehan, Bull, Wood & James, 2004). Lack of support for employees, and role pressure has been indicated as a major precursor to the development of job stress (Vagg & Spielberger, 1998). A review of how physical activity may also be detrimental to an individuals health and well-being and may act as a pre-cursor towards stress will now be presented.

Negative Effects of Exercise

For an overly worked employee in a fast paced, modern workplace, engaging in a regimen of exercise, through an employee well-being programme, may be counter productive. Physical improvement may be negated by factors such as exceeding physical

capabilities, or failing to recuperate adequately. Monat and Lazarus (1991) defined stress to refer to “to any event in which environmental demands, internal demands, or both tax or exceed the adaptive resources of an individual...” (p.3). Research has indicated that external stressors may also become additive (Meehan et al., 2004) overwhelming the individual. This may be obtained through engaging in an excessive level of exercise diminishing its positive benefits. Further research may identify differences between regimented exercise and general physical activity on well-being and also include a measure of stress to identify if it is a significant predictor on purported exercise benefits.

Overtraining has been observed frequently in athletes, due to training intensity being too high, recovery periods inadequate and / or nutritional demands not being met (Meehan, et al., 2004; Goodger, et al., 2007). Thus, it may be argued that a corporate employee who may be under a high level of stress at work could engage in a detrimental intensity or duration of exercise. This may lead to them exceeding their capacity to cope with the demands, resulting in lower job satisfaction or global well-being. The optimal scenario may be that of the employee who, regardless of work or life stress, engages in positive behaviour, such as healthy eating, aerobic exercise and ensuring they get adequate rest to combat the negative effects of overstrain, as well as improving health with physical fitness and nutrition.

Not all exercise may be beneficial to the individual. Meehan et al. (2004) indicated that benefits of regular exercise or sport participation may be negated by burnout, or overtraining, leading to injury (Goodger, et al., 2007), or even from excessive sessions (Hausenblas & Symons Downs, 2002; Szabo & Parkin, 2001). Overtraining has been suggested by Smith (2004) to lead to mood disturbances as a result of biochemical changes in the individual. The limited sample size (n- 20) reduced

generalisability of the findings but also raised an important point to consider.

Investigation of the presence of stress and what influence this may have in both an exercise and non exercising group could also be a relevant area of study. The assumption that all exercising individuals are buffering their stress through exercise and thus may report higher well-being than those who do not actively engage in exercise should be explored.

Brown (1992) found that increased fitness resulted in less illness compared to low levels of physical fitness. This trend was also observed over a six month period and also led to a decrease in susceptibility to stress. It seems that increased level of exercise has positive health benefits. This raises the issue of what negative effects may be observed in a higher level of exercise, or when the individual becomes dependent on the exercise. Steinberg et al. (1998) found that participants in an exercise setting failed to show continual improvement in mood over time, which they postulated may have been from an "exercise addiction" necessitating an even higher level of exercise intensity. The issue of exercise dependence will now be presented.

A meta-analysis by Hausenblas and Symons Downs (2002), investigating 29 years of research, indicated that many studies had attempted to quantify what was an unhealthy dependence on exercise. They concluded that methodological issues marred many of the research findings with lack of control groups and limited sample sizes. They also indicated that there were too many factors in the concept of exercise dependence making measurement difficult. Allegre, Souville, Therme and Griffiths (2006) also indicated that mixed definitions of the construct hindered effective research. They indicated that positive forms of dependence could be observed (beneficial to the individual) or negative dependence (detrimental to the individual). Simply described, if

psychological or physical health deteriorates as a consequence of physical exercise, such activity should be either modified or stopped.

Szabo and Parkin (2001) found that martial artists showed increases of up to 249% on measures of total mood disturbance such as anger, depression, tension and negative affect when deprived of training for one week. Even though the reported mood disturbance may not be categorised as evidencing dependence on exercise, the negative effects observed may also be experienced by individuals in a high stress workplace who do not enjoy the benefits of regular physical training. The evidence for the effects of exercise participation on stress will now be presented.

Stress

Whilst many people spend an increasing amount of their time on work related activities, Csikszentmihalyi (1999) proposed that increased remuneration does not necessarily lead to contentment. Not feeling content, people strive for an even higher level of financial reward and this type of behaviour pattern sees many individuals unsatisfied in many areas of their life. This concept of pursuing happiness-related goals has often been referred to as a “hedonic treadmill”. It describes how some individuals who strive for happiness or satisfaction believe that these depend on the attainment of certain goals, and once achieving these goals find that they need to progress to new achievements in a continual pattern of dissatisfaction (Diener, Lucas & Napa, 2006). This may become apparent where an individual strives through work to achieve increased material gains or greater status and possibly becoming unfulfilled and dissatisfied. These patterns of dissatisfaction can often have pronounced negative health effects as displayed in physical illness (Cohen & Williamson, 2001) or susceptibility to negative life stressors (Roth, Wiebe, Fillingim, & Shay, 1989).

Higher stress levels have been shown to increase the likelihood of reduced physical activity, increased smoking and increased dietary fat consumption (Ng & Jeffrey, 2003). Not all individuals, however, are affected in the same way and the level of impact may be influenced by factors such as resilience (Roth, et al., 1989) and personality factors, such as Type A personality showing greater vulnerability compared to Type B (Jamal, 2005). This indicates that the perception of stress is significant in how the stress response may affect an individual. Some individuals may choose to be active in order to buffer their stress (Brown, 1992) or others may choose a more sedentary response (Ng & Jeffrey, 2003). The success of an employee well-being programme therefore must consider the effect of stress for both sedentary and active individuals as well as the proposed type of activity.

Wijndaele et al., (2007) found that in a telephone survey of 2616 respondents that a high level of stress was associated with a lower level of sport participation but not general leisure activity. Thus individuals may not be achieving a high enough intensity of activity in their leisure time to mediate the effects of stress if not participating in sport activity. Wempe and Rosvall (2005) found that in questionnaire reports from 7169 participants, a significant association with stress was observed by those individuals exercising less than 30 minutes a week. Thus research interests need to uncover what intensity or duration of activity is of most benefit.

Blair, Cheng, and Holder (2001) reviewed 67 studies from 1990 to 2001 to identify whether a dose-response relationship was observed between physical activity and physical fitness. They found that increased activity in general was associated with reduced disease risk, and increased fitness was of greater benefit to health than general activity. Future research could investigate at what point physical activity begins to

provide physical and mental benefits as well as identifying the possible ceiling effect of activity before it ceases to be effective. This may have relevance for both employee well-being programmes as well as public health promotion.

An eight week exercise programme with 49 participants was applied by Wifley and Kunce (1986). Their results suggested that those individuals under high levels of stress benefited most from the brief duration of their intervention. As stress affects employees both in and out of work, it may be assumed that those under high levels of stress may find little time to exercise. Wifley and Kunce found that the best results were also obtained by those with a low level of fitness, indicating that stress as well as physical fitness can be mediated by a short intervention. Also, general lifestyle activity should also be included as a variable in future research. This may be an opportunity to maximize overall activity when in conjunction with exercise participation.

Employees may avoid participating in exercise sessions if this were taken as evidence for being stressed. This is because people may not want to admit to being stressed. The individual may not want to appear somewhat weak and may increase workload to display their desired state. Conversely, for those who do partake in exercising activity, and exceeds their capability, burnout may result (Meehan et al., 2004) negating any physical improvement.

Difficulties occur with actual measurement of stress levels using biochemical markers due to fluctuations in response to stressors (Kasl, 1998). The level of stress encountered by an employee may also vary according to their perception of the work. Judge, Locke, Durham, and Kluger (1998) proposed that the view of the employee could play a large part in their ability to cope and deal effectively with daily tasks. Baard et al.

(2004) also found evidence that a perception of support from the employees superiors mediated the effects on the employee.

Even where different occupations were assessed by Ganster et al. (2001) it was found that the increased stress levels on the employee could be attributed more as a result of the appraisal of the workload rather than the occupation itself. Whilst there are different objective occupational demands posed by various jobs it is the employee's subjective appraisal that undermines the stress levels that they experience (Judge et al., 1998). If the workload is perceived to be severe, it can have a lasting impact of stress on the individual affecting their home life and overall well-being (Peeters, De Jonge, Janssen, & Van der Linden, 2004).

An individual under a high level of job stress may impact the whole organization. This may be mediated by both the individual and the organization working in a collaborative process towards improved outcomes (Kohler & Munz, 2006). It has been suggested that the organization can improve by increasing levels of communication (Peeters et al., 2004) and also enhancing levels of autonomy where possible (Baard, et al., 2004; Judge, Thoresen, Bono, and Patton, 2001). Individuals can respond by increasing exercise, reducing saturated fat intake and ceasing unhealthy behaviours such as smoking (Lloyd & Foster, 2006). Hendrix et al. (1985) found that life stress influenced both job stress and job satisfaction. The significance of factors, such as job autonomy or remuneration, was mediated by the importance they hold to the employee and whether they were addressed by the organisation (Rice et al., 1991).

Individuals' proactivity in addressing stress related issues may have positive or negative effects. Given that the people may adopt unhealthy coping strategies in response to stress, such as smoking or reduced physical activity (Lloyd & Foster, 2006)

it can be proposed that stress may be a hindrance to beneficial engagement in physical activity. This suggests the inclusion of a measure to investigate how stress levels may be reported across differing levels of physical activity.

Summary

In Australia, decreasing physical activity and a largely sedentary lifestyle have taxed public health and increased financial burden. Given the increasing time spent at work for many individuals, an organisation may choose to implement an employee well-being programme in order benefit the employee and the organisation. The desired outcome for the individual may be to provide health benefits of a physical nature but also improved mental factors such as well-being. Global well-being has been shown to increase as a result of engagement in physical activity. For the organisation, the assumption that increased activity will result in increased job satisfaction has not been supported. However reduced absenteeism rates from engagement in physical activity has had some research support although conflicting findings do exist, preventing a definitive claim for reduced absenteeism to be made.

There are many factors that have been implicated in the effect of physical activity on job satisfaction. This has been attributed to such issues as; the personality of the individual, the communication between the organisation and its employees and the involvement of the employees in the establishment of such a programme. Not all exercise has been shown to have positive effects. Where exercise is of a duration or intensity that exceeds the coping ability of the individual, a negative impact can result that may be referred to as burnout or overtraining. This condition may be as a result of physical or mental overwork, and little attention is given to the effect of mental overwork in the workforce when implementing exercise interventions. This may

increase predisposition to stress related conditions and negate physical benefits from the physical activity if a programme is not tailored to the workforce.

Many studies have investigated stress as a factor in exercising research. Exercise overtraining can result in increased stress and this has possible links with illness. Whilst investigations focused on exercise and well-being factors or physical activity factors, little research in comparison, incorporated stress assessments when comparing exercise participation with general physical activity on well-being measures. ABS (2006) data indicated that 49% of Australians walked for exercise. Thus, research into exercise interventions may fail to identify those individuals who may be physically active overall but do not participate in regimented exercise activities.

An individual may not play sport, go to the gym or conduct any specific exercise regime, but may walk their pet, perform gardening activities or be physically active through commuting to work. The Western Australia Department of Health's (2002) "Find thirty" promotion highlighted where opportunities for activity could be engaged through minor lifestyle modifications such as walking stairs rather than taking the lift. Thus, the health promotion message is that various forms of activity will benefit the individual.

Conclusion

With an increasingly sedentary population at greater risk of mortality, physical activity has been widely recognised for its health benefit. Physical activity has been utilised through workplace employee well-being programmes to benefit both the employee and the organisation. For the organisation, benefits may range from reduced absenteeism and a healthier workforce. The employee may benefit from increased well-being, lowered disease risk and a greater ability to handle stress. Not all physical activity

may be beneficial; if too strenuous, overtraining may occur and conversely, no benefit may be obtained if the activity is not of an adequate intensity and duration. Most research has focused on exercise interventions and has not considered the effect of general activity in improving well-being as well as the mediating effect of stress.

Future research may consider this issue to investigate where the optimum benefits for both physical and mental factors exists. This may be achieved by comparing both activity level and type of activity (structured exercise such as sport, or general physical activity such as walking or gardening) and also including a measure of stress. This information may be useful to ensure that the maximum benefit for both physical and mental health can be obtained with the minimum level of activity. This will allow the sedentary individual as well as the regular exercising individual to keep their activity within limits without under training or overtraining and maximise the effectiveness of a workplace well-being programme.

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Running head: MINIMAL EXERCISE MAXIMUM BENEFIT

Minimal Exercise, Maximum Benefit? Comparing Incidental Physical Activity with
Structured Exercise Participation on Three Measures of Well-Being in a Group of
Corporate Employees.

Warwick J. McGlone

Edith Cowan University

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Warwick J McGlone

Abstract

Objectives: Whilst the world health organisation (WHO) asserts that western societies show insufficient levels of physical activity (PA), research has paid little attention to the contribution of non regimented activities to well-being. The current study compared global well-being (GWB), job satisfaction (JS) and perceived stress (PS) between corporate employees who engage in sport and those, less active, whose PA is intertwined in their daily routine. Four predictions were tested. Firstly, the sport group would report significantly higher GWB. Secondly, there would be a significant positive correlation between PA and GWB. Thirdly, there would be a significant negative correlation between PS and PA levels. Fourthly, there would be a significant negative correlation between PS and JS.

Design: Cross sectional survey

Methods: Participants were 216 corporate employees ($n = 162$ females & $n = 54$ males). They completed sport and leisure indexes of a sport questionnaire. GWB was assessed with the satisfaction with life scale, JS with a job satisfaction scale, and PS using a four item perceived stress scale. Data analysis comprised two MANOVAs and bivariate correlations.

Results: The first hypothesis was not supported as the leisure group reported a statistically higher level of GWB. Hypotheses two and three were both supported. Hypothesis four was not supported as a non significant negative correlation was found.

Conclusion: The findings suggest that whilst physical activity overall does contribute to enhanced GWB and reduced PS, the activities are optimally rewarding when incorporated into daily routine. JS, however, was significantly higher for the sport group.

Keywords: Global well-being, Job satisfaction, stress, Sport, Leisure activity

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Minimal Exercise, Maximum Benefit? Comparing Incidental Physical Activity with
Structured Exercise Participation on Three Measures of Well-Being in a Group of
Corporate Employees.

Introduction

The need for increased physical activity to reduce morbidity and mortality is largely undisputed (World Health Organisation [WHO], 2007; Warburton, Nichol & Bredin, 2006). Increasing physical activity has been shown to have a positive effect on both physical (Lloyd & Foster, 2006), and mental health (Thogersen-Ntoumani, Fox & Ntoumanis, 2005). Purported benefits from exercise engagement include; increased ability to cope with life stress (Brown, 1992), increased well-being (Rejeski et al., 2001), lowered cardiovascular health risks (Manca, 2006) and increased positive mood (Giacobbi, Hausenblas & Frye, 2005). Despite wide promotion of the need to increase physical activity (Department of Health [DOH], 2002), many Australians fail to achieve an adequate level of activity for health benefits (Australian Bureau of Statistics, [ABS], 2006).

In the workplace, physical activity as an integral part of employment is becoming greatly reduced. Many modern work duties have become increasingly sedentary through use of technology such as a personal computer. Attempts to address this lack of activity may be through implementation of health education (Anderson & Anderson, 1994) or, more commonly, workplace exercise and well-being programmes (Shephard, 1999). Research about the effects of exercise interventions on well-being, job satisfaction (JS), and stress (e.g., Thogersen-Ntoumani et al., 2005; Rejeski et al., 2001; Wijndaele et al., 2007) makes a sound case for the utilisation of organisational exercise programmes.

It has been suggested that whilst employee physical health improves from participation in an employee well-being programme including physical activity, there are also benefits to the organization. These may be manifested through reduced absenteeism (Jacobson & Aldana, 2001; Lechner & De Vries, 1997), as well as reduced turnover, which has been attributed to increased JS (Egan, Yang, & Bartlett, 2004).

Not all exercise participation has been shown to be beneficial for health. Where a physical or mental workload may exceed the individual's ability to cope, a negative condition, often referred to as "burnout" or "overtraining," can occur (Goodger, Gorely, Lavalley, & Harwood, 2007). Over time, an excessive workload can lead to susceptibility to stress, which may result in illness if maintained (O'Leary, 1990). Conversely, a low level of physical activity has also been associated with higher reports of stress (Wemme & Rosvall, 2005). Thus for use in an employee well-being programme, research would do well to investigate where the maximum benefit in well-being can be gained from the minimum level of physical activity.

The current paper will present the current state of research on exercise and the effects on subjective well-being, JS and stress. It will be shown that although much research has been conducted on exercise and various aspects of well-being, there exists little research on the differences that may be found when comparing general physical activity to structured sport or exercise participation. Also whilst research indicates that exercise enhances various components of subjective well-being, the possibility that similar benefits may be obtained from physical activity in general is largely ignored. The mental benefits from physical activity on well-being will now be presented.

Well-Being

It is often reported that besides improved mood (Giacobbi et al., 2005)

increased subjective well-being (SWB) (Rejeski et al., 2001) can be attributed to increasing physical activity. Diener (2000) reported SWB, broadly as an internal evaluation of one's life encompassing: experience, positive affect and life satisfaction (global well-being [GWB]). Rejeski, et al. (2001) conducted a randomized controlled exercise intervention on SWB in 854 participants over a two year period. They observed a significant increase in SWB from baseline measures which was also maintained at six and 24 months post intervention. Increasing employee well-being is important for an organisation, as low reports of well-being have been associated with increased turnover (Wright & Bonett, 2007).

Sjogren et al. (2006) found in a 15 week randomised controlled trial with 90 office workers, that although increased activity through an exercise intervention had no significant effect on GWB, a significant increase in overall SWB was observed. However, Thogersen-Ntoumani et al. (2005) compared 312 corporate employees across five levels of increased activity intensity. They compared the contribution of exercising (sport activity); with those of overall physical activity (work, sport and leisure) on reports of GWB by using the habitual physical activity scale (BQ) (Baecke, Burema & Frijters, 1982). Their results showed a significant increase in GWB for a high level of activity compared to low activity in both sport and overall physical activity reports. It may be suggested that improved GWB is more pronounced at different intensities of physical activity. Thus a physical activity intervention may have little effect on GWB unless an adequate intensity of exercise is achieved.

Exercise engagement may perform an important function in an individual's life if they achieve a positive outcome from the exercise. Giacobbi et al. (2005) found that in a sample of 106 students, increased exercise led to a significant reduction in negative

mood, and an increase in positive mood states. This positive enhancement in mood may be reinforcing, and thus increasing the likelihood of exercise participation. Similar findings were observed for increased positive affect as a result of increased physical activity by Reed and Ones (2005). It may be postulated that those individuals who do choose to engage in physical activity, have a different perspective on life, which leads to the purported mental benefits, rather than the exercise per se. This was observed by Thogersen-Ntoumani and Ntoumanis (2006) in self determined exercise reports from 375 individuals. Their findings suggested that individuals who assumed personal responsibility for their lives engaged in increased physical activity. A high level of intrinsic motivation strengthened their intention to maintain levels of physical activity over time. In contrast those who presented a more external locus of control engaged in less physical activity and showed less benefits.

In much research the focus may be on an exercise intervention, or a structured regimen that requires the individual to modify their lifestyle to accomplish this objective. It is important to consider how physical activity may be affected by life demands and stressors which may impact these findings. In addition it is important to correctly assess actual physical activity reports as it cannot be assumed those individuals performing sporting activities are more active than those who do not. Kahan, Fogelman and Bloch (2005) found in a survey of 406 respondents that self perception of activity level was misleading. When using the BQ to measure actual activity, they found overall activity was lower than initially reported.

In summary, increased physical activity has been associated with both improved overall factors of SWB including GWB and positive affect, and improved mood. However increased physical activity has been shown to be affected by individual

differences such as perspective on life, motivation, as well as likelihood of exercising. It is important for an organisation to assess physical activity levels of the workers. This is to ensure an adequate level of activity is achieved for improved physical health as well as improvement of mood, well-being and also ensuring that the activity is maintained, thus allowing these benefits to continue. An organisation may also consider physical activity for their workers for the effects on JS which will now be presented.

Job Satisfaction

Locke (1976) defined JS “as a pleasurable or emotional state resulting from the appraisal of ones job or job experiences” (p.1300). It has been suggested that increased JS can lead to reduced turnover (Egan, et al., 2004). Exercise is assumed to indirectly affect JS through increased GWB (Wright & Bonett, 2007). Altchiler and Motta (1994) investigated the effects of increased aerobic activity on JS, in 43 participants over an eight week intervention, using three sessions per week. Their findings indicated increased activity had no effect on JS reports or even absenteeism rates. These findings may also have resulted from implementation of an inappropriate exercise intervention or as commonly reported; initial discomfort from the activity itself (Shephard, 1999). It may also be that the addition of a regimen of exercise to an individuals lifestyle may be too strenuous.

Thogersen-Ntoumani et al. (2005) found no support for improvement of JS as a result of physical activity in 312 corporate employees. Brand, Schlicht, Grossmann, and Duhnsen (2006) conducted a 13 week exercise randomised, controlled, exercise intervention with 110 participants and also failed to find a significant effect on JS. DeGroot and Kiker (2003) indicated that in a meta-analysis of 22 studies, little support existed for well-being programmes on JS. Thus, with limited support for the effect of

exercise on JS, the assumption that engaging in a well-being programme is not robust. It may also be postulated that JS could be accounted for by more than just participation in physical activity.

JS has also been shown to be affected by environmental factors such as life and job stress (Hendrix, Troxler & Ovalle, 1985). It may be assumed that a lower report of JS or GWB could arise as a result of stressors, such as increased workload (Ganster, Dwyer, & Fox, 2001) or perceived lack of support from management (Baard, Ryan, & Deci, 2004). Thus as was observed in the case of well-being, JS is a complex construct that is affected by various variables including stress.

An employee well-being programme must also consider the accumulating effects of life stresses, such as financial issues, interpersonal difficulties or family and work matters. These issues in combination may have a greater impact on the individual (Meehan, Bull, Wood, & James, 2004). Lack of support for employees, and role pressure has been indicated as a major precursor to the development of job stress (Vagg & Spielberger, 1998). The evidence towards exercise interventions and stress will now be presented.

Stress

For an overly worked employee in a fast paced, modern workplace, engaging in a regimen of exercise, through an employee well-being programme, may be counter productive. Physical improvement may be negated by factors such as exceeding physical capabilities, or failing to recuperate adequately. Monat and Lazarus (1991) defined stress to refer to “to any event in which environmental demands, internal demands, or both tax or exceed the adaptive resources of an individual...” (p.3). Research has indicated that external stressors may also become additive (Meehan et al., 2004) overwhelming the

individual. This also could occur for an individual engaging in an excessive level of exercise, thus diminishing any potential health benefits.

Overtraining has been observed frequently in athletes, due to training intensity being too high, recovery periods inadequate and / or nutritional demands not being met (Meehan, et al., 2004; Goodger, et al., 2007). It may also be argued that a corporate employee who, may be under a high level of stress at work could engage in a detrimental intensity or duration of exercise. This may lead to them exceeding their capacity to cope with the demands, resulting in lower JS or GWB. In addition, investigation of the presence of stress and what influence this may have in both an exercise and non exercising group is a relevant area of study. The assumption that all exercising individuals are buffering their stress through exercise and thus may report higher well-being than those who do not actively engage in exercise should be explored. The addition of a measure of stress may also be considered to investigate the effect of stress in the relationship between job satisfaction and physical activity.

Brown (1992) found that increased physical fitness led to a decrease in susceptibility to stress over a six month period supporting findings by Wifley and Kuncze (1986). Research suggests that increased level of exercise has positive health benefits.

This raises the issue of what negative effects may be observed in differing levels of exercise. Higher stress levels have been shown to increase the likelihood of reduced physical activity, increased smoking and increased dietary fat consumption (Ng & Jeffrey, 2003). Not all individuals, however, are affected in the same way and the level of impact may be influenced by factors such as resilience (Roth, Wiebe, Fillingim, & Shay, 1989), indicating that the perception of stress is significant in how the stress response may affect an individual. Some individuals may choose to be active in order to

buffer their stress (Brown, 1992) or others may choose a more sedentary response (Ng & Jeffrey, 2003). The success of an employee well-being programme therefore must consider the effect of perceived stress for both sedentary and active individuals as well as the proposed type of activity.

Wijndaele et al., (2007) found that in a telephone survey of 2616 respondents that a high level of stress was associated with a lower level of sport participation but not general leisure activity. Thus individuals may not be achieving a high enough intensity of activity in their leisure time to mediate the effects of stress if not participating in sport activity. Wemme and Rosvall (2005) found that in questionnaire reports from 7169 participants, a significant association with stress was observed by those individuals exercising less than 30 minutes a week. Thus research interests need to uncover what intensity or duration of activity is of most benefit and also consider comparing sport activity to leisure activity.

An eight week exercise programme with 49 participants was applied by Wifley and Kunce (1986) and in this study it was found that those individuals under a higher level of stress benefited most from increased activity. It is the employee's subjective experience that undermines the stress levels that they experience (Judge, Locke, Durham & Kluger, 1998). If their workload is perceived to be severe, it can have a lasting impact of stress on the individual affecting their home life and overall well-being (Peeters, De Jonge, Janssen, & Van der Linden, 2004). Therefore general lifestyle activity should also be included as a factor in future research. This may provide an opportunity to maximize overall activity rather than risk overburdening the individual by the addition of a regimented exercise regime.

Summary

In Australia, physical activity levels are decreasing and are not meeting current recommendations. An organisation may choose to implement an employee well-being programme in order benefit the employee (increased GWB & JS, reduced stress) and the organisation (increased JS). However it is important to identify where physical activity gives the most benefit such as in a structured regime or in ones leisure time. ABS (2006) data indicated that 49% of Australians walked for exercise. Thus, research into exercise interventions may fail to identify those individuals who may be physically active overall but do not participate in regimented exercise activities.

Higher GWB has been shown as a result of increased physical activity; hence it may be assumed that increased overall activity both from sport and leisure should result in a greater report of GWB compared to a lower level of activity. Little attention however, has been given to the effect of mental overwork in the workforce when evaluating exercise interventions. This may increase predisposition to stress related conditions and negate physical benefits and may impact JS from the physical activity if a programme is not tailored to the workforce. The effect of stress is therefore an important factor to consider for its effects on GWB and JS as well as the effect of high and low levels of physical activity.

Whilst investigations focused on exercise and well-being factors or physical activity factors, little research in comparison, incorporated stress assessments with comparing exercise participation with general physical activity on well-being measures. The current study will aim to investigate where the optimum benefits for both physical and mental factors exist and also consider the possible mediating effect of stress. This study will be a partial replication of the Thogersen-Ntoumani et al., (2005) study using a

corporate sample of employees on measures of GWB and JS. However the current study will extend that research by assessing those who engage in regular physical exercise or sport (sport group) and compare them to their co workers who do not engage in regular structured exercise or sport (leisure group) and include a measure of perceived stress (PS).

Four hypotheses will be tested.

- 1: It is hypothesized that the sport group will score significantly higher on GWB than the leisure group
- 2: It is hypothesized that there will be a significant positive correlation between physical activity level and scores on GWB.
- 3: It is hypothesized that there will be a significant negative correlation between PS and physical activity.
- 4: It is hypothesized that there will be a significant negative correlation between PS and JS.

Method

Research design.

The current study used two factorial designs. Firstly, a 2 x 2 factorial design with physical activity (sport or leisure) as the independent variables was used. Secondly a 2 x 5 factorial design, with physical activity, (sport and leisure activity) and five levels of intensity of the activity from low (1) to high (5), as the independent variables. The dependent variables were participant scores on GWB, JS and PS.

Participants

The participants were recruited from a pool of male and female desk based corporate employees in a financial services company based in Perth and Joondalup,

Western Australia. 554 participants were contacted for the current study. 227 participants attempted the questionnaire, 11 questionnaires were incomplete and discarded, leaving a total sample of 216 participants (162 females & 54 males). This represents a useable response rate of 39%. The sport group participants ($n = 107$) consisted of 70 females ($M = 28.3$ years, $SD = 10.14$) and 37 males ($M = 29.19$ years, $SD = 7.63$). The leisure group ($n = 109$) consisted of 92 females ($M = 33.75$ years, $SD = 11.48$) and 17 males ($M = 30$ years, $SD = 10.03$). Whilst no remuneration was offered for participation, the researcher offered to donate \$1 per completed questionnaire to a choice of charity such as the Cancer Council of Australia if desired by the participants. No identifying information was requested beside gender and age, and anonymity was assumed.

Materials

Activity Index

The BQ sport index was used to identify the sport group, and the leisure index was used for assessing the activity levels of the leisure group, which had been previously used in similar research (e.g., Kahan et al., 2005; Thogersen-Ntoumani et al., 2005). This questionnaire has been shown to have satisfactory psychometric properties in much research (Baecke et al., 1982, Thogersen-Ntoumani, et al., 2005). This questionnaire provides a measure of activity across three domains: work, sport or exercise, and leisure providing a total level of activity from the three indexes, ranging from three (no activity) to 15 (high level of activity). As all participants in this study worked in desk based, sedentary roles it was assumed that the contribution of work to physical activity would be similar across the participants and hence the work activity index was not included in the questionnaire. The sport group completed two indexes (sport & leisure) but the

leisure group only completed one index (leisure). Thus the total activity level that could be obtained by the sport group was higher overall and ranged between two (none) to 10 (high). The leisure group range of activity ranged between one (none) to five (high level).

Global Well-being

The Gregg and Salisbury (2001) respondent version of the satisfaction with life scale (SWLS) (Diener, Emmons, Larsen & Griffin, 1985) was used to measure GWB. Adequate psychometric properties have been reported for this scale (Gregg & Salisbury, 2001; Diener et al., 1985). This scale consists of five items including: "I am satisfied with my life." Participants respond by indicating their level of agreement on a five point likert scale ranging from: "strongly disagree" to "strongly agree". The scores are tallied to produce a sum of scale ranging from five (extremely dissatisfied with life) to 20-25 (extremely satisfied with life).

Job Satisfaction

The Judge et al., (1998) modified version of the Brayfield and Rothe (1951) job satisfaction scale (JSS) was used to measure JS. This scale includes items such as: "most days I am enthusiastic about my work" with five responses over a continuum on a five point likert scale, with each response ranging from: zero (strongly disagree) to 10 (strongly agree), except two of the questions that are reverse scored. The scored responses were then summed and then averaged for an overall score ranging from five (low level of JS) to 25 (high level of JS). Adequate psychometric properties have been reported for this scale (Judge et al., 1998; Thogersen-Ntoumani et al., 2005)

Perceived Stress

The modified four question version of the perceived stress scale (PSS)

(Cohen, Karmarck & Mermelstein, 1983) was used to measure PS, which consists of questions such as “In the last month, how often have you felt that things were going your way?” The responses on the five point likert scale range from: “never” (zero) to “very often” (four points). Two of the questions are reverse scored and the responses are then summed to form an overall score of PS. A higher score indicates a higher level of perceived stress ranging from zero (extremely low level of PS) to 16 (extremely high level of PS). Although the four item PSS has a lower reported internal reliability ($r = .60$) compared to the 10 or 14 item PSS ($r = .85$), it has adequate reliability in situations requiring a short scale (Cohen & Williamson, 1988) which was why this was selected for use in the current study. All of the questionnaires used in this study were either available in the public domain and / or permission granted for educational research purposes and valid for use in the participants in the current study.

Procedure

After obtaining ethics approval from the Edith Cowan University Higher Research and Ethics Committee, and permission granted by the organizations people services department, the current study commenced. Participants were informed of the study with the introduction letter (see Appendix A) via internal group email with the private email link to complete the questionnaire (Appendix B) on the World Wide Web. The responses were then exported in database form. Only the required response information was able to be completed in text form and no other information was requested or needed for completion.

Analysis

Sport Index

The calculation of the sport index is in three parts. Firstly the level of sport

or exercise intensity (indicating a level of megajoules / hour) is obtained using Ainsworth et al.'s (2000) compendium and Pate et al.'s (1995) formula for metabolic equivalent task (MET), and multiplied by time (hours per week), multiplied by duration (months of the year). See Appendix C for full description of this analysis. This provides a simple sport score that is then summed with the responses from the three other sport index questions and then divided to provide a final sport index score rated between zero (no activity) to five (high level of sport activity). The next step was to calculate the leisure index score.

Leisure Index

The leisure index consists of four questions such as amount of time spent watching television or walking or cycling for leisure. See Appendix D for full description of this analysis. The leisure index is similarly scored between zero (no activity) to five (high level of activity). As the sport group completed both the sport and leisure index of the BQ (1982), their combined total was divided to allow a quintile comparison with the leisure group although the total activity level for the sport group was higher overall. The leisure group was determined by those who did not indicate any sport or exercise participation and only completed the leisure index.

Data was analysed using SPSS Version 14. These data were submitted to two between groups, multivariate analysis of variance (MANOVA)s to compare both the exercise and the leisure groups overall, and at each quintile of activity with sufficient n on the scores of GWB, JS and PS after all assumptions of normality were met. To further investigate the effects of the DV's, between subjects analysis of variance (ANOVA)s were performed. Bivariate correlation analyses were conducted to test the hypotheses that there would be a significant positive correlation between physical

activity level and GWB scores, a significant negative correlation between PS and physical activity, and a significant negative correlation between PS and JS.

Results

The questionnaires were screened for missing data prior to data analysis. Nine incomplete questionnaires were found in the leisure group, two in the sport group and were excluded from the analysis leaving a total number of 216 useable questionnaires. The variables were examined individually in their groups for univariate outliers and normality. Univariate outliers were defined as values that were more than three standard deviations from their mean. Normality was assessed through visual examination of plots and by calculating deviations of skewness and kurtosis and was found to be satisfactory.

The participants reports on the three dependent variables were analysed with a two way, between subjects multivariate analysis of variance (MANOVA) after the MANOVA test assumptions were deemed to be satisfactory. Mahalanobis distance with $p < .001$ did not detect any multivariate outliers in the sample. An alpha level of .05 was used for all statistical tests except where a Bonferroni correction was used ($\alpha = 0.017$) where indicated.

The first MANOVA examining the differences between the sport and the leisure groups in GWB, JS and PS was significant: Pillai's criterion = 0.001; $F(3, 212) = 7.60$; $p < 0.001$. Descriptive statistics indicated that the leisure group reported higher levels of GWB ($M = 17.65$, $SD = 3.87$) than the sport group ($M = 16.11$, $SD = 3.67$). The sport group reported a higher level of JS ($M = 16.58$, $SD = 3.89$) than the leisure group ($M = 14.79$, $SD = 3.37$). The sport group also reported a higher level of PS ($M = 5.66$, $SD = 2.68$) than the leisure group ($M = 5.17$, $SD = 2.70$). Univariate analyses were carried out using a between subjects ANOVA and indicated a significant difference between the

sport and leisure groups for GWB; $F(1, 214) = 8.99$; $p = .003$; $d = 0.41$, and for JS $F(1, 214) = 13.05$; $p = .001$; $d = 0.49$ but not for PS.

A second MANOVA was conducted on the quintile groups with sufficient N (sport quintiles 2 & 3, leisure quintiles 2, 3 & 4) on GWB, JS and PS after the data had been screened for normality. One univariate outlier was detected in the leisure quintile two for PS and this value of 14 was changed to 13 (within three standard deviations of the mean). This MANOVA was significant; Pillai's criterion = 0.001; $F(12, 597) = 3.96$; $p < 0.001$.

Descriptive statistics indicated the highest mean report of GWB was for the leisure quintile four ($M = 19.82$, $SD = 3.66$) and the lowest was for the sport quintile three ($M = 15.66$, $SD = 3.45$). The highest mean report for JS, was for the sport quintile three ($M = 16.60$, $SD = 4.09$) and the lowest was for the leisure quintile two ($M = 13.06$, $SD = 3.78$). The highest mean report for perceived stress was for the leisure quintile two ($M = 6.06$, $SD = 2.88$) and the lowest was for the leisure quintile four ($M = 4.18$, $SD = 2.46$). Univariate analyses were carried out using a between subjects ANOVA for the sport and leisure quintiles, and was significant for GWB; $F(4, 199) = 5.31$; $p = .001$; $d = 0.42$, for JS; $F(4, 199) = 6.41$; $p = .001$; $d = 0.49$ and for PS; $F(4, 199) = 2.48$; $p = .045$; $d = 0.21$.

Post hoc analyses were conducted using a Bonferroni adjustment for Type 1 error ($\alpha = 0.017$). Significant differences between groups for GWB were observed between sport quintile three ($M = 15.66$, $SD = 3.45$) and leisure quintile four ($M = 19.82$, $SD = 3.66$); $d = 1.18$. Significant differences observed between sport quintile four ($M = 16.41$, $SD = 4.01$) and leisure quintile four ($M = 19.82$, $SD = 3.66$); $d = 0.87$. Significant

differences were observed between leisure quintiles two ($M = 16.54$, $SD = 4.03$) and four ($M = 19.82$, $SD = 3.66$); $d = 0.84$.

For JS, significant differences were observed between leisure quintile two ($M = 13.06$, $SD = 3.78$) and sport quintile three ($M = 16.60$, $SD = 4.09$); $d = 0.89$, and between leisure quintile two ($M = 13.06$, $SD = 3.78$) between sport quintile four ($M = 16.59$, $SD = 3.64$); $d = 0.95$. None of the differences observed between quintiles were significant for PS using Bonferroni ($\alpha = 0.017$) or Tukeys HSD ($\alpha = .05$) post hoc comparisons. A difference was only observed when using Dunnett's two-tailed or LSD ($\alpha = .05$) post hoc comparisons, yielding a significant difference between sport quintile three ($M = 5.83$, $SD = 2.72$) and leisure quintile four ($M = 4.18$, $SD = 2.46$); $d = 0.62$, and between leisure quintile two ($M = 6.06$, $SD = 2.88$) and leisure quintile four ($M = 4.18$, $SD = 2.46$); $d = 0.69$, for PS. It is important to acknowledge that both Dunnett's two-tailed and LSD are based around t-test calculations and therefore vulnerable to Type 1 error, therefore this post hoc finding should be interpreted with caution. All quintile reports are shown in Appendix E.

Three bivariate correlation analyses were used to test the remaining three hypotheses. The first bivariate correlation examined the relationship between physical activity level and GWB scores and was significant $r = .26$; $p = .01$ indicating a low positive correlation between physical activity and global well-being. A positive trend was observed for increased physical activity on GWB for the leisure group and is displayed in Figure 1. The second bivariate correlation examined the relationship between PS and physical activity and was significant $r = -.15$; $p = .05$; indicating a low negative correlation between PS and physical activity. For the leisure group, a negative trend was observed between the three quintiles on PS and is displayed in Figure 2.

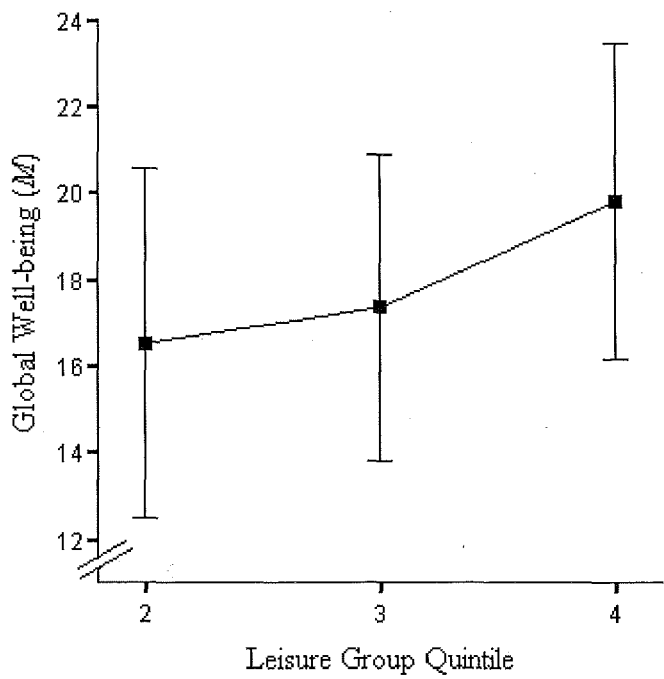


Figure 1. Mean global well-being scores for the three leisure group quintiles

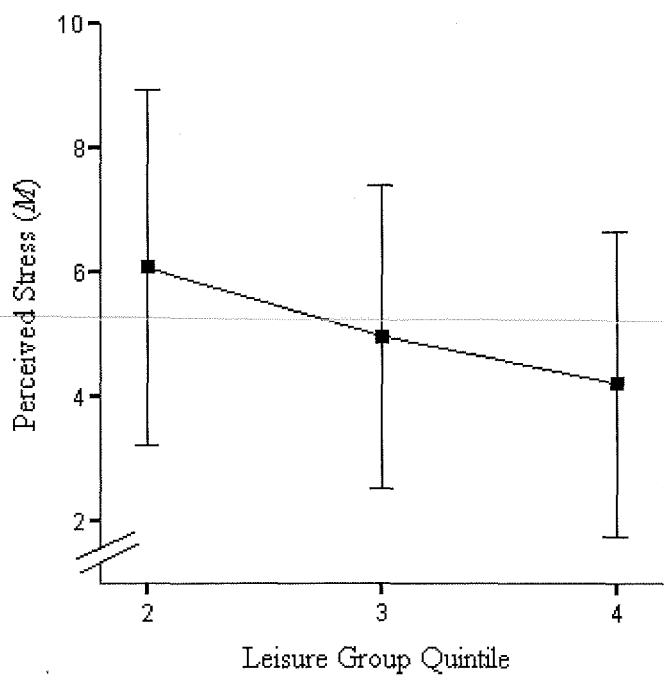


Figure 2. Mean perceived stress scores for the three leisure group quintiles

The third bivariate correlation examined the relationship between perceived stress and JS which was not significant $r = -.04$ indicating a low negative correlation between PS and JS.

Discussion

The first hypothesis predicted that the sport group would score significantly higher on GWB than the leisure group was not supported by the results as the leisure group scored significantly higher on GWB reports than the sport group. It is important to note that although the mean scores for both groups fell within the same range (15-19) which is categorised as “fairly satisfied with life” (Diener et al., 1985), the robustness of the finding and the substantial effect size that was obtained strengthens these findings. There was a clear statistical difference in reports between the sport and leisure group. Based on previous research (Thogersen-Ntoumani et al., 2005), it was assumed that the sport group, given that they were engaging in a higher level of activity would show a greater report of GWB than the leisure group. The fact that the leisure group in the current study scored significantly higher than the sport group on GWB suggests that the context is a determining factor in the contribution that physical activity has to GWB. Thus research on workplace well-being programmes should consider the contribution of physical activity as a whole including leisure activity, and not just sport or exercise.

On the measure of JS, the sport group reported significantly higher levels than the leisure group. In terms of classification on the JS scale, the leisure group was neutral, indicating that they were neither satisfied nor dissatisfied with their job. The sport group, however, reported a “higher” level of JS. This is an interesting finding because JS is important to the organisation and a well-being programme may do well to consider

different strategies to enhance it among workers who prefer regimented sport and those who are more likely to engage in physical activity as part of their leisure.

These findings also indicate that a higher level of activity as shown in the sport group resulted in a higher level of JS. As the GWB reports were higher for the leisure group, they may be satisfied with their life but not with their employment. Conversely, the sport group may have a structure oriented approach to work, appreciate deadlines and structure that manifest in their sporting activity, and may be mimicked in the workplace. The leisure group may, however, have a different perspective on life and may choose to work for financial reasons or may like a de-structured view and thus work may not facilitate this. The leisure group may just not see the work they do as intrinsically meaningful and this may result in their lower JS report compared to the sport group. Future research may investigate how the attitude towards work is manifested in these different groups, as the distinction between those who do sport and those that do not but are still physically active is a valid area of investigation.

As for the measure of PS, the sport group reported a marginally higher report than the leisure group but this was not statistically significant. Using the quintile reports, univariate analyses showed a statistically significant difference for PS. Dunnett's two-tailed and LSD post hoc comparisons revealed that PS was significantly higher in quintile two compared with quintile four of the leisure group and the sport quintile three and the leisure quintile four. This however should be interpreted with caution because these post hoc procedures are vulnerable to familywise error. This finding suggests that there is an advantage to being fairly physically active in leisure time as the PS report were lower and GWB reports were higher among those more physically active in the leisure group.

This pattern would be expected as GWB is assumed to be negatively correlated with PS and this trend was observed between leisure quintiles. The mean reported level was still very low for both sport (5.66) and leisure groups (5.16) as the scale ranged from zero (low level of PS) to 16 (high level). However, this is still an important area to explore, the instrument used to measure PS in the current study was only the four-item version, and future research may consider implementing the full 10 or 14 item scale for a more sensitive assessment as both report greater internal reliability (Cohen & Williamson, 1998). These were not utilised in this study due to time constraints and limited scope.

Due to insufficient numbers in the other quintiles only sport quintiles (two & three) and leisure quintiles (two, three & four) were compared. Whilst this meant that the full spectrum of quintiles was not represented in the sample it ensured robust analysis.

The second hypothesis predicted that there would be a significant positive correlation between physical activity level and scores on GWB was supported by the results. This finding, thus, suggests that as physical activity increased so does GWB. This finding lends support to the recommendation that a benefit from increased physical activity may be an increase in ones satisfaction with their life. This may be due to enhanced physical and / or mental factors. Whilst the observed correlation supports previous research by Thogersen-Ntoumani et al. (2005) and Rejeski et al. (2001) it should be interpreted with caution because albeit statistically significant it is a low (.26) correlation. Future research may consider examining this finding with increased sample size.

The third hypothesis predicted that there would be a significant negative correlation between PS and physical activity was supported by the results as a significant negative correlation was observed. This result suggests that physical activity may act as a mediator in how PS may affect the individual. Whilst the observed correlation supports findings by Brown (1992), it should be interpreted with caution because albeit statistically significant it is a low (.15) correlation which may be tested further by an increased sample size in future research. This finding may be used towards recommendations of increasing physical activity particularly in high pressure workplaces where high stress levels may commonplace such as in a call centre. In particular, these findings have indicated that a high level of physical activity including sport has no observed advantage on reducing PS. Overall increased activity in leisure time has been shown to be as effective on reducing perceived stress reports if not more so. Thus for a workplace programme, once a baseline measure of fitness has been obtained, it may only require a small increased in activity to obtain the desired benefit of reduced stress. What future research may consider is measuring how much activity is necessary to gain the most benefit without overtraining the individual or increasing reports of stress.

The fourth hypothesis predicted that there would be a significant negative correlation between PS and JS. This was not supported by the results as although a negative correlation was found, this was not significant ($\alpha > .05$). It seems that the relationship between PS and JS in this sample is not particularly strong. JS has been shown to be affected by many other variables such as personality factors (Dormann & Zapf, 2001), increased work knowledge (Levy & Williams 1998), or a perceived lack of support from management (Baard, et al., 2004). The findings from the current study

however may just be reflective of this particular workplace; future research may like to explore this finding in alternative workplaces.

The findings of the current study suggest that those individuals who engage in physical activity as part of their leisure, have a higher level of GWB than those that are more physically active and partake in regimented sport. It appears that for an organisation, increasing physical activity may result in increased JS but this may be detrimental to GWB. This is important because previous research (Wright & Bonett 2007) found when GWB was low, this increased probability of turnover, suggesting that whilst sporting activities in the workplace may enhance JS they would be counterproductive in terms of employees' GWB and retention.

The findings of the current study are limited by its co-relational nature, which limits the observation of causal relationships between variables. In order to increase the external validity of the findings, replications could be employed across different organisations. As participation was voluntary the sample may have been limited by self-selection. That is, those who wanted to inform others of their physical activity levels may have been more likely to participate than those more reticent to share related information. There was a higher ratio of females (75%) to males (25%) in the current study, but this profile was similar to the overall breakdown of the organization being approximately 60% female and 40% male. Future research may seek to incorporate various recruiting techniques, such as purposive sampling and randomisation, in order to obtain more varied and representative samples respectively. Whilst the response rate in the current study was 39%, which may be considered low, it was slightly higher than achieved by other studies in the area, for example Thogersen-Ntoumani et al. (2005) (33.19%). Attempting to enhance participation, the current study used a short

questionnaire (mean completion time five minutes) and offered the incentive of charity donation for completion.

Whilst it is acknowledged that other aspects of people's lives may be relevant to the variables measured in the current study, the findings, nevertheless, indicate that for employee well-being programmes to meet their objectives, pre-screening of employees' GWB, JS, and PS and subsequent tailoring of the programmes accordingly would be beneficial. Further, periodical monitoring of these variables will allow programmes' sensitivity to employees' needs. For an employee programme to be successful, both the likelihood of employees engaging in exercise and the type of activity necessary for physical benefit should be considered. This may take the form of group sporting activities, high or low intensity exercise sessions and aerobic or anaerobic conditioning to ensure that the required level of activity for health benefit is likely to be attained.

The findings suggest adding regimented sport onto an overall active lifestyle does not result in higher levels of GWB. This was demonstrated in the statistically significant differences between the leisure group and the sport groups overall, as well as leisure quintile four and sport quintile four with both showing higher GWB for the leisure group. Increasing the overall level of physical activity as a means for good health is the general message of the WHO (2007). The findings of the current study corroborate with this message and add that further to its positive effect on health, physical activity enhances GWB. Congruent with the DOH (2002) "Find thirty" health message, that recommended the incorporation of 30 minutes of daily physical activity, the current study found that those who had physical activity as part of their daily routine showed greater GWB than those who engaged in regimented sport.

A positive outcome from the current study has been to show that in order to improve GWB, that a high level of exercise is not necessary. This finding may be useful to encourage those individuals who are reticent to engage in sporting or physical activity to make small modifications to their lifestyle to increase activity thereby achieving an increased sense of GWB. Even small increases in physical activity may be just enough to ensure that the individual can build on this momentum without having to make large lifestyle changes. This may be achieved by maximising opportunity to engage in increased activity as part of their life, such as choosing to walk up stairs rather than taking the lift, or cycling to work a few days a week rather than driving, thus increasing their activity in small steps. These changes would be beneficial both in terms of GWB and physical health and also make a positive contribution to the environment with reduced vehicle usage.

Conclusion

Identifying that balancing life's overall demands with an optimal level of physical activity is principle to GWB rather than physical activity per se, is a unique and significant finding of the current study. Thus the current study makes a unique contribution to the body of knowledge in the area of exercise and well being. These findings could also inform practice as well as policy formulations for organizations to benefit their employees through appropriate physical activities and health promotion.

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Appendix A

Participation Request Letter



Warwick J. McGlone
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Joondalup WA 6027

Minimal Exercise, Maximum Benefit? Comparing Incidental Physical Activity with
Structured Exercise Participation on Three Measures of Well-Being in a Group of
Corporate Employees.

Dear Sir / Madam,

My name is Warwick McGlone and I am an XXXX staff member working in
Distribution based at XXXXXXX. My Honours research project for Psychology at Edith
Cowan University involves the type of physical activity and what influence various
forms of physical activity or sport has on ones outlook. I am interested in comparing
different levels of physical activity that benefit the individual both for themselves in
their home and work life and at what influence this has on their overall well-being. I am
requesting your participation in completing a brief anonymous questionnaire regarding
physical activity and your outlook on life. This study has been given full ethics approval
by the ECU Human Research Ethics Committee of the Computing, Health and Science
faculty and has been approved by People Services at XXXX.

The questionnaire should only take approx 5-10 minutes to complete and can be
accessed on the internet from the link provided and does not have to be completed at

your workplace; alternatively you may access a Microsoft Word document version from my public drive. For each questionnaire completed, \$1 will be donated to the charity of your choice as indicated on the questionnaire. The completion of the questionnaire is voluntary and you may withdraw at any time before completion of the online questionnaire. Please be aware that no time off work has been granted for completion of the questionnaire by XXXX and must be done either in break time or outside working hours. The questionnaire will have no effect on your position at work or any connection to your employment and the responses will only be viewed by myself and my supervisor; Dr Eyal Gringart. The overall results of the study will be made available on request in November.

You may contact me on 08 XXXXXXXXX or via email on warwick.mcglone@student.ecu.edu.au for further information or if you would like to speak to Dr Gringart on 6304 5631, email: e.gringart@ecu.edu.au or the Fourth Year Unit Co-ordinator; Dr Dianne McKillop on 6304 5736, email: d.mckillop@ecu.edu.au . If you wish to speak to a person independent of the project you may contact Dr Craig Speelman, on 6304 5724 or via email: c.speelman@ecu.edu.au

Your help and assistance in completing this questionnaire is much appreciated.

Warwick McGlone

Team XX: Call Centre

Appendix B

Questionnaire

This is an anonymous questionnaire, your information is only required for this study and does not have any bearing on your work position or your employment and is being used purely for educational purposes.

The estimated time for this questionnaire is 5-10 minutes. Please complete the fields on the questionnaire form; just click in each field or select your choice from the available options and / or write your answers in text in the spaces provided. For completion of the questionnaire, I will make a \$1 donation to the charity of your choice, please indicate your preference on the final page. Your responses will be anonymous and only viewed by myself and my supervisor. The overall results will be available for viewing in November.

Many thanks!!

Warwick McGlone

Team XX Call Centre

Questionnaire

Please indicate your gender: Male / Female

Please indicate your age: _____

1) Do you play sport or conduct regular exercise sessions (such as weight training, cycling, aerobics etc?) Yes / No- If no, go to Question 2

If yes:

Which sport do you play or what exercise do you engage in most frequently?

Answer _____

How many hours a week?

Less than 1 / 1-2 / 2-3 / 3-4 / 4+

How many months a year?

Less than 1 / 1-3 / 4-6 / 7-9 / 9+

If you play a second sport or conduct additional exercise activity:

Which sport or exercise is it?

Answer _____

How many hours a week?

Less than 1 / 1-2 / 2-3 / 3-4 / 4+

How many months a year?

Less than 1 / 1-2 / 2-3 / 3-4 / 4+

Question 2

2) In comparison with others of my own age, I think my physical activity during leisure time is:
Much more / more / the same/ less / much less

3) During leisure time I sweat:

Very often / Often / Sometimes / Seldom / Never

4) During leisure time I play sport:

Very often / Often / Sometimes / Seldom / Never

5) During leisure time I watch television:

Very often / Often / Sometimes / Seldom / Never

6) During leisure time I walk:

Very often / Often / Sometimes / Seldom / Never

7) During leisure time I cycle:

Very often / Often / Sometimes / Seldom / Never

8) How many minutes do you walk and / or cycle per day to and from work / study /and shopping?

Less than 5 / 5-15 / 15-30 / 30-45 / 45+

Below are 5 statements with which you may agree / disagree with. Using the scale please indicate your agreement by circling the number that corresponds to it.

9: In most ways my life is close to my ideal.

Strongly agree / Agree / Undecided / Disagree / Strongly Disagree

10: The conditions of my life are excellent

Strongly agree / Agree / Undecided / Disagree / Strongly Disagree

11: I am satisfied with my life

Strongly agree / Agree / Undecided / Disagree / Strongly Disagree

12: So far I have gotten the important things I want in life

Strongly agree / Agree / Undecided / Disagree / Strongly Disagree

13: If I could live my life over, I would change almost nothing

Strongly agree / Agree / Undecided / Disagree / Strongly Disagree

14: I feel fairly well satisfied with my present job

Strongly agree / Agree / Undecided / Disagree / Strongly Disagree

15: Most days I am enthusiastic about my work

Strongly agree / Agree / Undecided / Disagree / Strongly Disagree

16: Each day of work seems like it will never end

Strongly agree / Agree / Undecided / Disagree / Strongly Disagree

17: I find real enjoyment in my work

Strongly agree / Agree / Undecided / Disagree / Strongly Disagree

18: I consider my job rather unpleasant

Strongly agree / Agree / Undecided / Disagree / Strongly Disagree

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, please indicate with a circle how often you felt or thought a certain way.

19. In the last month, how often have you felt that you were unable to control the important things in your life?

Never / Almost never / Sometimes / Fairly often / Very often

20. In the last month, how often have you felt confident about your ability to handle your personal problems?

Never / Almost never / Sometimes / Fairly often / Very often

21. In the last month, how often have you felt that things were going your way?

Never / Almost never / Sometimes / Fairly often / Very often

22. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Never / Almost never / Sometimes / Fairly often / Very often

I would like my charitable donation to go to (if applicable) : (Please circle or complete)

Breast Cancer Foundation

MS Foundation of Australia

Princess Margaret Hospital

Or other: Please indicate here _____

Appendix C

Calculation of the Baecke et al. (1982) Sport index

Sport Index

Firstly, the level of sport intensity is assigned a code (indicating a level of MJ/hour) of either 0.76 (light activity), 1.26 (medium activity) or 1.76 (hard activity). An example of light activity would be playing golf or bowling, medium activity: cycling or tennis and hard activity: basketball or rugby (Baecke et al., 1982). In order to adequately assess different activities that the participants may have included such as aerobics or weight training as well as sport activity for the sport code, Ainsworth et al's., (2000) compendium was used. This is an accepted index of exercise intensity that has been extensively used in research.

Ainsworth et al's., (2000) compendium uses a MET (metabolic equivalent task) scale to categorizes the intensity of an exercise according to oxygen consumption. One MET is classified as being the amount of oxygen consumption required at rest or regarded as 1 kcal/kilogramme/hour (Thogersen-Ntoumani et al. 2005). To convert a kcal into the required intensity of a megajoules per hour to categorise the sport activity, this was achieved by converting a kcal into a MJ/hour ($1 \text{ kcal} = 0.25 \text{ MJ/hour}$) and calculating how many MET's would be required to achieve the three categories. These were 3 MET's (0.75 MJ/h) for the light intensity sporting activities, 5 MET's (1.26 MJ/h) for the moderate activity and 7 MET's (1.76 MJ/h).

As the range of sports and activities stated by the participants were freely of their choosing, it was decided to utilise a range of MET intensity to effectively categorise the activity. In a recommendation from the Centers for disease control and prevention, and the American college of sports medicine, Pate et al., (1995) categorised

activity from light (<3 MET's), moderate (3-6 MET's), to high (6+ MET's) . This formula was used to identify the intensity of the sport using Ainsworth et al.'s (2000) compendium. This sport activity was then used for the second step to calculate the simple sport score.

The simple sport score was calculated by the intensity of the sport (0.76, 1.26 or 1.76) multiplied by time (ranging from $<one$ to $>four$ hours per week), multiplied by proportion (ranging from $<one$ to $>nine$ months of the year). This result was then categorised into the simple sport score that ranged from one to five. The next step was to calculate the sport index score which was achieved by taking the simple sport score (between one and five) and adding to the responses from questions two, three and four (also scored between one and five) and dividing the result by four to produce the final sport index score. This score was rated between one (no activity) and five (high level of activity).

The sport group completed both the sport and leisure index of the BQ (1982) and their combined total was divided to give a combined activity level. This was conducted to enable comparison between quintiles of the leisure group. However, overall the sport group performed a higher level of physical activity.

An example of how the sport and leisure group quintiles would compare is as follows. Quintile two from the sport group would be regarded as an intensity of seven out of a maximum of ten, as both sport and leisure indexes were included (five maximum points per index). Comparatively, the leisure group quintile two would only be regarded as an intensity of two out of ten even though their maximum achievable intensity could be only five points total.

Appendix D

The leisure index consists of questions such as amount of time spent watching television or walking or cycling for leisure. The leisure index score was calculated by taking six from the answer given from question five (ranging between one and five which was reverse scored) and adding this to the responses from questions six, seven and eight (again ranging between one and five). This total was then divided by four to give a final result ranging between one (no activity) to five (high activity).

Appendix E

Table 1. Descriptive statistics for all quintiles for both the Sport and Leisure groups.

<i>M</i> (SD)	Sport Group Quintiles					Leisure Group Quintiles				
	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
<i>N</i>	-	3	53	44	7	-	35	50	22	2
GWB	-	15.00	15.66	16.41	18.14	-	16.54	17.36	19.82	20.5
		(0.82)	(3.45)	(4.01)	(3.18)		(4.03)	(3.53)	(3.66)	(2.12)
JS	-	17.00	16.60	16.59	16.14	-	13.05	15.70	15.59	13.5
		(4.08)	(4.09)	(3.64)	(4.09)		(3.78)	(3.04)	(2.46)	(0.71)
PS	-	6.67	5.83	5.59	4.42	-	6.06	4.96	4.18	5.00
		(1.70)	(2.72)	(2.61)	(2.87)		(2.88)	(2.44)	(2.46)	(4.24)

Appendix F

PSYCHOLOGY OF SPORT AND EXERCISE

An Official Journal of the European Federation of Sport Psychology (FEPSAC)

Guide for Authors

Psychology of Sport and Exercise is an international forum for scholarly reports in the psychology of sport and exercise, broadly defined. Manuscripts will be considered for publication which deal with high quality research and comprehensive research reviews. The journal is open to the use of diverse methodological approaches. Reports of professional practice will need to demonstrate academic rigour, preferably through analysis of programme effectiveness, and go beyond mere description.

Submission of Papers

Authors should submit their articles electronically via the Elsevier Editorial System (EES) page of this journal ⇨ <http://ees.elsevier.com/pse>. The system automatically converts source files to a single Adobe Acrobat PDF version of the article, which is used in the peer-review process. Please note that even though manuscript source files are converted to PDF at submission for the review process, these source files are needed for further processing after acceptance. All correspondence, including notification of the Editor's decision and requests for revision, takes place by email and via the Author's homepage, removing the need for a hard-copy paper trail.

Submission of a paper implies that it has not been published previously, that it is not under consideration for publication elsewhere, and that if accepted it will not be published elsewhere in the same form, in English or in any other language, without the written consent of the publisher.

Manuscript Preparation

General: The corresponding author should be identified (include a Fax number and E-mail address). Full postal addresses must be given for all co-authors. Manuscripts should be prepared following the general style guidelines set forth in the *Publication Manual of the American Psychological Association (5th Edition)*. An electronic copy of the paper should accompany the final version. The Editors reserve the right to adjust style to certain standards of uniformity. Authors should retain a copy of their manuscript since we cannot accept responsibility for damage or loss of papers. Original manuscripts are discarded one month after publication unless the Publisher is asked to return original material after use.

Paper Length: All manuscripts should be presented as concisely as possible, and our preference is to receive manuscripts that are 30 pages or less (APA format). For longer

manuscripts, authors should contact the appropriate Editor in Chief prior to submission with a clear justification for the need for a longer manuscript.

Abstracts: Papers should include a structured abstract, not exceeding 250 words, covering the main factual points and statement of problem, method, results and conclusions.

Keywords: Authors are requested to supply a maximum of eight keywords accurately describing the contents of the manuscript.

Text: Please follow the guidelines set forth in the *Publication Manual of the American Psychological Association (5th Edition)*. Do not import the Figures or Tables into your text. The corresponding author should be identified with an asterisk and footnote. All other footnotes (except for tables) should be identified with superscript Arabic numbers.

References: References should be prepared using the *Publication Manual of the American Psychological Association (5th Edition)* for style