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The relationship between physical well-being, mood states, physical self perceptions and participation and withdrawal from physical activity

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The Relationship Between Physical Well-being, Mood States, Physical Self Perceptions and Participation and Withdrawal from Physical Activity

by

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I have often wondered what I would finally end up writing on this page.

The three-four years that it has taken to complete this thesis have not been easy and there were times when I really thought I would never make it. Nevertheless, looking back now there are numerous people who have contributed towards my development and guided me to the point which I am now at.

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SUMMARY

Utilising different research perspectives and methodologies the primary aim of this thesis was to investigate the effects of participation in and withdrawal from physical exercise upon indices of health and psychological well-being. The first section of this thesis evaluated the effectiveness of a British corporate health and fitness club in relation to a wide range of lifestyle, physical and psychological measures. Furthermore, this thesis attempted to understand how physical self-perceptions, together with the importance individuals attach to these physical self-perceptions are related to physical fitness and physical activity levels in members of a corporate health and fitness club. Results indicated that members of the club had better psychological mood state scores and physical well-being, higher self-reported job satisfaction scores and were less absent from work than non-members. Males were also physically healthier than females, although there were no observed significant differences between males and females' mood state scores. There were no recorded gender differences in levels of job satisfaction scores or absenteeism. Additionally, results revealed a significant positive relationship between Physical Self-worth and physical activity scores in male members of the club. The second section of this thesis utilised both qualitative and quantitative research designs to consider the effects of withdrawal from exercise upon physical self-perceptions, perceived general health and mood states in physically active students. These results provide some support for the notion that exercise deprivation may negatively influence psychological well-being. Generally, it would appear that participation in physical exercise does have the potential to influence emotional well-being. Similarly, it also appears that withdrawal from habitual exercise can have a negative impact upon indices of mental health. Finally, results tend to indicate that males and females respond differentially to exercise/physical activity and exercise deprivation.

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INTRODUCTION

Introduction

Evidence concerning the relationship between physical activity, health and disease has grown rapidly over the past few decades. Today, there is little doubt that habitual physical activity and exercise, whether they are in the form of occupational, recreational, or fitness related exercise, are effective in reducing disease and improving various measures of mental health. According to Paffenbarger, Hyde, Wing and Hsieh (1986) death rates in sedentary individuals are approximately **twice** as high as for active persons. Nevertheless, the cause or causes of coronary heart disease are still uncertain, although studies have identified a number of factors "associated" with its prevalence and incidence: high blood pressure (Hagberg, 1990); cigarette smoking (United States Public Health Service, 1988); and obesity (British Cardiac Society, 1987; Thompson, Jarvie, Lahey & Cureton, 1982) usually rank among the top risk factors. It is difficult to accurately calculate the exact costs of diseases such as coronary heart disease, however, 'The Health of the Nation Report' (1988) calculated that in 1986-7 coronary heart disease (CHD) was responsible for the loss of 40.5 million working days. Importantly, today there are numerous epidemiological studies (see Blair, Kohl, Paffenbarger, Clark, Cooper & Gibbons, 1989; Chandrasheckhar, 1991) which have demonstrated that individuals who are active, whether at work or in leisure time, are between one third and one half less likely to develop, or to die from, coronary heart disease as those individuals whose lives are essentially sedentary (see Health of the Nation Report, 1988, p.132).

An increasing body of evidence suggests that participation in regular physical activity not only contributes towards improved physical well-being but can have significant positive effects on the mental health of individuals. Additionally, psychological well-being or mental health is generally acknowledged to comprise of positive as well as negative

emotions. Research dealing with these issues suggests that physical fitness training and exercise are linked to a wide variety of psychological dimensions. These include, but are not limited to mood states, (Berger & McInman, 1991; Rodin & Plante, 1989), depression and stress (Brown, 1992; Morgan, 1994), state and trait anxiety (Boutcher & Landers, 1989; Landers & Petruzzello, 1994) and self-esteem (McDonald & Hodgson, 1991; Sonstroem, 1984; Tucker, 1987). Physical self-perceptions (Caruso & Gill, 1992; Fox, 1988; Sonstroem, Harlow & Josephs, 1994) and body image (Skrinar, Bullen, Cheek, McArthur & Vaughn, 1986) have also been found to positively increase as a result of participation in physical exercise.

Poor psychological well-being has been identified as a major threat to employee health and performance and an inescapable aspect of modern working life (See Pelletier, 1992). Specifically in the workplace, numerous researchers (Itoh, Hanawa & Okuse, 1988) have observed a positive association between physical exercise and psychological health. Furthermore, workplace health promotion has been identified as an important vehicle for improving the health of the nation since it has the potential to target large numbers of people and who also appear to be a captive audience. For this reason health promotion in the workplace plays a vital role in the overall design and delivery of health education and subsequently the health of society.

Unfortunately, few people are taking advantage of the known physical and psychological benefits of regular exercise. The Allied Dunbar National Fitness Survey (1992) found that in terms of physical activity, over 70% of men and 80% of women fell below their appropriate activity level necessary to achieve a health benefit. Heart Beat Wales' report 'Recent Trends in Lifestyles in Wales 1985-1990' stated that in 1990 only 45% of men and 23% of women reported undertaking moderate or strenuous activity on

two or more occasions per week. With reference to corporate exercise clubs, participation statistics are similarly low (approximately 20-40% of the workforce; Song, Shephard & Cox, 1982). This is particularly worrying since such programs have great potential for increasing participation levels in a large number of the public and because many companies invest a lot of time and money in trying to make them successful.

Alternatively, a different perspective which may contribute towards our understanding of the relationship between exercise and well-being can be seen through studies which have attempted to consider the negative consequences upon health of not participating in, or withdrawing from habitual physical exercise. As highlighted earlier, many studies have demonstrated a positive relationship between physical exercise participation and it therefore seems likely that if individuals are denied or deprived of exercise they will report decrements in health and well-being. Knowledge concerning the impact of exercise deprivation and well-being is important for a number of reasons. Firstly, it may help us to understand the causal mechanism(s) for the exercise and psychological well-being relationship (e.g. mastery, distraction, endorphin etc.). Secondly, it provides us with a fresh and alternative perspective on the already well researched topic of psychological well-being and participation in physical activity in exercise psychology research. Thirdly, exercise and sport deprivation studies have the potential to provide some evidence concerning the controversial concept of exercise addiction and dependence. Finally, it may provide information regarding the responses, thoughts and feeling of those individuals who are unable to, or who have to cease exercising, for example, due to retirement from sport, pregnancy, burnout or injury.

Background Information

J. Sainsbury's is the largest food retail company in Britain and was one of the first companies in Britain to provide on-site exercise facilities for head office staff. Since the head office is based in a business and financial area of the city of London, there was little for employees to do during their breaks apart from visit the staff restaurant or local pubs. J. Sainsbury's also recognised that there was an important need for companies like themselves to provide exercise opportunities to their staff. This they hoped would improve employee health as well as provide alternative activities for staff to become involved with during the time that they were not working. Many staff use the club before work, after work, as well as during their lunch time. Some staff also work on a shift basis and therefore use the club at various times throughout the working day.

Over the years the club has expanded greatly and now offers a wide range of health related services to its members. Recently, since the company had begun to invest larger amounts of money into the club (initially due to the rising popularity of the club but also because there was a concern that the club should develop a new image) management felt under increasing pressure to justify their investment to other employees of the company as well as to shareholders. The author had been involved with the company for a number of years and had spent a considerable amount of time working in the J. Sainsbury's health and fitness club prior to the studies commencing. After a number of discussions with senior management it was agreed that some form of comprehensive evaluation of the club was needed in order to ascertain whether, (1) the club was actually making any difference to employees health, both physically and psychologically, and (2) to consider/justify the increased expenditure in the club by examining whether those employees involved in the club were saving the company money in other ways, such as decreased days absent from

work and improved job satisfaction compared to those who were not involved in the club. Importantly, to date there has been no empirical multidimensional evaluation of a British corporate health and fitness club. All previous research has been derived from American populations (e.g. Baun, Bernacki & Tsai, 1986; Stone, Rothstein & Shoenhair, 1993) populations.

The way in which individuals perceive themselves physically has been reported by Fox and Corbin (1989) to be structured hierarchically. This perspective postulates a three tier organisation where global physical self-worth is linked to a number of lower sub-domains. Furthermore, since physical self-perceptions have been reported by numerous researchers as important variables which influence behaviour (e.g. Caruso & Gill, 1992; McAuley, 1992) it was thought that devising a study which examined this issue would be significant in terms of identifying the type of member who in the future may require support in using the club and exercising on a regular basis. At the time of the study the management of the club had recently introduced an exercise attendance policy whereby members had to visit the club at least twice per week otherwise their membership would be automatically terminated. Despite this policy many members were still not using the club on a regular basis. Additionally, physical self-perceptions have not previously been empirically investigated in relation to British corporate health and fitness.

Ideally, it would have been appropriate to conduct the exercise withdrawal studies on employees who were members of the J. Sainsbury's health and fitness club but this was not possible. This was primarily due to a lack of interest in the exercise withdrawal studies from J. Sainsbury's senior management. Also, at the time of the study the health and fitness club had began to introduce a strict attendance policy and it was thought that conducting exercise withdrawal studies with these employees would compromise this

policy. Consequently, a student population was selected. It was also thought that more control over the data collection could be exerted by using a student population. Furthermore, from a specific research perspective, previous studies examining the effects of exercise withdrawal upon well-being have been poorly designed (for example, Baekland, 1970; Crossman, Jamieson & Henderson, 1987) and only one (see Sachs & Pargman, 1979a) has used a qualitative investigative research methodology. In addition, to the knowledge of the author, no study has examined this relationship in respect to physical self-perceptions.

Current Research Programme

This thesis aims to investigate the effects of exercise participation and exercise withdrawal upon indices of health utilising different research perspectives and methodologies. In seeking to understand this issue a number of specific aims have been identified. These are listed below.

1. Evaluate the effectiveness of a British corporate health and fitness club in relation to a wide range of lifestyle, physical and psychological measures.

2. Based on Fox and Corbin's hierarchical approach (1989), examine how physical self-perceptions, together with the importance individuals attached to these physical self-perceptions are related to physical fitness and physical activity levels in members of a corporate health and fitness club.

3. Using an intervention approach, investigate the effects of withdrawal from exercise upon physical self perceptions, perceived general health and mood states in physically active students.

4. Illicit complimentary information regarding subjects psychological states during exercise withdrawal through the use of semi-structured interviews.

It is proposed that: (1) there is a positive relationship between membership of corporate health and fitness club, physical activity and well-being; (2) physical self-perceptions and physical importance are positively related to increased physical activity participation; (3) withdrawal from regular physical exercise will negatively influence physical self-perceptions, mood states and perceived general health; and (4) qualitative data will provide a source of rich information to substantiate the specific effects of exercise withdrawal. Furthermore, it is also hypothesised that females are likely to demonstrate poorer health patterns and report more negative feelings when they are unable to exercise as compared to males.

Structure of the Thesis

This thesis contains 8 chapters. Chapter 1 is an introductory chapter to this thesis and provides readers with a framework for the preceding chapters within this thesis. Chapter 2 presents exercise and psychological well-being theories, models and hypotheses which are appropriate to the issues and concepts discussed throughout this thesis. Chapter 3 describes a study which attempts to assess whether members of the J. Sainsburys' corporate health club display better job satisfaction, psychological and physical health as

well as lower absenteeism compared to non-members and those on the waiting list. This chapter also examines this relationship with respect to gender differences. Chapter 4 attempts to understand the relationship between physical self-perceptions and physical activity participation in male and female members of the J. Sainsbury's health and fitness club. Chapters 5 and 6 investigate the effects of exercise deprivation upon physical self-perceptions, perceived general health and mood states in physically active male and female students. These results will be reported in two separate chapters since they adopt different data collection strategies. Additionally, physical self-perceptions (chapter 5) were measured at three times points whereas perceived general health and mood states were assessed on a daily basis throughout the study. As mood states and perceived general health constantly fluctuate throughout the day it was considered important to assess these frequently. In contrast, physical self perceptions are thought to be more enduring and unlikely to change drastically on a daily basis and therefore were only assessed pre, during and post intervention. All exercise withdrawal subjects also took part in a semi-structured interview and these results can be found in chapter 7. Results and conclusions from chapters 3-7 are brought together in chapter 8. Chapter 8 also discusses the methodological shortcomings of this thesis and suggests areas for further study.

CHAPTER 2

PSYCHOLOGICAL THEORIES, MODELS AND HYPOTHESES FOR PARTICIPATION IN PHYSICAL ACTIVITY AND EXERCISE WITHDRAWAL

Introduction

There are many different hypothesised mechanisms by which exercise is thought to influence an well-being Several biological, psychosocial and psychological models and theories have been suggested. Unfortunately, to date, there are no specific theoretical models available which attempt to consider the effects of moods and physical self-perceptions as a result of exercise and this gap is probably one of the fundamental criticisms of exercise psychology research today. Furthermore, whilst a number of explanations have been suggested for the reported effects of withdrawal from exercise, these studies have generally not been explained in terms of a theoretical and conceptual framework. Nevertheless, there are a number of related models and hypotheses which may help us to understand these proposed relationships.

Hyperthermic Model

One common model of affective change is a neurophysiological model developed from a early report by Von Euler and Sodenberg (1957) known today as the Hyperthermic Model. Essentially the model proposes that affective change from exercise is the result of somatic-psychic (that the body effects the brain) as well as psychosomatic (the brain effects the body) responses, although the dominant influence is the former. The primary stimulus promoting affective change is the elevation in body temperature from exercise and this alteration in physiological state is manifested in a number of responses that are orchestrated by the hypothalamus.

The belief that elevating body temperature can be therapeutic both now and in the past is common (e.g. sauna's and steam room). Indeed, research has revealed that total body warming (e.g. warm showers) has been shown to reduce muscle tension (deVries,

Beckman, Hubner & Dieckmeir, 1968). Specifically, in relation to exercise, Horne and Staff (1983) concluded from their study that high intensity exercise and passive heating produced similar increases in slow wave sleep (relaxation effect) and that exercise may be a vehicle for these effects. The discussed literature does appear to be suggesting that this model may well be a tenable explanation for the exercise and psychological well-being relationship. However, support for this model has been somewhat mixed and in fact there are many more studies (e.g. see Morgan, 1988; Hatfield, 1991; Petruzzello, Landers & Salazar, 1991; Youngstedt, Dishman, Cureton, Peacock, Wells, Fluech & Hinson, 1991) which have not demonstrated a positive relationship between exercise, increases in temperature and improved psychological states. It is now thought that there are more comprehensive models which explain the physical activity and psychological well-being relationship more accurately.

Endorphin Hypothesis

The endorphin hypothesis proposes that the effects of acute exercise on psychological well-being, in particular 'euphoria' is caused by the release and subsequent binding of endogenous opiods; these being Beta-endorphins to receptor sites in the brain (Steinberg & Sykes, 1985). According to Biddle and Mutrie (1991) this hypothesis is appealing because endorphins have chemical properties which are similar to those of morphine.

The endorphin hypothesis originated from early research on rats brain tissue which revealed significant increases in opiate receptor occupancy after the rats had been forced to exercise (Pert & Bowie, 1979; Wardlaw & Frantz, 1980). Christie and Chesher (1982) have also demonstrated that mice can become "swimming junkies" if they exercise regularly. Unfortunately, because of the inherent problems of examining Beta-endorphin

receptor site occupancy in humans, research has attempted to examine peripheral Beta-endorphin levels (blood outside the blood brain barrier) after exercise (see Durden-Smith 1978; Riggs, 1981; Synder, 1977a, 1977b, 1980). According to Leith (1994), cumulatively these studies suggest a positive relationship between exercise and psychological well-being. Boles and Fanselow (1982) and Colt, Wardlaw and Frantz (1981) have documented elevated levels of plasma endorphins following exercise and Allen and Coen (1987), in their study of mood following exercise, claim to have found support for the endorphin hypothesis. Furthermore, DeMeirlier, Naaktgeboren, Van Steirtegham, Gorus, Olbrecht and Block (1986) found a positive relationship between Beta-endorphins and exercise which they contended leads to more positive affective states.

However, more recent research by Farrell (1989) suggestsed that exercise does not alter the blood brain barrier in a way which allows peripheral endorphins to act directly upon the barrier. In other words, endorphins have been measured in the circulation and not directly in the brain, and because the blood brain barrier blocks the passages by which 'opiate' substances move from the blood to the brain it is difficult to test the endorphin hypothesis. Indeed, whilst several studies (e.g. Kraemer, Dzewaltowski, Blair, Rinehardt & Castracane, 1990) have attempted to examine this hypothesis, only one has found direct support (see Wildermann, Kruger, Schmole, Niemann & Matthaei, 1986). Interestingly, despite very limited support, the endorphin hypothesis remains one of the most popular explanations of the psychological benefits of exercise. However, according to Dishman (1995) it has been perpetuated without much consideration of available evidence.

The endorphin hypothesis has also been applied to the effects of exercise withdrawal. Morris, Steinberg, Sykes and Salmon (1990) have proposed a 'withdrawal syndrome' in that once exercise ceases individuals will immediately revert to their 'natural'

pre- exercise state as there is a reduction in the number and intensity of released Beta-endorphins. As such, the positive psychological effects of exercise are lost relatively rapidly once regular exercise has stopped (see Morris, *et al.*, 1990) and decrements in positive affective states are likely to be observed since individuals are no longer engaging in the biological process of producing beta-endorphins in the brain. In this way, when individuals withdraw from physical exercise their psychological state may dissipate and consequently they return mentally to a state similar to the one they previously held before they became regularly involved in exercise.

Energy Conservation and Exercise Dependence Model

A further physiological based explanation which has recently been offered is that of Thompson and Blanton's (1987) Energy Conservation and Exercise Dependence explanation (see Figure 2.1.). Thompson and Blanton (1987) suggest that exercise dependence is related to sympathetic arousal and that exercise is mediated by adaptive reductions in sympathetic output during exercise, which is caused by the increased efficiency of energy use associated with exercise. Because of the lowered sympathetic output, a person must engage in ever increasing levels of exercise to produce pre-training levels of physiological arousal during and immediately following exercise. This hypothesis supports the notion that exercise dependence is related to the production of catecholamines. In relation to exercise withdrawal specifically, once an individual is not participating in increased exercise performance and exercise training, they are no longer producing arousal 'drugs' (catecholamines) to the same extent. Unfortunately, there is very limited empirical support for this explanation in the literature. This may be due to two reasons. Firstly, it seems that researchers have concentrated their attention on other possible hypotheses and models as they feel they have greater potential for developing

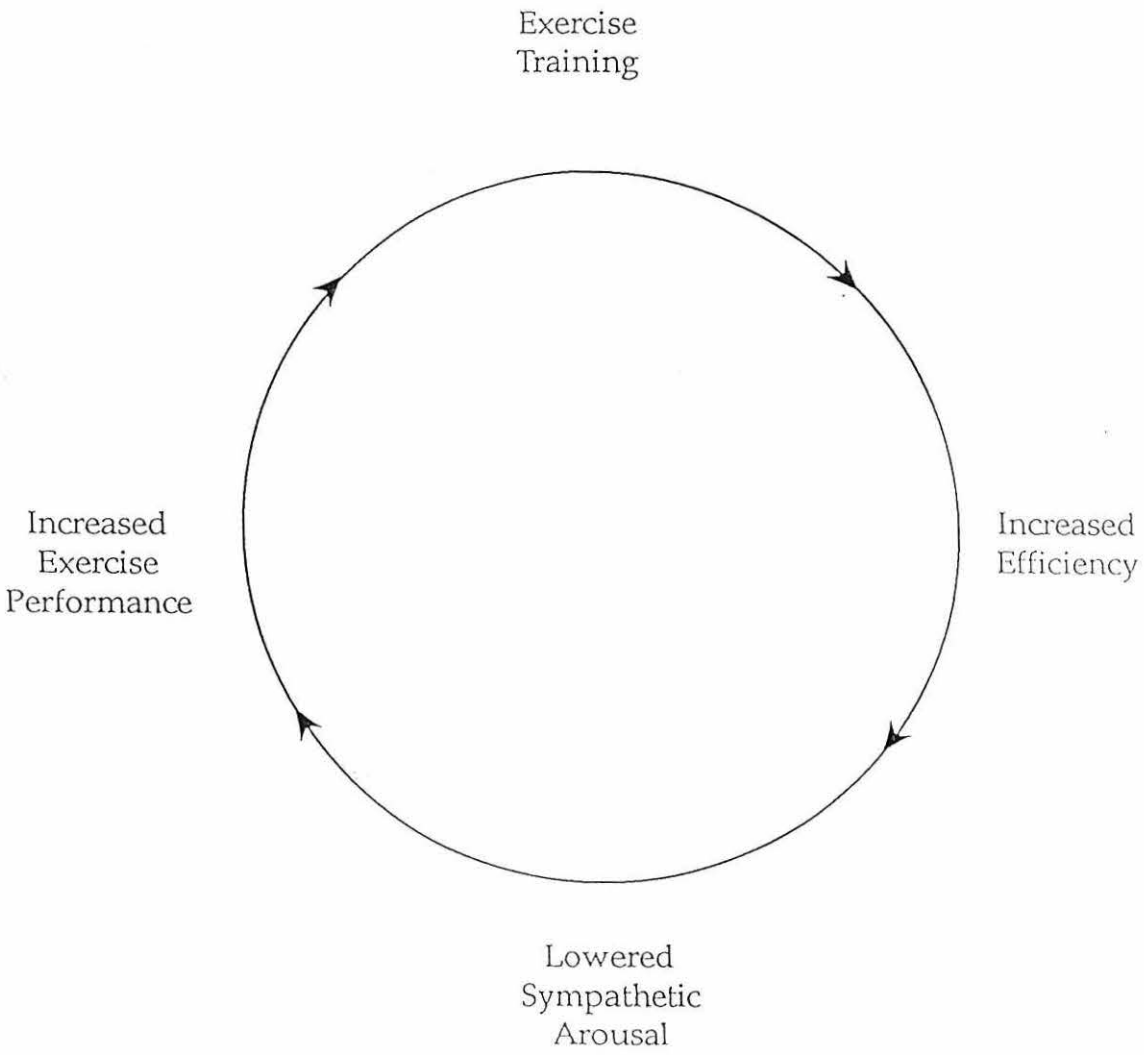


Figure 2.1 The cycle of exercise dependence

knowledge. Secondly, it appears that there are aspects of this model which are incorporated in other models. For example, the concept of the body producing catecholamines 'opiates' is not dissimilar to the endorphin hypothesis.

Exercise Addiction

A popular, although ambiguous, explanation/mechanism by which exercise is thought to influence regular and committed exercisers' lives is the concept of exercise addiction. Glasser (1976) suggested that runners become positively influenced by exercise, in this case running, because the emotional effects are interpreted positively by the runner. Exercise addiction, or dependence as it is sometimes referred to, is thought to share a number of similarities to other addictions and according to Morgan (1979b) the most important are the unpleasant effects of withdrawal. Indeed, the term 'addiction' has been suggested as a possible reason for negative responses resulting from exercise deprivation. Carmack and Martens (1979), in their validation studies of the Commitment to Running Scale, found that commitment to running predicted discomfort in runners who had to miss a run. The concept of addiction appears to have gained widespread recognition and, to a certain extent, acceptance amongst both researchers (Glasser, 1976; Sacks & Sachs, 1981) and exercise enthusiasts. Specifically, runners reported feeling guilty, irritable, depressed and sluggish.

According to Crossman, Jamieson and Henderson, (1987) 'addiction' is based on the experience a person derives from some particular thing. Likewise, Sachs and Pargman (1979d) define exercise dependence as "dependence of a physiological and/or psychological nature upon a regular regime of physical activity, characterised by withdrawal symptoms after 24-36 hours without exercise" (p.3). Clearly, these definitions are quite vague and

ambiguous and as such it is probably fair to say that this has resulted in over generalisation and some confusion as regards the exact nature of exercise addiction. The actual term addiction has so many diverse meanings and uses that in the past it has been difficult to pinpoint its exact nature. Additionally, quite often in the literature, the terms commitment to exercise and exercise addiction are used interchangeably. In other words, if you are commited you are also addicted. However, it should be noted that participation, even if it is frequent, does not necessarily demonstrate that an individual is addicted to exercise. Indeed, Sachs and Pargman (1984) have argued for the existence of a continuum between commitment and addiction.

It is also important to understand that a crucial distinction can be made between positive and negative addictions. Positive 'exercise addiction' characteristically has been described by feelings of a 'high', or 'euphoria' as well as a feeling of a loss of self and total integration with running (Glasser, 1976). Chan and Grossman (1988) suggesed that the positive benefits from exercise, in particular running, may lead to decreased tension, increased psychological wellness and more positive mood profiles. Furthermore, they also commented that running can increase body image and general self-esteem. The term 'runners high' is a popular expression utilised by runners as a description of their post exercise affect. Introspective accounts have clearly documented the positive affective states which can occur as a result of engaging in exercise, both during and post exercise. Mandell, (1979) provides a classic account in his paper entitled "The *Second* Second Wind:

> "Thirty minutes out, and something lifts. Legs and arms become light and rhythmic. My snake brain is making the best of it. The fatigue goes away and feelings of power begin. I think I'll run twenty-five miles today. I'll double the size of the research grant request. I'll have that talk with the [Dean]....
>
> Then, sometime into the second hour comes the spooky time. [Colours] are bright and beautiful, water sparkles, clouds breathe, and my body, swimming, detaches from the earth. A loving contentment invades the basement of my mind, and thoughts bubble up without trails. I find the place I need to live if I'm going to live. The running literature says that if you run six miles a day for

> two months, you are addicted forever. I understand. A cosmic view and peace are located between six and ten miles of running. I've found it so everywhere.
>
> After a run I can't use my mind. It's empty. Then a filling begins. By afternoon I'm back into life with long and smooth energy, a quiet feeling of strength, the kind wisdom, afforded those with fear, those detached yet full. The most delicious part is the night's sleep. Long and illusive, fickle dealer with me. Father Sandman now stands ready whenever I want. Maybe the greatest power of the second cycle is the capacity to decide when to fall asleep." (Pg 211)

Based on Mandell's introspection it appears that exercise has the power to influence and indeed induce changes in individuals' psychological state(s) in exercisers.

Nevertheless, in contrast, negative 'exercise addiction' typically consists of a variety of negative symptoms, such as decreased ability to concentrate, irregular sleep patterns, fatigue and greater social dysfunction. In support of Morgan (1979b), several studies have reported adverse psychological effects as a consequence of exercise deprivation (see Conboy, 1994; Gauvin & Szabo, 1992; Thaxton, 1982). Indeed, specific positive 'exercise addiction' studies (e.g. Summers, Sargeant, Levey & Murray, 1982) have documented indications of positive addictive euphoric states as a result of participation in running/exercise and negative responses, such as, guilt, irritability and decreased positive mood states if a scheduled run is missed. Robbins and Joseph (1980) in their study of 'exercise addiction' in runners found that most runners experienced deprivation sensations when they were unable to exercise. Similarly, Summers, Machin and Sargent (1983) found that marathon runners, who missed their run, reported negative psychological effects compared to those who did not miss their run. In particular, whilst both male and female runners reported similar levels of commitment to running, females perceived themselves to be more addicted to running and experienced more withdrawal symptoms than did males. Finally, Sachs and Pargman (1979a) in their early qualitative study of 'exercise addiction/dependence' revealed that 'addicted' runners not only prioritised running above

other activities in their lives, but also experienced withdrawal symptoms, such as anxiety, restlessness and irrational behaviour when regular running schedules were interrupted. Additionally, they concluded that withdrawal seemed to be the critical factor in 'exercise addiction'.

Sachs and Pargman (1979a, 1979b, 1979c, 1979d, 1984) have proposed a model of running addiction (although this model could quite conceivably be related to other forms of exercise) which contains two factors; running dependence and running commitment. This model hypothesize that involvement in exercise can be located on a continuum from addiction/dependence to commitment/dedication. Addicted/dependent runners (ADR's) tend to (1) participate with less awareness psychologically, (2) display less intellectual understanding about their running, (3) tend to emphasise perceived exhilaration and (4) focus less on motivational or causal factors. ADR's also experience withdrawal symptoms when a run is missed. Inversely, commitment/dedicated runners (CDR's) participate on a more practical and rationale basis. For example, unlike ADR's, CDR's do not run for the emotional feelings. Instead, CDR's understand their reasons for running and are reinforced by successfully achieving their running goals. Having said this, it is possible for individuals to move from being CDR's to ADR's over time in that an individual may come to recognise and thus appreciate the psychological or euphoric feelings from regular running. High and low commitment and dependence can also be further modified to distinguish between 4 types of runners (see Figure 2.2 for illustration). Group A runners display high levels of both commitment and dependence and could be classified as addicted. Group A runners centre their lives around running. For Group B runners, other factors encroach upon running (e.g. family) but the desire to run is very strong. Therefore, Group B runners display low commitment levels but are still highly dependent upon running.

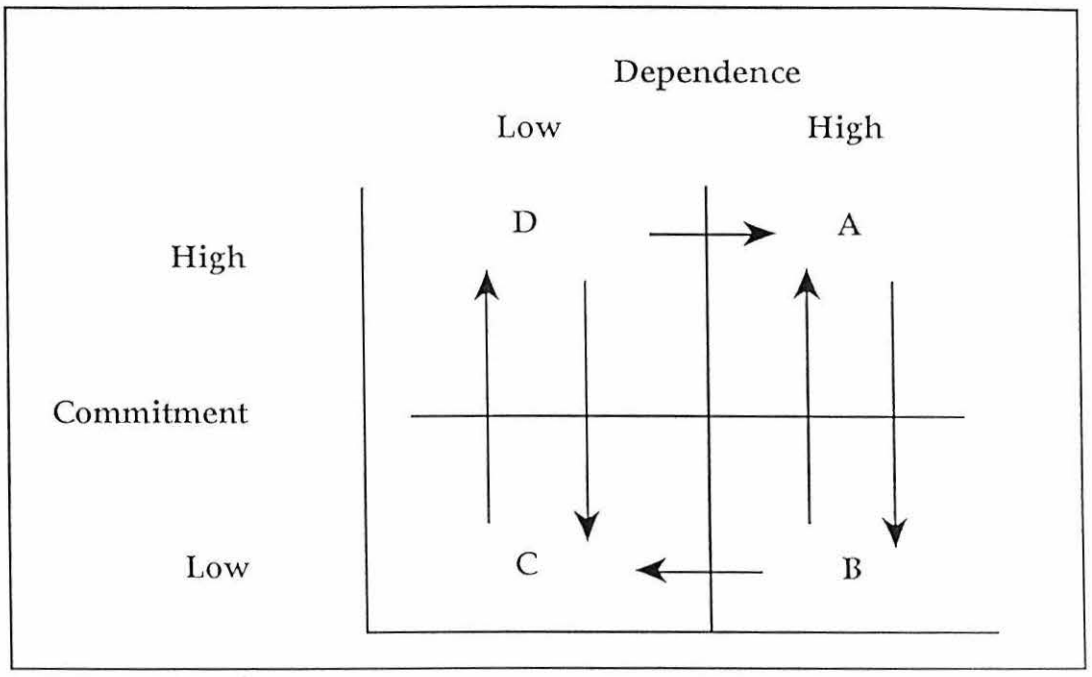


Figure 2.2 The Sachs and Pargman's model (1979c, 1984) including directions of movement. All runners start at C. This figure was adapted from Sachs and Pargman by Conboy (1994).

Group C runners are neither highly committed or dependent upon running. They run for recreational reasons and do not feel exercise is the most important aspect of their lives. Finally, Group D runners are highly committed but not highly dependent on running, although these runners are not common. Group D runners are not dependent as they only run short competitive distances but they are highly committed since they have intensive training routines (see Conboy, 1994). This model is useful as it allows runners/exercisers to be categorised on measures of withdrawal. For example it would be expected that Group A runners/exercisers would display more negative withdrawal symptoms that runners in Groups D, C and B. Likewise for Group D as compared to C and Group B as compared to Group D runners. Unfortunately, direct testing of this model is limited and somewhat inconsistent. Conboy (1994) when examining the relationship between exercise withdrawal and mood states in runners found support for a two factor model of exercise withdrawal symptomology (i.e. commitment & dependence). However, when testing this Conboy found that **all** runners displayed exercise withdrawal symptoms. Conboy concluded that it is perhaps likely that other factors are involved in creating exercise withdrawal symptoms.

Distraction Hypothesis

An intuitively appealing hypothesis which is thought to explain the exercise deprivation and psychological responses relationship is the distraction hypothesis. This hypothesis maintains that distraction from stressful stimuli, such as work demands, family responsibilities and financial burdens, is responsible for the improved psychological effects as opposed to exercise *per se*. This is known as the Distraction Hypothesis. This hypothesis was originally conceptualised by Bahrke and Morgan (1978) in their study

which compared the effects of walking on a treadmill, meditating or resting in a comfortable chair on measures of state anxiety. Their findings demonstrated that all three groups showed decreased levels of state anxiety after treatment, thus providing some support for a distraction hypothesis. Linked to the distraction hypothesis, Pennebaker (1982) has hypothesised that when individuals are involved in activities they tend to underload their capacity to process information, and as such they report more physical symptoms than when they are involved in tasks and activities that either overload or optimally tax their capacity to process information. Pennebaker (1982) refers to these processes as cues for competition and selective monitoring schema. For example, an individual who has many cues or situations competing for their attention (e.g. work, family & relationships) is less likely to feel, and thus subsequently report, negative symptoms compared to an individual who has minimal cues competing for their attention. Although intuitively the distraction hypothesis appears to make some sense, some caution should be exhibited in applying the distraction hypothesis as a framework for research since the results of Bahrke and Morgan's study could be interpreted in a variety of ways. Additionally, according to Gauvin and Brawley (1993), although exercise has been compared to other forms of distraction, other issues surrounding what people think about exercise has never really been investigated empirically or manipulated experimentally.

With regards to the negative effects of withdrawal from exercise, a further argument centres around the idea that negative psychological responses may be caused by a loss of rewarding activities (see Lewinsohn, Youngren & Grossup, 1979). Regular exercisers who are deprived of exercise may loose an important, consuming and rewarding part of their daily lives. Alternatively, it may be that the time which would have been spent being involved in exercise is spent in activities which themselves are depressing or anxiety-

provoking (e.g. over time at work or looking after the children). Presumably in terms of exercise withdrawal, people who stop exercising no longer have the pleasing distraction of exercise and therefore their minds become full of their normal every day stresses.

Mastery Hypothesis: Multidimensional and Hierarchical Approach

The mastery hypothesis states that exercise may increase people's sense of mastery, accomplishment and personal esteem and thereby lead to improved affect (see Fox & Corbin, 1989). Several other researchers working in related areas, such as self-efficacy (Bandura, 1977, 1981) perceived competence (Deci & Ryan, 1985; Harter, 1983) and physical self-perceptions (Fox & Corbin, 1989) all point to the potential influence that perceived mastery may have on affective states.

Early unidimensional conceptualisations of the 'self' (see Coopersmith, 1967; Piers, 1969) have been heavily criticised as they do not appear to accurately represent the 'self'. It is now thought that feelings regarding the 'self' are structured in a multidimensional and hierarchical fashion. Fox and Corbin (1989), specifically within exercise, have adopted a multidimensional and hierarchical approach to the study of the 'self' and developed an inventory to assess self-perceptions in the physical domain (see Figure 2.3.). The Physical Self-perception Profile (PSPP) and The Perceived Importance Profile (PIP) were developed to reflect and assess self-perceptions in four aspects of the physical self: (1) Sports Competence; (2) Physical Strength; (3) Body Attractiveness; and (4) Physical Conditioning. Fox and Corbin also included a global measure of Physical Self Worth.

Research using the PSPP (Fox, 1988) has shown that sport, strength, conditioning and perceptions are able to successfully discriminate between low and high active American college students with between 70-75% accuracy. Fox and Corbin (1989) and Fox (1990) have provided support for the PSPP. Their factor analyses identified the proposed factors

with encouraging internal consistency estimates. Furthermore, additional construct validity analyses have observed that individuals PSPP responses, particularly with the Conditioning Scale have systematic relations with levels of physical activity (see Fox & Corbin, 1989). According to Fox and Corbin (1989), the PSPP offers information and insight into the mechanisms and antecedents of self-change through physical activity experience. Furthermore, Fox and Corbin (1989) argue that their hierarchical model approach to feelings to the physical 'self' is attractive because it provides a testable mechanism, by which perceptions at the lower level might generalise to, or influence, more global feelings about one's physical self. There is little doubt that the hierarchical approach to the 'self' and the development of the accompanying scales has advanced knowledge significantly in this area. This is particularly true with regard to our understanding of the kind of self-perception profiles successful and regular exercise participants are likely to display as compared to less successful and/or infrequent/sedentary exercisers. Sonstroem, Speliotis and Fava (1992) comment that the Physical Self-perception Profile represents an outstanding advancement in the conceptualisation and operationalism of the 'self'. Individuals can customise their levels of esteem generally but also within domains. Importantly, several researchers (i.e. Harter, 1986; Rosenberg, 1982; Watkins & Park, 1972) have observed from their studies that individuals may "customise" their self-esteem depending on the amount of importance attached to specific self-perceptions. This is achieved by attaching different degrees of significance to each sub-domain of esteem, with the most important aspects being more prominent in influencing global self-esteem. In a general sense they are intent on maximising their chances of being good or competent at something. In other words, according to Harter (1986), there is a tendency by individuals to *self serve* their esteem by attaching greater importance weight to those areas which they deem important to their lives and which

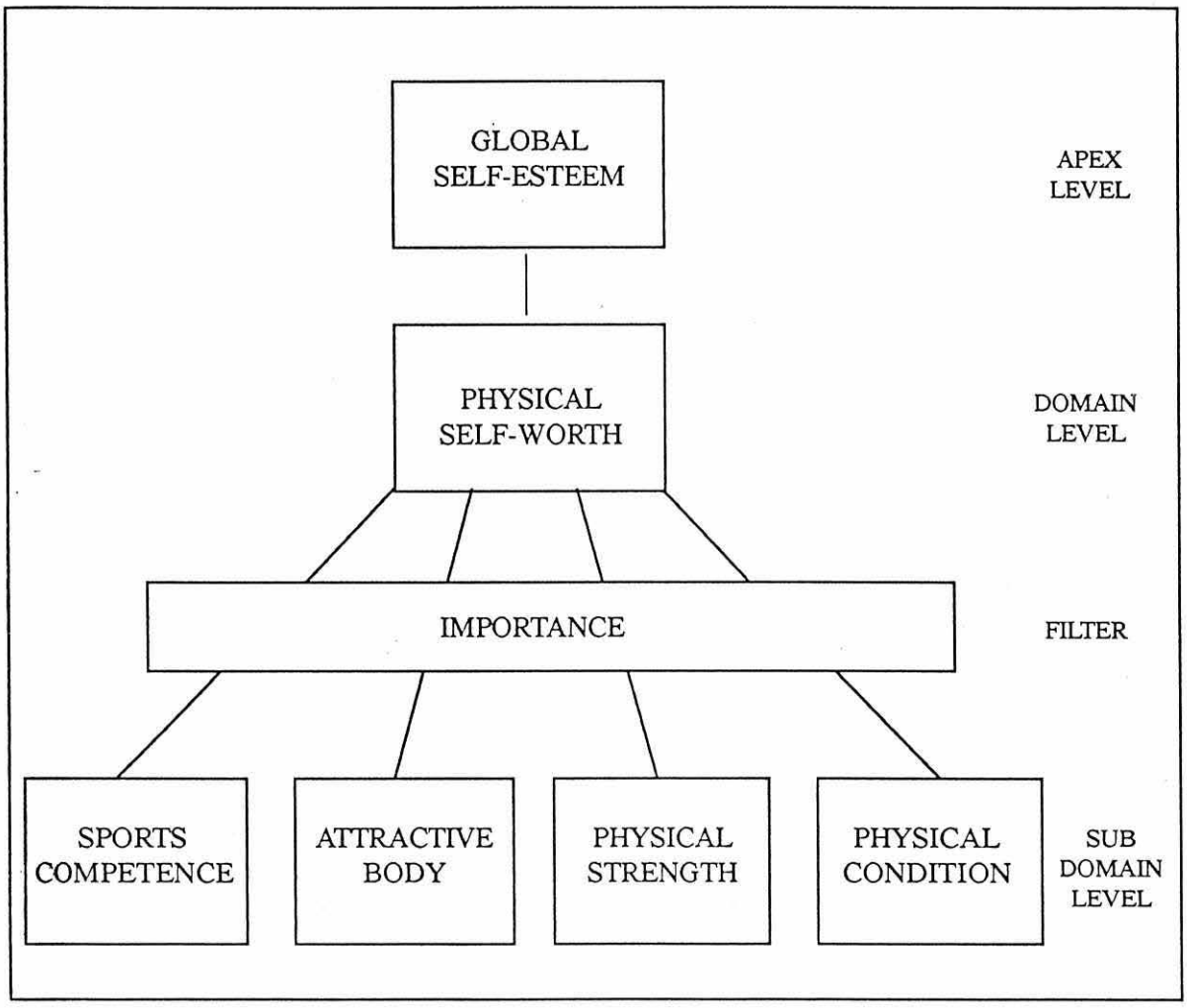


Figure 2.3. Fox and Corbin's (1989) hypothesised hierarchical organisation of physical self-perceptions

provide a sense of accomplishment. Similarly, individuals learn to *discount* the importance of those domains where they consistently experience a lack of competence and failure. For these reasons Fox and Corbin (1989) and Fox (1990) developed the Physical Importance Profile (PIP). This was constructed to accompany the PSPP and provides a measure of importance attached by the individual to their respective subscales. As such, it seems crucial for researchers to consider carefully the importance construct when investigating the possible psychological effects of exercise. Relating to a point made earlier regarding the high discrimination ability (70-75%) of specific physical perceptions, Fox (1988) has stated that "in support of the selection/discounting hypothesis, research that has included measures of perceived importance of the different aspects of competence has shown that these add further power to the prediction of physical activity" (pg. 238).

Nevertheless, it should also be borne in mind that Fox and Corbin's rationale for developing the PIP is slightly confusing and the placement of importance within their hierarchical approach may need reviewing. For example, it seems likely that importance plays a far more crucial role in this relationship and perhaps has the power to influence individuals self perceptions regarding exercise and physical activity at a much lower level within their model.

A further possible relationship between exercise withdrawal and physical self-perceptions may be explained in terms of the physical signs associated with exercise, for example fatigue, shortness of breath, muscle tone, weight loss and perspiration. These signs may be viewed as positive cues towards a sense of achievement in one's physical self, for example, that one has done something good for one's body or the loss of a certain target weight. Without these reinforcement cues it might be that people deprived of exercise feel, in some way, that they are neglecting their physical self and this could contribute towards

decrements in physical self-perceptions and feelings about ones self-esteem generally. This particularly may be the case with individuals who are habitually physically active, and/or who have had previous positive exercise experiences. Specifically, researchers have argued for a mastery/esteem explanation for the negative psychological responses which appear to be outcomes of exercise deprivation. Early research by Baekland, (1970) based on his exercise withdrawal findings, suggested that exercise can enhance feelings of esteem and mastery. Robbins and Joseph (1980) suggested that a possible cause of the negative feelings which appear as a consequence of exercise withdrawal is the loss of predictable feelings of accomplishment, success and self fulfilment post exercise.

Psychological Model for Physical Activity Participation

There have been a number of theoretical models which have attempted to consider the possible relationship between participation in physical activity and self-esteem. One such model is Sonstroem's (1974, 1976, 1978) Psychological Model for Physical Activity. Participation (see Figure 2.4) which was specifically developed for the prediction of exercise involvement, although this model is also concerned with the way in which exercise and consequent physical fitness contributes to psychological well-being. Sonstroem's theoretical model is also an attempt to identify mechanisms of participation in physical activity and the psychological benefits derived from one's involvement (Sonstroem & Kampper, 1980). Sonstroem's research using the Physical Estimation (Estimation) and Attraction Scales (Attraction) (PEAS) attempted to explain the relationship specifically between involvement in physical activity and self-esteem (Sonstroem, 1978). In developing the Estimation scale, the researchers assumed that perceptions of physical ability were a sub category of global self-esteem and believed that physical estimation played a mediating role between physical ability and self-esteem. This model assumes that involvement in physical activity increases

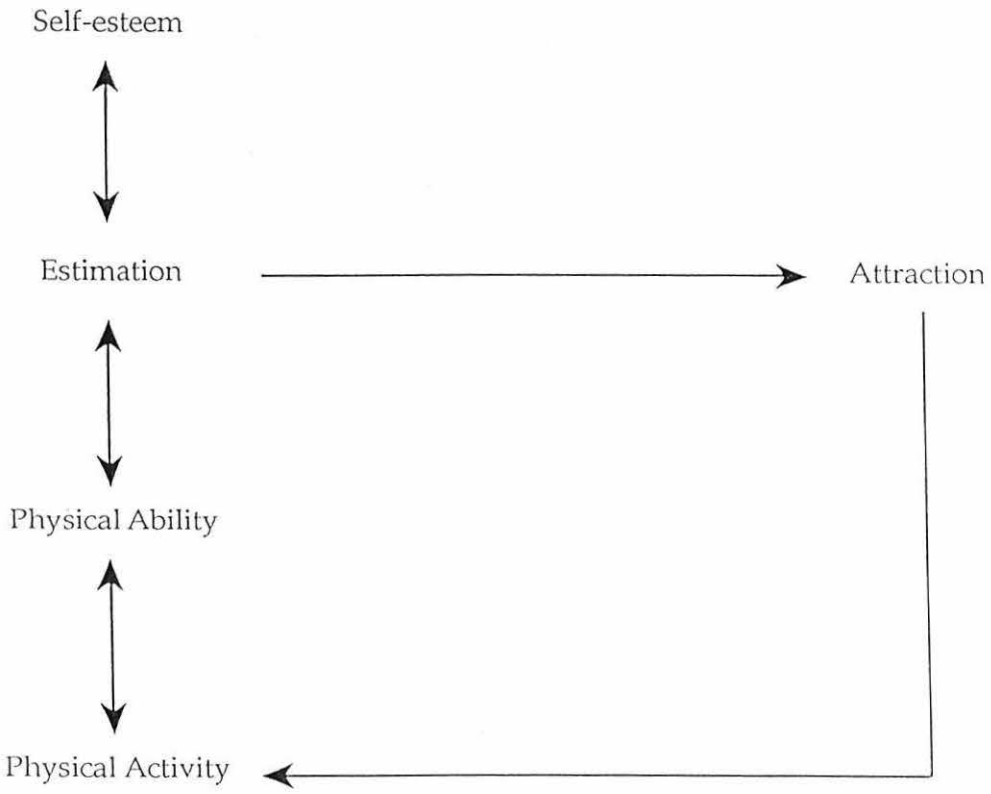


Figure 2.4 Psychological Model for Participation in Physical Activity

physical ability, which positively influences ones self estimation and consequently leads to higher levels of self-esteem. In other words, because individuals with high self-esteem take pride in their bodies, they continue to exercise, thereby maintaining and/or increasing fitness. Additional physical activity leads to increased perceptions of physical ability and self-esteem, which results in even greater attraction to physical activity. The cycle continues in this way. Early research using the PEAS to test this model concluded that although physical ability was not directly related to global self-esteem, perceptions of physical ability, as measured by the Estimation Scale, was significantly related to self-esteem (Sonstroem, 1976). Additionally, perceptions of physical ability were related to interest in physical ability as well as to the actual level of physical performance. The model has been reasonably successful in presenting some correlational evidence associating physical activity and psychological health, although some researchers have indicated a number of inconsistencies with the application of this model. Nevertheless, the results from studies (e.g. Safrit, Wood & Dishman, 1985) utilising the Psychological Model for Physical Activity Participation have on the whole been quite encouraging.

Competence Motivation Theory

Harter's Competence Motivation Theory (Harter, 1978, 1981) may also be a useful model in understanding the relationship between emotions and involvement in exercise and sport (see Figure 2.5). Harter argued that individuals have a desire to be competent and to deal effectively with the environment. Achievement related areas, for example sport and relationships, are supposed to represent important achievement domains. In order to satisfy the urge towards competence, individuals attempt mastery. When these mastery attempts are successful the person experiences positive effects or psychological states. This in turn

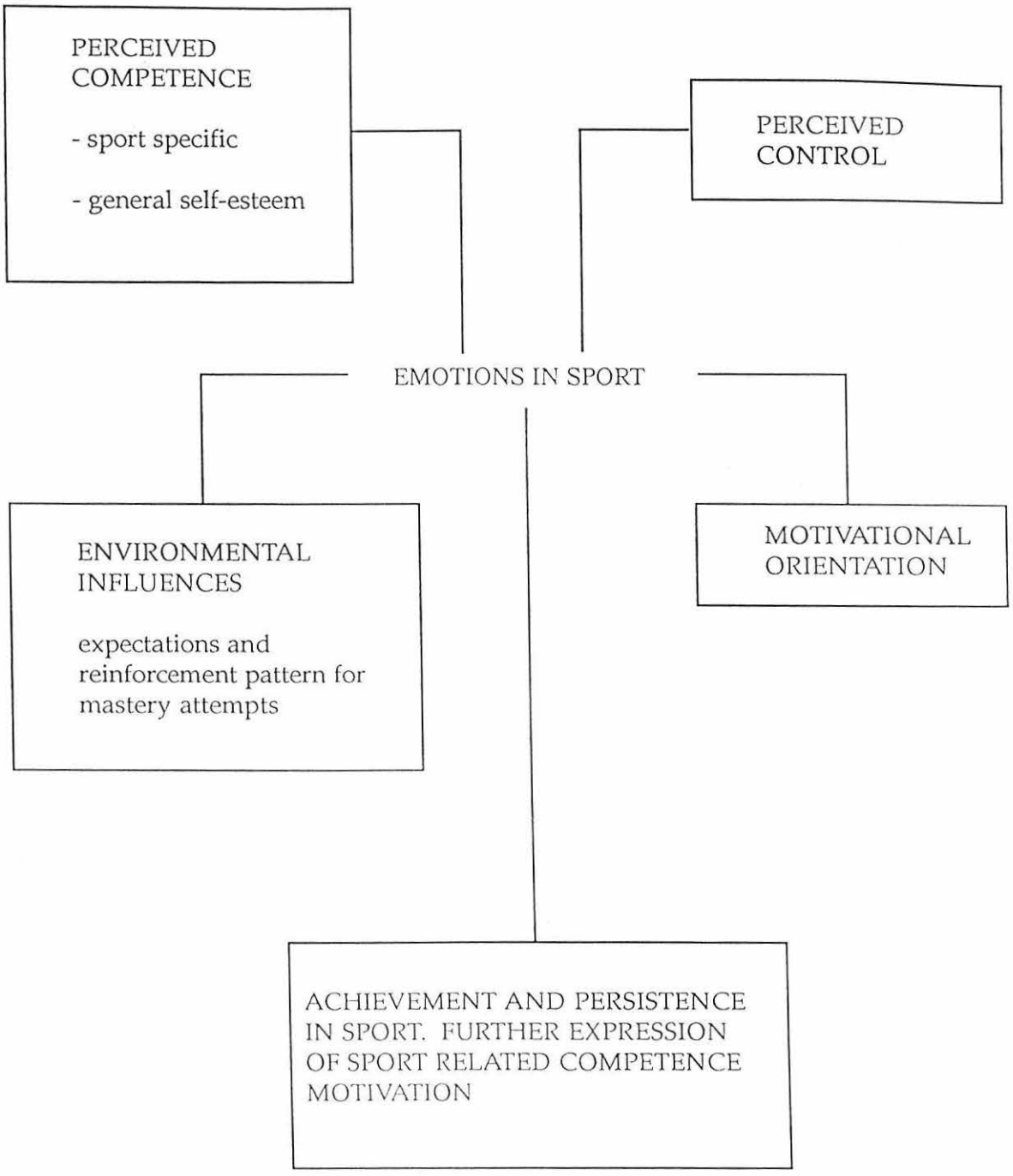


Figure 2.5 Harter's (1978, 1981) Competence Motivation Theory applied to the sport domain.

maintains and/or increases competence motivation. Harter argues that perceptions of competence with successful performance are critical determinants of subsequent motivation to participate. As such, this theory with further specific testing has potential to differentiate between those who exercise and those who do not, as well as low frequency exercisers and high frequency exercisers. Harters theory is based on the following:

1. Perceived competence, including general self-esteem and domain specific perceived competence;
2. Perception of control, indicating self-consciousness concerning the causal elements of success and failure in achievement situations;
3. Motivational orientation in achievement situations;
4. Socialisation influences such as the expectations of significant others in achievement situations and their pattern of reinforcement for mastery attempts.

The Theory of Personal Investment

The Theory of Personal Investment (TPI: Maehr & Braskamp, 1986) is an approach which may be utilised to understand and determine how motivational perspectives and feeling about ones self vary according to the individual and gender of the participant. This theory proposes that there are important social-psychological factors which correspond to variations in behaviour in specific contexts such as physical activity and that these characteristics may differ in relation to the gender of the individual. Maehr and Braskamp (1986) argue that the meaning of a particular context is comprised of three interrelated parts: (1) personal incentives; (2) sense of self; and (3) perceived options. Perceived incentives refers to the motivational focus of an activity, for example: (a) to try ones best and demonstrate skill improvement: (b) the desire to compete and socially compare ones

abilities with others; and (c) to receive support and recognition for one's involvement and accomplishment in physical activity.

It has been suggested that personal incentives vary as a function of gender. Additionally, according to Maehr and Braskamp (1986) the literature seems to suggest that women tend to emphasise affiliation and task mastery incentives (internal) more than men. Males, on the other hand place importance on competition incentives (external) more than females. Sense of self-perceptions include sense of competence, self reliance, goal directness and social identity. Since Maehr (1984) argued that people tend to participate in activities in which they feel efficacious, perceptions of competence are held to be an important mediator of behaviour. Similarly, support for Maehr's (1984) contentions can be found in a wealth of past and present research literature within the exercise domain where perceived ability has been found to predict exercise adoption (Dishman, 1986) and declining physical ability through lack of fitness and or disability has been linked to the cessation of exercise involvement. For example, Boothby, Tungatt, & Townsend, (1981), have suggested that one of the major reasons why adults reduce their level of physical activity is because they perceive their physical competence to be low and that females tend to view themselves as less able than males. The third and final component of Maehr and Braskamp's (1986) theory is perceived options. Within physical activity, perceived options could be operationalized as the degree to which a person can achieve his/her goal in a particular environment and/or the various barriers to participation which influence involvement in exercise.

These mastery hypotheses and the 'sense of self ' component of TPI are based on the idea that investigators, as well as subjects who begin exercise programs, expect positive benefits to occur, and therefore there probably is a certain amount of 'self-fulfilling

prophecy' associated with it. As with all the mechanisms and hypotheses discussed, there are problems with the mastery hypothesis and the constructs which come under its broad categorisation, especially in term of rigorous research testing its existence. Nevertheless, the idea of mastery and sense of self do appear to be promising and are proving to be a worthwhile basis for future research.

General Conclusions

In conclusion, by their very nature people are complex and diverse organisms. Therefore, it is difficult to pinpoint any one mechanism which is likely to adequately account for the exercise and psychological well-being relationship until further research specifically addresses each of these proposed explanations. Whilst there have been a number of suggested hypotheses for this relationship, research supporting physiological explanations has been weak with many studies being poorly designed. Moreover, whilst evidence supporting psychological explanations are not conclusive they do seem intuitively appealing. Specifically, the mastery explanations do appear to have consistent empirical support. It is hoped that some of the experiments within this thesis will provide information regarding the appropriateness of the models/hypotheses discussed earlier in explaining the exercise and psychological well-being relationship.

CHAPTER 3

PHYSICAL WELL-BEING, PSYCHOLOGICAL HEALTH, JOB SATISFACTION AND ABSENTEEISM IN MEMBERS AND NON-MEMBERS OF A CORPORATE HEALTH AND FITNESS CLUB

This chapter corresponds to: Daley, A. J., & Parfitt, G. (1996). Good health is it worth it? Mood states, physical well-being, job satisfaction and absenteeism in members and non-members of a British health and fitness club. *Journal of Occupational and Organisational Psychology*, **62**(2), 121-134.

Introduction

In America evaluations of workplace health promotion programs (WPHP) appear to be widespread and a matter of course. However, in Britain corporations have not scientifically investigated and appraised the physical and psychological health benefits of their WPHP. This chapter aims to assess the physical and psychological well-being of a British workforce and the potentially important role the opportunity to exercise during the working day may have for employees within a leading British food retail company.

Research reports in the USA evaluating various programs suggest that WPHP may be effective in improving the physical fitness levels of employees, reducing lifestyle risk factors and enhancing subjective emotional well-being (e.g. Bly, Jones, & Richardson, 1986). Such programs are also thought to improve employee health and well-being in a cost effective manner (e.g. Baun, Bernacki & Tsai, 1986; Pauly, Palmer, Wright & Pfeiffer, 1982). Whilst this may be the case in the United States, it could be argued that other countries have different societal and working values and that these values may differentially effect individuals physical and psychological responses to workplace exercise programs. Furthermore, workplace health promotion, has been a part of American working culture for some time. In contrast, within Britain the notion of workplace health promotion is a relatively new phenomenon and evidence supporting its use within the British workplace is seriously limited. This makes it difficult to apply outcomes from American studies to British populations and this study was designed to provide information from a British perspective and thus complement existing American WPHP evaluations.

Physical Well-being

There is strong, convincing evidence that regular exercise is an important health behaviour and it is generally agreed that exercise exerts a positive influence on many different components of health (e.g. Bouchard, Shephard & Stephens, 1993; Chandrasheckhar, 1991; Morris, Pollard, Everitt, Chave & Semmence, 1980; Vena, Graham, Zielany, Swanson, Barnes & Nolan, 1985) and health education campaigns have always included participation in regular physical activity and exercise as a means of preventing or recovering from a variety of disease states (e.g. Dishman, 1985; Steptoe & Cox, 1988). Importantly though, there is a wealth of evidence that, in terms of the risk factors for CHD, it is better to be active than sedentary (see Blair, 1993; Oldridge, 1982; The Royal College of Physicians, 1983).

The effects of physical activity in the workplace have been well discussed in the literature. From the results of their industrial fitness research, Aoki, Suzuki, Noji, Yanagiberi and Gunji, (1988) suggest that physical exercise decreases the risk of cardiovascular disease. Likewise Gamble, Boreham & Stevens (1993) found that a twice weekly exercise intervention program was effective in improving the physical fitness of ambulancemen. Finally, Stone, Rothstein and Shoenhair (1991) reported that a group of executives involved in a supervised corporate fitness program had fewer modifiable risk factors and better fitness levels than a group of executives in the same company who were generally sedentary.

Psychological Well-being

The individual psychological benefits of participation in habitual physical activity are numerous. Empirical support for the psychological effects of physical activity range from

changes in mood states (Morgan, 1985; Rodin & Plante, 1989), anxiety (Landers & Petruzzello, 1994; Steptoe, Edwards, Moses & Mathews, 1989) and depression, to altered self perceptions and self esteem (Caruso & Gill, 1992; Hughes, 1984; Sonstroem, 1984) and cognitive processes (Tomporowski & Ellis, 1986). Studies have also shown that participation in physical activity has positive effects upon mood and emotional well-being (Dishman, 1985; Dishman & Dunn, 1988; Maroulakis & Zervas, 1993). Indeed, according to McDonald and Hodgson (1991) moods are the most transient of the psychological well-being components and therefore perhaps the most responsive to exercise. These findings have been reiterated in a number of other studies (Berger & Owen, 1983; Berger & McInman, 1991; Ewing & Scott, 1984; Morgan, 1987).

Research examining the psychological effects of physical activity in the occupational environment has provided some interesting results. Sidney and Jette (1987) found that a 6.5 week occupational fitness program for correctional service officers was associated with favourable changes in self concept, mood and feeling towards the work environment. Pauly, Palmer, Wright, and Pfeiffer (1982) reported reduced anxiety following a 14 week employee fitness program. Gronningsaeter, Christensen, Larsen and Ursin (1991) found that moderately active clerical workers in an insurance company reported significantly lower levels of anxiety and depression than seldom active and inactive subjects.

Job Satisfaction and Absenteeism

The possible benefits of providing exercise facilities and programs for employees are numerous. However, from the employees' perspective, the potential economical benefits of providing exercise facilities are also important. Briazgounov's (1988) research suggested that employees fitness programs will result in decreased absenteeism, increased productivity

and decreased health care costs. In addition, by providing exercise facilities the employer should affect the reported job satisfaction of the employees (Gronningsaeter *et al.*, 1991). Importantly, job satisfaction has also been associated with reductions in depression and anxiety and improvements in overall mental health (Janman, Jones, Payne, & Rick, 1988).

The Present Study

If regular habitual exercise does improve physical well-being and psychological mood, and decreases absenteeism from work and boosts employees' job satisfaction (as the research seems to be indicating), then encouraging employees to be physically active may prove to be a rewarding and worthwhile activity for employees as well as employers.

The literature reviewed substantiates the notion that physical activity contributes to health and many large American corporations have realised the potential benefits of providing exercise facilities for their employees. Businesses and organisations in Britain are becoming more concerned about the impact of negative moods, anxiety, stress, and the effects such emotions have on employees' health. This can be seen in the increasing number of companies and organisations who have developed health promotion programs for their employees. Unfortunately, the possible practical benefits of onsite corporate exercise facilities as a prevention focused health strategy remains enticing, but essentially unproven, particularly in Britain. Those which have attempted to evaluate program effectiveness have been based upon anecdotal reports by employers, testimonials, popular press, self-reports from employees and attendance records of participants (see Donaldson 1993; Fielding, 1984). Clearly, there are several crucial questions regarding employee exercise programs facing British corporations - Do worksite exercise programs improve physical and psychological well-being in British employees and are they really worth it?

Answering these questions are important since future developments presumably depend upon the outcome. It is hypothesised that levels of aerobic capacity, physical activity participation, mood states, job satisfaction and absenteeism will be significantly better in the members of the worksite health and fitness club compared to the non-members and those on a waiting list to join the club.

The waiting list group was composed of employees who had made the decision to register to use the workplace exercise facilities but who were unable to do so at the time due to restricted membership numbers. It should be borne in mind that it will be difficult to infer causality in this study as a cross-sectional research methodology has been employed and thus it is possible that any positive differences in members of the health and fitness club may be a result of the type of people who join the fitness club, rather than the workplace health promotion program itself. This was the reason for including data on the waiting list group, for individuals in this group should display similar characteristics to the members but are not actually able to use the health club facilities. Regardless of the ability to provide evidence of causality, it will be possible from this study to provide data specific to a British working population.

Methodology

Subjects

2450 head office employees from a leading British food retail company were invited via a desk drop leaflet to participate in a health check-up at the companies health and fitness club. 293 employees (males = 147; females = 146) agreed to take part in the project. Ages ranged from 18 to 63 years (M = 34.6; SD = 15.6). Subjects held various positions within

the company ranging from clerical duties and secretarial work to administrative and managerial/director posts. Subjects were also classified into one of three groups based upon whether they were a member of (n = 96; males = 51; females = 45), a non-member of (n = 113; males = 60; females = 53) or on the waiting list to join (n = 84; males = 36; females = 48) the health and fitness club.

The apparent low response rate to participate in this study (293 subjects from 2450 employees) was attributed to lack of interest in the study and the non-availability of some employees since their jobs took them away from head office for long periods of time. Furthermore, the incentive of a free health check may not have been an appropriate incentive for some employees since they already have the offer of regular health checks from the health club (e.g. members & some management grades) and from the company medical centre. The actual responses to the deskdrop was 545 employees but due to time and financial constraints only 293 were tested as part of this study.

Bi-Polar Profile of Mood States (BI-POMS)

Lorr and McNair's (1984) BI-POMS consists of 72 adjectives rated on a five point scale (0 = not at all to 4 = extremely). Six identifiable mood or affective states are assessed, (1) Composed-Anxious, (2) Agreeable-Hostile, (3) Elated-Depressed, (4) Confident-unsure, (5) Energetic-Tired, and (6) Clear-headed-Confused. Subjects were asked to rate feelings during the past week including how they felt on the day they completed the BI-POMS. Since exercise has been hypothesised to have a positive relationship with mood states it was decided that the Bi-POMS Inventory which includes positive as well as negative mood subscales would be an appropriate measure of moods. See Appendix B for Bi-POMS.

Job satisfaction

Due to the sensitive nature of this study and the time constraints during the testing periods it was thought to be more appropriate to use the single overall item from Warr, Cook and Wall's (1979) Total Job Satisfaction Scale (see Appendix C) rather than the full 15 item version. This scale asks subjects to report on a scale of 1 (extremely dissatisfied) to 7 (extremely satisfied) how satisfied they felt about their job as a whole.

Absenteeism

Absenteeism data was provided by the company for the previous twelve months prior to the study commencing for all head office staff. Participating subjects absenteeism records were selected from these records. Absenteeism from work are compiled by section managers within the departments in the company who report these figures to central payroll and personnel departments.

Demographic Information and Lifestyle Characteristics

A written questionnaire was used to assess demographic information and lifestyle behaviours (see Appendix D). Included in the questionnaire were items indexing age and sex. Subjects also indicated whether they were members/non-members or on the waiting list to join the club. In addition to demographic data, all subjects gave information of their job status in the company (grade & department).

Lifestyle behaviour items asked respondents to rate on a scale from (1) hardly ever, (2) sometimes, (3) often and (4) always, how well they slept generally, what and how much they smoked or whether they had been a previous smoker and on average how much alcohol they consumed per week. An examination of lifestyle behaviours was included

because they are thought to be closely related to physical activity, physical fitness and/or exercise (see Shephard, 1986; Sinyor, Brown, Rostant & Seraganian, 1982). It was hoped that these questions would provide a general picture of employees' lifestyle habits.

Medical Screen Questionnaire (MSQ)

All participants were medically screened before any physical tests were performed via a written medical screen questionnaire (see Appendix E) (adapted from the British Association of Sports Sciences Physiological Testing Guidelines, 1988). The object of this questionnaire was to identify any health or medical problems which may have precluded subjects from completing the fitness test. The MSQ asked for information on family history, present symptoms, past history and medication and included a consent statement to take part in the aerobic capacity test.

Physical Activity (Participation in Physical Activity Questionnaire: PPAQ)

Following epidemiological precedent (see Paffenbarger, 1978) subjects were asked to think back over the last four weeks and (1) to state up to the five most physically demanding activities which they participated in, (2) how many times per week that they participated in each activity, (3) on average how many minutes they spent engaged in each activity, and (4) on a scale of 1 (very light) to 10 (very hard) how strenuous they would rate each activity. For scoring purposes type of activity and intensity of activity were combined and recoded into a single score. A composite physical activity score was made by multiplying the recoded type of activity and intensity score (1, 2 or 3) by the number of times the activity was performed each week, multiplied by the number of minutes subjects were engaged in that activity. This calculation was repeated for every stated activity. A grand total physical

index score was obtained by adding the composite scores for each activity. See Appendix F for a copy of the Participation in Physical Activity Questionnaire. Test-retest reliability for the PPAQ has been recored at r. = .69 (refer to Appendix F for further details regarding the rationale and the test-retest reliability of the PPAQ).

Blood Pressure and Resting Heart Rate

Blood pressure (BP) and resting heart rate (RHR) were measured using an automatic oscillometric blood pressure monitor. Subjects found to have high BP (systolic>160mmHg; diastolic>95mmHg) or extremely low BP (systolic<100mmHg; diastolic<60mmHg) or a high RHR (>100 bpm) were asked to relax as much as possible and re-tested approximately 10 minutes after the initial test. Subjects with high or extremely low blood pressure, or a high RHR did not take part in the fitness test and were referred to the company medical centre for further evaluation and monitoring.

Body Composition

A Harpenden skinfold calliper was used to assess subcutaneous fat at four body sites and the sum of the skinfold measurements along with age and gender were used to calculate the total body fat percentage of each subject. The four sites used for the assessment of body fat were (1) triceps, (2) biceps, (3) subscapular, and (4) suprailiac (see Durnin & Womersley, 1974). All measurements were taken from the non-dominant hand side of the body. Height and weight were taken at the same time. Whilst this may not be the most sensitive or accurate method of assessing body fat, it was nevertheless an approach utilised by the health and fitness club and as such it was considered important to use similar measurement protocols. This was particularly important in terms of giving members of the club

consistent feedback on body fat (many were likely to have had a company health assessment either during the time of this study or within 3 months prior to the commencement of this study).

Harvard Step Test - Physical Efficiency Index

After serious consideration of the time constraints which operated on the project as a whole and the subjects themselves who were being tested during the working day, it was decided that the Harvard Step Test (cf. Broucha, 1943) would be the most appropriate measure to assess physical efficiency. Refer to Appendix G for a description of the Harvard Step Test protocol.

Procedure

Each participant was examined individually for approximately 30 minutes during their working day. Upon arrival subjects were briefed as to what would be involved in the health check and were given feedback and advice throughout on every physical measure. The participants were guaranteed confidentiality in that no one in the company had access to any individual data. To provide further reassurance of this confidentiality subjects names were number coded.

Upon entering the fitness assessment room the content and format of the health check was explained to each subject. Participants then completed the demographic, lifestyle, participation in physical activity and medical screen questionnaires. After giving informed consent, the participants' blood pressure, resting heart rate, height, weight, percentage body fat were measured. Subjects also performed to the Harvard Step Test. Once subjects had recovered from the Harvard Step Test, they were given the Bi-POMS

and asked to complete this questionnaire and return it within 7 days. Appendix A contains a rationale for the questionnaires selected in this chapter.

Results

Lifestyle Characteristics

Initially 3 x 2 factor (Group vs Gender) univariate analyses of variance were conducted on all of the population and lifestyle characteristics variables. Table 3.1 summarises the lifestyle and physical characteristics of group participants. Members reported significantly better dietary habits scores than the waiting list and members demonstrated significantly lower mean resting heart rates than the non-members and the waiting list group. Intercorrelations between lifestyle scores and physical measures revealed significant weak to moderate relationships between physical efficiency index scores (PEIS) and physical activity ($r = .38$), bodyfat and PEIS ($r = -.41$), diet and PEIS ($r = .21$), resting heart rate and PEIS, ($r = .38$) and absenteeism and PEIS, ($r = .34$). Additionally, chi-squared analyses for the smoking data demonstrated that non-members smoked significantly more than the members ($\chi = 6.75$, $p<.02$), and the waiting list group ($\chi = 40.57$, $p<.01$) and that non-members smoked significantly less than the waiting list group ($\chi= 24.44$, $p<.01$).

Females displayed significantly higher mean body fat percentages, lower mean systolic and diastolic blood pressure values, reported consuming on average significantly less units of alcohol per week and weighed less than males. There was no significant difference between males and females on smoking habits. Table 3.2 summarises the gender characteristics of participants in this study.

Table 3.1. Background characteristics for Group on lifestyle and physical well-being, group means and standard deviations.

Measure	Members N = 96		Non-members N = 113		Waiting list N = 84	
	M	*SD*	M	*SD*	M	*SD*
% Body fat	22.5	5.3	22.4	6.4	21.0	6.6
Weight (kg)	71.2	9.2	69.9	9.2	69.2	7.9
Resting H.R.(bpm)*	64.8	10.0	71.8	11.9	71.0	8.9
Systolic B.P.(mmHg)	127.8	11.4	128.5	16.1	128.6	11.4
Diastolic B.P.(mmHg)	85.1	7.9	84.1	10.3	81.9	8.1
Quality of sleep[1]	3.4	0.6	3.5	0.9	3.2	0.8
Eating Habits+	3.3	0.7	3.2	0.7	2.9	0.6
Alcohol[2]	11.9	10.7	9.8	11.4	11.7	10.1

* = significant differences between the members and non-members at the $p<.01$ level.
+ = significant differences between members and those on the waiting list at the $p<.01$ level.
[1] = quality of sleep subjects felt they experienced from poor (1) to good (4).
[2] = the number of units subjects consumed per week.

Table 3.2. Background characteristics for Gender on lifestyle and physical well-being.

Measure	Males N= 147		Females N = 146	
	M	*SD*	M	*SD*
% Body fat*	17.5	5.7	26.6	5.1
Weight (kg)*	76.1	8.8	63.0	8.7
Resting H.R.(bpm)*	66.8	10.9	71.5	9.7
Systolic B.P.(mmHg)*	133.8	13.9	124.7	12.0
Diastolic B.P.(mmHg)*	85.1	9.0	80.3	8.6
Quality of sleep[1]	3.3	0.7	3.4	0.6
Eating habits	3.1	0.7	3.1	0.6
Alcohol*[2]	15.1	12.8	6.8	8.1

* = significant differences between the males and females at the $p<.01$ level.
[1] = quality of sleep subjects felt they experienced from poor (1) to good (4).
[2] = the number of units subjects consumed per week.

Physical Well-being and Mood States

The physical well-being and mood states variables were analysed using a 3 x 2 factor (Group vs Gender) multivariate analysis of covariance (MANCOVA) with age as the covariate because of its possible interrelationship and confounding effect on the dependent measures. Refer to Appendix P for the assumptions underlying MANCOVA. Due to missing data analyses were conducted on 263 of the original sample of 293. MANCOVA did not reveal a significant multivariate interaction. However there was a significant main effect for Group ($F(2,257) = 5.01$, $p<.01$).

Follow up Scheffe's tests demonstrated that there was a significant difference between members and non-members on all six bipolar subscales of the BI-POMS ($p<.01$) and significant differences between members and those on the waiting list on the BI-POMS subscales Energetic, Elated, Clearheaded and Confident. Additionally, close examination of the follow up tests revealed that mean differences between members and the waiting list group for Composed and Agreeable scores approached significance. The critical differences were 2.01 and 2.10 respectively, while the critical differences between the waiting list group and non-members were 0.4 and 0.5 respectively (see Table 3.3).

Scheffe's follow-up tests also indicated that members demonstrated significantly higher physical efficiency index scores (PEIS) ($p<.01$) and reported significantly higher participation in physical activity scores ($p<.01$) than non-members or the waiting list. MANCOVA also revealed a significant main effect for Gender ($F(1,257) = 2.51$, $p<.01$). Analyses revealed that males displayed significantly higher PEIS ($p<.01$) and reported significantly higher participation in physical activity scores ($p<.01$) than females. No gender differences were found on the BI-POMS subscales (see Table 3.4).

A 3 x 2 (Group vs Gender) ANCOVA was calculated for the Job Satisfaction scores. There was a main effect for Group ($F(2,257) = 5.68$, $p<.01$). Scheffe's follow-up tests indicated that members were on the whole more satisfied ($M = 5.2$, $SD = 1.09$) with their jobs ($p<.01$) than non-members ($M = 4.5$, $SD = 1.3$). However, there was no main effect for Gender. Intercorrelations between Job Satisfaction and Bi-POMS subscale scores were significant; Elated-Depressed, ($r = .44$), Clearheaded-Confused, ($r = .33$), Composed-Anxious, ($r = .38$), Agreeable-Hostile, ($r = .30$) and Confident-Unsure, ($r = .34$).

Table 3.3. Mood states scores and physical well-being for Groups, means and standard deviations.

Measure	Members N= 91		Non-members N = 96		Waiting list N = 76	
	M	*SD*	M	*SD*	M	*SD*
PPAQ *+	740.8	538.9	371.6	313.7	254.1	27.1
Physical efficiency index scores*+	79.5	20.5	70.2	21.3	69.6	18.9
Energetic*+	25.8	7.6	20.2	7.6	20.3	6.5
Elated*+	27.0	6.3	23.5	6.0	24.9	6.3
Clearheaded*+	28.3	5.7	26.0	6.2	26.1	6.4
Composed*	24.5	5.0	22.3	8.7	22.9	5.8
Agreeable*	27.7	5.4	24.9	5.9	26.0	5.8
Confident*+	25.5	3.5	23.0	6.9	22.4	6.5

* = significant differences between members and non-members at the $p<.01$ level.
+ = significant differences between members and those on the waiting list at the $p<.01$ level.

Due to company policy absenteeism rates were only provided for 162 (55.2%) (members, n = 52; non-members, n = 59; waiting list, n = 51; males n = 77; females n = 85) of the

original sample of 293. Actual days absent from work were used in the analyses. ANCOVA revealed a significant main effect for Group ($F(2,155) = 6.75$, $p<.002$). Follow-up tests revealed that the members were less likely to be absent from work ($M = 3.5$, $SD = 3.3$, $p<.01$) than the non-members ($M = 8.75$, $SD = 3.8$). The main effect for Gender approached significance ($F(1,155) = 3.37$, $p<.068$). Assumptions underlying the analytical procedures used in this chapter can be found in Appendix P.

Table 3.4. Mood states scores and physical well-being for Gender, means and standard deviations.

Measure	Males		Females	
	N = 131		N = 132	
	M	*SD*	M	*SD*
PPAQ scores*	531.0	451.6	380.0	307.3
Physical efficiency index scores*	79.3	18.5	67.2	21.6
Energetic	21.4	6.8	21.5	7.7
Elated	24.9	6.1	25.5	6.3
Clearheaded	26.0	6.4	25.5	5.8
Composed	22.8	5.3	23.6	5.6
Agreeable	26.1	5.5	26.3	5.9
Confident	24.2	5.9	23.6	5.8

* = significant differences between males and females at $p<.01$ level.

Discussion

Physical Well-being

In general, the results support the hypotheses and are consistent with American research which seems to suggest that members demonstrated significantly better scores higher physical efficiency index scores (PEIS) and reported participating in significantly higher levels of physical activity compared to non-members and those in the waiting list group. These results support a wealth of evidence that, in terms of physical health, it is better to be active than sedentary. Indeed, according to Shephard (1986) and Sinyor, Brown, Rostant and Seraganian (1982) the potential physical effects of regular aerobic exercise are far reaching and are not simply limited to cardiovascular functional capacity but also influence other aspects of physical well-being, such as lifestyle. According to Shephard (1988) recent publicity about the value of exercise in the prevention of a variety of medical disorders may well be leading to a positive interaction between exercise participation and health beliefs. Even though physical activity is recognised and accepted as an important factor which positively improves health, the specific nature of physical activity required to produce optimal improvements in physical health remains uncertain and unclear.

Males displayed significantly PEIS, reported higher participation in physical activity than females, had significantly lower body fat percentages and mean resting pulses. Females lower participation in exercise when compared to men may be partly explained by the fact that a number of researchers have found females to demonstrate low self-confidence in exercise settings (Lirgg & Feltz, 1989). The perception of ones own ability has been frequently cited as a mediating construct in achievement strivings and as a psychological factor affecting athletic performance (Lirgg, 1991). This would lead to

lower levels of participation in physical activity from women with low self-confidence or indeed them dropping out. Nevertheless, we should be cautious in interpreting these results since self-report measures are prone to inaccuracy and bias in terms of over reporting by respondents. Moreover, this would seem to be a particularly important issue when we also consider that researchers have suggested that males are boastful in that they overestimate their performance (Feltz, 1988). Caution must also be taken when interpreting the differences in PEIS between males and females since this study did not differentiate stepping height according to gender. In other words both males and females were required to step at the same height. Clearly it is possible that females' PEIS scores may have become artificially lowered due to their reduced height in comparison to males. Future research should attempt to provide stepping height which are specific to gender.

Lifestyle Measures

The lack of significant differences between the groups on several of the lifestyle and physical well-being measures was somewhat surprising and may be attributed to the insensitivity of the scoring method employed on the lifestyle characteristics questionnaire. Alternatively, many employees may have felt socially anxious and thus given socially desirable answers, particularly since subjects were being questioned about their lifestyle behaviours in a health-orientated environment. Nevertheless, the moderate correlation's between PEIS and other lifestyle measures would seem to partially indicate that the higher an employees' PEIS the less likely they are to demonstrate 'unhealthy' lifestyles.

Not surprisingly, males consumed significantly more alcohol than females (more than twice as much). Whilst the mean alcohol consumption of both males and females were well within the weekly allowance recommended by the Health Promotion Authority,

(1989), it was noticeable that males consumed a higher percentage of their recommended weekly allowance (70%) compared to females (45%). There were no large differences between males and females regarding smoking habits. This in some aspects is encouraging since traditionally in the past males have been more likely than females to be heavy smokers (see Reddy, Fleming & Adesso, 1992, pg. 8). This may be a sign that males are taking account of the dangers associated with smoking and/or that the non-smoking policies which the company adopt are effective in encouraging males to change their smoking habits.

Psychological Well-being

The results of the present study support research by Steptoe and Cox (1988), Berger and McInman (1991) and Thirlaway and Benton (1992) who suggested that habitual exercise and physical activity are associated with improvements in mood states and psychological well-being. Furthermore, these results add to the large body of research, (e.g. Gronningsaeter *et al.*, 1991; Sidney & Jette, 1987) which proposed that participants in corporate health and fitness clubs and programs have higher levels of emotional well-being than non-participants. Furthermore, the significant differences between members and those on the waiting list on four out of six of the Bi-POMS subscales has two important implications. Firstly, it would seem that there are no apparent psychological benefits of creating a waiting list to join the club. Secondly, since the waiting list group in this particular study were acting as a control group, it would seem that there are some psychological benefits of providing exercise facilities to employees. Indeed, there may be negative implications in terms of levels of morale and job satisfaction, absenteeism, and feelings of exclusion and frustration for those who have the initial good intention to

exercise during their working day and who want to exercise during their working day, but who are prevented from doing so due to restrictions on membership.

Similar to previous studies, the present study found no consistent differences between males and females on mood state measures. For example, Berger and Owen (1983) found no significant differences between males and females in their study of swimmers. McDonald and Hodgson (1991) in their meta analysis of studies using the Profile of Mood States reported that both male and female groups showed significant changes in tension, depression, vigour, fatigue and confusion. However, contrary to these findings Bebbington, Harvey, Tennant, Stuart and Wing (1981) have found that females were twice as likely to experience poor emotional well-being than males and D'arcy (1982) discovered that females had lower mental health scores than males, but that any sex differences disappeared when males and females within the same occupation were studied. This is clearly a possible explanation for the lack of significant differences between males and females in this study since all subjects were from the same company working in similar environments. Interestingly, Thirlaway and Benton (1992) found no significant gender differences in their study of the relationship between physical activity, cardiovascular fitness, mental health and mood and they suggest that this may be attributable to the 'homogenous' nature of their sample.

A second possible explanation for the lack of significant differences between males and females may be explained by the fact that some researchers have suggested that societal norms discourage males from expressing discomforts and pain. Reddy, Fleming and Adesso (1992) argue that this societal pressure to be strong ("big boys don't cry") is often reflected in males apparent low scores on psychological well-being questionnaires. Possibly then, the results of this study may be a reflection of good intentions rather than reality.

Alternatively, many studies which have considered the relationship between gender and exercise effects have typically used sedentary women who are usually housewives. However, in the present study, the sample was drawn from a group of successful working women who through their work experiences may present a more favourable psychological profile than the typical sedentary female.

Job Satisfaction and Absenteeism

The results of the present study suggest that members are more satisfied with their jobs compared to non-members and those on the waiting list. Similar to the mood findings in this study, there does seem to be indications that allowing and providing employees the opportunity to exercise has important consequences for how these employees feel generally about their job. These findings support work by Gronningaseter *et al.*, (1991) who, in their study of office workers employed in an insurance company, found that physically active subjects reported more job satisfaction as well as less perceived health problems and less anxiety than physically inactive workers. Furthermore, the moderate significant correlation's between levels of job satisfaction and mood states would further denote that, irrespective of levels of physical activity and group membership, there is a positive moderate relationship between job satisfaction and enhanced positive affective states.

The absenteeism trends in the present study support American research by Baun *et al.*, (1986) which found that participants in corporate health programs demonstrated a reduction in absenteeism, in particular sick leave. Similarly, Lynch, Golaszewski, Clearie, Snow and Vickery (1990) found that employees who participated in a facility-based fitness program experienced fewer days of absenteeism compared to non-participants. Controlling

for gender and previous absenteeism, participants were less absent from work compared to non-participants.

The trend towards significant gender differences in absenteeism may be due to a number of reasons. Tucker, Aldana and Friedman, (1990) found gender to be an important consideration in their study of absenteeism and cardiovascular fitness. Similar to the trend in this study they found females demonstrated many more absences than the males. Tucker *et al.,* (1990) go on to suggest that it is possible that females may appear to be absent more from work due to time off for childbirth or days spent at home to care for sick children. Intuitively, this would appear to be a possible explanation for the findings in this study since many of the female participants were full-time working mothers.

Unfortunately, the results from this part of the study should be viewed with some caution due to missing data from the original study sample. Consequently, this analysis is not quite as robust as the analyses for the other dependent measures. However, the fact that the results sit comfortably with previous research is very encouraging and implies that there are economic benefits to be gained from supporting corporate health clubs.

Concluding Remarks

On a note of caution, it must be recognised that this study has several limitations, in particular the missing data and the inability to infer causality due to the design used. Clearly, as suggested earlier, it may have been that enhanced mood states in the members could be due to them being fitter rather than because they were members of this particular corporate health and fitness club. In other words, members might have displayed 'normal' and that the non-members displayed 'below normal' mood states. Additionally it is also possible that those employees who felt good about themselves were the ones who make the

decision to join health clubs and participate in studies such as these. Indeed, ones confidence or psychological state influences the decision to (1) join an health and fitness club and (2) participate in regular exercise. This causation problem is clearly an issue for further study. Naturally, it should also be realised that subjects completed the BI-POMS questionnaires and the job satisfaction item while at work and some employees may have felt uncomfortable about doing this in their working environment. Similarly, it might have been that the majority of employees who were the most unhealthy did not respond to the desk drop strategy used for advertising this study. Importantly though, this would suggest that the results from this study represent the healthier employees and that the differences between the groups would be even more profound than these data seem to suggest.

On the whole, these results have a number of important implications for the way in which corporations and organisations in Britain support and deliver health promotion in the workplace and for their future health policies. This study has primarily concentrated on the positive effects exercise can have on well-being and in particular the potentially important role the opportunity to exercise during the working day may have on British workers physical and psychological health. Overall the single most promising approach to reducing the frequency and severity of health problems is to actively help all employees maintain their health, both physically and mentally, and reduce their chances of becoming ill in the future. At the same time, health involves more than not being ill. It involves actually feeling well and healthy. Corporate exercise programs need to actively strive to achieve this by providing the facilities and support to enable **all** employees to participate in physical activity.

There is no doubt that workplace health promotion can be a powerful vehicle in the promotion of health. Nevertheless, fitness programs at the workplace have failed to reach

their potential in two ways. Firstly, the members of corporate clubs are usually the healthier, more fit employees. Companies may want to do more than provide programs which attract only these types of people. Time should be concentrated on the employees who are at greatest risk from health related illness. Thus long term aims may be to develop programs that will reach everyone. Secondly, workplace health promotion needs to adopt a multidisciplinary approach and help employees to appreciate that good psychological and physical health are worth having.

CHAPTER 4

PHYSICAL SELF-PERCEPTIONS, PHYSICAL EFFICIENCY AND PHYSICAL ACTIVITY IN MALE AND FEMALE MEMBERS OF A CORPORATE HEALTH AND FITNESS CLUB

This chapter corresponds to: Daley, A. J., & Parfitt, G. (1996). Physical self-perceptions, aerobic capacity and physical activity in male and female members of a corporate health and fitness club. *Perceptual and Motor Skills*, 83, 1075-1082.

Introduction

It is widely believed that participation in habitual physical activity and exercise can lead to positive improvements in the physical (e.g. Blair, Kohl, Paffenbarger, Clark, Cooper & Gibbons, 1989) and psychological health (Caruso & Gill, 1992; Hughes, 1984; Thirlaway & Benton, 1992) of the population. Fox (1988) argued that self-esteem is probably one of the most widely accepted indicators of emotional health and well-being. Exercise practitioners are rightly concerned with the relations among self-esteem, self-perceptions and exercise and physical activity since physical exercise may provide a vehicle for the development of positive feeling about ones self.

The instigation of workplace exercise facilities in Britain is a growing area and companies are investing a considerable amount of time and money into providing such facilities and making them work. Unfortunately, long term adherence to corporate exercise programs has been of some concern in recent years. Importantly, in order to maintain most of the benefits of exercise it must be conducted on a regular basis over a period of time (Lee & Owen, 1986b). However, Cox, Shephard and Corey (1981) comment that despite the potential advantages of worksite exercise, typical rates of participation rarely exceed 20% to 40% of the workforce. Given these low rates of participation, identifying and understanding which factors influence adherence to exercise and exercise programs may assist in the development and implementation of interventions and programs aimed at increasing the frequency at which individuals exercise.

Several researchers (Caruso & Gill, 1992; Sonstroem, 1984) have identified self-esteem as the psychological variable with the most potential to reflect psychological benefit as a result of regular participation in physical activity/exercise. Tucker (1983b), Ewart (1989) and McDonald and Hodgson (1991) have also noted exercise to have a positive

influence on self-esteem and self-perceptions. Similarly, a review by Sonstroem (1984) which investigated the effect of exercise on self esteem changes in adults concluded that physical exercise participation appeared to be associated with improved self-esteem scores. Likewise, Gleser and Mendelberg (1990) in their review of this relationship came to similar conclusions. Finally, Harter's Competence Motivation Theory (1978) (see chapter 2 for further discussion of this theory) suggested that the perceptions individuals hold of themselves may affect future motivational influences to participate in sport and exercise. Unfortunately, many researchers (Hammer & Wilmore, 1973; Heaps, 1978) have not observed supportive evidence for this relationship. Jackson & Marsh (1986), Sonstroem (1984) and Sonstroem and Morgan (1989) argued that these inconsistencies in the literature are due to poor designs, inadequate measurements, lack of theory and failure to measure the multidimensionality of self-esteem.

More recently researchers have adopted a multidimensional and hierarchical approach to the self-esteem concept. For example, Fox and Corbin (1989) in their development of the Physical Self-perception Profile contended that perceptions of the physical self are multidimensional and hierarchical and presumed to be an important component of global self-esteem. Further, Fox and Corbin argued that there are several sub-domain levels of physical esteem (e.g. Physical Strength and Body Attractiveness scores) which collectively contribute to general physical self-perceptions.

Studies in the physical self-perception/body esteem literature have tended to involve similar college student populations and modes of exercise (aerobic), although more recently there have been a few studies which have concentrated on the anaerobic exercise and the self-perceptions and body-esteem relationships. For details of this research the reader is directed to Tucker (1983a, 1983b, 1987). Poag-DuCharme and Brawley (1993) made the

interesting comment that researchers must better understand the uniqueness of the exercise process and recognise the differences contained within specific exercise settings and that few studies have attempted to understand how self-perceptions may influence participation involving unstructured and less regimented forms of exercise. Typically many studies (e.g. Caruso & Gill, 1992; McAuley, 1992; Tucker, 1983a, 1983b) have been focused on the attendance patterns of participants enrolled in fitness classes that are run at set times each week. According to Poag-DuCharme and Brawley (1993), less research has attempted to understand how perceptions of self-efficacy may be related to less formalised settings and types of exercise (e.g. corporate health clubs) where the onus remains on the exercisers to both plan and attend their exercise sessions. Importantly, this argument could also be applied to the study of self-perceptions in the physical domain. Despite the fact that self-esteem and its closely associated constructs are probably the most widely researched areas within the topics regarding physical activity and mental health relationship, the literature examining the effects of worksite exercise programs upon employees physical self-perceptions has been sparse.

Since one's feelings about one's self, in particular perceptions of the physical self, have emerged as particularly important to self-esteem it seems appropriate and important to understand their role. Therefore, based on Fox and Corbin's (1989) hierarchical multidimensional approach this study attempts to understand the relationship between physical self-perceptions and physical activity in male and female members of a corporate health and fitness club who are involved in a broad range of physical exercises and for the most part are autonomous in their decisions about exercise.

Methodology

Subjects

Employees from a leading British food retail company were invited via a desk drop leaflet to participate in a health check-up at the company's health and fitness club. Thirty three females and 44 males (n = 77) (ages ranged from 18-55 years) of a British corporate health and fitness club volunteered to take part in this study. Subjects held various positions within the company ranging from clerical duties and secretarial work to administrative and managerial/director posts.

Physical Self-perception Profile (PSPP)

The Physical Self-perception Profile (PSPP) developed by Fox and Corbin (1989) assesses physical self-perceptions. The inventory contains five 6-item subscales; (1) Perceived Sports Competence, (2) Body Attractiveness, (3) Physical Condition, (4) Physical Strength and (5) Physical Self-worth. Coefficient alphas range from .82 to .92, and test-retest coefficients range from .74 to .92. The PSPP was originally validated with college students, although more recently Sonstroem, Speliotis and Fava (1992) validated it for use with male and females in their middle years (M = 44.1) (see Appendix H)

Perceived Importance Profile (PIP)

The Perceived Importance Profile (PIP) developed by Fox and Corbin (1989) accompanies the PSPP. The 8-item PIP consists of four, 2 item subscales which assess perceived importance attributed by an individual to competence in each of the four domains of the physical self. Test-retest reliability coefficients range from .68 to .83. See Appendix H.

Medical Screen Questionnaire (MSQ)

All participants were medically screened before any physical tests were performed via an adapted version of the British Association of Sport Sciences Physiological Testing Guidelines (1988) (refer to chapter 3 for a full description of the MSQ).

Participation in Physical Activity Questionnaire (PPAQ)

As stated in chapter 3, subjects were asked (1) to state up to the five most physically demanding activities in which they participated in (2) how many times per week that they participated in each activity, (3) on average how many minutes they spent engaged in each activity and (4) on a scale anchored by 1 (very light) to 10 (very hard) how strenuous they would rate each activity. For scoring purposes type of activity and intensity of activity were combined and recoded into a single score. A composite physical activity score was made by multiplying the recoded type of activity and intensity score (1, 2 or 3) by the number of times the activity was performed each week, multiplied by the number of minutes subjects were engaged in that activity. This calculation was repeated for every stated activity. A grand total physical index score was obtained by adding the composite scores for each activity. Refer to Appendix F for a description of the rationale for the PPAQ.

Harvard Step Test - Physical Efficiency Index

The Harvard Step Test (see Broucha, 1943) was utilised in order to assess physical efficiency in J. Sainsbury's employees. Appendix G contains a description and rationale for the Harvard Step Test protocol.

Procedure

Each participant was examined individually for approximately 30 minutes during their working day. Upon entering the fitness assessment room the content and format of the Harvard Step Test (HST) was explained to each subject. Participants then completed the informed consent form, PPAQ and MSQ. Once subjects had recovered from the HST, they were asked to complete the Physical Self-perception and the Physical Importance Profiles.

Analysis Details

To accommodate the possible interrelationship between individuals' physical self-perceptions and their perceived importance score, interacting variables were created between the Physical Self-perception and Physical Importance subscales: Body Attractiveness and Body Attractiveness Importance; Sports Competence and Sports Competence Importance; Physical Conditioning and Physical Conditioning Importance; Physical Strength and Physical Strength Importance. This involved multiplying subjects Physical Self-perception scores on each subscale with their appropriate Physical Importance scores. An interacting variable was not created for the subscale Physical Self-worth since there is no accompanying Physical Self-worth Importance Profile. Whilst a number of different arguments (e.g. discrepancy scores & actual-ideal scores) exist regarding the weighting of physical self-perceptions (see Marsh 1994; Marsh & Sonstroem, 1995), interacting variables were created because it was felt that (both practically as well as theoretically) it was important to take into account both actual perceptions as well as the importance attached to them. It was also felt that taking discrepancy scores (as suggested by Fox & Corbin, 1989 & Harter, 1986) between perceptions and importance was not ideal since it could be argued to be a somewhat insensitive crude measure and has received very

limited empirical support (see Marsh 1986, 1993b). A detailed rationale for the selection of the PSPP and PIP for use within this chapter can be found in Appendix A.

Results

Table 4.1 contains male and female means and standard deviation scores for age, PPAQ and physical efficiency index scores (PEIS). Refer to Table 4.2 for Physical Self-perception and Physical Importance Profile subscale mean scores for males and females.

Table 4.1. Male and female means and standard deviation scores for age, physical efficiency and PPAQ.

	Males		Females	
	M	*SD*	M	*SD*
Age	39.07	5.67	34.25	6.81
Physical efficiency index scores*	85.67	16.33	72.97	27.28
PPAQ scores	796.89	676.64	651.21	373.29

* = significant difference at the $p<.05$ level.

Pearson correlation's were conducted to examine the interrelations between Physical Self-perception and Physical Importance Profile subscale scores and results were similar in magnitude across gender. Refer to Tables 4.2 for male and female results respectively. Hierarchical multiple regression analyses for both males and females were conducted (Physical Self-worth was entered at the first step). Analyses indicated a significant linear relationship between Physical Self-worth and composite physical activity participation scores accounting for 15.8% of the variance in males ($F(1,41) = 7.72$, $p<.01$). For females,

Table 4.2. Physical Self-perception and Physical Importance Profile subscale correlations for males and females. Male scores are shown in ordinary type (upper matrix) and female scores are shown in bold (lower matrix).

	Body	Body Importance	Conditioning	Conditioning Importance	Physical Self-worth	Sport	Sport Importance	Strength	Strength Importance
Body	_	.11	.67**	.11	.84**	.65**	.11	.66**	.11
Body Importance	**.11**	_	-.01	1.0**	.06	.00	1.0**	.14	1.0**
Conditioning	**.61****	**-.01**	_	-.01	.81**	.80**	.01	.63**	-.01
Conditioning Importance	**.11**	**1.0****	**-.01**	_	.06	.00	1.0**	.14	1.0**
Physical Self-worth	**.86****	**.05**	**.78****	**.05**	_	.79**	-.06	.79**	.06
Sport	**.65****	**.00**	**.82****	**.00**	**.78****	_	.00	.69**	.00
Sport Importance	**.11**	**1.0****	**-.15**	**1.0****	**.05**	**.00**	_	.14	1.0**
Strength	**.45****	**.03**	**.75****	**.03**	**.69****	**.66****	**.35**	_	.14
Strength Importance	**.11**	**1.0****	**-.15**	**1.0****	**.05**	**.00**	**1.0****	**.35**	_

* = significant at the $p<.05$ level.
** = significant at the $p<.01$ level.

importance weighted Body Attractiveness subscale scores displayed a nearly significant positive relationship with composite participation in physical activity scores ($p<.069$). There were no significant predictions between unweighted physical self-perception scores and physical activity participation scores. Appendix P contains assumptions underlying regression analysis.

Table 4.3 Physical Self-perception and Physical Importance Profile means and standard deviations for males and females.

PSPP and PIP Variables	Males		Females	
	M	*SD*	M	*SD*
Body	14.51	4.64	13.42	4.39
Body Importance	6.20	1.39	5.94	1.26
Conditioning	17.40	4.43	16.81	4.68
Conditioning Importance	6.18	1.46	6.05	1.65
PSW	15.17	4.28	14.55	3.91
Sports	16.22	4.54	13.94	4.22
Sports Importance	5.47	1.50	5.08	1.71
Strength	15.71	4.47	15.32	4.44
Strength Importance	5.02	1.45	4.96	1.27

Discussion

Results have indicated that males who demonstrate high levels of Physical Self-worth scores are somewhat more likely to be involved in more physical activity. The result also provides some information about the way in which males within a corporate exercise setting evaluate themselves physically and the influence this may have on their exercise behaviour.

Additionally, similar to Marsh's (1994) findings, it would appear that weighted physical self-perception scores do not produce significantly stronger relations with Physical Self-worth scores as compared to unweighted responses.

One possible explanation for these results may be that men do not differentiate between sub-components of their physical self-worth and they may view their physical perceptions as equally important. The results from the present study only provide limited support for Fox and Corbin's (1989) development of the Physical Self-perception and Physical Importance Profiles. The hierarchical organisation of their model would suggest that Physical Self-worth scores should account for a large proportion of the variance with participation in physical activity scores. Whilst Physical Self-worth was the only significant predictor of participation in physical activity scores, it only accounted for 15.8% of the common variance in males which statistically is rather moderate. Moreover, these results would appear to lend partial support for Harter's (1978) multidimensional model of self-esteem which argues that global self-esteem is not subdivided into sub-components of competence but is comprised of global measures from several aspects of individuals lives.

The nearly significant positive relationship between Body Attractiveness and participation in physical activity scores was not surprising and loosely supports past literature which has found similar relations (see Caruso & Gill, 1992; Plummer & Koh, 1987). According to Harter (1988) physical appearance/attractiveness dominates self-esteem throughout the lifespan. Interestingly, while Fox and Corbin (1989) were developing their Physical Self-perception and Importance Profiles they found that the physical appearance dimension tended to dominate self-esteem in American college women. According to Fox (1988), because there is lower societal pressure and value for competence in sport for females, they are able to successfully 'discount' its importance and minimise its

effect on self-esteem. Furthermore, it has been argued by Klein (1988) that the media reinforces a masculine image of sport and this may provide a partial explanation as to why females are consistently found to participate in particular kinds of sports, for example keep fit and aerobics. These activities are specifically aimed at improving an individuals body shape and may play a mediating role in the exercise and physical perception relationship. However, as the relationship between Body Attractiveness and participation in physical activity scores was only nearly significant this result should be interpreted with some caution, although it does suggest that the way in which women within a corporate exercise setting perceive their bodily attractiveness, may be associated with their exercise behaviour.

In line with other theories, such as Competence Motivation Theory (Harter, 1978, refer to chapter 2) and Bandura's Self-efficacy Theory (1977) it seems that male club members physical identity is associated with employees choice of exercise behaviour. However, the cross sectional design of this study precludes any definite statements concerning the specific influence of participation in sport and exercise upon physical self-perceptions. Perhaps future studies of corporate health and fitness programs and employees' physical perceptions should be done longitudinally. This would produce valuable information regarding the long term influences of such programs and provide the opportunity to examine changes in employees' physical perceptions across time. Finally, an assumption of the weighted approach to self-perceptions is that weighted correlation's between weighted interaction average scores and self-esteem should be greater than correlation's with unweighted scores. This relationship was not directly tested in this study and is an important direction for future research.

CHAPTER 5

THE EFFECTS OF EXERCISE AND SPORT WITHDRAWAL ON PHYSICAL SELF-PERCEPTIONS IN MALE AND FEMALE COLLEGE STUDENTS

This chapter corresponds to: Daley, A. J., & Parfitt, G. (1996). Exercise deprivation in physical-self perceptions in physically active male and female college students. *Journal of Sports Sciences*, **14**(1), 24.

Introduction

There is strong and convincing evidence that regular physical activity and sport plays a crucial role in improving well-being and it is commonly felt that exercise exerts a positive impact on psychological health (e.g. Berger & McInman, 1991; Emery & Blumenthal, 1990). However, a different perspective to this relationship, which has received rather limited attention in the exercise sciences literature, is the effect of no longer participating in, or withdrawing from, sport and exercise and its effect upon psychological states. Importantly, there are no published studies to date which have investigated this relationship in terms of individuals' physical self-perceptions and physical importance profiles. Knowledge concerning the impact of exercise deprivation on well-being is important for various reasons. First, it may help us to understand the causal mechanism(s) for the exercise and psychological well-being relationship (for example, mastery or distraction). Secondly, it provides us with a fresh and alternative perspective on the already well researched topic of psychological well-being and participation in physical activity in exercise psychology research. Finally, it may provide insight into the responses, thoughts and feelings of those individuals who are unable to exercise, or who have to cease exercising, for example, due to retirement from sport, pregnancy, burnout or injury.

Physical Self-perceptions

Regularly engaging in physical activity and sport appears to have both physical and mental benefits, including a more positive evaluation of ones body and the development of more positive body esteem (see McDonald & Hodgson, 1991). Similar to other aspects of well-being, physical self-perceptions have been shown to be positively associated with regular participation in physical activity. Sonstroem (1982, 1984) has suggested that increased

self-esteem appeared to be associated with exercise program participation. Furthermore, several researchers (Folkins & Sime, 1981; Sonstroem, 1984) have identified self-esteem as the psychological variable with the most potential to reflect psychological benefits from physical activity. Skrinar, Bullen, Cheek, McArthur and Vaughn (1986) reported that aerobic exercise can improve an individuals perception of internal body consciousness and enhances feelings of body competence. Additionally, Tucker (1987) found that participation in a weight training program significantly improved body concepts in male college students.

An important development in the physical self-perceptions and body esteem literature has been the recognition that differences exist in the way males and females perceive their physical selves. In the past, studies have failed to report differentiated results for gender. Many studies include all male samples which have been subsequently generalised to females. A number of studies have shown that females report considerable concern with body weight. For example, according to Fallon and Rozin (1985) and Tiggerman & Pennington (1990), women express greater dissatisfaction with their body size and shape and are more likely to perceive themselves as overweight than are men (e.g. Wooley, Wooley & Dryenforth, 1979). Studies have consistently shown that women, particularly overweight women, have more negative physical self-perceptions or body esteem (e.g. Brodie & Slade 1988; Cash & Hicks, 1990). Franzoi and Shields (1984) found that dimensions of body esteem were different for male and female college students. For males, body esteem dimensions consisted of physical attractiveness, upper body strength and physical condition. In contrast, for women, the dimensions of esteem were sexual attractiveness, weight concern and physical condition.

As discussed in chapter 2, Fox and Corbin (1989), in their development of the Physical Self-perception (PSPP) and Physical Importance Profiles (PIP), contended that

perceptions of the physical self are multidimensional and hierarchical, and presumed to be an important component of global self-esteem. There has been much empirical support for the use of a hierarchical and multidimensional approach to measuring self-perceptions. For example, Caruso and Gill (1992) using the PSPP and PIP found that females in a 10 week aerobics and weight training group program demonstrated positive changes in physical self-perceptions compared to the control group. Interestingly, they also found differences in levels of perceived importance attached to particular subscales. Indeed, control subjects demonstrated lower physical conditioning importance than the weight training and aerobic exercise group. The importance of physical strength was also lower for the control group than the weight training and aerobics groups. This would seem to suggest that the amount of perceived importance attached by individuals to their physical perceptions influences their participation in physical exercise. Sonstroem, Speliotis and Fava (1992) utilising the PSPP found that physical self-perceptions predicted degree of involvement in exercise for males as well as females. Likewise, Sonstroem, Harlow and Josephs (1994) have observed relationships between specific PSPP scales and self-esteem in adult female aerobics dancers and that these were on the whole mediated by physical self-worth. They also found that physical activity was associated with more positive conditioning and more negative body attractiveness. PIP results were not reported. Unfortunately, as regards gender, whilst there has been much empirical research in this area, there are very few studies which have examined gender differences in relation to physical self-perceptions and physical exercise specifically. The implications for this will be discussed later.

The Present Study and Specific Design Issues

Much of the research examining exercise withdrawal has typically used runners who have been engaged in intensive training programs (e.g. Conboy, 1994; Crossman, Jamieson & Henderson, 1987; Thaxton, 1982). As such their psychological responses may not be a true reflection of the real responses to exercise withdrawal of physically active people in general. More representative samples of physically active people who are involved in a range of physical activities (e.g. either aerobic or anaerobic, or a combination of both) would provide more generalisable data about the impact of exercise deprivation. A 10 day exercise withdrawal intervention was chosen for a number of reasons. Firstly, Gauvin and Szabo (1992) only utilised a 6 day intervention which was not considered sufficient to elicit changes in physical self perceptions. Therefore, a 10 day intervention was included.

Psychological well-being or mental health are multidimensional global concepts. There are many different components which make up ones psychological self. Despite this, previous studies have generally been centred around single measures of psychological health, such as mood states, anxiety and depression. It was thought that examining the impact of exercise withdrawal upon physical self-perceptions would provide an added dimension and complement existing information concerning the effects of exercise deprivation. Additionally, it may well provide a real and more complete indication of individuals' psychological health as a result of withdrawing from exercise and sport.

Many studies have selected subjects based on their levels of commitment (e.g. Gauvin & Szabo, 1992) or included subjects based on a minimum level of involvement in exercise and sport (Morris, Steinberg, Sykes & Salmon, 1990). Whilst this may be an important construct which influences subject responses, it is also possible that high

commitment to exercise/sport may be clouding the real exercise withdrawal effects. It is also possible that people who withdraw from exercise/sport display more intense negative effects because they are highly committed rather than because they 'missed' the exercise in itself. Thus, it is difficult to ascertain whether the effects of exercise withdrawal are due to: (1) commitment; (2) withdrawing from exercise/sport in itself; (3) previous involvement in sport and exercise; and (4) a combination of all these points. It was considered important to include subjects who reported a range of commitment scores, as well as controlling for the effects of commitment upon affect.

There were a number of reasons for adopting a 10 day intervention. Studies of exercise deprivation typically only require subjects to withdraw from sport/exercise for brief durations. For example, Gauvin and Szabo (1992) included a 6 day exercise withdrawal period, Thaxton (1982) a 1 day and Crossman *et al.*, (1987) a 1 day (in runners) and a 5 day (in swimmers) exercise withdrawal intervention. Nevertheless, it is important to note that Baekland (1970) and Morris *et al.*, (1990) did include much longer withdrawal periods; these being 4 and 2 weeks respectively. However, as discussed, these studies were not well designed and are subject to several serious methodological flaws. Consequently, this study included a 10 day exercise withdrawal intervention. Whilst, it is it recognised that this is still a relatively short time frame, it was considered unrealistic to expect physically active college students to abstain from exercise for longer than 10 days.

Importantly, gender may play an important role in the influence of exercise on well-being. Unfortunately, many of the withdrawal studies to date use all male samples (e.g. Morris *et al.*, 1991). Additionally many studies fail to consider gender as an issue and thus do not analyse their results independently, or include unequal numbers of males and females in their sample (e.g. Gauvin & Szabo, 1992). This is also the case with exercise withdrawal

studies, where more often than not all male samples are used. Whilst there are several legitimate design issues for doing this, it makes cross study comparisons somewhat difficult and in the long term can only slow down development in this field. In the light of observed differences discussed earlier in males' and females' physical feelings about themselves, it was thought important to examine gender differences in relation to the effects of withdrawal from sport and exercise. Furthermore, since data from Crossman *et al's.*, (1987) study revealed significant differences between competitive male and female runners' levels of negative mood changes as a result of exercise deprivation, it was considered appropriate to consider this difference in relation to physical self-perceptions.

What role does exercise motivation play in this relationship? Many different reasons for participating in physical exercise are cited by individuals, for example to feel good, stress management, and health reasons (see Markland & Hardy, 1992). Specifically, females often report exercising for weight loss and physical appearance as important motives for their participation in exercise. As such these motives may have important implications for both the effect and intensity of exercise withdrawal. However, no exercise withdrawal study to date has considered the influence of subjects' initial motives for exercise upon the psychological effects of exercise deprivation. Therefore, this study includes a measure of exercise motivation. It was hoped that this would illicit information regarding initial subjects motives for exercise and subsequently whether the effects of exercise deprivation are influenced by exercise motives.

Finally, as mentioned previously, to the knowledge of the author there are no published studies which have attempted to investigate the relationship between individuals' physical self-perceptions and withdrawal from habitual physical exercise and sport and consequently our knowledge in this area is severely limited. Therefore, based on Fox and

Corbin's (1989) hierarchical and multidimensional approach, the purpose of the present study was to investigate the relationship between exercise withdrawal and physical self-perceptions. It is hypothesised that subjects deprived of regular exercise participation would demonstrate larger negative changes in physical self-perceptions than the control group. Additionally, this study was designed to consider gender differences as a result of exercise deprivation. Therefore, based on previous research by Cash and Hicks (1990) and Tiggerman and Pennington (1990), it is secondly hypothesised that females deprived of regular exercise participation would demonstrate larger and more negative changes in interacting variables Body Attractiveness/Body Attractiveness Importance and Physical Conditioning/Physical Conditioning Importance than males and those in the control group and that males would display more negative changes in Physical Strength/Physical Strength Importance than females.

Methodology

Subjects

As highlighted earlier in chapter 1, a student sample was selected for the withdrawal study within this thesis. Subjects were recruited via advertisements posted in a British university. Sixty two subjects agreed to take part in the study. However, due to constraints of training 2 subjects dropped out from the study and an additional 3 subjects' data was omitted from the study due to incomplete information and missing values. Therefore, the total sample consisted of 27 withdrawal (males = 14; females = 13) and 30 control (males = 12; females = 18) subjects. Subjects reported being involved in a broad

range of aerobic and anaerobic activities. Ages ranged from 18-36 years. See Tables 5.1 and 5.2 for group and gender age means and standard deviations.

Commitment to Exercise Questionnaire

The Commitment to Running Scale (CTEQ) (Carmack & Martens, 1979), designed to measure dedication/addiction to running was adapted into a Commitment to Exercise/Sport Questionnaire (see Appendix I) by substituting the word 'running' for 'exercise/sport' to make it applicable to a variety of exercise forms. Validity studies have shown this substitution to be internally consistent (see Gauvin & Szabo, 1992). The scale includes 12 self descriptive statements. For example, 'Exercise/sport is vitally important to me', 'Exercise/sport is the high point of my day' and 'I look forward to exercise/sport'. Subjects were required to rate on a scale of 1 to 5 whether they agreed or disagreed with each statement. Reliability data support its test-retest stability and internal consistency

Estimated Maximal Oxygen Uptake

Estimated maximal oxygen uptake was measured on two occasions, pre-intervention and at the end of the intervention to verify that no significant changes in affect had occurred due to exercise deprivation. Estimated maximal oxygen uptake was measured using the Multistage Fitness Test (Leger & Lambert, 1982). This fitness test requires subjects to run between 2 markers placed 20 metres apart whilst keeping up with a series of bleeps. The pace increases every minute and the level at which subjects drop out determines their estimated oxygen uptake score.

Participation in Physical Activity Questionnaire

Refer to chapter 3 for details regarding the Physical Activity Questionnaire (PPAQ) and Appendix F for a discussion of the test-retest reliability of the PPAQ.

Exercise Motives

The Exercise Motivation Inventory (E.M.I.; Markland & Hardy, 1992) was employed as a measure of motives for exercising in this study. The EMI was originally developed to assess a broad range of exercise motives: (1) Stress Management; (2) Weight Management; (3) Re-creation; (4) Social Recognition; (5) Enjoyment; (6) Appearance; (7) Personal Development; (8) Affiliation; (9) Ill -Health Avoidance; (10) Competition; (11) Fitness; and (12) Health Pressures. The E.M.I. contains 44 items and respondents are asked to agree or disagree which each item on a scale from 0 to 5. The internal consistency is generally acceptable with reliability coefficients ranging from .63 to .90. Test-retest reliability coefficients ranged from .59 to .88. A copy of the E.M.I. can be found in Appendix J.

Physical Self-perception Profile

The Physical Self-perception Profile (PSPP) developed by Fox and Corbin (1989) assesses physical self-perceptions. The inventory contains five 6-item subscales: (1) Perceived Sports Competence; (2) Attractiveness of the Body; (3) Physical Condition; and (4) Physical Strength; (5) Physical Self-worth. Internal consistency coefficient alphas ranged from .82 to .92, and test re-test coefficients ranged from .74 to .92 (Fox & Corbin, 1989).

The Perceived Importance Profile (PIP) developed by Fox and Corbin (1989) accompanies the PSPP. The 8-item PIP consists of four, 2-item subscales which assess perceived importance attributed by an individual to competence in each of the four domains

of the physical self. Test re-test reliability coefficients range from .68 to .83. A copy of the PSPP and PIP can be found in Appendix H.

Exercise Withdrawal Intervention

Subjects were required to withdraw totally from participation in exercise and sport for 10 days inclusively. The intervention began on a Sunday and finished the following Tuesday.

Procedure

Prior to the commencement of the study subjects were briefed about the procedures involved in the study. The format of the questionnaires were explained and subjects were advised that they may be required to stop exercising at some point during the following two weeks and that they would be randomly assigned to either the control or the withdrawal group. Subjects received explicit instructions to continue exercising as normal until they were told to abstain from exercise.

On day 1 subjects were asked to complete the CTEQ, PPAQ, PSPP and PIP. Estimated maximal oxygen uptake ($V0_2$ max.) was measured on day 2. On day 4 subjects were informed to which group they had been assigned (control or withdrawal) and that they were required to withdraw from exercise as from day 5 of the study. The exercise withdrawal group were told to abstain from all forms of exercise/sport and physical activity for the following 10 days, whereas the control group were instructed to continue exercising as normal. The exercise deprivation intervention began on day 5. On day 15 (the end of the exercise withdrawal intervention) subjects were re-tested on estimated maximal oxygen uptake (this was measured in the evening after day 15 questionnaires had been completed) and the PSPP and PIP. On day 16 (1st day of the post intervention) withdrawal subjects

were informed that they could exercise and participate in sport as normal again. On day 21 (last day of the post intervention) subjects were re-tested for the final time on the PSPP and PIP measures. Additionally, all subjects participated in a semi-structured interview the results of which are reported in chapter 7. All subjects received an incentive for participating in the study (a free T-shirt). A detailed rationale for the questionnaires selected in this study can be found in Appendix A.

Analyses Details

Due to missing data, analyses were conducted on 56 of the original 62 subject sample. As in chapter 4 interacting variables were created between the PSPP and PIP subscales. Means were adjusted for commitment and levels of participation in physical activity. Abbreviations to the Physical Self-Perception and Physical Importance Subscale names were made; Body Attractiveness and Body Attractiveness Importance (Body/Bodyimp), Sport Competence and Sport Competence Importance (Sport/Sportimp), Physical Conditioning and Physical Conditioning Importance (Cond/Condimp) and Physical Strength and Physical Strength Importance (Stren/Strenimp). It should also be understood that the intervention measure of perceptions was taken on the last day of the exercise withdrawal intervention and is referred to as 'during the intervention' in the following results section. Appendix P contains the assumptions underlying the statistical tests used in this chapter.

Results

Demographic and Population Characteristics

Tables 5.1 and 5.2 show demographic and population characteristics means and standard deviations for Group and Gender respectively. Univariate 2 x 2 (Group vs Gender) analyses of variance were conducted for commitment to sport and exercise and participation in physical activity scores. There was a significant Group main effect for commitment to sport and exercise scores ($F(1,52) = 5.98$, $p<.01$). There was a significant Gender main effect for participation in physical activity scores ($F(1,52) = 4.72$, $p<.01$).

Table 5.1. Group means and standard deviations for demographic and population characteristics.

	Withdrawal N = 27		Control N = 30	
	M	*SD*	M	*SD*
PPAQ scores	1009.0	402.5	1164.0	608.0
Commitment to sport and exercise*	48.8	5.7	51.2	2.0
Age	23.3	5.8	21.6	2.2

*significant difference between groups at the $p<.01$ level.

Table 5.2. Gender means and standard deviations for demographic and population characteristics.

	Males N = 26		Females N = 31	
	M	*SD*	M	*SD*
PPAQ scores*	1265.2	429.8	926.7	577.4
Commitment to sport and exercise	50.0	4.5	51.2	5.1
Age	24.6	3.0	24.2	4.5

*significant difference between males and females at the $p<.01$ level.

A 2 x 2 x 3 (Group vs Gender vs Time) analysis of variance with repeated measures on Time was conducted on the estimated VO_2 max scores. No significant interactions or main effects were recorded. Furthermore, multivariate 2 x 2 (Group vs Gender) analysis of variance on the exercise motives also resulted in no significant effects.

For the purposes of the present investigation 2 (Group: withdrawal vs control) x 2 (Gender: males vs females) x 3 (Time: pre-intervention vs intervention vs post-intervention) univariate analyses of covariance (physical activity and commitment to sport and exercise as the covariates) with repeated measures for Time were conducted on all Physical Self-perception and Physical Importance Profile interacting variables.

Conditioning and Conditioning Importance

Analyses demonstrated a significant 2 x 2 x 3 interaction for Cond/Condimp ($F(4,203) = 48.00$, $p<.01$). To further understand this interaction result a series of 'simple' 2 (Group: withdrawal, control) x 3 (Time: pre-intervention vs intervention vs post-intervention) and 'simple' 2 (Gender: male, female) x 3 (Time: pre-intervention vs

intervention vs post-intervention) ANCOVAs were conducted. A significant 'simple' interaction for males in the control and withdrawal groups ($F(4,107) = 22.93$, $p<.01$) (see Figure 5.1) was observed.

Follow-up Tukey's tests demonstrated that male control subjects during the intervention demonstrated significantly higher Cond/Condimp scores than at the pre and post intervention. Furthermore, control males at each time (pre, during the intervention and post intervention) demonstrated significantly higher Cond/Condimp scores than male withdrawal subjects at each time. Refer to Table 5.3 for means and standard deviations.

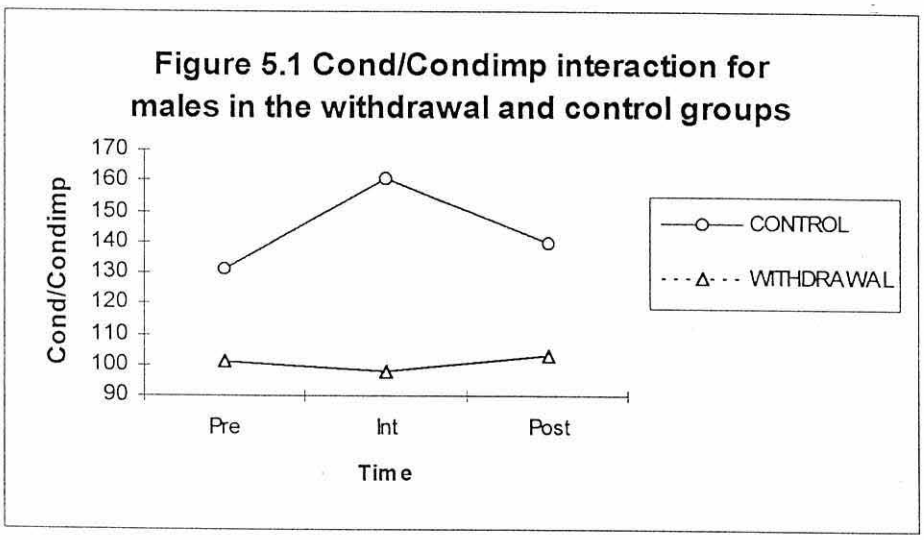


Table 5.3. Male, control and withdrawal means and standard deviations across time for Cond/Condimp.

Cond/Condimp	Pre-Intervention		Intervention		Post Intervention	
	Mean	*SD*	Mean	*SD*	Mean	*SD*
Male Control	131.2	31.9	161.3	40.2	140.1	41.9
Male Withdrawal	101.0	38.6	98.6	29.8	103.2	22.4

There was also a significant 'simple' interaction between males and females in the control group ($F(4,107) = 26.83$, $p<.01$) (see Figure 5.2 and refer to Table 5.4 for means and standard deviations).

Follow-up Tukey's tests revealed that control males during the intervention demonstrated significantly higher Cond/Condimp scores than control females at all Times and control males during the pre-intervention and post intervention. Additionally, follow up Tukey's tests revealed that control males post intervention reported significantly higher scores than female controls pre and post-intervention.

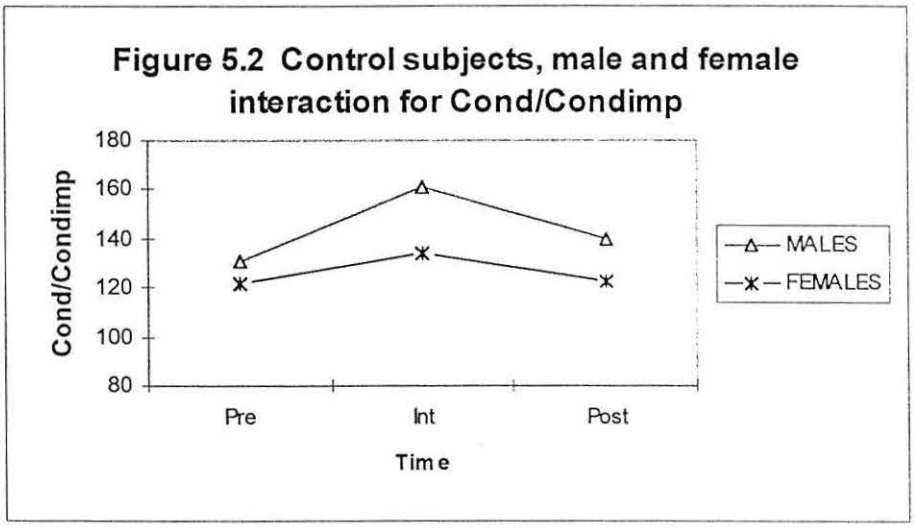
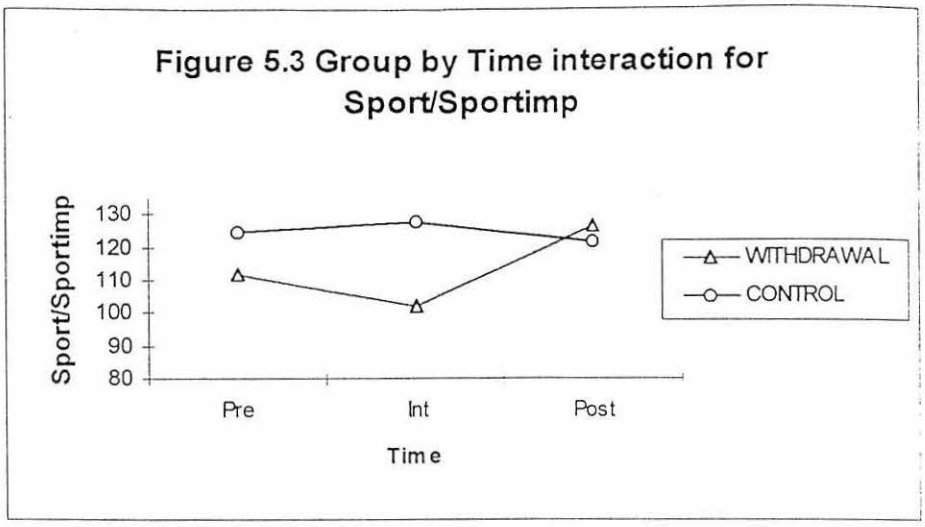


Table 5.4. Control group, male and female means and standard deviations across time for Cond/Condimp.

Cond/Condimp	Pre-Intervention		Intervention		Post Intervention	
	Mean	*SD*	Mean	*SD*	Mean	*SD*
Control Males	131.2	31.9	161.3	40.2	140.1	41.9
Control Females	122.6	37.4	134.4	34.6	123.7	34.7

Sports and Sports Importance

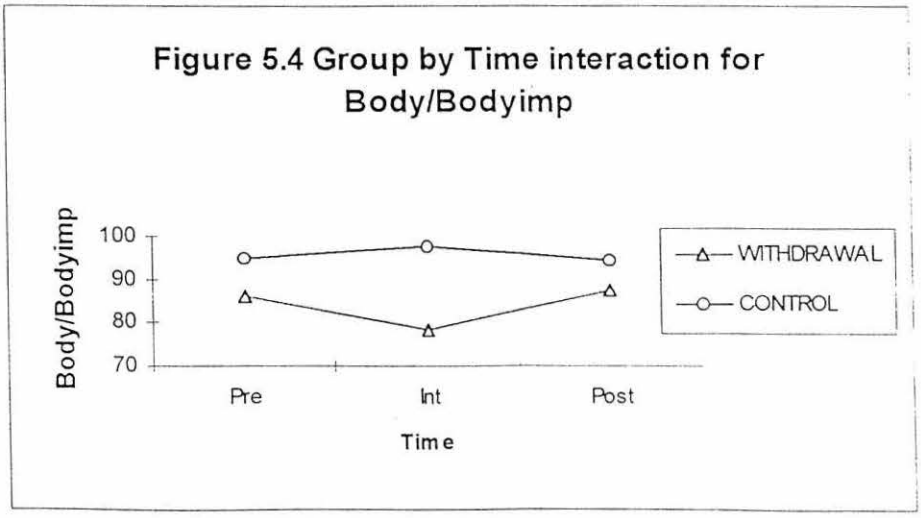
Analyses revealed a 2 x 3 (Group vs Time) interaction for Sport/Sportimp ($F(4,203) = 51.16$, $p<.01$) (See Figure 5.3).



Tukey's test's revealed that withdrawal subjects during the intervention reported significantly lower Sport/Sportimp scores than at post intervention. Withdrawal subjects, during the intervention, reported significantly lower Sport/Sportimp scores than control subjects at the pre, during the intervention and post intervention. See Figure 5.3 and refer to Table 5.5 for means and standard deviations across time.

Body Attractiveness and Body Attractiveness Importance

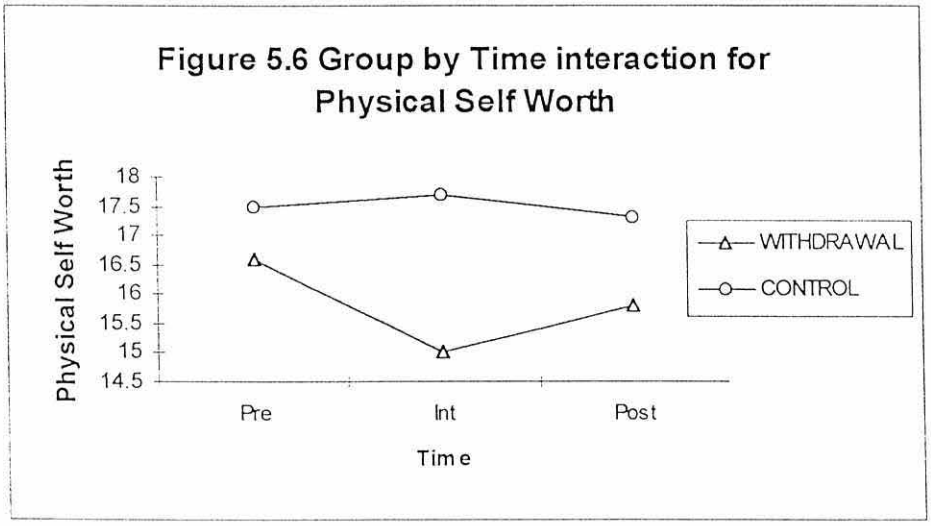
Analyses also demonstrated a 2 x 3 (Group vs Time) interaction for Body/Bodyimp ($F(4,203) = 51.19$, $p<.01$) (see Figure 5.4).



Tukey's test revealed that withdrawal subjects during the intervention reported significantly lower Body/Bodyimp scores compared to Control subjects pre, during the intervention and post intervention. See Figure 5.4 and refer to Table 5.5 for means and standard deviations across time.

Physical Self-worth

Finally, a significant 2 x 3 (Group vs Time) interaction for Physical Self-worth ($F(4,203) = 51.26$, $p<.01$) was recorded (see Figure 5.6).



Tukey's test's demonstrated that withdrawal subjects pre intervention displayed significantly higher Physical Self-worth scores than during the intervention and post intervention. Control subjects pre-intervention reported significantly higher physical Self-worth scores than withdrawal subjects during the intervention. Control subjects during the intervention displayed significantly higher Physical Self-worth scores compared to withdrawal subjects during the intervention and post intervention. Finally, control subjects

post intervention reported significantly higher Physical Self-worth scores compared to withdrawal subjects during the intervention. See Figure 5.6 and refer to Table 5.5 for means and standard deviations across time. Assumptions underlying the analyses selected can be found in Appendix P.

Table 5.5. Means and standard deviations for Physical Self-perception and Physical Importance Profiles (PSPP, PIP).

PSPP/PIP	Pre-intervention				Intervention				Post-intervention			
	Withdrawal		Control		Withdrawal		Control		Withdrawal		Control	
	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*
Body/Bodyimp	86.2	28.3	95.1	30.9	78.2	33.5	97.5	30.2	87.5	28.3	94.3	30.5
Sport/Sportimp	112.0	38.1	124.4	40.3	102.0	32.5	127.5	41.1	126.5	30.8	121.5	35.7
Cond/Condimp	104.5	38.0	121.8	35.1	108.4	30.8	141.9	35.7	107.5	31.1	125.5	38.2
Stren/Strenimp	97.3	35.3	100.3	26.7	96.4	29.5	109.4	35.2	95.3	34.5	100.4	27.7
Physical Self-worth	16.6	3.6	17.5	2.9	15.0	3.6	17.7	2.9	15.8	4.3	17.3	3.2

Discussion

The present set of results provides some support for the proposed relationship between exercise withdrawal and negative changes in physical self-perceptions (PSP). There were significant negative differences in the withdrawal group compared to the control group at the end of the intervention but not pre or post intervention in 3 (Body/Bodyimp, Sport/Sportimp and Physical Self-worth scores) of the scales contained in the Physical Self-perception and Physical Importance Profiles. Generally, the pattern of results was for a decline in these physical self-perceptions during the intervention (as measured at the end of the intervention) but to increase following the re-commencement of exercise. Importantly, the pattern of results for the subscale Cond/Condimp were inconclusive, despite the fact they show a similar pattern of significant results. The Stren/Strenimp scores were non-significant. There were no group or gender mean changes in estimated VO_2 max. scores between the pre-intervention and the end of the intervention. This is important since any changes in the withdrawal subjects' physical self-perceptions during the withdrawal period were not due to subjects becoming aerobically less fit and were more likely to have been due to the exercise withdrawal.

As suggested earlier a crucial and important element which may mediate the hypothesised effects of exercise withdrawal are individuals' motives for exercising. For example, an individual may report lower levels of body attractiveness during exercise deprivation simply because they exercise for body attractiveness reasons and missed the opportunity to work on their physique rather than because they missed exercise in itself. Nevertheless, since there were no reported significant differences between groups or gender it would appear that the effect of initial exercise motives upon these results were minimal.

The significant Sport/Sportimp interaction, in particular the differences between the groups during the intervention for Sport/Sportimp scores were not surprising since many of the subjects were involved competitively in university sports teams and clubs. As such they may have perceived that not participating in training sessions/matches would influence their subsequent skill and performance levels. They may have also felt uneasy or anxious about returning to sport/exercise since they had been absent from the sporting environment for 10 days. Furthermore, these negative feelings may have manifested themselves in, or influenced, withdrawal subjects lower responses on the PSPP at the end of the intervention. This particularly may have been the case for those withdrawal subjects who had to miss important matches during the exercise intervention, and/or who were involved in team sports and who had to return to a team which had been successful without their contribution. At the end of the intervention the university football, netball, hockey, rugby and squash teams were all heavily involved in inter-university sports competitions where the stakes were high, and loss of a game would result in automatic exclusion from the competition. Indeed, 17 of the 27 withdrawal subjects were members of sports clubs which were involved in such competitions.

Additional secondary analyses in which Sports Competence and Sports Competence Importance were analysed separately, revealed that control subjects attached more importance to sports competence than did withdrawal subjects at the end of the intervention. The implication for this is that withdrawal subjects may have attached less importance to sports competence during exercise withdrawal simply as a consequence of not being able to exercise. They may also have engaged in the process of discounting the importance placed on individual physical self-perceptions. Alternatively, other things within their lives may have become the focus of their attention.

The significant interaction for Body/Bodyimp scores may have occurred since withdrawal subjects may have felt that not participating in exercise/sport would negatively influence their weight and body physique. This would support previous research by Caruso and Gill (1992), McDonald and Hodgson (1991) and Tucker (1983b) which have all documented enhanced feelings of physical and body esteem as a result of participation in sport and exercise. It is also possible that negative changes in Body/Bodyimp and Sport/Sportimp scores contributed to producing negative reductions in Physical Self Worth scores in the withdrawal subjects. This argument would sit comfortably with the work of Sonstroem, (1982; 1984) which has suggested that individuals' physical ability perceptions have a positive relationship with global measures of esteem. Additionally, differences between the control and withdrawal group during the intervention could have been the result of withdrawal subjects generally feeling that their overall physical well-being had changed, thus bringing about lower physical self-perceptions in the withdrawal group.

The significant results for Cond/Condimp scores are not as straight forward as they first appear and should be interpreted with considerable caution. Indeed, closer examination of the cell means demonstrated that in actual fact the withdrawal group Cond/Condimp scores during the study remained relatively static. However, it appears that the control groups' pattern of mean scores for Cond/Condimp increased dramatically during the intervention which appears to have contributed heavily towards the observed significant difference at this time. It is not clear what this change could be attributed to.

Despite the inconclusive results from the subscale Cond/Condimp, this study would tend to support the mastery hypotheses (see chapter 2) for the negative affects of withdrawal from exercise, particularly since subjects returned, or began to return, to their pre exercise state once the exercise deprivation intervention had finished. A possible

explanation for the result, is the notion of the loss of rewarding or important activities. Lewinsohn, Youngren and Grossup (1979) have suggested that individuals involved in physical activity who have to 'give-up' habitual exercise experience negative psychological responses because they have to surrender something which is an important part of their lives. Indeed, for many people, exercise is an activity in which they derive a sense of achievement, self-gratification, enjoyment and fulfilment. In relation to physical self-perceptions, if individuals feel that they are not receiving positive physical reinforcement cues, in that they are not engaging in any process of self-reward, and are neglecting their physical selves it seems likely that decrements in physical self-perceptions will occur. Unfortunately, there is little published evidence to support this hypothesis and as such it is only one possible explanation for these results. Future studies should attempt to investigate the role of the loss of rewarding activities in the exercise withdrawal and physical self-perceptions relationship.

Gender Issues

The general lack of any gender differences on the physical self-perception measures was somewhat surprising, especially since previous studies suggest that gender differences regarding physical self-perceptions and body esteem exist. For example Fox and Corbin (1989) in their development of the PSPP found that significant gender differences existed, with females scoring lower than males on all subscales. Moreover, there is research which has suggested the notion of body weight and physical appearance concerns are female dependent and in some instances have been noted to be a serious preoccupation with some women (see Silverstein, Peterson & Perdue, 1986).

Based on post hoc interpretations it is suggested (as considered earlier) that in the Group by Gender By Time interaction for Cond/Condimp scores, the male control group at the end of the intervention is 'causing' this significant effect. This may have been due to external factors influencing control males' feelings about their physical conditioning during the intervention or perhaps they became more reflective about their physical selves at this time. Nevertheless, due to the fact that numerous haphazard significant interactions were observed for Cond/Condimp means that no real inferences can be made regarding this variable.

In relation to the general lack of gender differences in this study as a whole, it could have been the case that males responses on the PSPP and PIP were somehow tainted, particularly since Reddy, Fleming and Adesso (1992) suggest that societal pressure encourages males to surpress their feelings and they may therefore under report their affective states. In relation to this study specifically, males may have believed it more important to demonstrate high physical self competence and avoid demonstrating low physical self competence than females. Interestingly, traditionally it was thought that greater importance was attached to body esteem and physical self-perceptions by females than males. It is possible that today this may be changing and that such issues are becoming important concerns for males and as such any pre-existing differences between the sexes are dissipating or are no longer as obvious.

Methodological Issues and Future Directions

On a cautionary note, whilst this study has provided some insightful data into the physical self-perception changes that individuals experience as a result of exercise deprivation, there are several methodological flaws which need to be examined. Firstly, subjects were aware

of the nature of the study and as such may have mentally prepared themselves for the sort of feelings they thought they might have experienced if they were assigned to the withdrawal group.

Secondly, some subjects may have 'dosed up' on exercise during the pre-intervention period and thus experienced elevated perceptions before the withdrawal began. Consequently, subjects may have reported smaller changes in physical self-perceptions during exercise deprivation, although these problems were partially controlled as all subjects were unaware when the exercise withdrawal would begin and to which group they would be allocated. Finally, withdrawal subjects may have developed preconceptions concerning the expected outcomes of exercise deprivation intervention and this may have clouded the effects of exercise withdrawal reported here. Nevertheless, all withdrawal subjects did also participate in a semi-structured interview during the exercise withdrawal which may provide some information regarding this issue (these results are reported in chapter 8).

Since physical self-perceptions were considered as relatively stable psychological characteristics it was thought unnecessary to ask subjects to complete the questionnaires repeatedly. However, future studies should attempt to include an additional measure of physical self-perceptions during the exercise withdrawal intervention as this would provide valuable information in relation to the point at which changes occur in physical self-perceptions.

Additionally, whilst this study did observe statistically different results in withdrawal subjects physical self-perceptions, future studies may need to include longer exercise withdrawal interventions if more profound changes in physical self-perceptions are to be

observed. This would perhaps be more realistic of the kind of negative response processes individuals experience when deprived of exercise and sport participation.

CHAPTER 6

THE EFFECTS OF EXERCISE DEPRIVATION UPON PERCEIVED GENERAL HEALTH AND MOOD STATES

This chapter corresponds to:

Daley, A. J., & Parfitt, G. (1996) The effects of exercise withdrawal upon perceived general health in physically active students. *Physical Activity, Sport, and Health. The 1996 International Pre-Olympic Scientific Congress*. Dallas, Texas. Conference Proceedings.

Daley, A. J., & Parfitt, G. (in press) The effects of exercise withdrawal upon perceived general health. *Journal of Sport Sciences*.

Introduction

The idea that regular physical exercise may influence psychological health is not new and there has been much recent research evidence examining the possible influence of regular physical activity upon a variety of psychological states (see Berger, Friedman & Eaton, 1988; Biddle & Mutrie, 1991; Blumethal, Williams, Needels and Wallace, 1982; Crews & Landers, 1987; Landers & Petruzzello, 1994; Long & Haney, 1988a; Leith & Taylor, 1990; North, McCullagh & Tran, 1990). However, the specific mechanism the exercise and mental health relationship has not been clearly identified (see chapter 2).

Indeed, there have been a number of studies which have considered the possible relationship between physical exercise upon several measures of perceived psychosomatic health and mood states. For example, Gronningsaeter, Christensen, Larsen and Ursin (1990) in their study of subjective health complaints and levels of involvement in physical activity found that seldom active individuals reported many more complaints than moderately or highly active subjects. Interestingly, female subjects reported significantly more subjective health complaints than did the males. Furthermore, Agnew and Levin (1987) also reported a small but positive association between mood and perceived health in a sample of runners. Plante and Rodin (1990) have also suggested, in their review of the exercise and well-being literature, that exercise can improve mood states and that this effect is especially clear for short term improvement.

An alternative method of understanding, and experimentally examining, the psychological influence of participating in exercise is to consider the effects of exercise deprivation or 'to take exercise away' from regular exercise and sport participants. Specifically, whilst the exercise withdrawal evidence is severely limited, there have been a number of studies in this field which have attempted to document the influence of exercise

withdrawal on perceived health and psychosomatic symptoms. As presented in chapter 2, there are a number of explanations and models concerning the proposed 'cause' of exercise withdrawal effects (e.g. The energy conservation explanation and exercise addiction). Many researchers (e.g. Allen & Coen, 1987; Sachs & Pargman, 1979a, 1979b, 1979c, 1979d, 1984) have argued that the concept of exercise addiction and the endorphin hypothesis are responsible for the negative effects of withdrawing from exercise. Whilst the aim of this study was not to directly test either of these models, it nevertheless may provide indications as to their predictive ability.

The reported effects of exercise withdrawal appear to vary within the literature, although it does seem that anxiety, depression and mood disturbances are amongst the more popular constructs to be investigated within the exercise deprivation literature. Baekland (1970) in one of the earliest studies of exercise deprivation considered the relationship between exercise withdrawal and sleep patterns. Subjects in this study consisted of individuals who exercised regularly, at least 3 times per week. There was no control group and the gender orientation of the subjects is unknown. Negative changes in sleep patterns were observed and increased sexual tension was reported by subjects.

Over a decade ago, Thaxton (1982) investigated exercise dependency in runners who ran at least 5 times per week for over a year. Half the subjects ran on the day of the experiment and the other half did not. Analyses of the data revealed significantly higher levels of depression and galvanic skin responses in the exercise deprived runners compared to the control group. From these results, Thaxton (1982) concluded that even slight variations in the schedules of runners can lead to decrements in psychological well-being.

Morris, Steinberg, Sykes and Salmon (1990) have considered the "effects of temporary withdrawal from regular running" in terms of perceived general health. In

particular, they investigated this relationship in relation to Social Dysfunction, Insomnia, Severe Depression and Somatic responses over a two week exercise withdrawal intervention. Subjects were tested at the end of each week. Similar to Baekland's (1970) study and other exercise withdrawal studies, Morris *et al.*, (1990) selected male runners as their sample. Subjects ran at least 3 times per week. The data revealed a significant decrement in all 4 measures of perceived general health at the end of the exercise withdrawal intervention.

More recently, Gauvin and Szabo (1992) considered the effects of a 1 week (6 days) exercise withdrawal intervention on mood states and perceived physical symptoms. Their results revealed that subjects who were strongly committed to exercise did not show any observable changes in mood states during exercise withdrawal, although there were negative changes in perceived physical symptoms. The lack of any significant changes in withdrawal subjects mood states may have been due to the intensive data collection proceedures employed in this study.

The present study

In the past, many exercise withdrawal studies have been based on poor methodological designs (see Baekland, 1970), week to week and pre to post comparison measures (see Crossman *et al.*, 1987; Morris *et al.*, 1990). In order to understand fully the hypothesised effects of withdrawal from regular exercise, psychological and physical responses may need to be monitored and evaluated more closely throughout the whole intervention period. The present study required subjects to complete questionnaires every day throughout the study. It was thought that this simple, yet concentrated design would provide more complete and realistic data regarding the real effects of exercise withdrawal.

Specifically, this study is loosely centred around Gauvin and Szabo's (1992) exercise withdrawal study which focused on changes in mood states and psychosomatic symptoms as a result of exercise deprivation. College students who reported exercising at least 3 times per week and who were highly committed to exercise/sport participated in the experience sampling method (ESM) 4 times per day for 35 days. The withdrawal group withdrew from exercise for 6 days (between days 15-21). Their results revealed no significant differences in moods states between the withdrawal and control groups, although withdrawal subjects reported twice as many physical symptoms both during and post intervention. Nevertheless, whilst this study is one of the most comprehensive and controlled studies of its type there are a number of problems which if addressed would add to our understanding of the effects of exercise upon well-being.

The ESM whilst it allows researchers to measure symptoms repeatedly at random intervals during any one day, it is very time consuming and appears to be an intrusive data collection strategy. Furthermore, the ESM is prone to reporting bias (subjects were required to complete the same questionnaires 4 times per day for 5 weeks) and is likely to produce missing data. Although it is accepted that psychological states do fluctuate throughout any given day, it was hoped that a better strategy would be to concentrate subjects attention on how they are feeling at two points during the day and thus minimise reporting bias as well as reduce subjects possible distress at having to continually rate how they are feeling. It was hoped that this design would: (a) obtain a more complete picture and not interfere too much with the normal daily procedure of subjects which is important if sound results are to be obtained; (b) be a less monotonous design; and (c) be a less restrictive research methodology which would not only encourage subjects to adhere to the withdrawal intervention but to report feelings more accurately. Similar to Gauvin and

Szabo's (1992) investigation, the present study used aggregated data over a period of days as this was thought to provide more stable indicators of affective states than would simple pre to post and/or week to week comparisons (Rushton, Brainerd & Pressley, 1983).

Additionally, studies of exercise deprivation typically only require subjects to withdraw from sport/exercise for brief durations. For example, Gauvin and Szabo (1992) included a 6 day, Thaxton (1982) a 1 day and Crossman *et al.*, (1987) a 1 day (in runners) and a 5 day (in swimmers) exercise withdrawal intervention. Nevertheless, it is important to note that Baekland (1970) and Morris *et al.*, (1990) did include much longer withdrawal periods although as discussed in chapter 5, these studies were not well designed and contain several serious methodological flaws. Consequently, this study included a 10 day exercise withdrawal intervention.

As discussed in chapter 5, past exercise deprivation research have generally included runners as their sample and/or subjects who have been selected based on their self-reported levels of commitment to running. These types of samples are not representative of the exercising population as a whole and may display very different psychological profiles during exercise deprivation compared to the 'normal' exercisng adult. Therefore, this study attempted to included subjects from a variety of different sports and exercise settings who by implication were likely to self-report different commitment levels.

Gauvin and Szabo (1992) stated in their study that future research should include a measure of motivation since they believed that this may influence subjects' psychological responses resulting from exercise withdrawal. Whilst the number of published exercise withdrawal studies to date are small and no study has attempted to consider this issue. Chapter 5 contains a detailed rationale for including motivation as a potential discriminating measure and for including a 10 day exercise intervention period. Finally, as also discussed

in chapter 5, gender differences may well be evident in the psychological effects of withdrawing from exercise therefore specific gender hypotheses are stated.

Therefore, the present study extends the current exercise withdrawal literature in 3 ways. Firstly, it is based on an improved design. Secondly, it includes subjects with varying levels of involvement and commitment to sport and exercise and thirdly, equal representation of males and females are included in both the control and withdrawal group. It is hypothesised that subjects deprived of regular participation in sport and exercise would demonstrate significantly more negative changes in perceived general health and mood states than the control group. Secondly, it is hypothesised that females deprived of regular exercise participation would demonstrate significant decrements in perceived general health and mood states than either males or the control group.

Methodology

Subjects

As stated in chapter 5, subjects were recruited via advertisements posted in a British university. The total sample consisted of 27 withdrawal (males =14, females = 13) and 30 control subjects (males = 12, females = 18). Means and standard deviations for group and gender are contained in Tables 6.1 and 6.2.

General Health Questionnaire

The General Health Questionnaire-28 (Goldberg & Hillier, 1979; Goldberg & Williams, 1988) is a widely used and extensively validated index which is designed to measure

sensitive disorders of brief duration. This questionnaire was also slightly modified from 'have you recently' to 'have you' to make the items more applicable on a day to day basis. The GHQ-28 contains 28 items and 4 separate factor subscales: (1) Somatic Symptoms - Have you been feeling perfectly well and in good health; (2) Insomnia - Have you lost much sleep over worry; (3) Social Dysfunction - Have you felt that you are playing a useful part in things; and (4) Severe Depression - Have you felt that life was entirely hopeless. See Appendix K.

The Subjective Exercise Experience Scale (SEES)

The Subjective Exercise Experience Scale (McAuley & Courneya, 1994) was designed to measure a variety of mood states in relation to exercise and contains three dimensions: Psychological Distress; Fatigue; and Positive Well-being. These constructs are Bi-polar. Each dimension contains 4 items. Subjects are require to rate on a scale of 1 (not at all) to 7 (very much so) how much they agree or disagree with each mood state right now, at this point in time, for example 'I feel great', 'I feel discouraged' and 'I feel drained'. The internal consistency ranged from .85 (Psychological Distress), .86 (Positive Well-being), to .88 (Fatigue). Refer to Appendix L

Bi-Polar Profile of Moods States (Bi-POMS)

The original Bi-Polar Profile of Mood States (Lorr & McNair, 1984) was constructed to measure six bi-polar subjective mood states. Each scale comprises of 12 items, 6 positive and 6 negative. The form consists of 72 items. The six scales are as follows: (1) Energetic-Tired; (2) Elated-Depressed; (3) Clearheaded-Confused; (4) Composed-Anxious; (5) Agreeable-Hostile; and (6) Confident-Unsure. Refer to Appendix B. For the purpose of the

present study the Bi-POMS was shortened to 36 items. Appendix N contains a rationale and description of the validation process for the shortened Bi-POMS.

Exercise withdrawal Intervention

Subjects were required to withdraw totally from participation in exercise and sport for 10 days. The intervention began on a Sunday and finished the following Tuesday.

Procedure

Refer to chapter 5 for descriptions of the Commitment to Exercise/Sport and Participation in Physical Activity Questionnaires, Exercise Motivation Inventory and the measurement protocol for estimated maximal oxygen uptake. These measures were used as stated in chapter 5. Refer to Appendices E, I, and J respectively for examples of these questionnaires.

Prior to the commencement of the study subjects were briefed about the procedures involved. The format of the GHQ-28, Bi-POMS and SEES were explained and subjects were advised that they may be required to stop exercising at some point during the following 2 weeks and that they would be randomly assigned to either the control or the withdrawal group. Subjects received explicit instructions to continue exercising as normal until they were told to withdraw from exercise. All the questionnaires were labelled with the appropriate date and time on which they were to be completed. Questionnaires were organised into booklets of 3 day blocks. Subjects were given enough booklets to last for the whole study and were requested to return their booklets every 3 days. Importantly, an additional comments section was included at the end of each questionnaire which subjects were encouraged to use. It was hoped that subjects would use this opportunity to report

any events or feelings which were not part of their normal daily lives and/or which they felt may have influenced their responses on each particular day. Subjects were given strict instructions to complete the questionnaires at the appropriate times and not to complete questionnaires on a back dated basis.

It was decided that subjects had to complete at least two thirds of the questionnaires for their data to be included in the analyses. Additionally, a major difficulty which had to be minimised if this study was to demonstrate continued validity was the influence of testing upon effect. Therefore, three forms of the questionnaires were constructed. All three forms contained the same items, although these items were organised into three different orders. It was hoped that this would produce an element of expectation similar to any new questionnaire and make it difficult for subjects to simply respond in the same manner to every questionnaire on each day. It was also decided that two separate measures of moods states would be included since unlike the SEES the Bi-POMS was not developed specfically for exercising populations. A rationalefor the selected questionnaires used in this chapter can be found in Appendix A.

Days 1-4 (Pre-intervention)

On day 1 subjects were asked to complete the CTEQ, PPAQ, GHQ-28, SEES and BI-POMS. Additionally, subjects were advised on day 1 they would be expected to continue to the complete the GHQ-28 once per day (in the evening) and the SEES and BI-POMS twice per day (evening and morning) for the duration of the study. Estimated maximal oxygen uptake was measured on day 2. On day 4 subjects were informed as to which group they were assigned (control or withdrawal) and that they were required to withdraw from exercise as from day 5. The exercise withdrawal group were told to abstain from all forms

of exercise and sport for the following 10 days, whereas the control group were instructed to continue exercising as normal. The exercise deprivation began on day 5.

Days 5-14 (Intervention)

Subjects continued to complete the GHQ-28, SEES and BI-POMS each day. Subjects returned their booklets of questionnaires every three days. When subjects returned their booklets they were asked how they were coping generally with the exercise deprivation and were given some encouragement to continue completing the questionnaires. At this time also, control and withdrawal subjects were urged to continue completing their questionnaires on the appropriate day and time and to inform the experimenter if they experienced any problems with the questionnaires and/or the exercise deprivation. On day 14 subjects were advised that as from day 15 they could commence exercising once again.

Days 15- 21 (Post-intervention)

Subjects continued to complete the GHQ-28, SEES and BI-POMS until day 21. Estimated maximal oxygen uptake was re-tested on day 15. All subjects received an incentive for participating in the study.

Analysis Details

As mentioned previously, subjects had to complete at least two thirds of the questionnaires to be included in the analyses. Day 1 was omitted from analyses as this was considered to be a familiarisation period with the questionnaires. Likewise, day 21 was not included in analyses as it would have led to unequal time blocks. Subjects also participated in a semi-structured interview post intervention. Therefore, data used in analyses began at day 2 and

finished with day 20. Data was organised into the following aggregated time blocks for analyses: Time 1 = days 2-4; Time 2 = days 5-7; Time 3 = days 8-11; Time 4 = days 12-14; Time 5 = days 15-17; and Time 6 = days 18-20. Correspondingly, Time 1 constituted the pre-intervention, Times 2, 3 and 4 the intervention and Times 5 and 6 the post-intervention. Due to missing data, analyses include 55 subjects from the original 62 subject pool. Means were adjusted for commitment and levels of participation in physical activity.

Results

Demographic and Population Characteristics

Tables 6.1 and 6.2 show demographic and population characteristics means and standard deviations for Group and Gender respectively. Univariate 2 (Group: withdrawal vs control) x 2 (Gender: male vs female) analyses of variance were conducted for commitment to sport and exercise and participation in physical activity scores. There was a significant Group main effect for commitment to sport and exercise scores ($F(1,52) = 5.98$, $p<.01$) (control subjects were more committed than withdrawal subjects). There was also a significant Gender main effect for participation in physical activity scores ($F(1,52) = 4.72$, $p<.01$) (males self reported more participation in physical activity than females).

A 2 (Group: withdrawal vs control) x 2 (Gender: male vs female) x 2 (Time: pre-intervention vs post-intervention) analysis of variance with repeated measures on Time did not reveal any significant interactions for estimated VO_2 max scores. A 2 (Group: withdrawal vs control) x 2 (Gender: male vs female) ANOVA revealed no significant differences for exercise motives. Likewise stepwise and forced entry regression analyses did not reveal any significant predictions between levels of involvement or commitment to

sport/exercise and perceived general health. Also, secondary stepwise and forced entry regression analyses on all four cells, these being: (1) male withdrawal; (2) male control; (3) female withdrawal; and (4) female control, did not reveal any significant predictions for either commitment or involvement in physical activity and perceived general health scores.

Table 6.1. Group means and standard deviations for demographic and population characteristics.

	Withdrawal N = 27		Control N = 30	
	M	*SD*	M	*SD*
PPAQ	1009.0	402.5	1164.0	608.0
Commitment to sport and exercise*	48.8	5.7	51.2	2.0
Age	23.3	5.8	21.6	2.2

*significant difference between groups at the $p.<.01$ level.

Table 6.2. Gender means and standard deviations for demographic and population characteristics

	Males N = 26		Females N = 31	
	M	*SD*	M	*SD*
PPAQ*	1265.2	429.8	926.7	577.4
Commitment to sport and exercise	50.0	4.5	51.2	5.1
Age	24.6	3.0	24.2	4.5

*significant difference between males and females at the $p.<.01$ level.

Analyses

For the purposes of the present investigation a series of 2 (Group: withdrawal vs control) x 2 (Gender: males vs females) x 6 (Time: Time 1 vs Time 2 vs Time 3 vs Time 4 vs Time 5 vs Time 6) univariate analyses of covariance (physical activity and commitment to sport and exercise as the covariates) with repeated measures for Time were conducted for all subscale contained in the General Health Questionnaire-28, Subjective Exercise Experience Scale and the Shortened Bi-POMS. Assumptions underlying the statistical tests employed in this chapter are contained in Appendix P.

GHQ-28: Insomnia

Univariate analysis revealed a 2 x 2 x 6 (Group vs Gender vs Time) interaction for Insomnia scores ($F(5,255) = 2.83$, $p<.01$). To further understand this interaction result a series of 'simple' 2 x 6 (Group vs Time) and 'simple' 2 x 6 (Gender vs Time) ANCOVAs were conducted. Analyses revealed a significant simple interaction for males in the withdrawal and control groups ($F(5,115) = 2.54$, $p<.03$) and a significant simple interaction for males and female in the control group ($F(5,135) = 3.43$, $p<.01$).

Follow-up Tukey's test for the 'simple' male 2 x 6 (Group vs Time) interaction revealed that male control subjects at Time 1 displayed significantly lower Insomnia scores than at Times 2 and 3. Male control subjects at Time 2 and 3 displayed significantly higher Insomnia scores than at Times 4, 5 and 6 (See Figure 6.1 and refer to Table 6.3). Furthermore, follow-up tests revealed that male control subjects at Time 1 and 4 demonstrated significantly lower Insomnia scores than male withdrawal subjects at Times 1, 3 and 4. Male control subjects at Time 5 displayed significantly lower Insomnia scores than male withdrawal subjects at Times 1, 2, 3, 4 and 5. Additionally, male control subjects at

Time 6 displayed significantly lower Insomnia scores than male withdrawal subjects at all other Times.

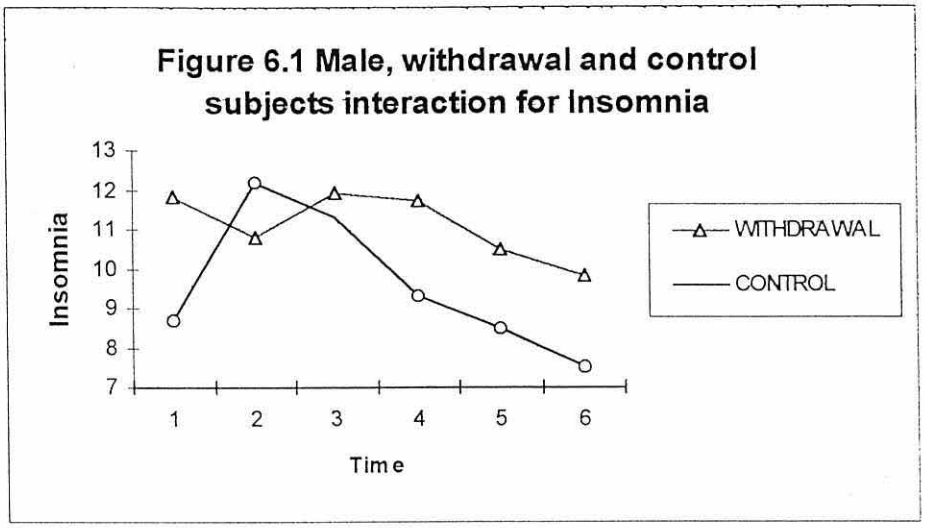


Table 6.3. Male, control and withdrawal means and standard deviations across time for Insomnia.

MALES	Time 1		Time 2		Time 3		Time 4		Time 5		Time 6	
	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*
Withdrawal	11.8	3.3	10.8	3.2	11.9	3.6	11.7	3.8	10.5	3.0	9.8	3.5
Control	8.7	1.3	12.2	2.9	11.3	3.2	9.3	2.0	8.5	2.0	7.5	2.8

Tukey's follow-up tests for the 'simple' control group 2 x 6 (Gender vs Time) interaction revealed that male control subjects at Time 1 displayed significantly lower Insomnia scores than at Times 2 and 3. Male control subjects at Time 2 displayed significantly higher Insomnia scores than at Times 4, 5 and 6. Control males at Time 3 demonstrated significantly higher Insomnia scores than at Times 4, 5 and 6. Control male subjects at Time 2 displayed significantly higher Insomnia scores than female control subjects at all Times. Control males at Time 3 reported significantly higher Insomnia scores than females at Times 4 and 5. Also, at Time 6, control males displayed significantly

lower Insomnia scores than control females at Time 6. See Table 6.4 and refer to Figure 6.2 for means and standard deviations across time.

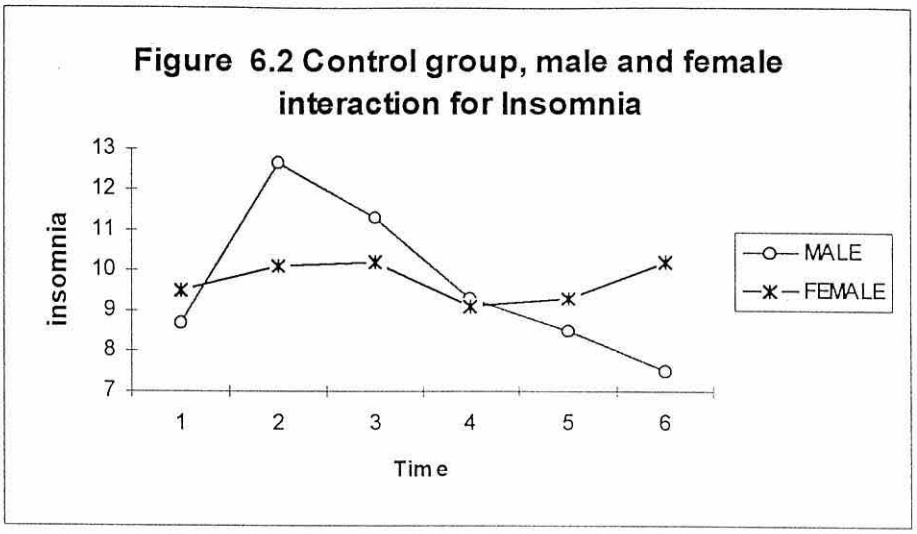


Table 6.4. Control group, male and female means and standard deviations across time for Insomnia.

CONTROL	Time 1		Time 2		Time 3		Time 4		Time 5		Time 6	
	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*
Male	8.7	1.3	12.2	2.9	11.3	3.2	9.3	2.0	8.5	2.0	7.5	2.8
Female	9.5	2.6	10.1	3.3	10.2	4.3	9.1	2.7	9.3	3.9	10.2	4.5

GHQ-28: Somatic Symptoms

Analyses also revealed a 2 x 6 (Gender vs Time) interaction for Somatic Symptoms scores ($F(5,255) = 5.02$, $p<.01$). Follow-up Tukey's tests revealed that males at Time 1 displayed significantly lower Somatic Symptoms scores than at Time 4. Males at Time 2 displayed significantly higher Somatic Symptoms scores than males at Times 1, 3, 5 and 6. Males at Time 3 displayed significantly lower Somatic Symptoms scores than at Times 2, 4, 5 and 6. Furthermore, follow-up tests demonstrated that females at Time 2 reported significantly higher Somatic Symptoms scores than at Times 1 and 3 and females at Time 3 displayed

significantly lower scores than at Times 4, 5 and 6. Males at Time 1 displayed significantly lower scores than females at Times 2, 4, 5 and 6 and males at Time 1 displayed significantly higher scores than females at Time 3. Males at Time 2 reported significantly higher scores than females at Times 1, 2, 3, 4, 5 and 6. Males at Time 3 displayed significantly lower scores than females at Times 2, 4, 5 and 6. Males also reported significantly higher scores than females at Time 3. Males at Time 4 displayed significantly lower scores than females at Times 1 and 3. Males at 5 displayed significantly lower scores than females at Times 1 and 3. Males at Times 5 and 6 reported significantly lower scores than females at Times 1 and 3. See Table 6.5 and refer to Figure 6.3 for male and female means and standard deviations across time scores.

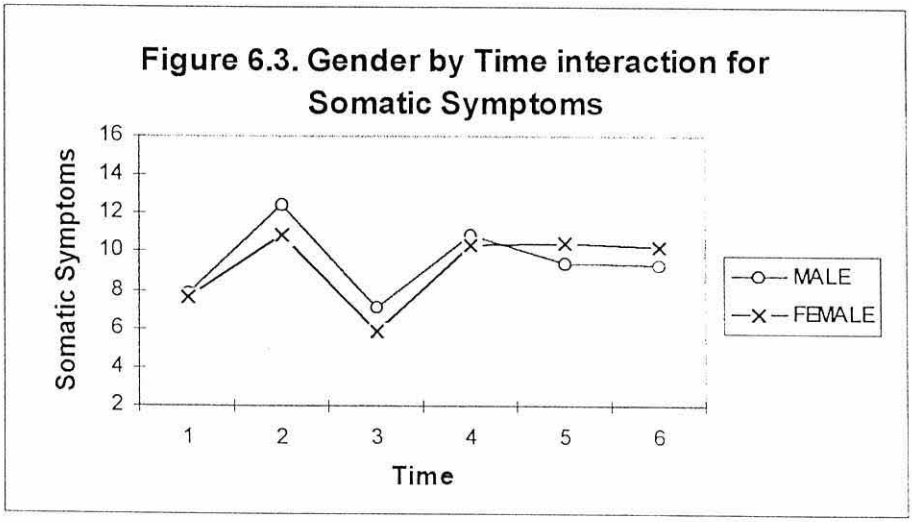


Table 6.5. Male and female means and standard deviations across time for Somatic Symptoms.

GENDER	Time 1		Time 2		Time 3		Time 4		Time 5		Time 6	
	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*
Male	7.9	1.7	12.4	3.7	7.1	3.4	10.9	3.5	9.4	2.97	9.3	2.56
Female	7.6	0.8	10.9	3.2	5.9	3.1	10.4	2.2	10.5	2.9	10.3	2.5

Table 6.6. Group means and standard deviations for General Health Questionnaire subscales.

GHQ Subscales	Time1				Time 2				Time 3				Time 4				Time 5				Time 6			
	Withdrawal		Control		Withdrawal		Control		Withdrawal		Control		Withdrawal		Control		Withdrawal		Control		Withdrawal		Control	
	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*
Somatic Symptoms	10.38	2.79	10.89	2.35	11.35	3.32	12.06	3.74	11.63	3.14	12.08	3.43	11.25	2.79	10.12	2.99	10.34	3.13	9.6	2.78	10.64	3.58	10.22	2.22
Insomnia/ Anxiety	10.91	2.64	9.12	2.61	11.42	4.03	11.25	3.12	14.21.	4.21	13.11	4.61	11.30	3.26	9.33	2.38	10.51	3.49	8.89	2.99	10.67	3.57	10.78	3.65
Social Dysfunction	14.07	2.34	13.54	1.16	15.1	2.27	14.27	2.27	14.79	1.55	14.31	2.91	14.87	2.38	13.25	2.27	13.1	2.91	12.34	2.18	13.11	2.91	12.75	3.58
Severe Depression	7.99	1.48	7.55	1.10	7.99	1.38	7.74	1.49	7.09	1.80	7.34	2.75	7.74	1.10	7.66	1.00	8.0	1.26	7.48	0.98	7.13	1.45	8.21	1.42

Table 6.7 Gender means and standard deviations for General health Questionnaire subscales.

GHQ Subscales	Time 1				Time 2				Time 3				Time 4				Time 5				Time 6			
	Males		Females		Males		Females		Males		Females		Males		Females		Males		Females		Males		Females	
	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*
Somatic Symptoms	7.95	1.77	7.65	0.82	12.48	3.73	10.91	3.33	7.19	3.41	5.95	3.11	10.97	3.50	10.41	2.29	9.40	2.97	10.50	2.93	9.34	2.55	10.31	2.56
Insomnia/ Anxiety	9.12	2.34	9.97	2.31	11.61	3.09	11.27	4.06	14.08	4.53	13.23	3.29	10.62	2.93	10.01	2.45	9.51	2.53	9.89	3.81	9.38	1.89	9.77	3.26
Social Dysfunction	13.67	2.02	13.90	1.51	14.94	2.33	14.48	1.98	14.50	1.90	14.85	2.91	14.22	2.65	13.91	1.99	11.90	3.48	13.54	3.00	12.46	3.51	12.99	3.41
Severe Depression	10.94	3.05	10.33	1.97	7.85	1.3	8.02	1.56	10.71	1.92	9.73	2.61	7.81	1.07	7.58	1.01	7.60	1.03	7.89	1.12	7.89	0.98	7.89	1.35

GHQ-28: Social Dysfunction

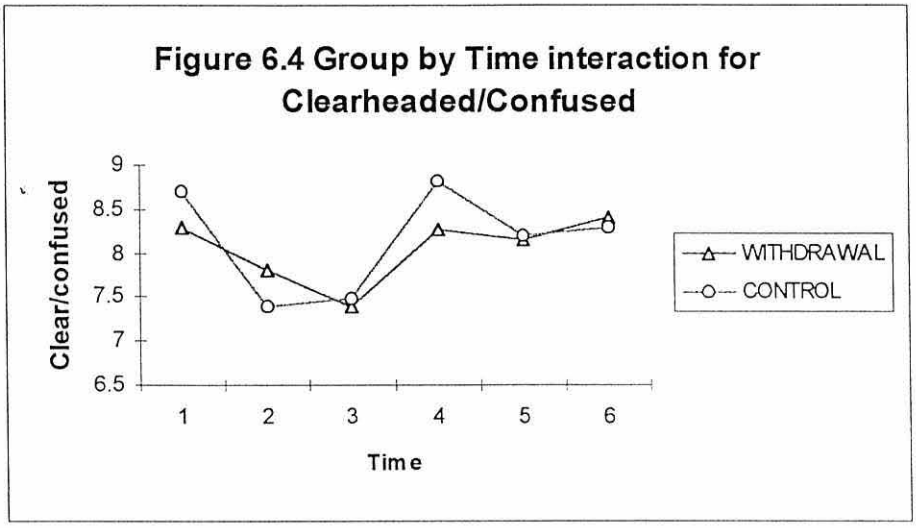
There was a nearly significant 2 x 2 x 6 (Group vs Gender vs Time) interaction for Social Dysfunction scores ($p<.066$). Separate follow-up 'simple' 2 x 2 (Group vs Gender) ANCOVAs at each time block demonstrated a 2 x 2 (Group vs Gender) interaction at Time 2 ($F(1,49) = 4.43$, $p<.01$) and Time 4 ($F(1,49) = 4.43$, $p<.01$). Follow-up Tukey's tests revealed that male control ($M = 15.1$, $SD = 2.6$) subjects reported significantly higher Social Dysfunction scores than female controls at Time 2 ($M = 13.4$, $SD = 1.4$). Female control subjects at Time 2 ($M = 13.4$, $SD = 1.4$) reported significantly lower Social Dysfunction scores compared to female withdrawal subjects ($M = 15.5$, $SD = 2.5$) at Time 2. At Time 4, Tukey's tests demonstrated that control females ($M = 12.4$, $SD = 2.2$) reported significantly lower Social Dysfunction scores compared to male and ($M = 14.3$, $SD = 3.0$) female withdrawal subjects ($M = 15.3$, $SD = 1.7$). Female withdrawal subjects ($M = 15.3$, $SD = 1.7$) also reported significantly higher Social Dysfunction scores compared to female control subjects ($M = 12.4$, $SD = 2.2$) at Time 4.

A Group main effect ($F(1,49) = 5.38$, $p<.03$) at Time 4 (withdrawal reported significantly higher Social Dysfunction scores compared to control subjects) and a Gender main effect at Time 5 (females reported higher levels than males) were observed for Social Dysfunction scores ($F(1,49) = 4.27$, $p<.04$). (Refer to Table 6.6).

Bi-POMS: Clearheaded-Confused

Univariate ANCOVAs revealed significant 2 x 6 (Group vs Time) interaction for Clearheaded-Confused scores ($F(5,245) = 5.29$, $p<.05$). Tukey's follow-up tests revealed that withdrawal subjects had significantly higher Clearheaded scores at Time 3 than at Time 6. Control subjects reported significantly higher Clearheaded scores at Times 1 and 4 than

at Times 2 and 3. Additionally, control subjects at Times 1 and 4 displayed significantly higher Clearheaded scores than withdrawal subjects at Time 3. See Figure 6.4 and refer to Table 6.6 for means and standard deviations.

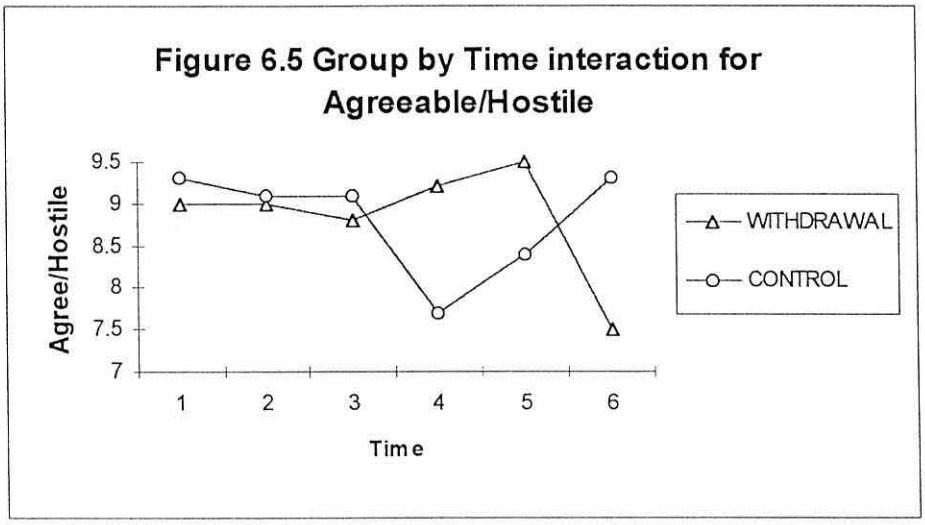


Additional follow up 'simple' 2 x 2 (Group vs Gender) ANCOVA's at each Time Block revealed interaction ($F(1,49) = 50.67$, $p<.01$) for Clearheaded scores at Time 2. Tukey's follow up tests showed that male control subjects at Time 2 reported significantly higher Clearheaded scores than withdrawal male and female subjects, and female control subjects at Time 2. A significant Gender main effect ($F(1,49) = 6.90$, $p<.01$) at Time 2 for the Clearheaded subscale was also observed (males reported significantly higher scores compared to females). See Table 6.6.

Bi-POMS: Agreeable-Hostile

Analyses also revealed a significant 2 x 6 interaction (Group vs Time) for Agreeable-Hostile scores ($F(5,245) = 5.65$, $p<.05$). Withdrawal subjects at Time 6 reported significantly lower Agreeable scores than at Times 1, 2, 3, 4 and 5. Control subjects at

Time 4 reported significantly lower Agreeable scores than at Times 1, 2, 3, and 5. Additionally, control subjects at Time 4 reported significantly lower Agreeable scores than withdrawal subjects at Times 1, 2, 4, and 5. Control subjects at Time 4 reported significantly lower Agreeable scores than withdrawal subjects at Time 4. Withdrawal subjects at Time 6 reported significantly lower Agreeable scores than control subjects at Times 1, 2, 3, and 6.



Bi-POMS: Confident-Unsure

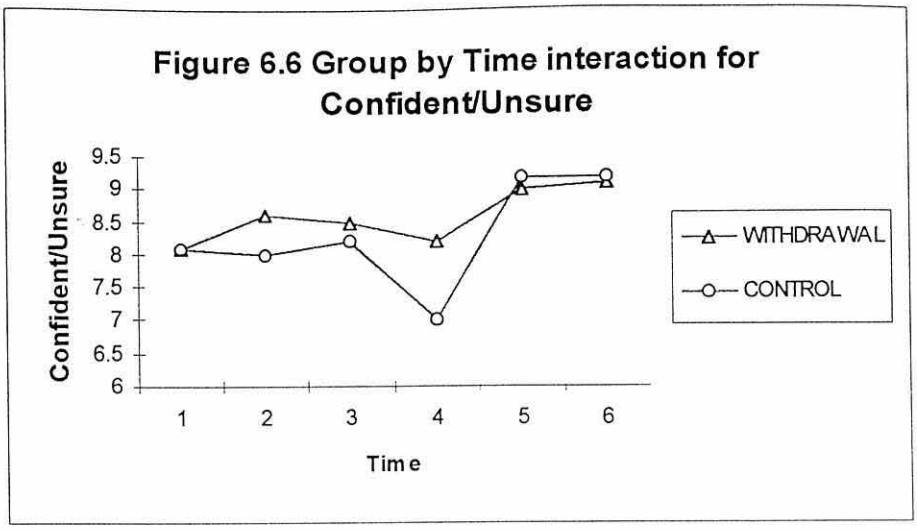
ANCOVA revealed a significant 2 x 6 (Group vs Time) interaction for Confident-Unsure scores ($F(5,245) = 2.62$, $p<.03$). Tukey's tests also revealed that control subjects reported significantly lower Confidence scores at Time 4 than at Times 1, 2, 3, 5 and 6. Control subjects at Time 4 reported significantly lower Confidence scores than withdrawal subjects at Times 2, 3, 4, 5 and 6. See Figure 6.6 and refer to Table 6.6 for Group subscale means and standard deviations across time.

Table 6.8. Group means and standard deviations for Shortened Bi-POMS subscales.

Bi-POMS Subscales	Time1				Time 2				Time 3				Time 4				Time 5				Time 6			
	Withdrawal		Control		Withdrawal		Control		Withdrawal		Control		Withdrawal		Control		Withdrawal		Control		Withdrawal		Control	
	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*
Energetic-Tired	8.41	1.1	8.26	1.41	8.66	1.6	8.31	1.63	8.31	1.03	8.41	1.04	8.09	0.96	8.47	1.29	8.58	1.32	8.69	1.06	8.59	1.93	8.24	1.64
Clearheaded-Confused	8.35	1.03	8.72	1.29	7.83	1.08	7.40	1.45	7.41	1.19	7.49	1.13	8.27	1.46	8.82	1.42	8.14	1.53	8.26	1.49	8.41	1.35	8.28	1.63
Composed-Anxious	7.05	1.12	7.55	1.24	7.49	1.02	7.37	1.24	7.54	1.14	7.76	1.16	7.07	1.49	7.56	1.46	7.16	1.00	8.00	1.64	8.23	1.64	8.34	1.34
Ageeable-Hostile	9.01	1.41	9.31	1.55	9.07	1.50	9.13	1.45	8.88	1.55	9.11	1.29	9.2	1.31	7.7	1.54	9.54	1.69	8.49	1.17	7.51	1.87	9.33	1.28
Confident-Unsure	8.15	1.29	8.16	1.15	8.61	1.15	8.06	1.67	8.54	1.06	8.26	1.59	8.24	1.75	7.08	1.95	9.04	1.41	9.23	2.26	9.18	1.98	9.26	1.99
Elated-Depressed	7.03	1.53	7.66	1.52	6.96	1.53	7.31	1.39	7.15	1.61	7.67	1.43	6.71	1.14	8.18	2.00	6.82	1.64	7.89	1.23	6.56	1.58	7.61	1.31

Table 6.9. Gender means and standard deviations for Shortened Bi-POMS subscales.

Bi-POMS Subscales	Time 1				Time 2				Time 3				Time 4				Time 5				Time 6			
	Male		Female		Male		Female		Male		Female		Male		Female		Male		Female		Male		Female	
	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*
Energetic-Tired	8.49	1.34	8.48	1.18	8.77	1.70	8.34	1.53	8.44	0.94	8.26	0.94	8.23	1.65	8.76	1.32	8.21	1.43	8.71	1.16	8.26	1.18	8.67	1.54
Clearheaded-Confused	8.78	1.11	8.11	1.21	8.31	1.21	7.12	1.33	7.76	1.32	7.14	1.24	8.71	1.44	8.31	1.52	8.58	1.36	8.64	1.58	8.39	1.49	8.65	1.66
Composed-Anxious	7.18	1.12	7.41	1.24	7.54	1.14	7.19	1.34	7.91	0.95	7.35	1.35	7.28	1.47	7.56	1.48	7.37	1.23	7.65	1.04	7.54	1.63	7.87	1.54
Ageeable-Hostile	9.06	1.50	9.26	1.46	9.72	1.05	8.79	0.99	8.99	1.55	8.99	1.33	8.48	1.28	8.42	1.07	8.91	1.65	9.12	1.22	8.10	1.72	8.75	1.43
Confident-Unsure	8.27	1.09	8.12	1.39	8.68	1.16	8.06	1.63	8.26	1.11	8.54	1.54	7.92	1.53	7.82	2.18	9.26	1.31	9.01	1.28	9.11	1.58	9.64	1.53
Elated-Depressed	7.26	1.46	7.43	1.58	7.29	1.39	6.86	1.49	7.42	1.48	7.39	1.00	7.47	1.72	7.65	1.41	6.99	1.66	7.52	1.21	6.88	2.11	7.29	1.24



There were no observable significant Group or Gender interactions or main effects for Subjective Exercise Experience Scale scores.

Discussion

Together, the results of the present study generally do not show consistent support for the stated hypotheses, particularly the mood states and gender results. Some negative changes in perceived general health were observed during the exercise withdrawal intervention, although it would also appear exercise deprivation can influence mood states in a positive manner. There are a number of possible explanations for the observed findings which will be highlighted in the preceding sections. Importantly, the contradictory results of the present study may be related to the overall focus of the questionnaires utilised.

Perceived General Health

Generally, the perceived general health results would appear to provide tentative support for the hypothesised negative effects in perceived general health symptoms as a results of

exercise withdrawal. However, on the whole, this data did not demonstrate immediate decrements in withdrawal subjects' perceived health, rather there appeared to be a time delay before any decreases in withdrawal subjects' psychological states, or increases in perceived symptoms, were evident. The gender hypothesis appears to be partially supported although these changes were not always consistent and are at times somewhat confusing.

Unfortunately, the Insomnia results are inconclusive. Since there was a significant difference during the pre-intervention (Time 1), in that male withdrawal subjects reported significantly higher Insomnia scores than the male control subjects, it is difficult to conclude that the significant differences between male withdrawal and control groups at Times 4, 5 and 6 are directly related to the exercise withdrawal intervention. This is disappointing since previous research (Morris *et al.*, 1991) specifically employing the General Health Questionnaire-28 have found significant changes in Insomnia scores during exercise withdrawal. Nevertheless, the analyses of the Somatic Symptoms scores and Social Dysfunction scores do seem to suggest that subjects do not feel instantaneous effects from exercise withdrawal. Rather, these effects appear to occur in a delayed fashion.

On closer inspection of the additional comments made by the withdrawal subjects during Time 1, it appears that several were experiencing a certain amount of anxiety and/or were about to enter into stressful situations which could have led to an increase in their self-reported feelings of insomnia. The below are comments have been extracted as examples of additional comments made by withdrawal subjects during Time 1:

Subject 6 "I feel like I want to challenge/argue with someone."

Subject 8 "I've have been feeling bad today. I don't seem to be sleeping well at all."

Subject 15 "I [now] feel very tired."

Subject 13 "[I] failed my written test on my first aid course."

Subject 42 "Slightly concerned about the effects of 10 days off training is going to have."

Subject 43 "Hyped up."

Similar to the Insomnia data, the differences between the groups at Time 4 revealed that withdrawal subjects reported higher Social Dysfunction scores than control subjects. If we consider the items contained within the Social Dysfunction subscale, (for example, 'felt that you were playing a useful part in things' and 'been able to enjoy your normal day to day activities') it appears that withdrawal subjects were perhaps feeling alienated or 'cut off' from their social networks and environments. Indeed, as mentioned in chapter 5, many of the subjects were involved in team games where the 'social scene' is an important part of being a member of a particular club, for example football, hockey, rugby and netball. Furthermore, 17 of the withdrawal subjects were predominantly involved in team games. Additionally, many subjects reported participating in exercise classes such as circuits, interval training and aerobics. As such social cohesion may have been an important reason for participating in these types of activities in the first instance. It could be argued that exercise/sport gives individuals a sense of social identity about themselves, (e.g. 'coach', 'athlete' & 'rugby player'). For others, it is important to be seen as a fit, healthy and regularly exercising individual. Not being able to exercise may have influenced withdrawal subjects' identity in some way and denied them positive re-enforcement cues regarding their social identity. This is turn may have led to decrements in their perceived social functioning during the exercise withdrawal intervention.

A crucial and important element which may mediate the hypothesised effects of exercise withdrawal are individual motives for exercising. For example, an individual may report higher Social Dysfunction scores during exercise withdrawal simply because they exercise for social reasons and missed the social interactions of a team environment and the working towards a collective team goal, rather than because they missed the thrill of exercise/sport in itself. However, since there were no reported differences between the groups or gender, it would appear that exercise motivations were unlikely to have influenced these results.

There were no significant Group differences for the subscales Severe Depression and Somatic Symptoms. In relation to the Severe Depression scores, it was perhaps, on reflection, somewhat over optimistic to have expected changes in Severe Depression scores over a 10 day exercise withdrawal intervention. Particularly since this subscale included items such as 'Have you had thoughts of death and dying?' and 'Have you had thoughts of making away with yourself?' Clearly, these type of questions are heavily clinically based and perhaps were not appropriate questions for inclusion in this study of physically active, young and successful university students.

The Somatic Symptoms responses were very surprising and unanticipated. Previous exercise withdrawal studies (e.g. Gauvin & Szabo, 1992; Morris *et al.*, 1991) have reported highly significant differences in their studies of exercise withdrawal, particularly in relation to Somatic Symptoms scores. Additionally, since there was a significant difference between groups at Time 4 for Insomnia, we would have expected similar results for the Somatic Symptoms subscale, especially considering the close nature of these two constructs. A possible explanation for these results is that of 'psychological relief' from training as suggested by Crossman *et al.*, (1987). Indeed, withdrawal subjects may have

perceived the exercise withdrawal as a positive event as they did not have to train or play matches on a regular basis throughout the exercise withdrawal and were able to dis-engage from sport and exercise and rest. As stated in chapter 5, at the time of the study many of the subjects, in particular team sport participants, were heavily involved in inter-university competitions, training regularly (in some clubs training typically takes place between 3-4 times per week) and travelling away to matches at weekends as well as during the week. Some withdrawal subjects may have been over training, tired from travelling and therefore relieved from the pressures of their respective sports. Additionally, other withdrawal subjects may have viewed the exercise withdrawal intervention as an ideal opportunity to do other things such as meeting up with friends and catching up with academic work (anecdotal conversations with subjects support this suggestion). Thus, their time may have been filled with other distracting activities which precluded any negative thought or feelings that they may have been experiencing concerning the exercise withdrawal.

The mixture of non-significant and significant results for Social Dysfunction subscale may have been due to a time phase constraint. Perhaps when the intervention commenced (Time 2) subjects felt or perceived themselves to be socially isolated, but they became accustomed (Time 3) to the way they were feeling. In other words, there was a plateauing effect. However, towards the end of the intervention (Time 4) perhaps withdrawal subjects perceived lack of social integration was becoming a source of strain once more.

The results of this study do not appear to support an addiction explanation (see chapter 2 for discussion of the literature regarding exercise addiction). Moreover, subjects would have to have displayed a pattern of immediate decrement in well-being (when the intervention commenced) to support such a hypothesis. Rather, on the whole, the present

study observed differences between groups towards the middle and end of the 10 day exercise withdrawal intervention. If the endorphin hypothesis was in operation then we would expect immediate changes in well-being. Since this study did not directly measure the release of endorphins it is difficult to suggest any firm conclusions. However, the limited supportive empirical literature and the psychological pattern of results in this study would not appear to support such an explanation. Similar to the results of this study, previous studies do not appear to support the concept of exercise addiction (see Kraemer, Dzewaltowski, Blair, Rinehardt & Castracane, 1990; Langenfeld, Hart & Kao, 1987; DeMeirleir, Naatgeboren, Van Steirtegham, Gorus, Olbrecht & Block, 1986).

Also, if exercise addiction were a feasible explanation for decrements in psychological well-being and perceived health as a consequence of exercise deprivation, it is reasonable to assume a positive relationship between exercise dependence/commitment and exercise withdrawal effects. However, data from this study did not elicit such results. In other words, high levels of dependence/addiction/commitment did not predict more negative and intense exercise diseuphoric states in subjects. Conboy (1994) also found that neither commitment nor dependence were associated with changes in mood states. In fact, he observed that runners who were highly committed to and dependent upon exercise were less likely to be prone to exercise withdrawal symptoms compared to any other kind of runner. Once again, it is important for readers to understand that this study did not test directly for the concept of 'exercise addiction' and as such any conclusions made regarding exercise addiction should be regarded as suggestive. Nevertheless, one of the defining components of exercise addiction/dependence is that exercise withdrawal should lead abruptly to unpleasant symptoms and negative psychological responses, which can be alleviated by the re-instatement of exercise (see Morris *et al.*, 1991). As such this study has

provided some additional and exploratory evidence regarding exercise addiction, although further research into this topic is greatly needed. Related to exercise addiction, Morris *et al'* (1991) have suggested a 'withdrawal syndrome' as a possible explanation (see chapter 2 for a description of the withdrawal syndrome hypothesis). However, since the results of the present study were somewhat delayed or non-significant, it may not be appropriate to view the present study's results as part of a withdrawal syndrome hypothesis.

Mood States

The results of the present study on the whole do not provide support for the hypothesised effects. The fact that withdrawal subjects reported feeling significantly higher Agreeable scores and Confidence scores than the control group during the intervention (Agreeable-Hostile and Confident-Unsure) was very surprising and are not wholly explainable. Moreover, contrary to popular opinion it appears that exercise withdrawal can have a positive as well as a negative influence on individuals' mood states and subsequent psychological well-being. The results for the subscale Clearheaded-Confused do not show any consistent pattern.

Firstly, the fact that female subjects reported significantly lower Clearheaded-Confused scores than males at the start of the exercise withdrawal (Time 2) may tentatively suggest that females become dis-orientated since their normal daily routine has been disturbed and disrupted and they found it more difficult psychologically than males to deal with this situation. Quite often individuals report that they find exercise to be a time in their lives where they can 'mentally unload' or where they can think in a clear and uninterrupted environment (cf. distraction hypothesis, chapter 2).

The results from the Agreeable-Hostile data did not fit the expected pattern and are somewhat ironic. Whilst both groups were similar in their Agreeable-Hostile scores during the pre-intervention, withdrawal subjects displayed higher Agreeable-Hostile scores than the control subjects during the middle (Time 4) and end of the exercise deprivation period (Time 5). In Particular, at Time 4 and Time 5 withdrawal subjects may have experienced elevated Agreeable scores and Confidence scores due to the fact that they were aware that within the next few days the exercise deprivation would come to an end and that they would be able to exercise once more. This conceivably may have led to increases at this time. A specific study which may help to explain these results is that of Crossman *et al.*, (1987). In their study of competitive runners and swimmers these researchers found that subjects self-reported being apparently 'addicted to exercise', yet during the exercise deprivation approximately as many withdrawal subjects reported more positive moods as reported more negative moods. Crossman *et al.*, interpreted this in terms of the athletes experiencing psychological relief from the regular routine and commitment to exercise and training. Additionally, according to Crossman *et al.*, over training produces general feelings of exhaustion and tiredness and a lack of energy which dissipates during lay off. In relation to this study, subjects may have felt more positive about themselves since they were getting a rest from exercise and sport. This may have manifested itself in withdrawal subjects reporting more positive affect than when they were exercising. Meanwhile, control subjects were exercising as normal and were perhaps still involved in heavy training schedules. However, if this was the case, we would have expected subjects to report more positive affect on the fatigue scale contained in the SEES and the Energetic-Tired subscale of the shorted Bi-POMS.

Gender issues

Generally, the gender results are not straightforward and for the most part are equivocal. The 3 factor interaction for Insomnia scores was not made any clearer by additional and subsequent analyses. Closer consideration of Figures 6.1 and 6.2 and observation of the significant follow-up Tukey's tests results seems to be indicating that male control subjects at Time 2 and Time 6 are significantly contributing towards the observed 3 factor Insomnia interaction. Importantly, these results do not support the stated hypotheses since no differences were envisaged between males and females in the control group and the means for males in the control group do not follow any consistent pattern.

Furthermore, follow-up tests for the 'simple' Group by Gender interaction at Time 2 showed that male control subjects reported significantly higher Social Dysfunction scores compared to female control subjects and that female controls reported lower scores compared to female withdrawals at Time 2. At Time 4, female control subjects reported significantly lower Social Dysfunction scores than male withdrawal subjects and female control subjects reported lower Social Dysfunction scores than female withdrawals. Unfortunately, these results are somewhat confusing and no explanation is readily available. The differences observed between female withdrawal and control subjects at Time 2 would perhaps seem to fit with a 'withdrawal syndrome'/addiction explanation in that the exercise withdrawal appeared to induce a rapid onset of social dysfunction in females. However, the differences between female control and male withdrawal subjects at Time 4 are strange and unclear.

In summary, in light of the above findings and the 'simple 'Gender main effect at Time 5, (females displayed more negative Social Dysfunction scores than males) it would appear that female withdrawal subjects demonstrated more adverse effects as a result of the

exercise withdrawal than female control subjects for the subscale Social Dysfunction. Presumably in term of exercise withdrawal, females may have felt less integrated since exercise may have been at a time which they purposefully met with friends to engage in physical activity. The other important gender result are that males reported higher Somatic Symptoms scores at Times 2 and 3 than did females. This result is difficult to explain, although it does fit with the gender results from Crossman *et al's.*, (1987) study which found that male athletes, irrespective of competitive level, exhibited more negative moods during exercise withdrawal than did females competing at lower levels. In conclusion, this study does appear to offer some tentative support for the negative effects of exercise deprivation upon perceived general health but it does not appear to provide support for the concept of exercise addiction. Moreover, it would seem evident that a social deprivation/lack of social integration explanation would appear to be more applicable in clarifying these results.

Methodological Issues

On a cautionary note, this study has several methodological flaws which should be addressed. The frequent completion of questionnaires by subjects may have confounded these results and consequently led to subjects not reporting affects accurately, this is despite the semi-random nature of the three forms of the GHQ-28, SEES and BI-POMS. Subjects inevitably may have become familiar with all three forms of the questionnaires. Furthermore, whilst asking subjects to complete questionnaires twice per day was considered an improvement on Gauvin and Szabo's (1992) study it is possible that the proposed less intense nature of this study is subject to similar criticisms. Furthermore, it is also possible that withdrawal subjects felt under pressure to give socially desirable answers.

The shortened Bi-POMS may require further validation on younger adults since the validation study involved working adults. As such the shortened Bi-POMS may not be as 'sensitive' to variations in students' moods as compared to adults. Finally, due to the manner in which individual time blocks were organised it is possible that this led to a smoothing of effects over time. Futhermore, the non-significant effects for the subscales contained within the SEES and the Energetic-Tired, Elated-Depressed and Composed-Anxious subscale of the shortened Bi-POMS were disappointing. The lack of any observable differences on the SEES was surprising, particularly since the SEES is an exercise specific measure of mood states. However, as both questionnaires were actually developed with an American population, some items could be termed as ambiguous to a British student population, particularly with the SEES (items which were deemed unclear were omitted in the shortened Bi-POMS during its validation process).

Furthermore, whilst it was considered a methodological strength to include a mixture of anaerobic and aerobic exercising subjects, it does make it difficult to ascertain the exact nature of the proposed withdrawal effect in relation to activity type. Importantly, all the subjects were self selected and as such were willing to withdraw from exercise. As such their responses may reflect a positive bias compared to athletes and exercising individuals who are truly forced from exercise, for example, due to injury and retirement.

Implications and Conclusions

The results of the present study are somewhat mixed and therefore it would be unwise to make firm conclusions in relation to any proposed mechanism or explanations for the exercise deprivation and well-being relationship. Whilst some negative changes were observed during the exercise withdrawal intervention it would also seem that exercise

withdrawal can have positive influence upon individuals' mood states. Practitioners perhaps should bear these findings in mind and not assume that exercise deprivation will ultimately bring about negative changes in mood states based simply on the evidence that actual participation in physical activity leads to positive affective states. It might be the case that exercise withdrawal has its own distinct pattern of change which is not comparable with exercise and psychological well-being studies. Furthermore, although several other studies have reported very clear negative changes in various aspects of psychological well-being, several others have found no changes and a limited number of studies have observed positive changes.

The contradictory results of the GHQ-28 and BI-POMS may also be due to the specific focus of the questionnaires utilised. Whilst the GHQ-28 is a measure of 'psychological health', it is orientated towards psychosomatic responses which may also be associated with actual negative physical changes in 'well-being' during deprivation (e.g. feeling tired, loss of muscle tone & headaches). In contrast, the BI-POMS attempts to measure psychological feelings of well-being more directly. Thus, it might be that exercise withdrawal negatively influences psychosomatic symptoms but that psychological mood states are positively enhanced during lay off from exercise. Clearly, it would appear that further research is required to investigate this issue more precisely.

CHAPTER 7

THE EXERCISE WITHDRAWAL EXPERIENCE: A QUALITATIVE APPROACH

Introduction

This study is the last within this thesis which attempts to discuss the effects of withdrawal from exercise/sport. Other chapters in this thesis consider these effects in terms of physical self perceptions (chapter 5) and perceived general health and mood states (chapter 6). The present study is primarily concerned with investigating the experience of withdrawing from exercise for a 10 day period from a qualitative research perspective. Studies considering the exercise withdrawal experience have been limited, with most concentrating on specific well-being dimensions such as mood states, anxiety and depression. Indeed, many of these studies have tended to be biased in that they use all male samples and/or competitive runners. Furthermore, whilst there have been some quantitative studies, an extensive literature search revealed only one other study which has employed a qualitative based design. Sachs and Pargman (1979a), using interview methods, reported a tendency among addicted runners to prioritise running above all other activities, as well as the occurrence of withdrawal symptoms such as anxiety, restlessness and irritation when regular running was disrupted. However, Sachs and Pargman's (1979) study was mainly concerned with understanding the concept of running addiction, rather than the actual experience of withdrawing from exercise. They also had a small sample of male runners (N = 12). Therefore, this study can be seen as a development from Sachs and Pargman's study in that it was specifically concerned with the exercise withdrawal experience generally rather than the concept of exercise addiction. This study also included subjects who participated in a broad range of physical activities (not just running) and used an even spread of male and female exercise.

Whilst there are various advantages and disadvantages to both quantitative as well as qualitative method of inquiry, it was thought to be more useful to also employ the later

since it was hoped that this would lead to a better understanding of the **general** experience of exercise deprivation from the subjects' perspective. Therefore, it was the purposes of the present study to:

1. Understand further the exercise withdrawal experience in relation to general psychological and physical well-being;
2. Identify other factors which may contribute to, or influence, subjects exercise withdrawal experience;
3. Identify coping strategies employed by subjects to deal with exercise withdrawal and the other kinds of activities engaged in during exercise deprivation;
4. To explore the influence of the menstrual cycle in women during exercise withdrawal;
5. Further understand what it was subjects missed as a result of not being able to exercise;
6. Assess expectations as regards exercise withdrawal; and
7. Understand the impact social isolation can have upon the exercise withdrawal experience.

Methodology

Subjects

The participants in this investigation were twenty seven male (N=14) and female (N=13) physically active subjects who reported exercising at least once per week. Subjects reported being involved in a broad range of aerobic and anaerobic activities, for example, weights, squash, hockey, rugby, mountain walking , football and cycling.

Interview schedule

The interview schedule was devised by two researchers who were familiar with the reported feelings commonly reported by exercise withdrawal subjects. These researchers collaborated on the most important and appropriate constructs to be examined and questions to be included in the interview schedule. Since this study was concerned with the **general** experience of withdrawing from exercise it was thought important to firstly make the questions themselves quite broad and then to give subsequent prompts/probes where necessary. As such the schedule contained 12 questions for females (3 questions regarding the menstrual cycle) and 9 for males which related to the exercise withdrawal experience. These questions related directly to the aims stated earlier. The interview schedule can be found in Appendix O.

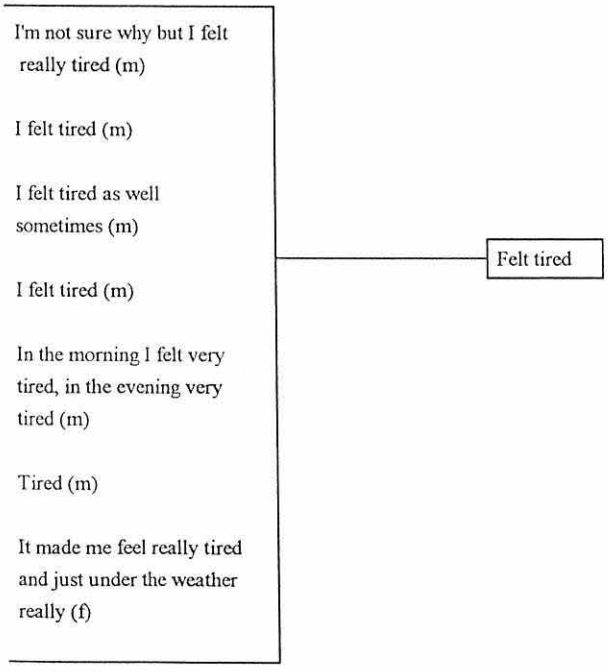
Procedure

Before the exercise withdrawal began, subjects were briefed concerning the procedures involved in the study and they were told that they would be required to participate in a retrospective semi-structured interview after the exercise withdrawal had finished. It was heavily stressed to subjects that all data would be treated in the strictest confidence and that this study was concerned with identifying overall group themes rather than individuals' feelings and responses. Once the exercise withdrawal had finished subjects were asked to make a convenient appointment for their interview. The interview itself was preceded by a introductory speech which explained the general format of the questions and the reasons for tape recording the interview. Subjects were encouraged to speak openly and honestly about their exercise withdrawal experience. Interviews lasted between 15 and 20 minutes. All interviews were rigorously transcribed by the author which resulted in 78 pages of

transcript. These were examined in depth by the author so that the contents of each script became familiar.

Data analysis

Transcripts were analysed using inductive hierarchical content analysis procedures as recommended by Patton (1990). Firstly, two researchers (one of which was the author) identified raw data themes in the form of words, quotations or paraphrased quotations from each individuals' answers which were specific to the exercise withdrawal experience. This first step involved comparing and contrasting each individual interview quote with all other quotes and identifying emergent themes for each question. The purpose was to 'tag' and cluster interview quotes with similar meanings which would produce raw data themes (see Patton, 1980). See below for an illustration of this process.



m = male quote, f= female quote

Extracted illustration of the clustering of interview quotes into raw data themes.

Secondly, as suggested by Scanlan, Ravizza & Stein (1989) these raw data themes were then organised into 'interpretable and meaningful' higher order themes by using both inductive (allows themes to emerge from the quotes themselves) as well as deductive methods (uses predetermined themes to organise quotes). This resulted in 1st and 2nd order dimensions and ultimately general dimensions. Consensus among the researchers had to be agreed before a particular phrase or theme became categorised into a higher order theme or dimension. This process ensures that the validity of the 'tags' created are guarded against one individuals' personal ethnocentrisms and perceptual bias (Lecompte & Goetz, 1982). Essentially, inductive content analysis builds upon itself in a pyramid fashion by using the same processes outlined above. Once raw data themes had been agreed, they were clustered into 1st order dimensions (and in some cases 2nd order dimensions) which were subsequently categorised into general dimensions. See Appendix Q for a report of the clustering of interview quotes into raw data themes within the interview schedule.

This process was validated by using a number of procedures. Consensus validation was obtained from a independent researcher who agreed the categorisation of interview quotes into the raw data themes. Consensus for each raw data theme was also agreed. In other words once, interview quotes had been agreed into their particular raw data themes, agreement had to be obtained regarding the clustering of raw data themes into 1st order, 2nd order and general dimensions.

Results

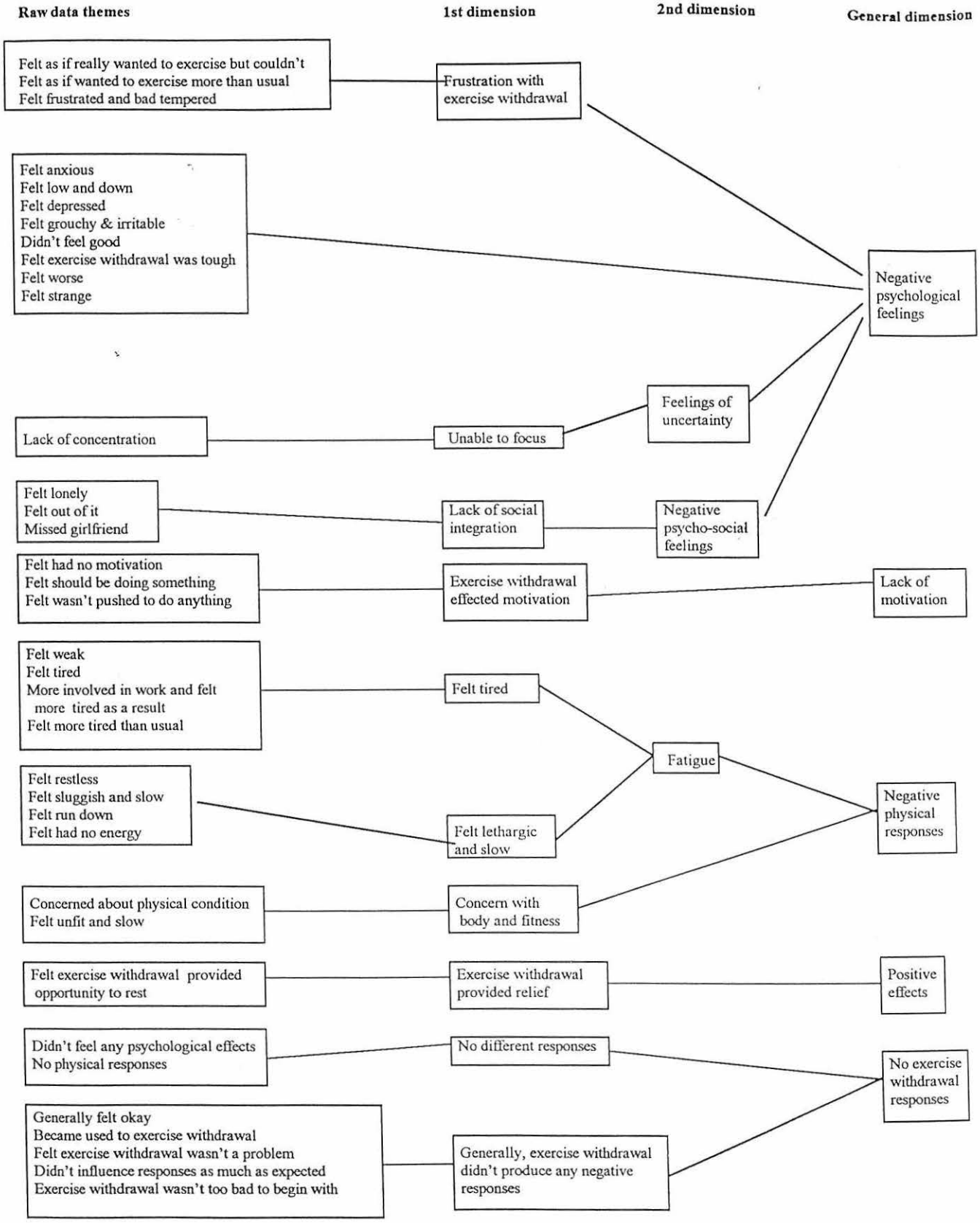


Figure 7.1. - Feelings and symptoms during exercise withdrawal

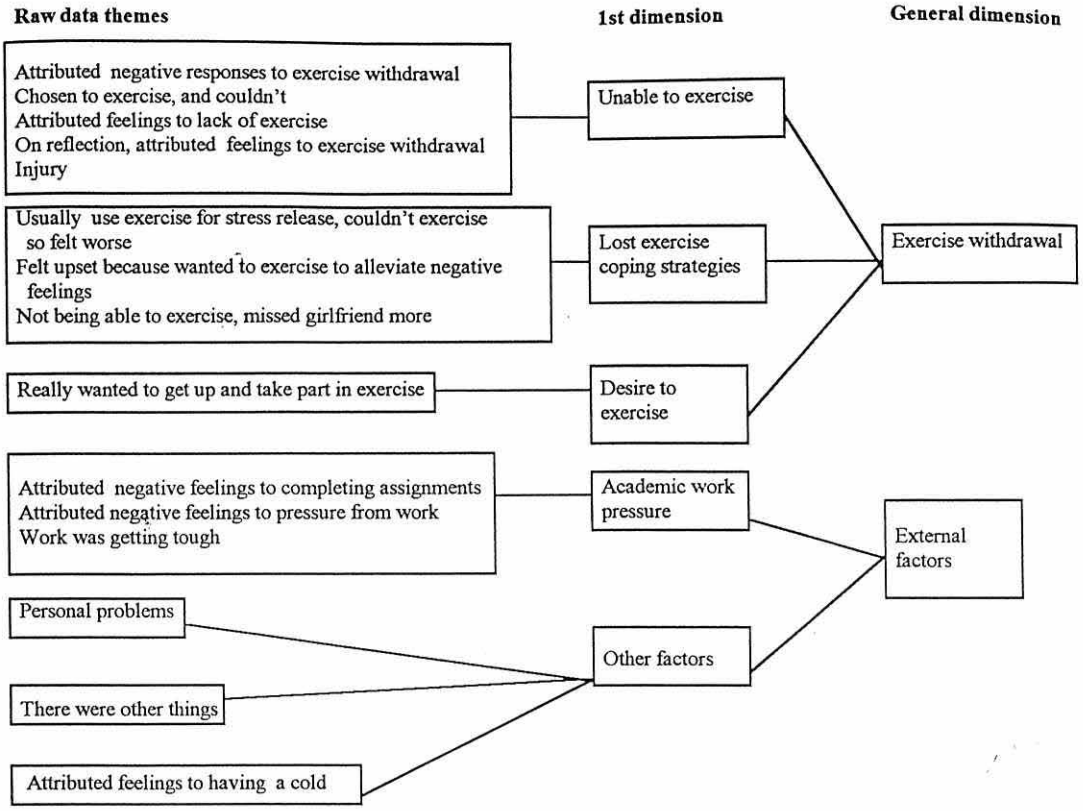


Figure 7.2. - Attribution of negative feelings and symptoms during exercise withdrawal

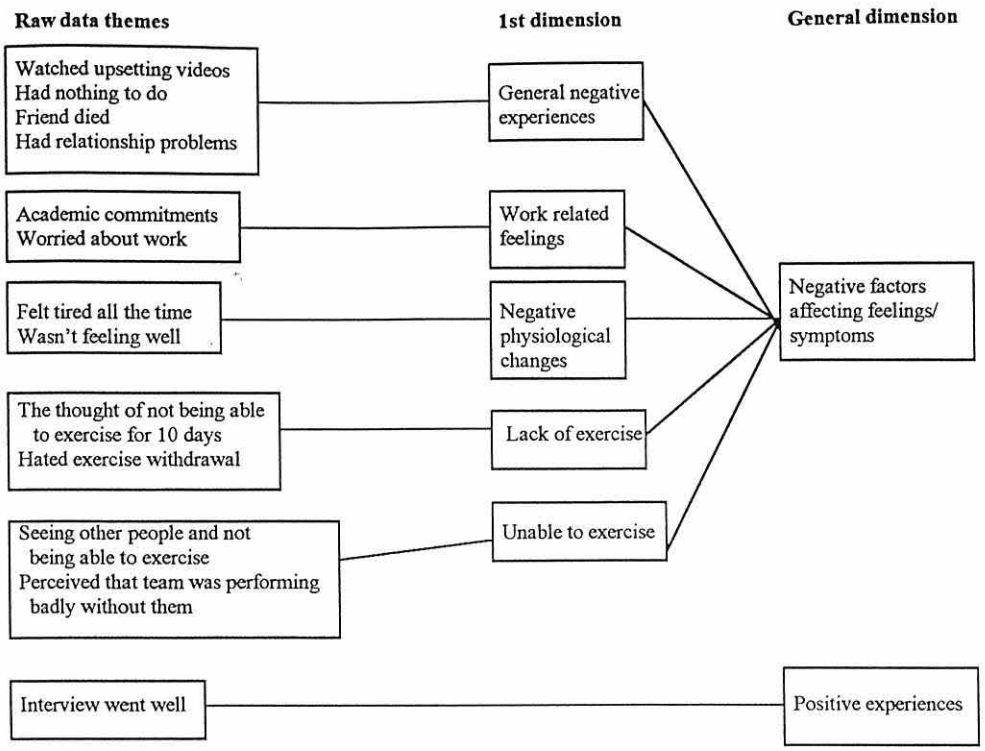


Figure 7.3 - Other factors which contributed towards feelings symptoms during exercise withdrawal

Additionally, 9 out of 14 males (64%) and 6 out 13 females (46%) commented that there were no other events which may have contributed towards any negative feelings they had experienced during the study.

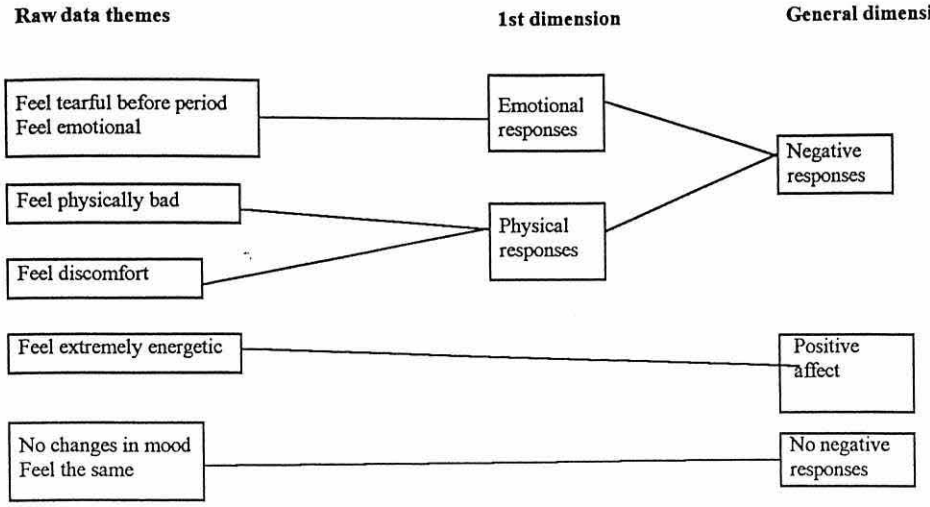
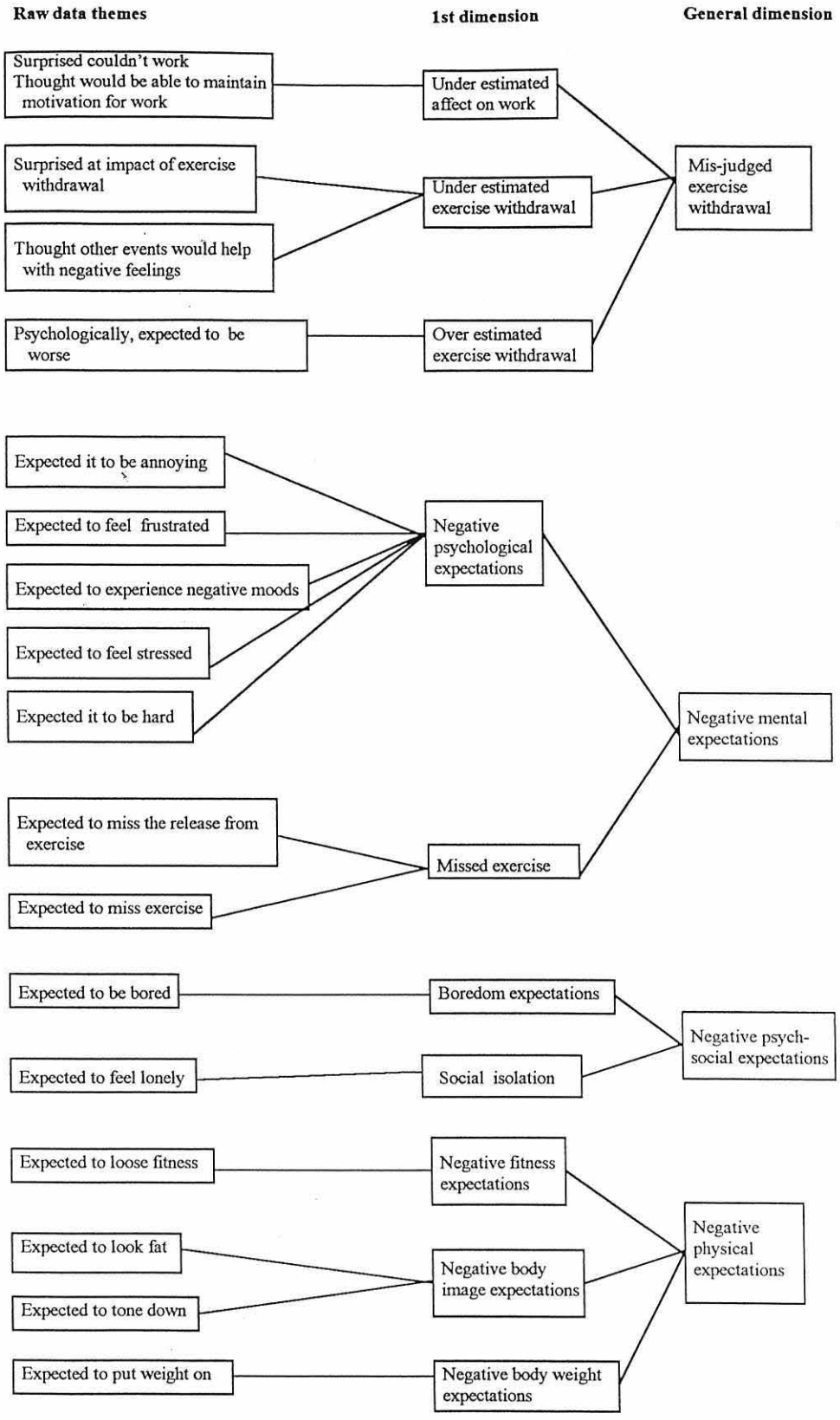


Figure 7.4. - Feelings during the menstrual cycle.

Question 5a & 5b

Females were also asked a further two questions. These were, "Can you tell me when your next period is due ?" and " Did you have your period during the exercise withdrawal intervention?" The original reason for including these questions in the interview schedule was to be able to locate the exact time of menstruation in relation to the exercise withdrawal and any negative effects which females felt they experienced during this time. In this way, it would be possible to 'take into account' these effect. Since females only reported minimal negative effects from their menstrual cycles and only 4 experimental females indicated that they had had their period during the exercise withdrawal intervention these questions were deemed to have little relevance.


Raw data themes
1st dimension
General dimension
Surprised couldn't work
Thought would be able to maintain motivation for work
Under estimated affect on work
Surprised at impact of exercise withdrawal
Thought other events would help with negative feelings
Under estimated exercise withdrawal
Mis-judged exercise withdrawal
Psychologically, expected to be worse
Over estimated exercise withdrawal
Expected it to be annoying
Expected to feel frustrated
Expected to experience negative moods
Expected to feel stressed
Expected it to be hard
Negative psychological expectations
Negative mental expectations
Expected to miss the release from exercise
Expected to miss exercise
Missed exercise
Expected to be bored
Boredom expectations
Expected to feel lonely
Social isolation
Negative psych-social expectations
Expected to loose fitness
Negative fitness expectations
Expected to look fat
Expected to tone down
Negative body image expectations
Expected to put weight on
Negative body weight expectations
Negative physical expectations

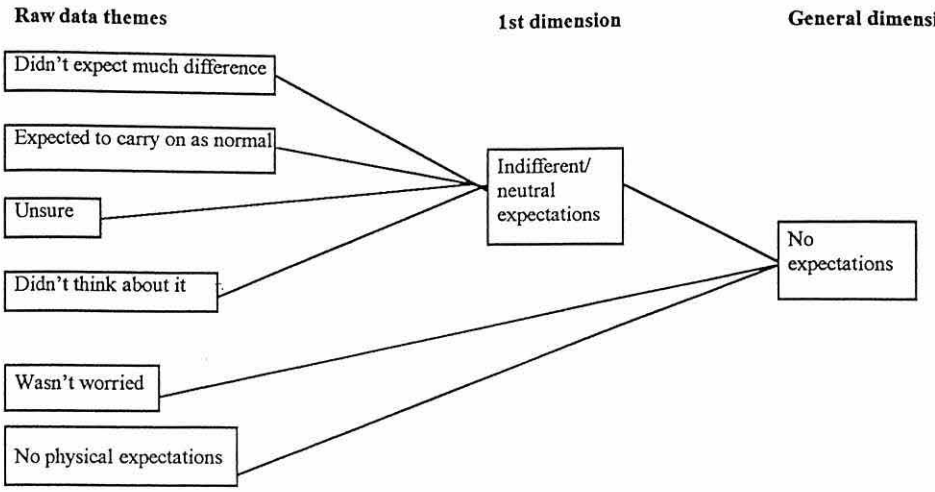


Figure 7.5. - Expectations regarding exercise withdrawal

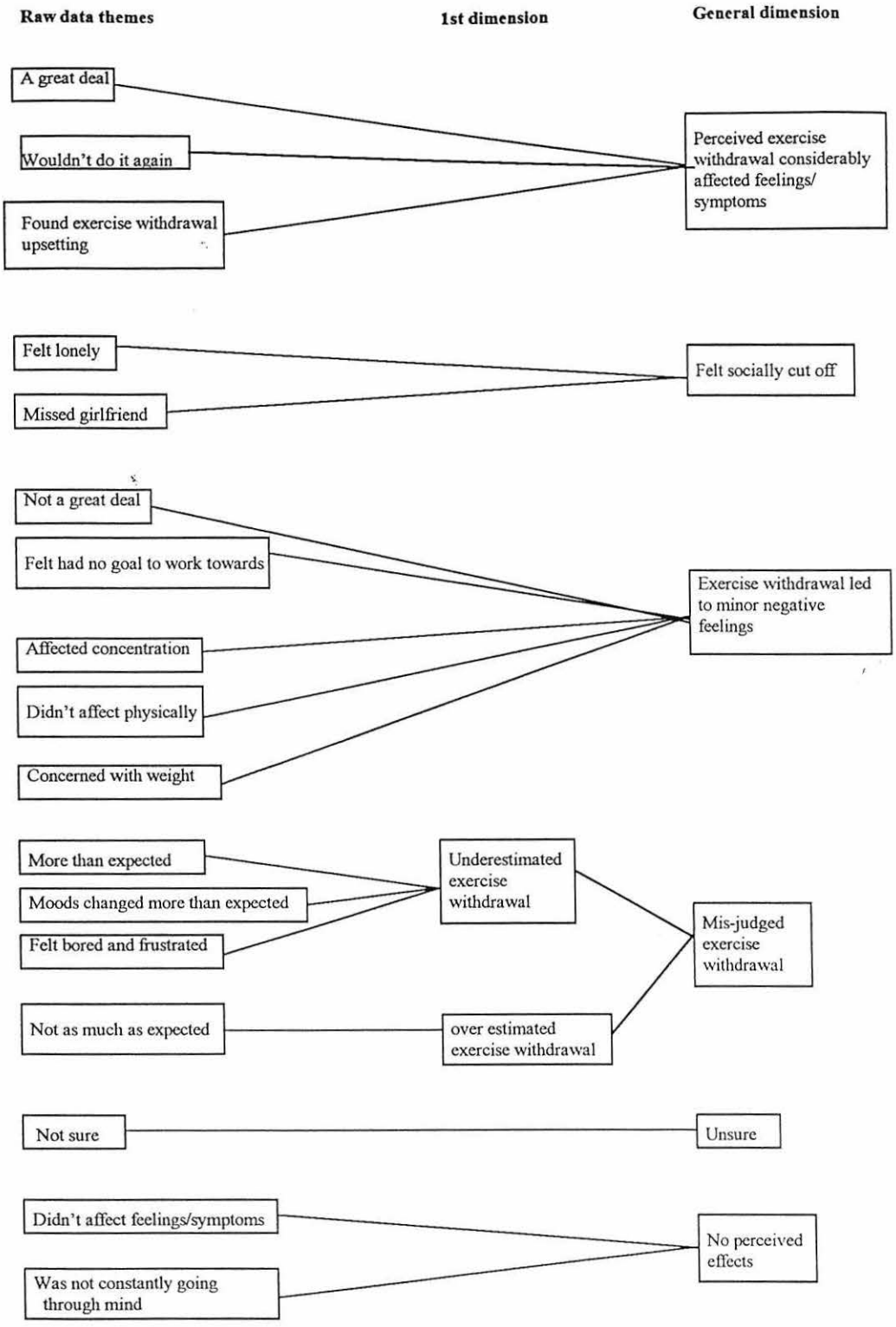


Figure 7.6. - Extent to which exercise withdrawal affected feelings/symptoms

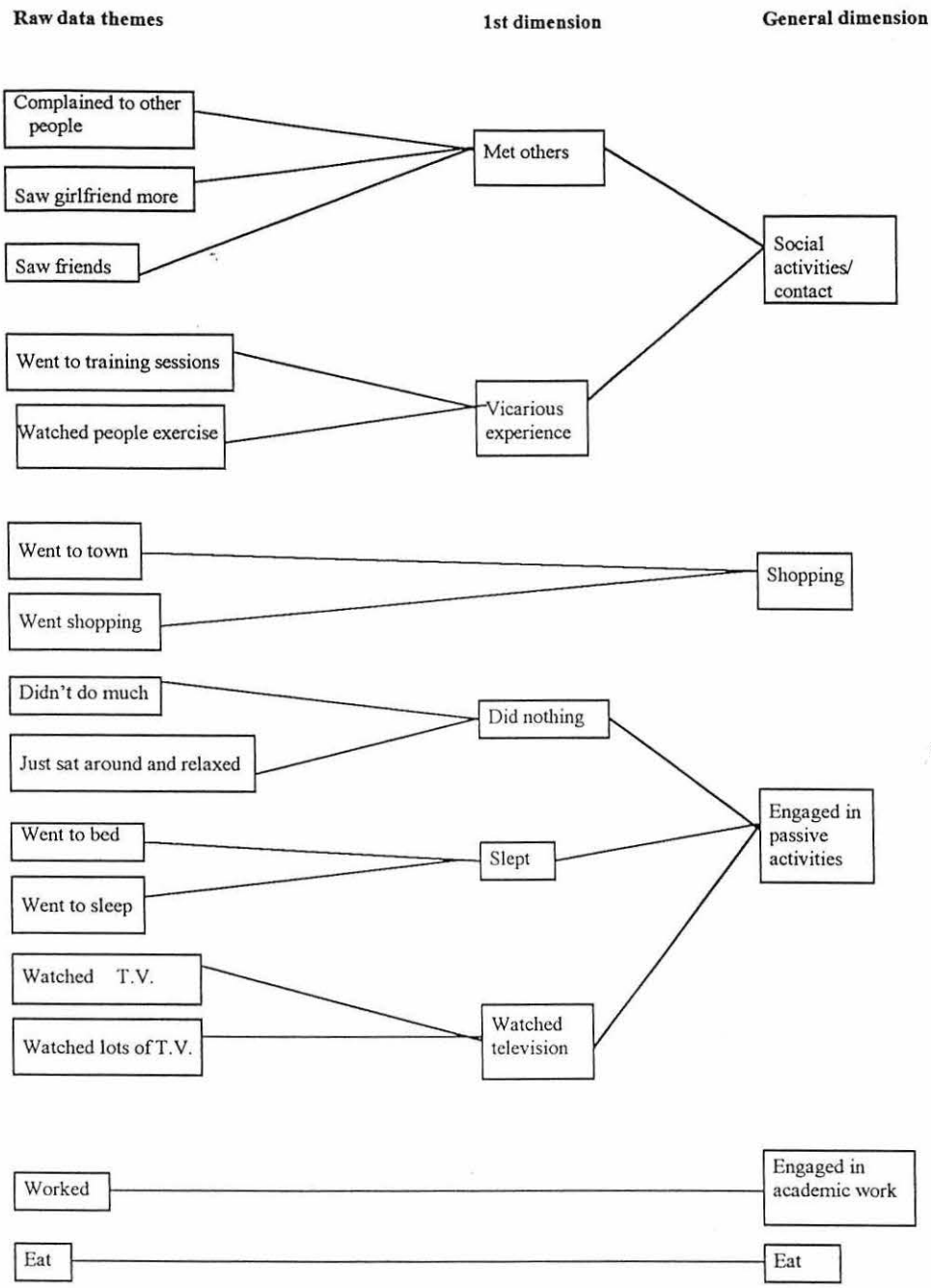


Figure 7. 7. - Activities subjects engaged in instead of exercise

Subjects were also asked whether engaging in these activities helped them to feel better. Nine subjec responded with a positive yes, (7 males & 2 females). Seven subjects responded with a tentative y (2 males & 5 females). Six subjects responded no, (2 males & 4 females) and 2 were unsure(1 male 1 female).

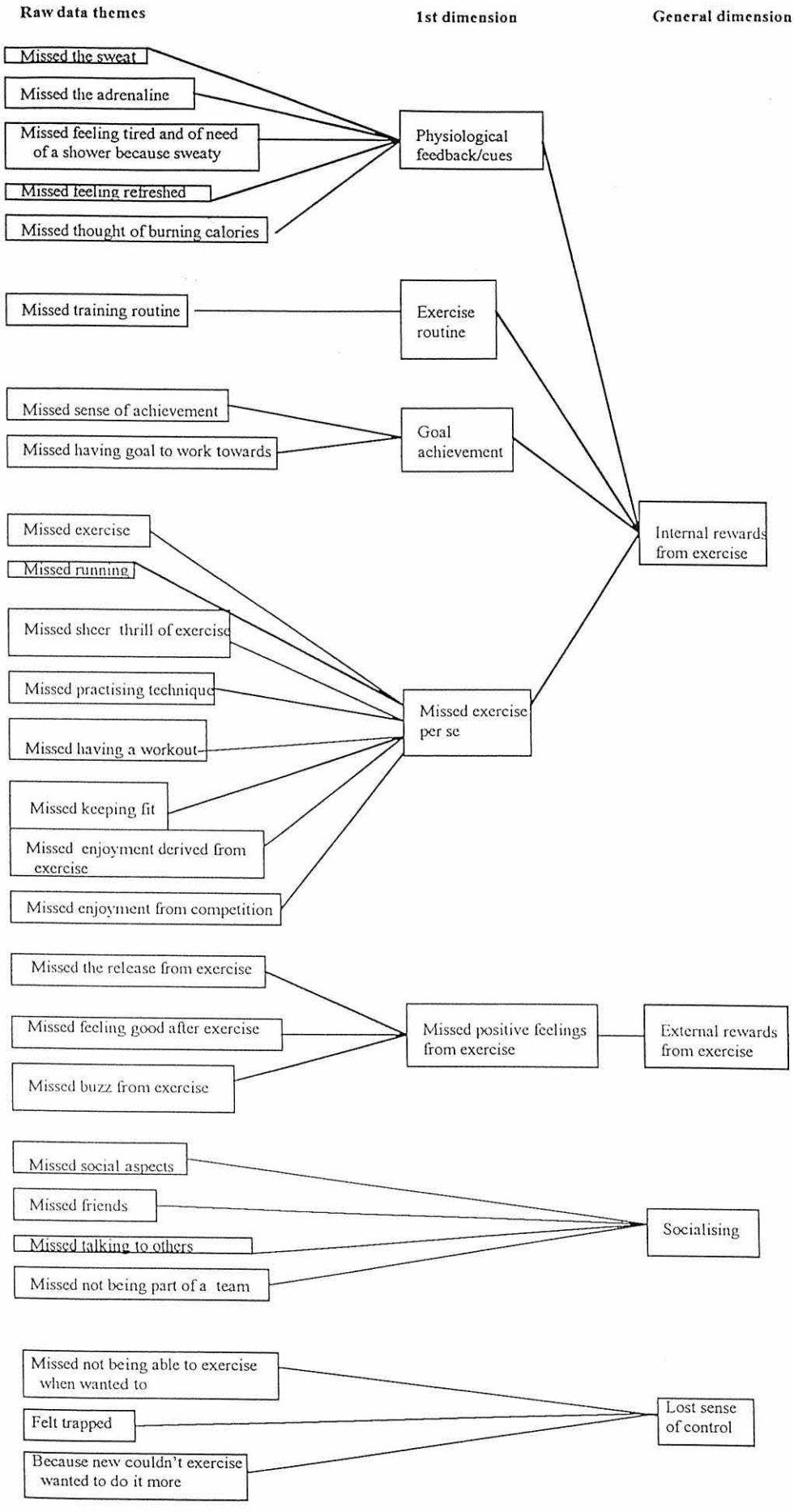

Raw data themes
1st dimension
General dimension
Missed the sweat
Missed the adrenaline
Missed feeling tired and of need of a shower because sweaty
Missed feeling refreshed
Missed thought of burning calories
Physiological feedback/cues
Missed training routine
Exercise routine
Missed sense of achievement
Missed having goal to work towards
Goal achievement
Internal rewards from exercise
Missed exercise
Missed running
Missed sheer thrill of exercise
Missed practising technique
Missed having a workout
Missed keeping fit
Missed enjoyment derived from exercise
Missed enjoyment from competition
Missed exercise per se
Missed the release from exercise
Missed feeling good after exercise
Missed buzz from exercise
Missed positive feelings from exercise
External rewards from exercise
Missed social aspects
Missed friends
Missed talking to others
Missed not being part of a team
Socialising
Missed not being able to exercise when wanted to
Felt trapped
Because new couldn't exercise wanted to do it more
Lost sense of control

Figure 7.8 - The 'things' subjects missed during exercise withdrawal

Subjects were also asked whether they still socialised with the people they normally exercised with. Eleven subjects responded yes,(8 males & 3 females), 9 responded no, (6 males & 3 females) and 2 subjects (1 male & 1 female) did not socialise with their sporting friends as they participated in individual sports anyway.

Discussion

The exercise withdrawal subjects interviewed as part of this study reported a range of emotional and physiological symptoms and feelings. These will be discussed in light of recent developments in the exercise sciences literature. It was also hoped to identify specific factors which may have coloured the results obtained in the present investigation. The major and most important findings are examined in the following section and suggestions and implications for practitioners are made. Finally, the major methodological flaws of this study are discussed along with some future research directions.

Question 1

Clearly, it can be seen from the responses made by subjects to Question 1 (see Figure 8.1) that a variety of feelings, moods and symptoms were experienced during exercise withdrawal (fourty raw data themes, twelve 1st order dimensions, three 2nd order dimensions and five general dimensions). It is important to note at this time that the '*negative psychological feelings*' general dimensions and the 1st order dimensions within it are quite broad and encompassing as subjects reported such a wide diverse range of emotional states. It was interesting to note the emergence of the 1st order dimension *'negative moods states'*. It is clear that many of the words and phrases used by subjects to describe how they were feeling were taken from the questionnaires (General Health Questionnaire-28, Subjective Exercise Experience Scale and Bi-Polar Profile of Mood States) used in the quantitative sections of this thesis reported in chapters 6 and 7. As such, the lack of any consistent significant differences in the quantitative study of mood (chapter 7) was surprising. It may be that exercise withdrawal is a rather complex individualistic experience and therefore a quantitative methodology which is essentially

group based is unlikely to produces a clear picture of the exercise withdrawal experience in comparison to a qualitative research methodology.

As expected many comments were made regarding frustration with exercise withdrawal (four raw data themes). This perhaps was inevitable. Whilst, subjects volunteered to take part in the present study, they were still 'controlled' by the constraints of the study and may have perceived a lack of control over their lives which lead to feelings of frustration. The *'lack of social integration'* 1st order dimension was anticipated as many of the subjects are involved in team sports where a strong social network is in place. The appearance of the general dimension *"positive affect'*, whilst it only generated two actual interview quotes, was quite a surprise as it was not envisaged that habitual exercisers and sports participants would actually enjoy not being able to exercise. However, as discussed in chapter 6, Crossman, Jamieson and Henderson (1987) found similar results in their study of the effects of short lays offs from training on well-being. They explained their results by suggesting that subjects interpreted their lay off from exercise as an opportunity to rest and have a break. Consequently, withdrawal from exercise does not always have to be a negative experience, although this is the impression usually assumed by researchers. From the health practitioner and exercise/sports psychologists perspective, this apparent finding is important as it highlights that not all athletes attach negative feelings or interpret an inability to exercise as a negative experience. Perhaps when faced with athletes who are unable to exercise (e.g. due to injury, pregnancy or retirement) practitioners should encourage them to see the positive aspects to lay offs in training (e.g. time out, mental and physiological rest, opportunity to work on other aspects of performance and practice mental training techniques etc.). However, for the most part, subjects reported feeling

negatively influenced by the exercise withdrawal and that it was not a pleasant experience (only two subjects reported positive psychological effects during exercise withdrawal).

There were also many raw data themes specifically in relation to physical responses to exercise withdrawal (nineteen raw data themes, six 1st order and three general dimensions). Interview quotes within the 1st dimension "felt tired" and "felt lathargetic" appeared to be quite common, particularly amongst the males and would appear somewhat of a contradiction in that subjects were less physically active during the intervention, yet they felt more tired. However, it is commonly reported within the exercise and well-being literature that exercise revitalises individuals, provides a sense of drive and is refreshing (see Johnsgard, 1985a, 1985b; Vitulli, 1987). Perhaps the fact that subjects did not have this 'stimulus' resulted in them feeling tired and fatigued. The overall tone of the raw data themes within the 1st order dimension *'felt lethargic* were also orientated towards feelings of lathery and slowness which could be explained in a similar manner. There were also some concerns with the influence that withdrawal would have on physical conditioning and fitness (two raw data themes). The emergence of the general dimension 'negative physical responses' would also appear to support the results of Gauvin and Szabo's (1992) study where exercise withdrawal was found to have a significant influence on the number of psychosomatic responses reported by withdrawal subjects as compared to controls.

The number of raw data themes made regarding 'no or indifferent' exercise withdrawal effects (thrirteen raw data themes, three 1st order themes) was quite large which seems to be suggesting that not all subjects found the exercise deprivation too disruptive. It also perhaps suggests that the exercise withdrawal intervention was not long enough to bring about changes in well-being, and/or that subjects might have prepared mentally for the kind of feelings/symptoms which were thought exercise withdrawal would

produce. Consequently, withdrawal subjects did nit report much change in well-being. See Figure 8.1.

Question 2

On the whole, subjects attributed the way they felt and the symptoms they experienced during the study to the exercise withdrawal (twenty-one raw data themes) although subjects did offer a number of other explanations and events which may have influenced their well-being. Readers should also consider that whilst the 1st order dimension *'lost exercise coping strategy'* was categorised within the general dimension *'exercise withdrawal'* this is not necessarily a 'good fit' and is slightly ambiguous. In other words, raw data themes within this '*lost coping strategy'* generally eluded to the fact that because subjects were unable to exercise they felt they had lost a means of coping with everyday hassles rather than attributing the way they were feeling to the exercise withdrawal *per se*. For example, " when I don't do that (exercise) I find things get on top of me", and, "because I usually use it as a stress release from work and because I can't exercise I found my work being the focus of my mind". The other 1st order dimension to emerge which subjects felt also affected the way they were feeling were as follows: *'academic work pressure'* (three raw data themes); *' desire to exercise'* (one raw data theme); and a broad *'other factor category'* (three raw data themes). These should be considered when assessing the true impact of exercise withdrawal since it appears that there were other reasons/events which may have negatively influenced withdrawal subjects emotional states during this time. Consequently, these results should not be over interpreted and should be considered in parallel with the comments made by subjects within the list of 1st order themes listed earlier. See Figure 8.2.

Question 3

Question 3 is closely linked to Question 2 in that both questions were concerned with examining the impact of other factors on subjects well-being albeit from different perspectives. Generally speaking, subjects did not feel that there were many things (other than the exercise withdrawal) which contributed towards the way they had felt and/or the symptoms they had experienced. A total of three raw data themes, five 1st order dimensions and two general dimensions were created. Similar to Question 2 responses, a *'work related feelings'* 1st order dimension emerged as did *'negative physiological changes'*. It can be concluded that there were not too many external factors which influenced withdrawal well-being and/or which were not previously mentioned in response to Question 1. See Figure .8.3.

Questions 4, 5 and 6

There were limited responses to the question of whether females menstrual cycle affected their moods. Several subjects did report negative affective states during their menstrual cycle (n = 10) although this only produced seven raw data themes (two physical, two emotional & six no changes). However, overall it appears that the females in the present study did not report their moods were influenced by their menstrual cycle. This is encouraging since previous literature (see Logue & Moos, 1986; Moos, 1985) has documented that females report more negative psychological states at certain phases in their menstrual cycles. This also suggests that the results for females in this study can be regarded as unlikely to have been influenced by their menstrual cycle phases. See Figure 8.4.

Originally, Questions 5 and 6 was composed as a 'safety mechanism' in case their was a large negative response to Question 4. In this way, it would be to possible to take into account the responses made by females who felt that they were influenced by their menstrual cycle in relation to the actual stage they were at in their cycle during exercise withdrawal. Since there was a limited number of negative responses to Question 4, Questions 5 and 6 was not considered important to these results.

Question 7

Subjects reported having many negative expectations regarding exercise withdrawal, many of which were quite specific (twenty raw data themes, eleven 1st order themes, five general dimensions). This may be problematic in terms of the results of the responses given for Question 1, as well as self-reported responses in earlier quantitative chapters (see chapters 5, 6 & 7). Indeed, whilst it appears from Question 1 that subjects generally felt the exercise withdrawal experience was negative, they clearly also had expectations regarding how they thought they might feel before the intervention began.

From a methodological perspective this is quite concerning since it could have been the case that subjects reported negative changes in well-being because they were fulfilling their own expectations of what they thought the exercise withdrawal would be like for them. In other words, it is possible that the results from chapters 5, 6 and 7 are subject to a negative affectivity bias. It was also interesting to see that the 1st dimension *'under estimated affect on work'* emerged from interviews. It appeared that several subjects were hoping to use their 'spare' time while they were not exercising to get on with their academic work (two raw data themes). However, the subjects found that they overestimated their capacity to do this and were unable to involve themselves in their academic work to the

extent to which they had anticipated. Likewise, several subjects either overestimated (one raw data theme) or underestimated (two raw data themes) the exercise withdrawal intervention. Examples of comments made by subjects are "I didn't think it would be that bad" and "I expected psychologically to be a bit worse than I actually was". It was also interesting to note that there was a bias towards female subjects having negative expectations regarding their body image and body weight (four raw data themes, three 1st dimensions). In contrast, for males there were clear signs of expectations and concern with fitness levels. This might be associated with the different types of socialisation patterns males and females experience and the culturally imposed physical appearance expectations women commonly report feeling. Many subjects, both male and female did also report having no definite expectations in relation to exercise withdrawal which is encouraging.

Question 8

Question 8 attempted to assess the extent to which subjects felt the exercise withdrawal had affected subjects. The results for this question are somewhat mixed and do not follow any clear pattern. Several subjects mentioned that they had perceived exercise withdrawal to have considerably affected their feelings and symptoms (four raw data themes, which were predominately made by males) whilst others believed that they were only moderately or mildly influenced (five raw data themes). The creation of the general dimensions *'unsure'* and *'no perceived effects'* suggests that for others the exercise withdrawal intervention was not a source of concern. However, these findings appear to contradict the results from Question 1 where subjects tended to believe both psychologically as well physically, that they had experienced many negative changes in well-being. In fact, in some instances these changes were documented as being rather dramatic. As such, the results

from this question suggests that subjects did not respond to questions in a consistent manner and that the exercise withdrawal experience is complex and can differentially influence subjects in quite diverse ways. See Figure 8.6.

Question 9

Subjects were asked about the sorts of things they had done during the time that they would normally have exercised. Social activities in a variety of forms appeared to be a popular factor. Since many people engage in exercise and sport for social reasons it seems reasonable that they would seek out social interaction in other forms and with other people when not exercising. For example, many subjects commented that they had visited friends, went shopping and watched their team play. Therefore the emergence of the general dimension *'social activities/contact'* was no surprise. Passive activities were also popular amongst subjects, such as *'slept'* and *'did nothing'*. These general dimensions could also be linked to Question 1 (subjects had to describe generally how they felt both psychologically as well as physically during the exercise withdrawal) in that some subjects reported having no motivation or drive to do other things and in Question 6 (subjects were asked to comment on their expectations regarding exercise withdrawal) where some subjects reported being unable to engage in more academic work even though they had hoped to do so during exercise withdrawal. Associated with the *'engaged in passive activities'* general dimension, many people report that exercise helps them to organise their time and makes them feel alive. Being unable to exercise, subjects may have lacked the ambition to be productive and thus found themselves taking part in unstimulating activities such as sleeping and watching television. Due to the timing of the study it also seemed somewhat inevitable that several subjects became more academically active in that it was

mid-way through the academic term and subjects were likely to have received assignments and assignment deadlines and ultimately subjects may have felt under increasing pressure to perform. Furthermore, there may be implications in terms of the generalisability of this sample to adults generally as all subjects were students. As such, these results should not be taken out of context when applied to other populations.

Question 10

As reported in Question 9, when asked most subjects offered alternative activities which they participated in during the exercise deprivation intervention. Question 10 was aimed at eliciting whether engaging in these activities helped subjects to deal better with the way they had been feeling during the exercise withdrawal. As the majority reported that "yes" these activities did help them to deal more effectively with their feelings/symptoms, had subjects not engaged in such activities, the exercise withdrawal experience may have been more psychologically negative than presently reported by subjects. It is therefore also probable that subjects took part in these activities, passively or otherwise, as coping strategies to either deal with the way they were feeling at the time or more specifically to fill in the extra time which they had during their day. See Figure 8.7.

Question 11

A variety of general dimension were created for the raw data themes which indicated the things which individuals missed about not being able to exercise. Clearly, it can be seen that most raw data themes could be clustered into a negative or positive 1st order dimension. Generally speaking, all the created themes seemed to be factors which individuals commonly report for exercising, (e.g. socialising, physiological feedback, and

enjoyment). Indeed the literature has documented that subjects frequently state being involved in exercise for a variety of different reasons (see Markland & Hardy, 1992). As such it seems logical that subjects would 'miss' exercise for these reasons. Additionally, the gender split in each dimension was relatively equal, although specifically, for the general dimension *' missed positive feelings from exercise'* females tended to report missing exercise more for these reasons (nine raw data themes, seven female, two male). This may be indicating that females are more internal in their reasons for exercise and subsequently missed the internal elements associated with participating in regular activity.

Question 12

Question 12 was really included to attempt to tap the possible social mechanism associated with the positive benefits of exercise and the subsequent negative feelings when withdrawing from exercise. If it was possible to elicit whether subjects still socialised with the people they normally exercised with, then information regarding subjects social networks during the intervention could possibly be examined. Eleven subjects responded "yes" they did still socialise with their normal exercise /sports friends, nine said "no", two did not socialise with their sports friends anyway and five could not remember. Whilst these results appear to be evenly balanced, one third (nine from twenty-seven subjects) of subjects responded no to Question 12. This perhaps is indicating that several subjects did feel isolated socially and that their normal network had been disrupted. Finally, these results may also be suggesting that the social mechanism associated with exercise and sport is a crucial factor as to why individuals take part in the first instance. Furthermore, when individuals are unable to exercise they find it difficult to maintain the same social network or at least to maintain it to the same degree.

General Conclusions

Overall, the results of this study seem to be indicating that exercise withdrawal can produce a wide range of psychological emotions and physical symptoms. Although, as subjects did appear to have many different expectations regarding exercise withdrawal, these results should be interpreted with some reservations. It also appears that the exercise withdrawal experience is quite an individualistic and a personal one. As such, future studies in this area may benefit considerably from adopting a qualitative research methodology as this may illicit more accurate responses from subjects. Since this study attempted to adopt a inductive analysis approach probes were only used when it was felt necessary to in order for subjects to understand the question. On a positive note, the finding that females did not feel affected by their menstrual cycle is encouraging since it hopefully provides some added validity to this study.

CHAPTER 8
DISCUSSION

Summary

As stated in chapter 1, this thesis was primarily concerned with investigating the effects of participation in and withdrawal from physical activity and exercise in relation to a number of health measures. Specifically, this thesis attempted to: (1) evaluate the effectiveness of a British corporate health and fitness club; (2) examine the relationship between physical self-perceptions, physical importance and physical activity and fitness using Fox and Corbin's (1989) hierarchical approach; (3) investigate the effects of exercise withdrawal upon physical self-perceptions, perceived general health and mood states; (4) obtain additional and complimentary information regarding participants' psychological and physical health during exercise withdrawal through the use of semi-structured interviews. Correspondingly, it was hypothesised that the data would display a positive relationship between membership of corporate health and fitness club, physical activity and well-being. Secondly, it was predicted that physical self-perceptions and physical importance would be positively related to increased physical activity participation. Thirdly, withdrawal from regular physical exercise was thought to be negatively related to health. Furthermore, it was hoped that data from semi-structured interviews would provide important additional information to support the specific effects of exercise withdrawal. Finally, it was predicted that females would display poorer health patterns and report more negative psychological feelings when they withdrew from exercise compared to males.

Collectively, the data reported in this thesis suggests that the opportunity to exercise has a significant positive relationship with well-being. The following sections will discuss the extent to which the results of this thesis support the objectives and predictions outlined previously. This chapter will conclude by highlighting a number of the

methodological strengths and weakness of each experimental chapter and future research directions will also be offered.

Corporate Health and Fitness: Psychological and Physical Health

As predicted, chapter 3 revealed that members of the J. Sainsbury's health and fitness club demonstrated higher physical efficiency index scores and reported participating in significantly more physical activity than either the non-members or the waiting list group. Notably, these results support a number of specific workplace studies (e.g. Aoki, Suzuki, Noji, Yangagiberi & Gunji, 1988; Gamble, Boreham & Stevens, 1993) which have observed significant improvements in the fitness of employees who participated in worksite sponsored exercise programs compared to those who did not participate. The Confederation of British Industries calculates that sickness absence and lost working time costs an average of two and a half million pounds per business per annum (cf. Department of Health, 1993). Encouragingly, it seems that workplace exercise programs do show potential to change the health of large numbers of the British working population in a relatively effective manner. In the long term, such programs may well increase employees overall work productivity and company profit margins. Indeed, data from chapter 3 suggests that the number of days absent was significantly less in members of the club compared with non-members and the waiting list group.

Similar to numerous other American studies, (e.g. Bly, Jones, & Richardson, 1986; Baun, Bernacki & Tsai, 1986; Sidney & Jette 1987) the results from chapter 3 would also appear to be suggesting that workplace health promotion programs can positively influence psychological states as well as job satisfaction in members of workplace health promotion programs. Moreover, it would seem evident that non-members of such programs display

significantly poorer psychological mood states compared to their colleagues who are members. It can be argued that such programs may be a potentially powerful vehicle in the promotion of well-being of British society since they have the capacity to reach a large proportion of the nation. However, if fitness programs at the workplace are to fulfil their potential they must be aware that members of corporate clubs are usually the healthier, more fit employees. Energy, time and money must be invested in those employees who are at a greater risk of health related illness'.

Whilst there is a paucity of empirical evidence which addresses the potential outcomes of workplace health promotion programs, well developed theoretical models outlining and explaining the processes by which these programs are meant to operate are absent. The absence of any theoretical direction is evident by the fact that there is a lack of consistency across programs with regards to the aspects of health which are promoted and the methods used to accomplish improvements in health (Donaldson, 1993). Until researchers switch their focus from the role of exercise in both physical and psychological well-being to developing some form of conceptualisation of well-being advancement, within this field is likely to be slow compared to other disciplines.

Corporate Health and Fitness: Physical Self-perceptions and Exercise

Based on developmental work in this area by such researchers as Fox and Corbin (1989), Sonstroem (1984) and Caruso and Gill (1992), the aim of chapter 4 was to consider the relationship between exercise and physical self-perceptions in members of the J. Sainsbury's health and fitness club. In accordance with Fox and Corbin's (1989) multidimensional and hierarchical approach to the 'self' it also seems reasonably clear that participation in physical activity is related to individuals' physical feelings about themselves.

Similar to Marsh's (1994) findings, it would seem that weighted physical self-perception scores do not produce significantly stronger relations with Physical Self-worth scores as compared to unweighted responses. The results from chapter 4 indicated that the interaction term between physical self-perceptions and physical importance have strong relations with both participation and withdrawal from exercise. Researchers have also been critical of Fox and Corbin's (1989) construction of importance within their model and its suggested use within the physical self-perception domain. Marsh (1994) stated that Fox (1990) and Fox and Corbin (1989) in their speculations regarding the relationship between specific physical self-perception components, global self-concept and esteem were influenced by two quite different theoretical models; the importance weighted average (i.e. the creation of interacting variables between self-perceptions and importance) and the actual/importance discrepancy model as proposed and used by Harter (1986). As such, it is not entirely clear how Fox and Corbin (1989) proposed the Importance Profile to be used. It might simply be the case that Fox and Corbin have misinterpreted the terms 'moderating' and 'mediating' since a hierarchical approach would by its nature imply a moderating effect.

Exercise Withdrawal: Physical Self-perceptions, Perceived General Health and Mood

Chapter 1 hypothesised that withdrawal from regular physical activity would have a negative influence upon health. Indeed, the data revealed that participants who withdrew from physical exercise for 10 days did display significantly lower physical self-perceptions when compared to those who continued to exercise as normal. Once withdrawal participants re-commenced exercise participation their self-reported physical self-perceptions increased. This data would further suggest that withdrawal from physical exercise can have a detrimental impact upon how people view themselves physically,

particularly in terms of their physical self worth, sports competence and their feelings of bodily attractiveness. Since there are no other published studies to date which have investigated the exercise deprivation and physical self-perceptions relationship, no concrete conclusions can be drawn. However, these results do support a growing body of literature in this area which has documented negative changes in other aspects of well-being. For example, Baekland, (1970), Conboy, (1994) as well as Gauvin and Szabo, (1992) have all reported negative changes in various indices of mental health and psychosomatic responses as a result of exercise withdrawal.

The results for perceived general health and mood scores were rather less straight forward, particularly as compared to the physical self-perceptions data and therefore do not clearly support the prediction stated earlier. Some negative changes in perceived general health were observed but these were by no means of the same magnitude as those reported by Morris, Steinberg, Salmon and Sykes (1991) who also used the GHQ-28. Conversely, whilst a negative relationship between exercise withdrawal and mood states was hypothesised in chapter 1, this was not observed. On the contrary, where significant results were recorded these were positive in direction. In other words, exercise withdrawal participants reported better mood states compared to the control group. Whilst surprising, these results do in actual fact support limited past literature (Crossman, Jamieson & Henderson, 1987) which recorded similar findings in swimmers and runners.

In conclusion, it is evident that chapter 6 contains somewhat contradictory data, whereby withdrawal subjects reported decreased perceived general health scores but improved mood states during exercise deprivation. It perhaps is possible to explain these results in light of the measures used in chapter 6. The GHQ-28 is a measure of 'psychological health', and focuses on psychosomatic symptoms and as such may be more

directly associated with actual negative physiological changes in 'well-being' during exercise withdrawal (e.g. increased headaches & tiredness). In contrast, the Bi-POMS is a measure of mood states which focuses almost exclusively upon psychological well-being. Consequently, there is the possibility that exercise withdrawal negatively influences psychosomatic symptoms but that feelings related to mood states are positively enhanced during lay off from exercise.

Exercise Withdrawal: Qualitative Perspective

The major reason for the inclusion of qualitative perspective was to gather information concerning the general exercise experience and therefore compliment the quantitative data reported in chapters 5 and 6. As stated earlier, this proved to be an invaluable exercise and uncovered many important details concerning the exercise withdrawal experience.

Data collected during semi-structured interviews with exercise withdrawal subjects indicated that deprivation from regular exercise had produced a broad range of physical symptoms and emotional feelings. Subjects also appeared to have clear expectations regarding how they thought they would feel during their exercise withdrawal experience which does introduce the problem of negative affectivity bias. Subjects reported engaging in a variety of activities with social activities being the most popular. Since many people engage in exercise and sport for social reasons it seems reasonable that they would seek out social interaction in other forms, and with other people, when deprived of exercise. Similarly, it appears likely that subjects participated in these activities, passively or otherwise, as coping strategies to counteract the negative feelings they were experiencing during withdrawal and to keep their minds occupied.

Gender Issues

This thesis attempted to consider gender differences in relation to exercise participation, withdrawal from exercise and well-being. However, at times the gender results reported were quite surprising and inconsistent. Nevertheless, there are several gender issues which warrant further discussion. As predicted, males demonstrated higher levels of participation in physical activity and physical fitness scores than females. Almost 9 years ago the General Household Survey (1986) demonstrated that sport and recreational physical activity was a minority practice. In particular, approximately 1 in 3 men and only 1 in 5 women participated in any form of physical exercise. More recently, the Allied Dunbar National Fitness Survey (1992) observed that over 7 out of 10 men and 8 out of 10 women fell below their age-appropriate activity level necessary to achieve health benefits. In particular, among 16-24 year olds, 70% of men and 91% of women were below the target level suggested for achieving health benefits. What does seem clear is that practitioners in all fields need to actively encourage more women to participate in some form of physical exercise on a regular basis. This may ultimately lead to positive improvements in other aspects of their health, such as decreased percentage body fat and lower weight.

The lack of any gender differences/changes in chapters 3 (mood states) and 5 (physical self-perceptions) are intriguing and were not expected, although there does appear to be a number of possible explanations for these results. Firstly, it could be that simply no actual differences exist between males and females in their emotional well-being. Although, in the past there seemed to be strong feelings that females by their nature were more emotional than males. For example, Gray (1971b) suggested that females display more pronounced fear and anxiety than males and that this is due to their hormonal

constitution. It seems apparent that adult males under-representation of their feelings has come from the social context in which they are socialised. Numerous sociological studies (e.g. Kagan, 1978; Maccoby & Jacklin, 1974) have observed that from an early age children are socialised into different contexts. Males are encouraged to be strong, brave and to control aggression and fear, whereas females are encouraged to be nurturing, caring and free to express their feelings. This clearly may have very serious implications for the way in which children behave as adults, the way in which they perceive their realities, and ultimately the kind of responses they produce on psychological inventories and questionnaires (see Reddy, Fleming & Adesso, 1992).

Similarly, the gender results from chapter 5 were not unexpected. Whilst weight remains an important health issue for most people, body image and body attractiveness appear to be particularly important issues for females and this might be reflected in the females responses to the Physical Self-perception Profile (PSPP) in relation to exercise withdrawal. Equally, it might also be that males and females are becoming similarly concerned with perceived physical selves and well-being. However, on the whole the results from chapter 4 would not support such a position. On the contrary, the predictors of physical activity differed for males and females. In chapter 4, high Body Attractiveness x Body Attractiveness Importance scores approached significance in predicting levels of participation in physical activity in females, whilst Physical Self-worth significantly predicted physical activity in males. Perhaps males self-concept and worries may be more closely related to perceptions of their effectiveness and their physical fitness (see Ben-Tovim, Walker, Murray & Chin, 1990). The results in chapter 4 would appear to suggest that males see themselves in global terms of what they can do physically. In contrast, females may equate their self-worth in terms of their perceived bodily attractiveness.

The gender results for the withdrawal studies in this thesis are not wholly clear. Chapter 6 provided some general indications that females were more socially dysfunctional than males during the exercise withdrawal intervention. Nevertheless, whilst the gender results are far from clear cut, it was pleasing to observe that in chapter 7 the majority of experimental females did not feel that their menstrual cycle affected the mood states to any great extent (e.g. "I'm not particularly moody at all" & I would have thought I would be the same"). This is encouraging since it provides added validity, as well as reliability, to the females results as they were unlikely to have been 'inflated' by the fact that females were at a particular stage in their menstrual cycle. It was also interesting to note that when asked to describe how they felt during the exercise withdrawal 1st order dimension *'Lack of social integration'* was heavily female dominated (e.g. "You felt a bit out of it and missing it" & "I felt a bit lonely, sort of cut off and alone"). As expected females displayed quite specific expectations regarding body image and body weight during their interviews.

On a more general note, in terms of understanding gender differences in well-being, the research in this area has not always been well founded since many studies do not include female subjects as part of their samples or include unbalanced gender samples. Ironically, many of the studies which do include female subjects, then do not report analysing gender effects (e.g. Gauvin & Szabo, 1992). Mutrie (1986) contends that this inevitably leads to an inequality within research results and perhaps causes gender differences to be clouded. Whilst this thesis did include equal representation of males and females in all the experimental chapters, no clear conclusions can be made regarding the gender aims and hypotheses stated in chapter 1.

Exercise and Well-being Theories and Models

No specific aims or hypotheses were stated regarding the numerous models discussed in chapter 2, although it seems appropriate to make some comment as to whether data from this thesis offers any support for these models in explaining the physical activity, exercise withdrawal and mental health relationships.

Both chapters 4 and 5 do appear to support mastery explanations (see chapter 2) for the hypothesised relationship between exercise and physical self-perceptions and it does seem that they provide the best hope at present of being able to adequately explain these relationships. Indeed, the mastery theories and models (i.e. Competence Motivation Theory, Theory of Personal Investment & Psychological Model of Physical Activity Participation) are supported by: (1) many well designed empirical studies (e.g. McDonald & Hodgson, 1991; Sonstroem 1982; Tucker 1987) which have found a positive relationship between these two variables; and (2) some of the exercise withdrawal literature (see Baekland, 1970). Interestingly, as mentioned in chapter 6 the fact that withdrawal subjects returned to pre-basal levels in three of the five domains contained in the Physical Self-perception and Physical Importance Profile would seem to be suggesting that exercise can enhance an individuals' physical self-esteem. Although, the self-esteem/mastery explanation has been suggested by several exercise withdrawal researchers as a feasible explanation, rigorous testing specifically within the exercise deprivation literature is greatly needed. This is especially the case with different subject populations.

This thesis also provides some support for the 'loss of positive cues explanation' in that several subjects in chapter 7 commented that they missed the physiological cues which they gain while participating in exercise. Additionally, many of the female withdrawal subjects in chapter 7 suggested that they missed the positive psychological

feelings/feedback which exercise gave them (e.g. "The feeling of exercise" & "I think the feeling afterwards"). Several females also commented that they were concerned with their body image and body weight (e.g. "I exercise to control my weight so I missed the thought of not burning calories"). Perhaps they felt that they were not receiving the positive feedback cues which exercise provides them with when they engaged in habitual exercise regimes or that these were important areas which they perceived they would loose if they stopped exercising.

The concept of exercise addiction requires some further discussion. Essentially, there are two issues concerning exercise addiction which need commenting upon. The first concerns whether actual evidence exists which supports the notion of exercise addiction. Secondly, a serious ambiguity which warrants some discussion is the way in which the terms exercise/running addiction and commitment to exercise/running are used interchangeably. It seems that in the past researchers have referred to the process of exercise addiction as if it were a measurable, well established construct for which there is reasonable empirical evidence. However, as suggested in chapter 6, the actual research evidence supporting addiction to exercise is very limited. Whilst some studies report the existence of increased beta-endorphins post exercise (e.g. Christie and Chesher, 1982; Riggs, 1981; Synder, 1977a, 1977b, 1980), the direct evidence documenting a process of addiction to exercise is not forthcoming. Similarly, neither the perceived general health or the mood state results in chapter 6 would support an exercise addiction hypothesis. This perhaps would point towards alternative hypotheses and models as being more capable of explaining the exercise and psychological well-being relationship, for example the mastery and positive re-enforcement cues hypotheses.

Methodological Design Issues

The most serious methodological issue in chapter 3 concerned the missing absenteeism data, although this was not a problem which could be easily rectified. Nevertheless, a certain amount of fortune was experienced in gaining access to limited absenteeism data since many companies are usually reluctant to release this kind of personal and highly confidential data to external bodies.

Chapters 3 and 4 were based on cross-sectional designs and consequently it is difficult to infer causality and this should be clearly understood when interpreting these findings. Additionally, as in most studies which are concerned with individuals' thoughts and feelings, there is a tendency for those who are willing to participate in research studies to perhaps display better psychological profiles than the 'average' individual. Thus chapter 3 may be subject to a certain amount of selection bias as are the other chapters within this thesis. Following on, subjects within the withdrawal study were self-selected university students all of whom were engaged in some kind of physical activity at least once per week and therefore the generalisability of this study to other populations may quite justifiably be questioned.

Subject mortality rates in both studies were fortunately quite low. In fact (as indicated in chapter 3), more employees volunteered to take part in the study than there was actual time to test. If employees did not return their questionnaires as part of their health assessment they were simply excluded from the study and other employees were invited to take part in their place. Subject drop-out within the exercise withdrawal study did occur, although this was minimal and was expected due the scope and intensive nature of the study. Some subjects also failed to return all their completed questionnaires,

although they had to complete at least two thirds of the questionnaires otherwise their data was eliminated from analyses.

The intense data collection strategy used in chapter 6 may have led to situations whereby: (a) subjects became so familiar with the questionnaires that they did not answer each item in a truly honest manner; (b) they became bored with repeatedly completing the same kind of questionnaires; and (c) subjects became increasingly distressed at having to continually rate how they had been feeling. This was partially controlled by constructing three forms of the GHQ-28, SEES and shortened Bi-POMS which were presented in a different order each day. Nevertheless, such strategies do have the advantage of providing researchers with 'moving pictures' as opposed to a single 'photograph' of psychological states (Gauvin & Szabo, 1992). Such strategies also safe guard against researchers obtaining indications of subjects' momentary state or memory rather than subjects' ongoing psychological status.

An additional methodological weakness might have been the 'hawthorne effect'. Due to ethical reasons and in order to recruit subjects for both studies within this thesis, it was necessary to provide details concerning what was required from volunteers. This issue was not one which could be easily rectified since this process of expectation can be either a conscious or unconscious process. Nevertheless, some caution should be applied when interpreting these results since they may have been artificially inflated in chapters 3 and 4 and deflated in chapters 5 and 6.

Schaller & Ciadini (1990) have suggested that depressed feelings are related to behavioural inactivity. Thus, it is highly feasible that subjects' most negative psychological feelings were not reported. Since chapter 6 hypothesized that exercise withdrawal would lead to negative changes in perceived general health and mood, this is clearly of some

concern and suggests that the actual effects of withdrawal from exercise are perhaps far more profound than this thesis suggests.

The reliability of the results from the mood studies, the population used in chapter 3 were quite specific in nature and therefore it is unwise to apply these results too far a field. Equally, chapter 6 utilised a shortened version of Bi-POMS which has not been fully validated. Whilst a preliminary reliability test indicated that the internal consistency of the shortened Bi-POMS was stable, exploratory factor analyses only revealed satisfactory scale confirmation with Lorr and McNair's (1984) original factor structure. Hence, the results should be interpreted with some reservations. Nevertheless, from a research perspective, the speed at which the shortened version can be completed makes it appealing for use in future mood state and exercise studies. It is also important to comment on the results of chapters 6 compared to chapter 7. It is quite possible that the lack of significant quantitative results in chapter 6 was the result of the adopted research design and that when experimental subjects in chapter 7 were given the opportunity to talk freely about their exercise deprivation experience they were able to reflect and elaborate on their experiences more accurately. This clearly supports the decision to incorporate the qualitative exercise withdrawal study and adds to the growing evidence for the inclusion of qualitative research designs (see Eklund, Gould & Jackson, 1993) in exercise and sport psychology.

Expectations which were held by withdrawal subjects could have quite conceivably influenced the way in which subjects reported their feelings. It is evident from chapter 7 (qualitative data) that subjects had quite clear expectations as regard the exercise withdrawal intervention (e.g. " I thought I would be jumpy and feel fed up", "I thought I would be very moody" & "I expected my fitness to go down"). Bearing this in mind, data from the withdrawal studies should be interpreted with some caution.

Statistical analysis was an important aspect of chapters 3, 4, 5 and 6 and various statistical procedures were utilised in order to examine the data obtained. Whilst statistical tests provide researchers with a means by which data can be quantified there are a several issues which should be considered before the conclusions from the above stated chapters can be accepted and interpreted as meaningful. In accordance with tradition, a probability level $p<.05$ was selected as the standard level of significance throughout this thesis. It is accepted that this decision may have resulted in the making of Type I errors. This particularly might have been the case in chapter 6 and to a lesser extent chapter 5 where numerous post hoc analyses were conducted.

Although this section has primarily concentrated on the weaknesses of this thesis, above and beyond this there are several encouraging design strengths which should also be emphasised. In the past qualitative and quantitative approaches to studying human behaviour have generally been perceived on opposite ends of the spectrum. Researchers have generally tended to advocate one approach or the other and have ignored the unique role that the other approach may take. It is strongly believed that adopting both approaches to the study of exercise withdrawal was an important development not only in terms of contributing to the available research evidence but also in terms of advancing and encouraging the use of a combination of idiographic and nomothetic research designs in the behavioural sciences. It seems reasonable to comment that this is something researchers previously have been reluctant to do. Furthermore, according to Eklund, Gould and Jackson (1993) a greater understanding of the phenomena being studied is more likely to be obtained if researchers "report both idiographic and nomothetic findings" (p.46).

To the knowledge of the author there has been no evaluation of a British worksite exercise program which examines physical as well as psychological aspects of well-being.

Chapters 3 and 4 provide original data concerning the value of such programs for individuals to use whilst in the workplace. The inclusion of a large sample of J. Sainsbury's employees from different departments and occupations was also encouraging.

A definitive strength to the withdrawal studies was the inclusion of an additional comments section at the end of each days questionnaires as this allowed subjects to elaborate on how they had felt. Importantly, on several occasions results from chapters 6 and 7 appeared unclear, but on closer examination of the additional comments made by subjects these confusing results became interpretable to some degree.

The inclusion of gender as a separate factor both in discussionary and analyses terms was considered to be an important development conceptually. Clearly, from these result and other research studies discussed in earlier chapters, males and females do not always respond similarly to exercise/physical activity and exercise deprivation. Future studies need to consider this issue since it is crucial to the development of literature within the exercise/health psychology field.

The large sample size included in the withdrawal studies was very pleasing, especially since it contained an equal balance of males and females Typically, exercise withdrawal studies utilise rather small samples with the average being between 10-15 subjects. Due to the interest in, and commitment from, the subjects the present withdrawal study was able to report data from twenty seven experimental participants which is the largest sample of any published exercise withdrawal study to date. Finally, as stated previously, there are no published studies to date which report the data regarding the relationship between exercise deprivation and physical self perceptions and thus the data contained in chapter 5 is entirely original.

Despite the fact a significance level of $p<.05$ was set, it was pleasing to observe that many of the results within the experimental chapters were in actual fact significant at the $p<.01$ level. Statistical consideration was also given to the influence that 'other' factors would have on the data obtained. Chapter 3 included a sample with a large age range and it was therefore necessary to 'take this into account' by the use of analysis of covariance which ensured that the results obtained were not influenced by an age bias. Likewise, chapters 5 and 6 covaried the effects of levels of commitment and physical activity participation with GHQ-28 and Bi-POMS scores. In doing so it was hoped that data from these chapters could be intrepreted and understood irrespective of commitment to exercise and physical activity participation scores.

Future Research Directions

As alluded to in chapter 3, more British based evaluation of workplace exercise evaluations are greatly needed, particularly those which include measures of employer benefits, for example absenteeism, productivity and job satisfaction. Furthermore, whilst cross-sectional studies have the potential to illicit large amounts of information regarding subjects, they do not directly tackle the issues of causality. Hence, future studies should consider adopting intervention based methodologies as well as longitudinal designs. Future studies which examine the relationship between exercise, self-esteem and self-perceptions within specific exercise settings would also be useful. Whilst there is considerable literature which examines the exercise and self-perceptions in college students and children, there have been less studies conducted with adults within specific exercise situations.

Another issue which merits further attention in future research pertains to the intensive data collecting methodology employed in chapters 6. Whilst several strategies

were employed to limit obtaining 'cloudy' data, much trust had to be laid in the hands of the subjects to complete the questionnaires at the appropriate time and day and to report emotions accurately. Future research may want to consider variations to the data collection process used in chapter 6.

Future studies may wish to consider different types of withdrawal from sport/exercise, for example forced withdrawal (as in this study), injury and burnout. This may provide interesting information regarding the differences between distinct types of exercise withdrawal and the impact if can have on individuals' lives.

On the whole the questionnaires selected for use within this thesis were well established measures and demonstrated good internal consistency as well as test re-test reliability. The exceptions to this are the PPAQ and the lifestyle questionnaire which both require further developmental and statistical validation. Furthermore, on reflection the use of the GHQ-28 was not the most appropriate measure of well-being as it is quite clinically orientated and some of the items may not have been applicable to physical active college students.

The use of more qualitative based methodologies would be advantageous as they appear to provide invaluable data regarding individuals thoughts/feelings during exercise deprivation. In the present exercise deprivation study it was possible to accumulate complementary information which would have been difficult using a quantitative methodology. Whilst there are a number of models and hypotheses suggested in chapter 2 more empirical testing of exercise and well-being models is needed, in particular some form of conceptual framework needs to be developed for understanding the exercise and well-being relationship as well as the specific association between exercise deprivation and well-being.

General Conclusions

The results of this thesis have highlighted the positive influence regular exercise can have upon health and clearly the opportunity to exercise is an important aspect of well-being. Generally, it has been shown that membership of a corporate health and fitness club and participation in physical exercise has the potential to influence individuals' emotional and physical well-being. Furthermore, data indicated that withdrawal from exercise can negatively influence physical self-perceptions and perceived general health but that mood states are significantly improved during withdrawal. Finally it would appear that when subjects are provided with the opportunity to reflect on their emotional well-being by using qualitative research methods, they are able to convey their feelings more precisely.

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APPENDICES

APPENDIX A

Rationale for Questionnaire Selection

This thesis has been heavily questionnaire based and therefore it seems appropriate to briefly comment on the reasons for the selection of certain questionnaires. The questionnaires used were chosen as a result of an extensive literature search, and whilst there were a number of different measures which could have been used, in many cases these had not been subject to rigorous statistical development procedures.

Chapter 3

The Bi-POMS has been specifically developed to assess both positive and negative mood states and therefore would appear to realistically assess the range of moods individuals might experience in any given day. Most other mood states measures including the original POMS only elicit information regarding unipolar feelings. The Subjective Exercise Experience Scale was selected to accompany the Bi-POMS in chapter 6 since the Bi-POMS was not developed specifically for use with an exercise population. The Subjective Exercise Experience Scale (SEES) has only recently been published (1996) and was therefore not available at the time chapter 3 was conducted.

J. Sainsbury's senior management were not keen on the inclusion of any detailed questions which asked employees about their current level of job satisfaction. Therefore, a compromise was achieved whereby employees were asked one simple overall question in relation their general feelings towards their job. As stated in chapter 3, Warr, Cook and Wall's (1979) Job Satisfaction Scale was employed. This scale has demonstrated consistent validity with various specific measures of job satisfaction (see Warr, Cook, and Wall, 1979).

The lifestyle questionnaire attempted to focus on major health behaviours (e.g. smoking) and these items were used as very **general** indictors of self reported health habits. The lifestyle questionnaire was constructed by the author of this thesis and has not been assessed for validity or reliability which may cast some doubt over its predictive ability in exercise and health settings. However, within chapter 3 this questionnaire was able to elicit differences between groups and gender in some health habits.

Chapters 4 & 5

The Physical Self-perception (PSPP) and Physical Importance Profiles (PIP) (Fox & Corbin, 1989) are the most widely accepted measures of physical feelings towards one's self and unlike most other self esteem questionnaire are based on a theoretical rationale. Additionally, whilst there are several self-esteem measures available many of these focus on several domains of self-esteem rather than physical self-perceptions specifically.

Chapter 6

The rationale for the Bi-POMS has been outlined previously. An additional reason for use of the Bi-POMS was that it was considered important to maintain some consistency of measures throughout the thesis. Refer to Appendix M for a full description and rationale of the shortened version of the Bi-POMS as used in chapter 6.

Similar to the Bi-POMS, the SEES is a measure of acute feeling states. Traditionally, affective responses in relation to exercise has been measured according to positive or negative dimensions. However, McAuley and Courneya (1994) have suggested that the manner in which an individual feels physiologically may also play an important role in their perception of the exercise experience. Therefore the SEES was employed to assess the proposed multidimensionality of the exercise withdrawal experience.

APPENDIX B

Bi-Polar Profile of Mood States (72 items)

Below are words that describe feelings and moods people have. Please read every word carefully and then circle the number which best describes how you have been feeling DURING THE PAST WEEK INCLUDING TODAY.

0 = Much unlike this 1 = Slightly unlike this
2 = Slightly like this 3 = Much like this

1) Composed	0 1 2 3	19) Vigorous	0 1 2 3
2) Angry	0 1 2 3	20) Dejected	0 1 2 3
3) Cheerful	0 1 2 3	21) Kindly	0 1 2 3
4) Weak	0 1 2 3	22) Fatigued	0 1 2 3
5) Tense	0 1 2 3	23) Bold	0 1 2 3
6) Confused	0 1 2 3	24) Efficient	0 1 2 3
7) Lively	0 1 2 3	25) Peaceful	0 1 2 3
8) Sad	0 1 2 3	26) Furious	0 1 2 3
9) Friendly	0 1 2 3	27) Light-hearted	0 1 2 3
10) Tired	0 1 2 3	28) Unsure	0 1 2 3
11) Strong	0 1 2 3	29) Jittery	0 1 2 3
12) Clearheaded	0 1 2 3	30) Bewildered	0 1 2 3
13) Untroubled	0 1 2 3	31) Energetic	0 1 2 3
14) Grouchy	0 1 2 3	32) Lonely	0 1 2 3
15) Playful	0 1 2 3	33) Sympathetic	0 1 2 3
16) Timid	0 1 2 3	34) Exhausted	0 1 2 3
17) Nervous	0 1 2 3	35) Powerful	0 1 2 3
18) Mixed-up	0 1 2 3	36) Attentive	0 1 2 3

37) Serene	0	1	2	3	
38) Bad tempered	0	1	2	3	
39) Joyful	0	1	2	3	
40 Self-doubt	0	1	2	3	
41 Shaky	0	1	2	3	
42 Perplexed	0	1	2	3	
43 Active	0	1	2	3	
44 Downhearted	0	1	2	3	
45 Agreeable	0	1	2	3	
46 Sluggish	0	1	2	3	
47 Forceful	0	1	2	3	
48 Able to concentrate	0	1	2	3	
49 Calm	0	1	2	3	
50 Mad	0	1	2	3	
51 Jolly	0	1	2	3	
52 Uncertain	0	1	2	3	
53 Anxious	0	1	2	3	
54 Muddled	0	1	2	3	
55) Ready-to-go	0	1	2	3	
56) Discouraged	0	1	2	3	
57) Good natured	0	1	2	3	
58) Weary	0	1	2	3	
59) Confident	0	1	2	3	
60) Businesslike	0	1	2	3	
61) Relaxed	0	1	2	3	
62) Annoyed	0	1	2	3	
63) Elated	0	1	2	3	
64) Inadequate	0	1	2	3	
65) Uneasy	0	1	2	3	
66) Dazed	0	1	2	3	
67) Full of pep	0	1	2	3	
68) Gloomy	0	1	2	3	
69) Affectionate	0	1	2	3	
70) Drowsy	0	1	2	3	
71) Self-assured	0	1	2	3	
72) Mentally alert	0	1	2	3	

APPENDIX C

Job Satisfaction Question

Taking everything into consideration how do you feel about your job as a whole?

1	2	3	4	5	6	7	8	9	10
Extremely Dissatisfied				Not Sure					Extremely Satisfied

APPENDIX D

Demographic and Lifestyle Questionnaire

All information is strictly confidential.

Please circle answers where appropriate

Subject number:

Age:

Sex:

Occupation/Department:

Marital status:

Number of children:

How long does it take you to get to work?

Are you a Member of the gym, Non-member, or on the Waiting list to join?

Do you smoke? yes/no

If 'yes', what and how much do you smoke?

Generally, do you sleep soundly?

Hardly ever Sometimes Usually Often Always

Do you eat balanced regular meals?

Hardly ever Sometimes Usually Often Always

On average how much alcohol do you drink per week?

APPENDIX E

Medical Screen Questionnaire

- Have you consulted your doctor within the last 6 months?
- Are you presently taking any form of medication?
- Have you had any major surgical operations in the past six months?
- Do you suffer, or have you ever suffered from;

Asthma	yes/no	Diabetes	yes/no
Bronchitis	yes/no	Epilepsy	yes/no

- Do you suffer, or have you ever suffered from any from of heart complaint?
- Is there a history of heart disease in your family?
- Do you currently have any form of muscle or joint injury?
- Is there anything to your knowledge that may prevent you from successfully completing a submaximal fitness test?

I agree to take part in a fitness assessment. I understand what will be involved.

Please sign here.....
Employee

APPENDIX F

Participation in Physical Activity Questionnaire (PPAQ), Development and Reliability

Please read all instructions carefully.

- Please state up to 5 of the **most physically demanding activities** which you have participated in over the past four weeks.
- Then state how many times each week you do each activity.
- Please indicate on average how long each activity lasts (in minutes).
- On a scale of 1 (very light) through to 5 (moderate), to 10 (very hard) **how hard** in terms of physical exertion would you rate each activity?

Activity	Times Per Week	Time (minutes)	How Hard

PPAQ Development

An additional aim of this thesis was to develop a new measure of physical activity for specific use with an adult population. It was hoped that this questionnaire (as described above) would identify the current activity status of individuals based on the time, frequency, intensity and type of physical exercise. The development of the PPAQ was based on a number of previously published measures of physical activity participation. Whilst all of the physical activity questionnaires listed below have been used successfully in a variety of research settings, for a number of reasons they were not deemed appropriate for the purposes of this thesis. These measures were:

1. The Extent of Physical Participation Scale (EPP: Sonstroem, Speliotis & Fava, 1992);
2. Exercise Participation Questionnaire (EPQ: as used by King, Taylor, Haskell & DeBusk, 1990);
3. The Minnesota Questionnaire (Taylor, Jacobs, Schucker, Knudsen, Leon & Debacker, 1978);
4. The 7-Day Recall Questionnaire (Blair, 1984).

Firstly, neither the EPP or the EPQ include a measure of exercise intensity. As there is literature (see Parfitt, Markland & Holmes, 1994; Williams & Eston, 1989) which suggests the intensity of exercise is an important determinant of whether individuals experience positive emotional states post exercise, the EPP and the EPQ were not considered able to measure physical activity accurately. Additionally, the EPP does not allow respondents to report the exact length of activity participation. Rather, the respondents are required to tick a box which reflects the amount of time they have been involved in exercise. If physical activity is to be assessed accurately, respondents should be given the opportunity to report the intensity at which they have exercised and the **exact** length of time that they have been involved in exercise. Consequently the PPAQ requires respondents to report their perceived intensity of exercise and state in minutes the precise length of time that they have been involved in physical activity/exercise.

Furthermore, the 7-day recall and the Minnesota Questionnaire takes approximately 15-20 minutes to complete. For the purposes of chapters 3 and 4, a short, quick and simple measure of physical activity was crucial since the time available for health assessments was limited. Therefore, the development of an instrument which met these criteria was thought necessary. The PPAQ requires approximately 5 minutes to complete. Additionally, the 7-day recall questionnaire requires subjects to report only those activities which they have

found to be at least moderately strenuous. Light activities are calculated via a process of subtraction. In theory, while this appears to be a useful data gathering strategy (respondents are only required to focus on relatively short periods of time in which they have been engaged in moderate to hard exertion) in practice it does not lend itself to accurate measurement. The reason being that most individuals' days actually involve light activities and yet they are unable to report these. Respondents should be given the opportunity to report all kinds of physical activity irrespective of the exertion level. In considering these issues, the PPAQ attempts to encourage respondents to focus on those activities which they have found "physically demanding", but they are also given the opportunity to report 'light activities' if these are the only means by which they have been physically active.

The 7-day recall questionnaire only requires respondents to recall physical exercise from the previous 7 days. However, if a reliable and representative measure of activity is to be obtained longer recall periods are required. Additionally, physical activity was included in this thesis as a measure of current health status. Therefore, it was felt that exercise conducted 1-7 days previously was unlikely to have affected current health status to any large degree. Likewise, in relation to the Minnesota Questionnaire, exercise conducted 12 months previously was also unlikely to have any direct bearing on current health status either. Indeed, physical activity questionnaires which require subjects to recall over one year are perhaps more prone to inaccuracy. Such measures may be more valuable for use with sports competitors who are more likely to be involved in regular exercise and training patterns and are able to report physical exercise more reliably. Consequently, the PPAQ utilises a 4 week recall period since it was felt that exercise conducted 4 weeks previously would be a relatively easy time span for respondents to recall and would also be more likely to have influenced current health status.

Anecdotal conversations with many subjects highlighted that the PPAQ may need some modifications, particularly regarding the way in which intensity of exercise is explained. Some subjects commented that they found it difficult to interpret the intensity scale and felt that this aspect of the questionnaire required further clarification. Perhaps modifications in relation to Borg's (1977) scale may be appropriate. Clearly, this issue could have contributed towards the small discrepancy between test and re-test scores.

Test-retest Reliability

In order to assess test-retest reliability the Participation in Physical Activity Questionnaire (PPAQ) was administered to 153 physically active university students and then re-administered 14 days later. Unfortunately, during the retest only 104 questionnaires were returned. Therefore, this study consisted of 104 subjects (males = 61; females = 43). The mean and standard deviation of subjects' age was 18.8 and 1.7 respectively. Pearson's correlation was conducted to assess the reliability of the PPAQ responses. The results revealed a test-retest reliability correlation coefficient of $r = .69$. Whilst the sample used in this study was relatively small the result obtained was encouraging and demonstrated good consistency over time.

APPENDIX G

Harvard Step Test Protocol

Brouha (1943) developed a simple step test to determine an index of aerobic capacity. The Harvard Step Test requires subjects to step at a rate of 30 steps per minute for 5 minutes. The bench height is 20 inches. Post exercise heart rate is measured 1 to 1-1/2, 2 to 2-1/2, and 3 to 3-1/2 minutes after exercise. The three heart rates are added together and the total is used in the following equation to determine the physical efficiency index (PEI):

$$PEI = \frac{\text{duration of exercise (sec) x100}}{\text{2 x sum of recovery heart rates}}$$

Participant Feedback

An evaluation of physical efficiency can be given according to the following classifications:

Index	Classification
< 55	poor
55-64	low average
65-79	average
80-89	good
> 89	excellent

The correlation coefficients between step test scores and VO_2 max range between 0.32 and 0.77 (see Cureton & Sterling, 1964; deVries & Klafs, 1965; McArdle, Klatch, Pechar, Jacobson & Ruck, 1972). The Harvard Step test error rate at predicting maximal oxygen uptake consumption has been reported at +/- 12.5% (deVries & Klafs, 1965).

Harvard Step Test Rationale

Whilst numerous measures of physical fitness and aerobic capacity exist the Harvard Step Test was selected for a number of reasons. It was decided that treadmill running would not be an appropriate form of exercise to use with J. Sainsbury's employees since this would have required some form of familiarisation period which in itself would have been time consuming. Since each subject was only allocated a 30 minute slot where all health measures had to be taken, treadmill assessment protocols were not considered an appropriate form of measurement for physical fitness. Furthermore, within the club all of the treadmills are located in the main exercise area. In order to provide and secure personal privacy it was imperative that subjects were tested in the assessment room. Many senior mangers (particularly females) were concerned that junior members of staff would be able to see them exercising and they wanted to remain anonymous. This could only be assured by conducting health profiles in the assessment room. Equally, employees were perhaps unlikely to reveal personal details regarding their lives, health and job whilst in an open plan environment.

When making their appointments many employees were anxious about the 'fitness' test, and seemed reassured and comfortable with the idea of the stepping rather than running or cycling. Additionally, the management of the club were concerned that if cycle ergometry was used members of the club may be given conflicting and confusing information regarding their fitness since they would have already received feedback from their cycle ergometer fitness test as part of their induction to the club and throughout their membership. Therefore, the Harvard Step Test (HST) was selected since it would not interfere with the ongoing fitness procedures in the club and could be conducted easily within the assessment room. However, it is recognised and clearly understood that the HST may not have been the most appropriate test for use with adults over the age of 60

years since the 20 inch stepping height may be too strenuous for participants over this age. Furthermore, the 20 inch stepping height can possibly cause local leg fatigue in females since they are inherently shorter than males and this may lead to a greater differentiation of physical efficiency index scores than would perhaps be expected if stepping heights were adjusted according to gender.

APPENDIX H

THE PHYSICAL SELF PERCEPTION PROFILE (PSPP)

WHAT AM I LIKE?

These are statements which allow people to describe themselves. There are no right or wrong answers since people differ a lot.

First decide which one of the two statements best describes you.

Then go to that side of the statement and Check if it is just "sort of true" OR "really true" FOR YOU.

EXAMPLE

Really true for me	Sort of true for me				Sort of true for me	Really true for me
☐	☐	Others are not quite so competitive	BUT	Some people are very competitive	X	☐

REMEMBER to check only ONE of the four boxes

1.	☐	☐	Some people feel that they are not very good when it comes to play ing sports	BUT	Others feel that they are really good at just about every sport	☐	☐
2.	☐	☐	Some people are not very confident about their level of physical conditioning and fitness	BUT	Others always feel confident that they maintain excellent conditioning and fitness	☐	☐
3.	☐	☐	Some people feel that compared to most, they have an attractive body	BUT	Others feel that compared to most, their body is not quite so attractive	☐	☐
4.	☐	☐	Some people feel that they are physically stronger than most people of their sex	BUT	Others feel that they lack physical strength compared to most others of their sex	☐	☐
5.	☐	☐	Some people feel extremely proud of who they are and what they can do physically	BUT	Others are some times not quite so proud of who they are physically	☐	☐
6.	☐	☐	Some people feel that they are among the best when it comes to athletic ability	BUT	Others feel that they are not among the most able when it comes to athletics	☐	☐

	Really true for me	Sort of true for me				Sort of true for me	Really true for me
7.	☐	☐	Some people make certain they take part in some form of regular vigorous physical exercise	BUT	Others don't often manage to keep up regular vigorous physical exercise	☐	☐
8.	☐	☐	Some people feel that they have difficulty maintaining an attractive body	BUT	Others feel that they are easily able to keep their bodies looking attractive	☐	☐
9.	☐	☐	Some people feel that their muscles are much stronger than most others of their sex	BUT	Others feel that on the whole their muscles are not quite so strong as most others of their sex	☐	☐
10.	☐	☐	Some people are sometimes not so happy with the way they are or what they an do physically	BUT	Others always feel happy about the kind of person they are physically	☐	☐
11.	☐	☐	Some people are not quite so confident when it comes to taking part in sports activities	BUT	Others are among the most confident when it comes to taking part in sports activities	☐	☐
12.	☐	☐	Some people do not usually have a high level of stamina and fitness	BUT	Others always maintain a high level of stamina and fitness	☐	☐
13.	☐	☐	Some people feel embarrassed when it comes to wearing few clothes	BUT	Others do not feel embarrassed by their bodies when it comes to wearing few clothes	☐	☐
14.	☐	☐	When it comes to situations requiring strength some people are one of the first to step forward	BUT	When it comes to situations requiring strength some people are one of the last to step forward	☐	☐
15.	☐	☐	When it comes to the physical side of themselves some people do not feel very confident	BUT	Others seem to have a real sense of confidence in the physical side of themselves	☐	☐

	Really true for me	Sort of true for me				Sort of true for me	Really true for me
16.	☐	☐	Some people feel that they are always one of the best when it comes to joining in sports activities	BUT	Others feel that they are not one of the best when it comes to joining in sports activities	☐	☐
17.	☐	☐	Some people tend to feel a little uneasy in fitness and exercise settings	BUT	Others feel confident and at ease at all times in fitness and exercise settings	☐	☐
18.	☐	☐	Some people feel that they are often admired because their physique or figure is considered attractive	BUT	Others rarely feel that they receive admiration for the way their body looks	☐	☐
19.	☐	☐	Some people tend to lack confidence when it comes to their physical strength	BUT	Others are extremely confident when it comes to their physical strength	☐	☐
20.	☐	☐	Some people always have a really positive feeling about the physical side of themselves	BUT	Others sometimes do not feel positive about the physical side of themselves	☐	☐
21.	☐	☐	Some people are sometimes a little slower than most when it comes to learning new skills in a sports situation	BUT	Others have always seemed to be among the quickest when it comes to learning new sports skills	☐	☐
22.	☐	☐	Some people feel extremely confident about their ability to maintain regular exercise and physical condition	BUT	Others don't feel quite so confident about their ability to maintain regular exercise and physical condition	☐	☐
23.	☐	☐	Some people feel that compared to most their bodies do not look in the best of shape	BUT	Others feel that compared to most their bodies always look in excellent physical shape	☐	☐
24.	☐	☐	Some people feel that they are very strong and have well developed muscles compared to most people	BUT	Others feel that they are not so strong and their muscles are not very well developed	☐	☐
25.	☐	☐	Some people wish that they could have more respect for their physical selves	BUT	Others always have great respect for their physical selves	☐	☐

	Really true for me	Sort of true for me				Sort of true for me	Really true for me
26.	☐	☐	Given the chance, some people are always one of the first to join in sports activities	BUT	Other people sometimes hold back and are not usually among the first to join in sports	☐	☐
27.	☐	☐	Some people feel that compared to most they always maintain a high level of physical conditioning	BUT	Others are a little self-conscious about the appearance of their bodies	☐	☐
28.	☐	☐	Some people are extremely confident about the appearance of their body	BUT	Others are a little self-conscious about the appearance of their bodies	☐	☐
29.	☐	☐	Some people feel that they are not as good as most at dealing with situations requiring physical strength	BUT	Others feel that they are among the best at dealing with situations which require physical strength	☐	☐
30.	☐	☐	Some people feel extremely satisfied with the kind of person they are physically	BUT	Others sometimes feel a little dissatisfied with their physical selves	☐	☐

HOW IMPORTANT ARE THINGS TO YOU

	Really true for me	Sort of true for me				Sort of true for me	Really true for me
1.	☐	☐	Some people feel that being good at sports is vitally important to them	BUT	Others feel that being good a sports is not so important to them	☐	☐
2.	☐	☐	Some people do not feel that maintaining a high level of physical conditioning is very important to them	BUT	Others feel that maintaining a high level of physical conditioning is extremely important to them	☐	☐
3.	☐	☐	Some people believe that having an attractive physique or figure is vitally important to them	BUT	Others believe that having an attractive physique or figure is not all that important in their lives	☐	☐
4.	☐	☐	Some people believe that being physically strong is not so important to them	BUT	Others feel that it is extremely important to them to be physically strong	☐	☐
5.	☐	☐	Some people feel that having very good sports ability and skill is not so important to them	BUT	Others feel that having a high level of sports ability is really important to them	☐	☐
6.	☐	☐	Some people feel that maintaining regular vigorous exercise is vitally important to them	BUT	Others feel that keeping up regular vigorous exercise is not of prime importance to them	☐	☐
7.	☐	☐	Some people do not feel it so important to them to spend a lot of time and effort maintaining an attractive body	BUT	Others think that it is vitally important to spend time and effort maintaining an attractive body	☐	☐
8.	☐	☐	Some people feel that being strong and having well developed/toned muscles is vitally important to them	BUT	Others feel that being strong and having well developed/toned muscles is not so important to them	☐	☐

APPENDIX I

Commitment to Sport and Exercise Questionnaire (CTEQ)

The following statements may or may not describe your feelings about exercise and sport. Read each statement and then circle the appropriate number to indicate how well the statement describes your *feelings most of the time*. There are no right or wrong answers. Do not spend too much time on any one item, but give the answers which seem to describe/be how you generally *feel* about exercise and sport.

	Strongly Disagree	Disagree	Uncertain		Strongly Agree
I look forward to exercise/sport.	1	2	3	4	5
I wish there were more enjoyable way to stay fit.	1	2	3	4	5
Exercise/sport is drudgery.	1	2	3	4	5
I do not enjoy exercise/sport.	1	2	3	4	5
Exercise/sport is vitally important to me.	1	2	3	4	5
Life is so much richer as a result of exercise and sport.	1	2	3	4	5
Exercise/sport is pleasant.	1	2	3	4	5
I dread the thought of exercise/ sport.	1	2	3	4	5
I would arrange or change my schedule to meet the need to exercise/sport.	1	2	3	4	5
I have to force myself to exercise/sport.	1	2	3	4	5
To miss exercise/sport is sheer relief.	1	2	3	4	5
Exercise/sport is the high point of my day.	1	2	3	4	5

APPENDIX J

Exercise Motivation Inventory

NAME: .....

AGE..... SEX: MALE / FEMALE

On the following pages are a number of statements concerning the reasons people often give when asked why they exercise. Please read each statement carefully and indicate, by circling the appropriate number, whether or not each statement is true for you personally. If you do not consider a statement to be true for you at all circle the zero. If you think that a statement if very true indeed for you circle the five. If you think that a statement is partly true for you then circle one, two, three or four, according to how strongly you feel it reflects why you exercise.

Remember we want to know why you *personally* choose to exercise, not whether you think the statements are good reasons for *anybody* to exercise.

No.	QUESTION						
1.	To stay slim	0	1	2	3	4	5
2.	To feel physically fit	0	1	2	3	4	5
3.	Because exercise gives me goals to work for	0	1	2	3	4	5
4.	Because I feel good after exercising	0	1	2	3	4	5
5.	To lose weight	0	1	2	3	4	5
6.	Because my Doctor advised me to exercise.	0	1	2	3	4	5
7.	Because regular exercise helps me to cope with life's difficulties	0	1	2	3	4	5
8.	Because I like people to know that I am fit and healthy	0	1	2	3	4	5
9.	To meet other people	0	1	2	3	4	5
10.	To stay/become more agile	0	1	2	3	4	5
11.	To give me space to think	0	1	2	3	4	5
12.	To help prevent an illness that runs in my family	0	1	2	3	4	5
13.	To improve my appearance	0	1	2	3	4	5
14.	Because I have a lot of fun being active with other people	0	1	2	3	4	5
15.	To show my worth to others	0	1	2	3	4	5
16.	Because it makes me feel good.	0	1	2	3	4	5
17.	To develop personal skills	0	1	2	3	4	5
18.	Because I find exercise satisfying in and of itself	0	1	2	3	4	5
19.	To take my mind off things	0	1	2	3	4	5
20.	To help control my weight	0	1	2	3	4	5
21.	Because it helps to reduce my tension	0	1	2	3	4	5
22.	To compare my abilities with other peoples	0	1	2	3	4	5
23.	To make new friends	0	1	2	3	4	5
24.	To avoid heart stress	0	1	2	3	4	5
25.	For enjoyment of the experience of exercising	0	1	2	3	4	5
26.	Because I like to be seen as fit and healthy	0	1	2	3	4	5

27.	Because exercising helps me to lose fat	0	1	2	3	4	5
28.	To gain recognition for my accomplishments	0	1	2	3	4	5
29.	Because I find exercise invigorating	0	1	2	3	4	5
30.	To prevent health problems	0	1	2	3	4	5
31.	To measure myself against personal standards	0	1	2	3	4	5
32.	To gain attention from others	0	1	2	3	4	5
33.	Because after exercising I feel refreshed	0	1	2	3	4	5
34.	To avoid ill health	0	1	2	3	4	5
35.	To accomplish things that others are incapable of	0	1	2	3	4	5
36.	Because I enjoy physical competition	0	1	2	3	4	5
37.	To look more attractive	0	1	2	3	4	5
38.	To help manage stress	0	1	2	3	4	5
39.	To stay/become flexible	0	1	2	3	4	5
40.	Because exercise helps me to burn calories	0	1	2	3	4	5
41.	To help recover from an illness	0	1	2	3	4	5
42.	To release tension	0	1	2	3	4	5
43.	Because I find physical activities fun especially when competition is involved.	0	1	2	3	4	5
44.	Because I feel at my best when exercising	0	1	2	3	4	5

Thank you for completing this questionnaire.

APPENDIX K

GENERAL HEALTH QUESTIONNAIRE

Please read this carefully:

We should like to know if you have had any medical complaints, and how your health has been in general over the last *24 hours*. Please answer ALL the questions on the following pages simply by underlining the answer which you think most nearly applies to you.

It is important that you try to answer ALL the questions.

Thank you very much for your co-operation.

HAVE YOU:

been feeling perfectly well and in good health?	Better than usual	Same as usual	Worse than usual	Much Worse than usual
been feeling in need of a good tonic?	Not at all	No more than usual	Rather more than usual	Much more than usual
been feeling run down and out of sorts?	Not at all	No more than usual	Rather more than usual	Much more than usual
felt that you are ill?	Not at all	No more than usual	Rather more than usual	Much more than usual
been getting any pain ? in your head?	Not at all	No more than usual	Rather than usual	Much more than usual
been getting a feeling of tightness or pressure in you head?	Not at all	No more than usual	Rather more than usual	Much more than usual
been having hot or cold or cold spells?	Not at all	No more than usual	Rather than usual	Much more than usual
lost much sleep over worry?	Not at all	No more than usual	Rather than usual	Much more than usual

had difficulty in staying asleep once you are off?	Not at all	No more than usual	Rather than usual	Much more than usual
constantly under strain?	Not at all	No more than usual	Rather than usual	Much more than usual
been getting edgy and bad tempered?	Not at all	No more than usual	Rather than usual	Much more than usual
been getting scared or panicky for no reason?	Not at all	No more than usual	Rather than usual	Much more than usual
found everything getting on top of you?	Not at all	No more than usual	Rather than usual	Much more than usual
been feeling nervous and strung-up all the time?	Not at all	No more than usual	Rather than usual	Much more than usual
been managing to keep yourself busy and occupied?	More so than usual	Same as usual	Rather less than usual	Much less than usual
been taking longer over the things you do?	Quicker than usual	Same as usual	Longer than usual	Much longer than usual
felt on whole you were doing things well?	Better than usual	About the same	Less well than usual	Much well than usual
been satisfied with the way you've carried out your tasks?	More satisfied	About same as usual	Less satisfied than usual	Much less than usual
felt that you are playing a useful part in thing?	More so than usual	Same as usual	Less useful than usual	Much less than usual
felt capable of making decisions about things?	More so than usual	Same as usual	Less so than usual	Much less than usual
been able to enjoy your normal day-to-day activities?	More so than usual	Same as usual	Less so than usual	Much less than usual
been thinking of yourself as a worthless person?	Not at all	No more than usual	Rather more than usual	Much more than usual
felt that life is entirely hopeless?	Not at all	No more than usual	Rather more than usual	Much more than usual
felt that life isn't worth living?	Not at all	No more than usual	Rather more than usual	Much more than usual

thought of the possibility that you might make away with yourself?	Definitely not	I don't think so	Has crossed my mind	Definitely have
found at times you couldn't do anything because you nerves were too bad?	Not at all	No more than usual	Rather more than usual	Much more than usual
found yourself wishing you more dead and away from it all?	Not at all	No more than usual	Rather more than usual	Much were than usual
found that the idea of taking your life kept coming into your mind	Definitely not	I don't think so	Had crossed my mind	Definitely has

APPENDIX L

The Subjective Exercise Experience Scale

By circling a number on the scale below each of the following items, please indicate the degree to which you are experiencing each feeling now, at this point in time.

I FEEL

Great	1	2	3	4	5	6	7
	not at all			moderately		very much so	
Awful	1	2	3	4	5	6	7
	not at all			moderately		very much so	
Drained	1	2	3	4	5	6	7
	not at all			moderately		very much so	
Positive	1	2	3	4	5	6	7
	not at all			moderately		very much so	
Crummy	1	2	3	4	5	6	7
	not at all			moderately		very much so	
Exhausted	1	2	3	4	5	6	7
	not at all			moderately		very much so	
Strong	1	2	3	4	5	6	7
	not at all			moderately		very much so	
Discouraged	1	2	3	4	5	6	7
	not at all			moderately		very much so	
Fatigued	1	2	3	4	5	6	7
	not at all			moderately		very much so	
Terrific	1	2	3	4	5	6	7
	not at all			moderately		very much so	
Miserable	1	2	3	4	5	6	7
	not at all			moderately		very much so	
Tired	1	2	3	4	5	6	7
	not at all			moderately		very much so	

APPENDIX M

Validation of the Shortened Bi-POMS

There are a number of uses for the Bi-POMS, although its principal uses are (1) to identify and assess moods and feelings in normal individuals, (2) to individually assess in groups various withdrawal manipulations in relation to mood states and (3) to assess mood change resulting from various intervention strategies, (e.g. exercise & relaxation). Because this study required subjects to complete the Bi-POMS repeatedly twice per day for 21 days as well as completing a series of other questionnaires (these questionnaires were already relatively short) it was thought that devising a shortened version of the Bi-POMS would facilitate the response rates from subjects and could be more easily applied. It was particularly important that the amount of time subjects spent completing questionnaires was minimised because there was a possibility that the actual act of completing the questionnaires and the repetitive nature of this study would influence subjects mood states in some way. Additionally, there may have been a problem with subjects becoming over sensitive and too familiar with the questionnaires. In other words attempts had to be made to control for the influence of testing upon the results. Furthermore, it was thought that shortening the Bi-POMS to 36 items (exactly half the items contained in the original questionnaire) would make both measures of moods more comparable in terms of size and completion time.

The original 72 item Bi-POMS was administered to a sample of 270 adults. The first step involved confirming the original factor structure of Lorr and McNair's (1984) Bi-POMS (Bi-POMS/72). Ideally this should have involved confirmatory factor analysis (Lisrel 6). Unfortunately, due to the size of the model specifications, in particularly, the number of items contained in the Bi-POMS/72 Lisrel 6 was unable to be utilised for confirmatory factor analysis.

Therefore, a 2 stage structure and item confirmation analyses was adopted, these being exploratory factor analysis and cronbach's alpha reliability tests. In order to confirm Lorr and McNair's (1984) original factor structure all 72 items were subjected to principal components factor analysis with varimax rotations. Six scales were specified. Table 10.1 shows the factors, items and item loadings of the rotated factor matrix. The exploratory factor analysis provided some similarities with Lorr and McNair's (1984) original factor structure.

The internal consistency of the original Bi-POMS was examined using Cronbach's alpha (1951). Alpha reliability coefficients ranged from .843 to .897 and are also shown in Table 10.2. Based on the item removal statistics of the reliability analysis and the total item correlation statistics, item reduction was undertaken. A number of combinations of different items were tested until the best 'fit' of 6 items were obtained. The weakest 6 items were removed from each scale, 3 positive and 3 negative. Alpha reliability coefficients ranged from .747 to .838. Table 10.3 shows the alpha coefficient statistics for the six subscales following the reduction of the 3 weakest negative and positive items (6 in total). Subscale means and standard deviations are also included. The final version of the shortened Bi-Polar POMS contained 36 items and can be found in Appendix L.

Items, subscales and factor loadings for the original Bi-POMS/72 (loadings <0.3 not shown;ambiguously loading items shown in bold).

		FACTOR					
Item		Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
V62	agreeable	.74806					
V44	elated	.69496					
V56	elated	.64788					
V8	elated	.62320					
V26	agreeable	.58348					
V64	confident	.57890	.39711				
V38	**agreeable**	**.55535**			.51623		
V68	elated	.54784	.35070				
V28	**confident**	**.54267**	**.44921**				
V52	confident	.53704	.34269				
V65	**composed**	**.53468**	**.46858**				
V50	agreeable	.52931					
V53	**composed**	**.52846**	**.48708**				
V14	agreeable	.51560			.34294		
V2	agreeable	.51247					
V40	confident	.50872	.35919				
V20	**elated**	**.49158**	**.44439**				
V32	**elated**	**.47944**	**.37908**				
V1	**composed**	**.46094**		**.45808**			
V5	composed	.45991					
V54	clear		.73555				
V29	composed		.66681				
V6	clear		.65682				
V30	clear		.65345				
V41	composed		.62900				
V17	composed		.60693				
V66	clear		.60380				
V18	clear	.35678	.56032				
V42	clear	.34358	.52424				
V16	confident		.47850				
V48	**clear**		**.43904**	.36554	.38371		
V4	**confident**		**.42962**				**.35102**
V13	composed		.33061				
V35	confident			.77338			

V60	clear			.73751			
V71	confident	.40736		.69926			
V47	confident			.65113			
V72	clear	.30107		.64832			
V24	clear			.55062			
V11	confident			.54132			
V55	**energetic**			**.51603**		**.41211**	
V12	**clear**		.46596	**.51597**			
V59	**confident**	**.32725**	.43125	**.48078**		**.33037**	
V36	**clear**			**.47344**	**.31629**		
V19	**energetic**			**.46779**		**.43443**	
V63	**elated**			**.46608**		**.31528**	
V23	**confident**		.34387	**.45330**			
V57	agreeable				.66050		
V33	agreeable				.62229		
V45	agreeable				.39294	.59464	
V27	elated				.57452	.36342	
V69	agreeable				.54180	.34874	
V25	composed	.33956			.52295		
V9	**agreeable**				**.48771**	**.30383**	
V61	**composed**	**.33080**			**.47644**		
V21	agreeable				.46661		
V49	**composed**	**.30997**	.30580	**.34578**	**.44423**		
V37	**composed**	**.39425**		**.34754**	**.42449**		
V15	elated					.68740	
V7	energetic					.66109	
V51	elated				.39604	.63638	
V39	**elated**				**.48112**	**.59604**	
V3	elated				.35583	.56312	
V31	**energetic**				**.40778**	**.52260**	
V67	**energetic**			**.46145**		**.51012**	
V43	**energetic**			**.39718**		**.39957**	
V22	energetic						.80560
V10	energetic						.78540
V70	energetic						.75243
V34	energetic						.74994
V58	energetic						.72454
V46	energetic		.34892				.55277

Cronbach's alpha coefficients for original Bi-POMS.

Subscales	Number of items	Mean	*SD*	Cronbach's alpha
Energetic-Tired	12	21.61	7.85	.897
Elated-Depressed	12	25.30	6.65	.869
Clearheaded-Confused	12	27.02	6.27	.879
Composed-Anxious	12	24.87	6.84	.880
Agreeable-Hostile	12	26.43	6.01	.843
Confident-Unsure	12	23.85	6.91	.864

Cronbach's alpha coefficients for shortened Bi-POMS.

Subscales	Number of items	Mean	*SD*	Cronbach's alpha
Energetic-Tired	6	11.18	4.16	.825
Elated-Depressed	6	12.70	3.74	. 823
Clearheaded-Confused	6	13.57	3.14	. 747
Composed-Anxious	6	12.30	3.75	. 804
Agreeable-Hostile	6	13.25	3.35	. 777
Confident-Unsure	6	12.36	3.94	. 838

As mentioned previously the exploratory factor analysis only provided 'adequate' support for Lorr and McNair's original Bi-POMS/72 factor structure since a number of items were ambiguously loaded. In summary, 3 subscales had reasonable factor loadings (Clearheaded-Confused, Agreeable-Hostile & Energetic-Tired), 2 subscales had adequate loadings (Confident-Unsure & Elated-Depressed) and one subscale was rather weak (Composed-Anxious) in that a number of other items from different subscales loaded onto this factor.

One of the problems which may have contributed towards the ambiguous loadings of a number of items and thus the weakening of some factors is the problem of cultural and unclear terminology. The original Bi-POMS is an American questionnaire and as such it perhaps contains items which are confusing to British individuals. Additionally, a number

of items contained in the original Bi-POMS are unclear and cryptic, which is perhaps why several items in this study had loadings on two or more factors (e.g. 'Serene' & 'Ready to Go'). One final point which should be made is that Lorr and McNair (1984) conducted validity studies on the original Bi-POMS on university students whereas the present study used working adults (age ranges = 18-65yrs) who may well display different psychological mood profiles as compared to the average college student and therefore a perfect factor structure 'fit' would be unlikely.

Whilst exploratory factor analysis only provided reasonable support for the original factor structure of Bi-POMS/72 the internal consistency as measured by Cronbach's alpha was good and clear. The relationship between items on each specified scale was strong with alpha's ranging from .84 to .89. Importantly also, on each scale when any one item was deleted alpha rarely fell below .87 which suggests that (1) each item was strong in its own right but also along with corrected item total correlation, and that (2) each item 'fit' together quite comfortably. When the best fit of items for the shortened Bi-POMS (see Appendix L) were being selected any unclear items were automatically disregarded, for example 'Full of Pep' and 'Businesslike'.

APPENDIX N

Shortened Bi-Polar Profile of Mood States

Below are words that describe feelings and moods people have. Please read every word carefully and then circle the number which best describes how you are feeling RIGHT NOW

0 = Much unlike this
1 = Slightly unlike this
2 = Slightly like this
3 = Much like this

1) Bad tempered	0 1 2 3	20) Energetic	0 1 2 3
2) Anxious	0 1 2 3	21) Joyful	0 1 2 3
3) Muddled	0 1 2 3	22) Able to concentrate	0 1 2 3
4) Discouraged	0 1 2 3	23) Composed	0 1 2 3
5) Sluggish	0 1 2 3	24) Kindly	0 1 2 3
6) Efficient	0 1 2 3	25) Uncertain	0 1 2 3
7) Weary	0 1 2 3	26) Confident	0 1 2 3
8) Good-natured	0 1 2 3	27) Gloomy	0 1 2 3
9) Dazed	0 1 2 3	28) Untroubled	0 1 2 3
10) Annoyed	0 1 2 3	29) Uneasy	0 1 2 3
11) Inadequate	0 1 2 3	30) Jolly	0 1 2 3
12) Self assured	0 1 2 3	31) Unsure	0 1 2 3
13) Fatigued	0 1 2 3	32) Ready to go	0 1 2 3
14) Downhearted	0 1 2 3	33) Light-hearted	0 1 2 3
15) Perplexed	0 1 2 3	34) Mentally alert	0 1 2 3
16) Nervous	0 1 2 3	35) Peaceful	0 1 2 3
17) Grouchy	0 1 2 3	36) Friendly	0 1 2 3
18) Powerful	0 1 2 3		
19) Active	0 1 2 3		

APPENDIX O

Structured Interviews; Male and Female Versions

Structured Interview: FEMALE

Q1. Please describe generally how you felt during the exercise withdrawal period?
Prompt: Think about how you were feeling both physically as well as mentally?

Q2. What would you attribute this to?
Prompt: So was this due to the exercise withdrawal?

Q3. Was there anything else which may have contributed towards you feeling this way and/or experiencing these symptoms?

Q4. As you might know some women find that their feelings fluctuate throughout their menstrual cycle so linked to this question - Do you normally suffer from any noticeable fluctuations in your moods prior or during your period?

Q5. Can you tell me when your next period is due?

Q6. Did you have your period during the exercise withdrawal time?

Q7. What did you think would happen to you physically and psychologically when you were asked to withdraw from exercise?

Q8. To what extent do you believe being asked to withdraw from exercise affected you?

Q9. What sorts of things did you do during the time you would normally have been exercising?

Q10. Did this help you to deal better with the way you were feeling?

Q11. What did you miss about not being able to exercise?

Q12. Did you still socialise with the people you would normally have been exercising with?

Structured Interview: MALE

Q1. Please describe generally how you felt during the exercise withdrawal period?
Prompt: Think about how you were feeling both physically as well as mentally?

Q2. What would you attribute this to?
Prompt: So was this due to the exercise withdrawal?

Q3. Was there anything else which may have contributed towards you feeling this way and/or experiencing these symptoms?

Q7. What did you think would happen to you physically and psychologically when you were asked to withdraw from exercise?

Q8. To what extent do you believe being asked to withdraw from exercise affected you?

Q9. What sorts of things did you do during the time you would normally have been exercising?

Q10. Did this help you to deal better with the way you were feeling?

Q11. What did you miss about not being able to exercise?

Q12. Did you still socialise with the people you would normally have been exercising with?

APPENDIX P

Assumptions of Statistical Tests

Chapter 3:

Multiple Analysis of Covariance

a. The population from which the samples are drawn are normally distributed.

b. The variability of the groups in the experiment is equal or nearly so (homogeneity of variance).

c. The scores in all groups are independent.

d. Samples have been randomly selected from the population and randomly assigned to conditions.

e. Data is based on a parametric scale.

f. More subjects per group than there are dependent variables.

g. Outliers.

h. Independence of the covariates and the treatments effects.

i. A linear relationship between the covariates and the dependent variable.

j. Homogeneity of the regression coefficients.

Assumptions underlying analysis of covariance were tested using SPSS/PC. Assumptions a to g and j were satisfied. Additionally it is important to note that subjects were not randomly selected from the population although they were randomly assigned to groups.

Chi-Squared Analysis

a. Expected cell frequencies are greater than 5. The obtained frequencies in any given cell are normally distributed around the expected frequency.

b. Nominal data and ordinal groupings.

c. Each subject contributes to the count in only one cell in the cross tabulation.

All assumptions were tested and met.

Chapter 4:

Pearson's Product Correlation Coefficients

a. Interval variables are used.

b. Linear relationship between variables.

All assumptions were tested and met using SPSS windows.

Hierarchical Regression Analysis

a. Ratio of subjects to independent variables should be no less than 5:1 and ideally 20:1.

b. Outliers.

c. Normality and Homoscedasticity of residuals.

d. Multicollinearity.

e. Singularity.

All assumptions were tested and a, b d and e and met using SPSS for Windows.

Chapters 5, 6 & 7

Repeated Measures Analysis of Covariance

a. The population from which the samples are drawn are normally distributed.

b. The variability of the groups in the experiment is equal or nearly so (homogeneity of variance).

c. The scores in all groups are independent.

d. Samples have been randomly selected from the population and randomly assigned to conditions.

e. Data is based on a parametric scale.

f. More subjects per group than there are dependent variables.

g. Outliers.

h. Independence of the covariates and the treatments effects.

i. A linear relationship between the covariates and the dependent variable.

j. Homogeneity of the regression coefficients.

k. Sphericity

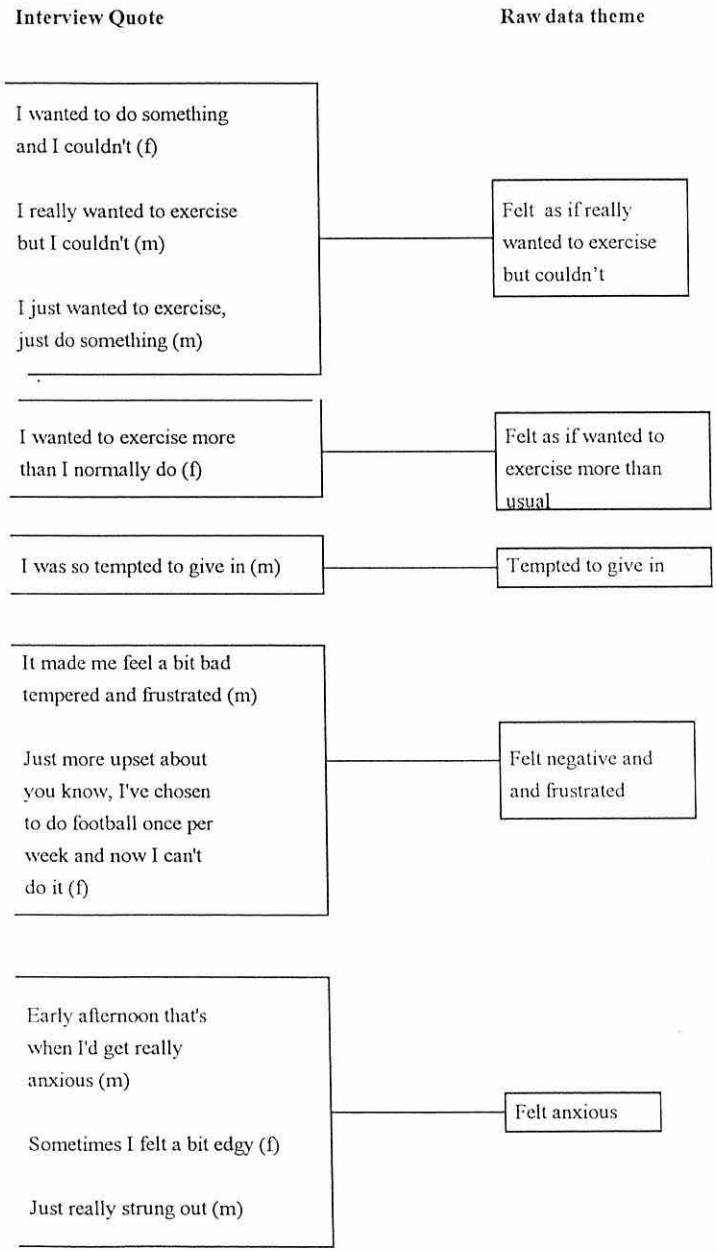
All assumptions were tested. Assumptions a to g and j were met. subjects were not randomly selected from the population although they were randomly assigned to groups.

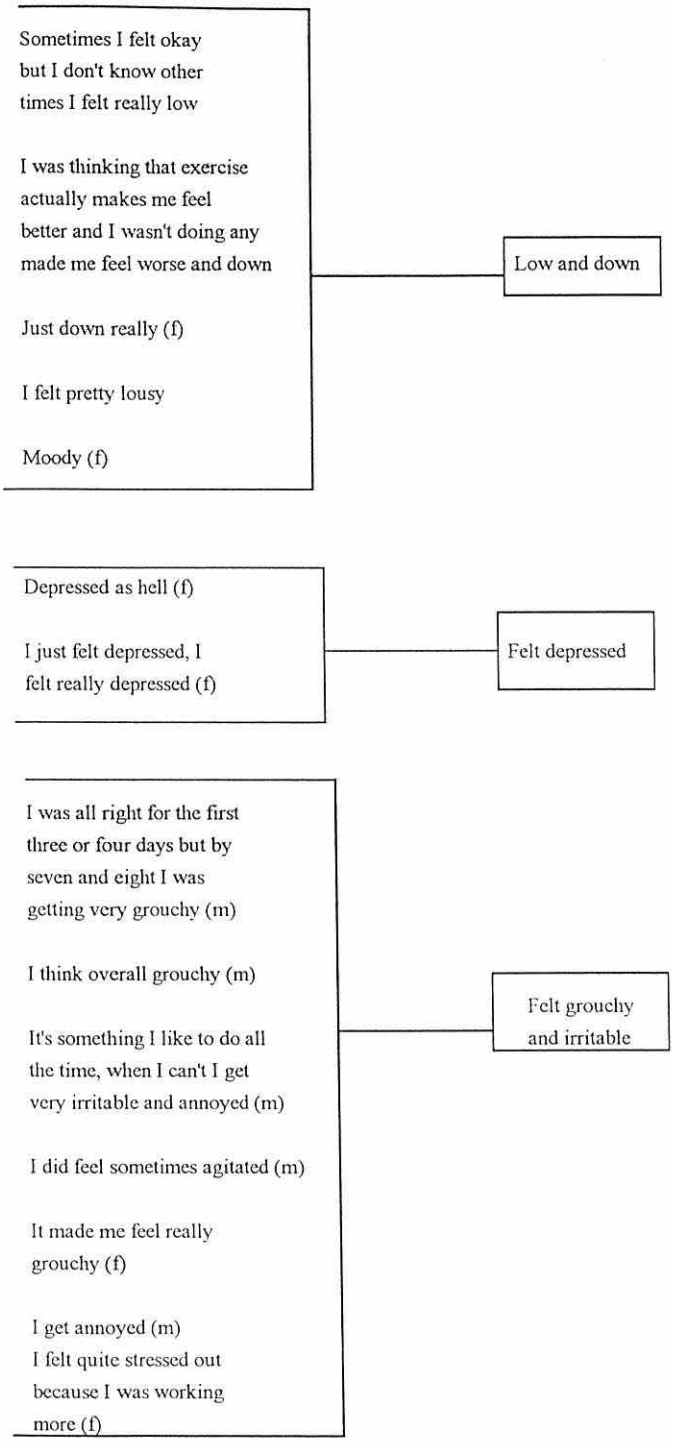
APPENDIX Q

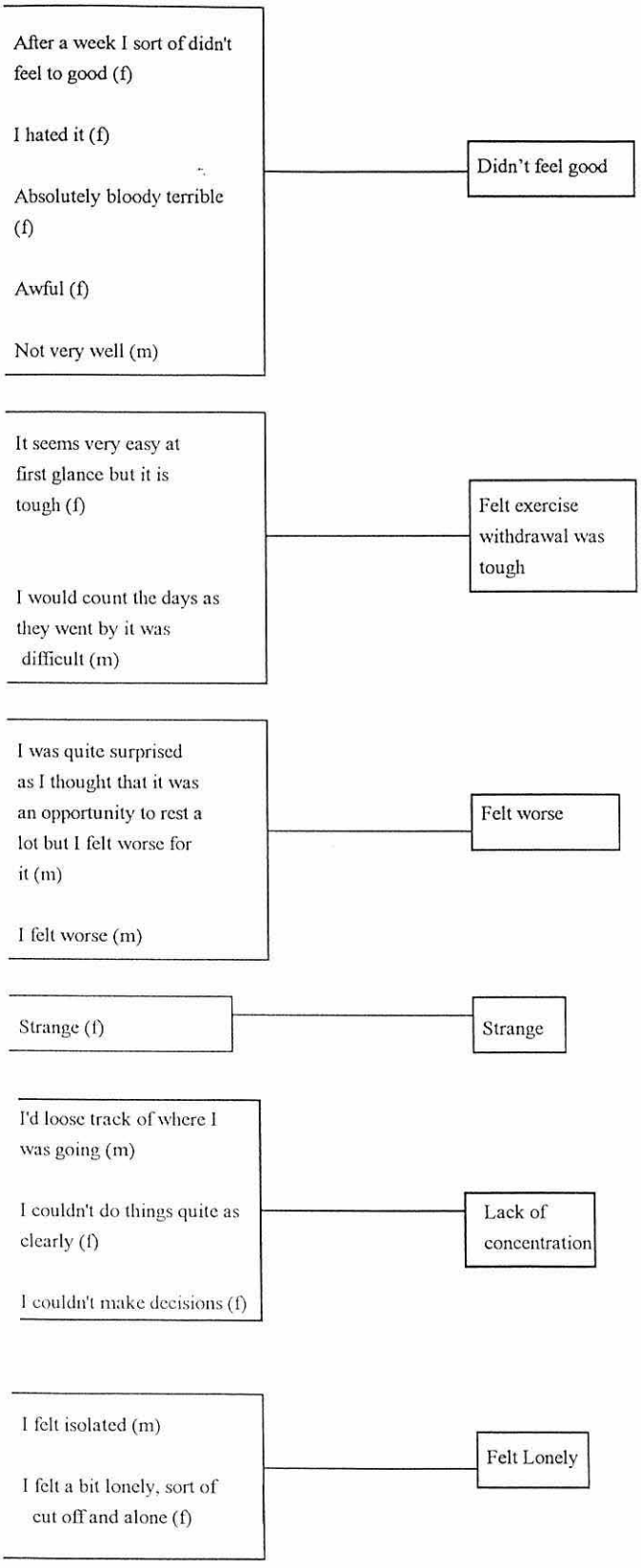
Clustering of Interview Quotes into Raw Data Themes

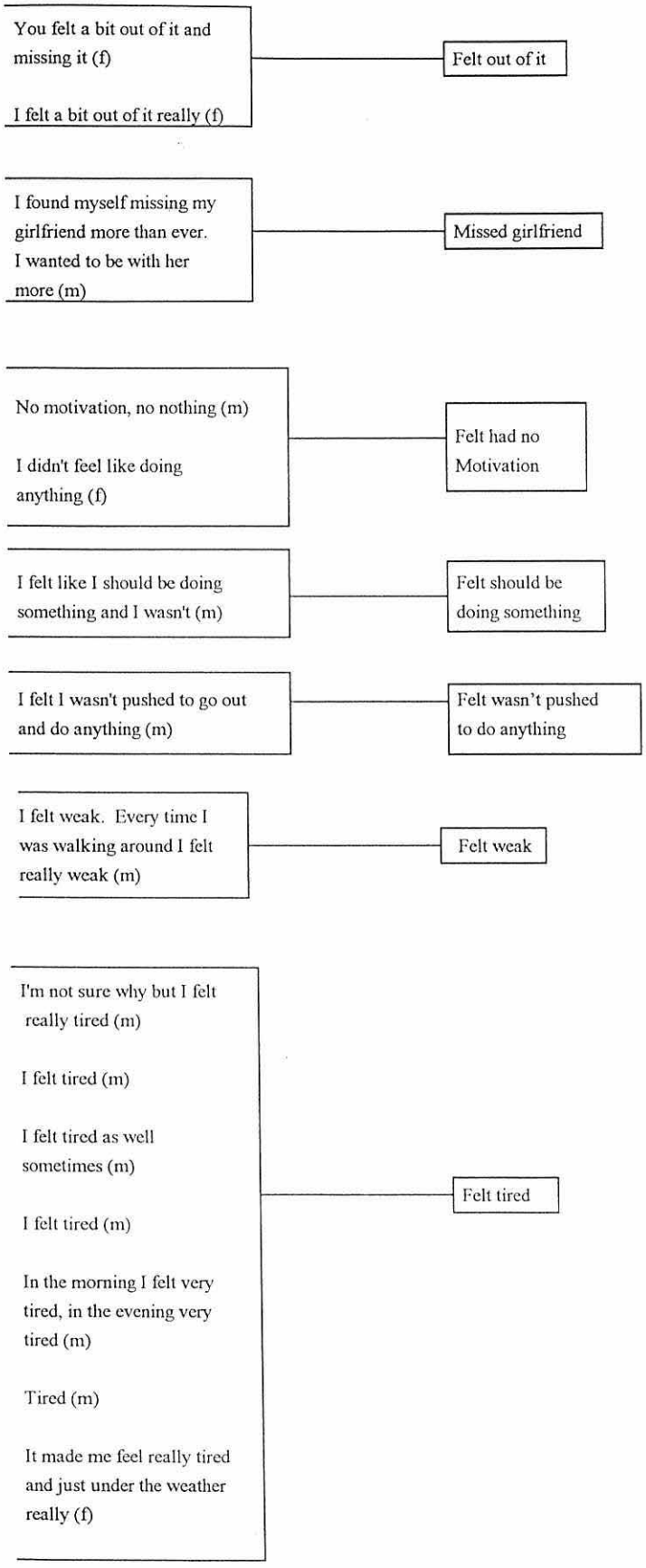
Question 1.

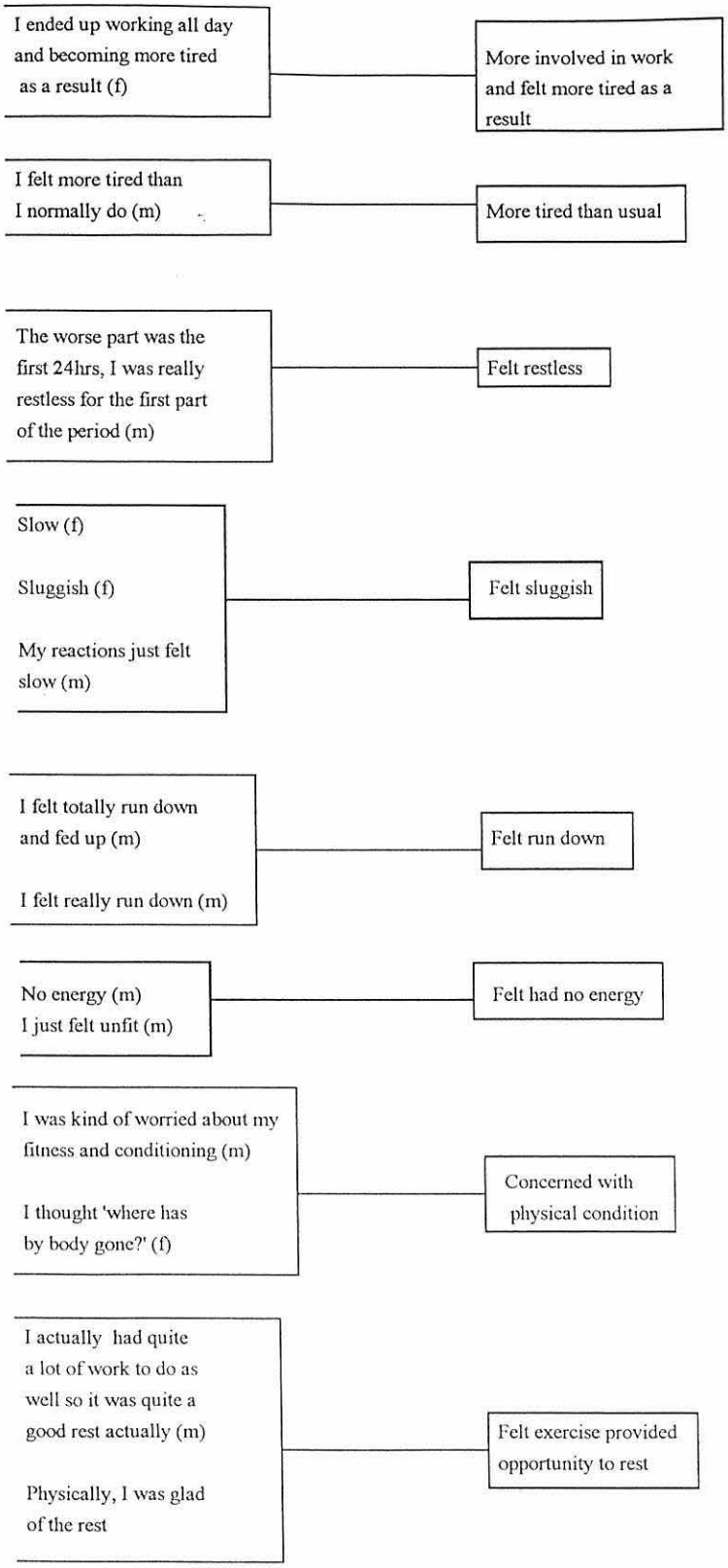
Please describe generally how you felt during the exercise withdrawal period? Prompt: Think about how you were feeling both physically as well as mentally

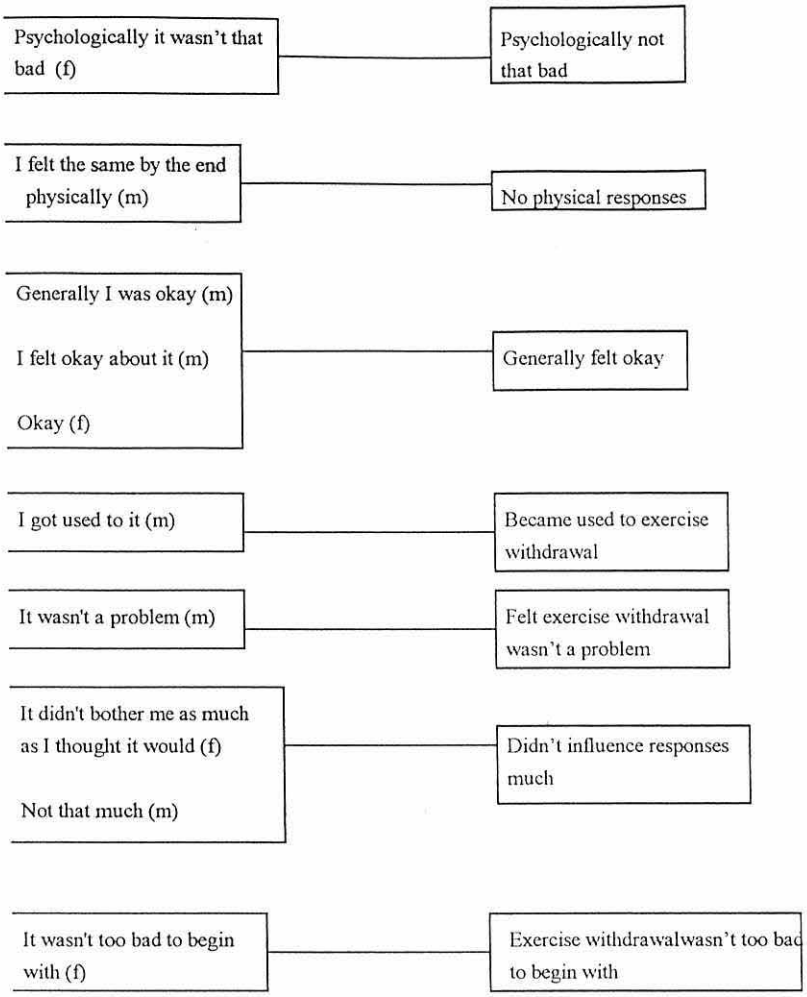



Sometimes I felt okay but I don't know other times I felt really low
I was thinking that exercise actually makes me feel better and I wasn't doing any made me feel worse and down
Just down really (f)
I felt pretty lousy
Moody (f)
Low and down
Depressed as hell (f)
I just felt depressed, I felt really depressed (f)
Felt depressed
I was all right for the first three or four days but by seven and eight I was getting very grouchy (m)
I think overall grouchy (m)
It's something I like to do all the time, when I can't I get very irritable and annoyed (m)
I did feel sometimes agitated (m)
It made me feel really grouchy (f)
I get annoyed (m)
I felt quite stressed out because I was working more (f)
Felt grouchy and irritable

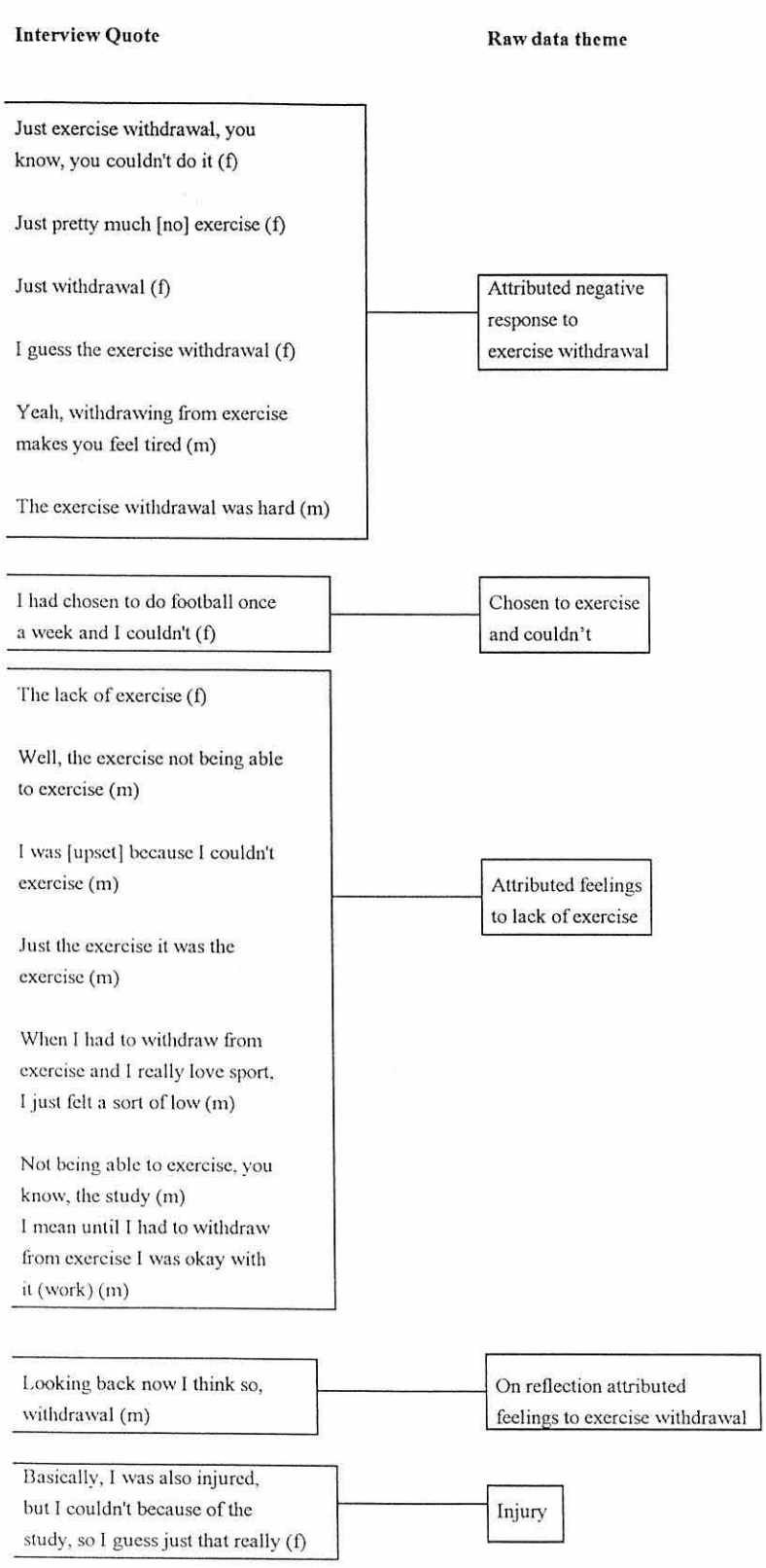

After a week I sort of didn't feel to good (f)
I hated it (f)
Absolutely bloody terrible (f)
Awful (f)
Not very well (m)
Didn't feel good
It seems very easy at first glance but it is tough (f)
I would count the days as they went by it was difficult (m)
Felt exercise withdrawal was tough
I was quite surprised as I thought that it was an opportunity to rest a lot but I felt worse for it (m)
I felt worse (m)
Felt worse
Strange (f)
Strange
I'd loose track of where I was going (m)
I couldn't do things quite as clearly (f)
I couldn't make decisions (f)
Lack of concentration
I felt isolated (m)
I felt a bit lonely, sort of cut off and alone (f)
Felt Lonely

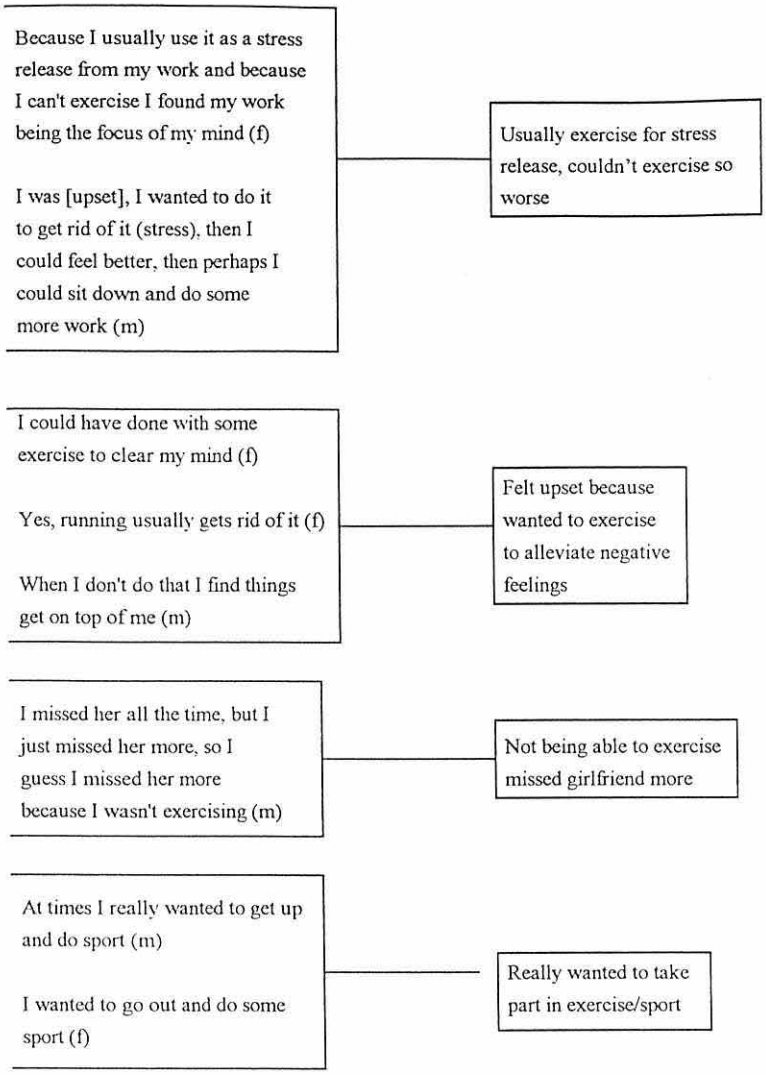

You felt a bit out of it and missing it (f)
I felt a bit out of it really (f)
Felt out of it
I found myself missing my girlfriend more than ever. I wanted to be with her more (m)
Missed girlfriend
No motivation, no nothing (m)
I didn't feel like doing anything (f)
Felt had no Motivation
I felt like I should be doing something and I wasn't (m)
Felt should be doing something
I felt I wasn't pushed to go out and do anything (m)
Felt wasn't pushed to do anything
I felt weak. Every time I was walking around I felt really weak (m)
Felt weak
I'm not sure why but I felt really tired (m)
I felt tired (m)
I felt tired as well sometimes (m)
I felt tired (m)
In the morning I felt very tired, in the evening very tired (m)
Tired (m)
It made me feel really tired and just under the weather really (f)
Felt tired

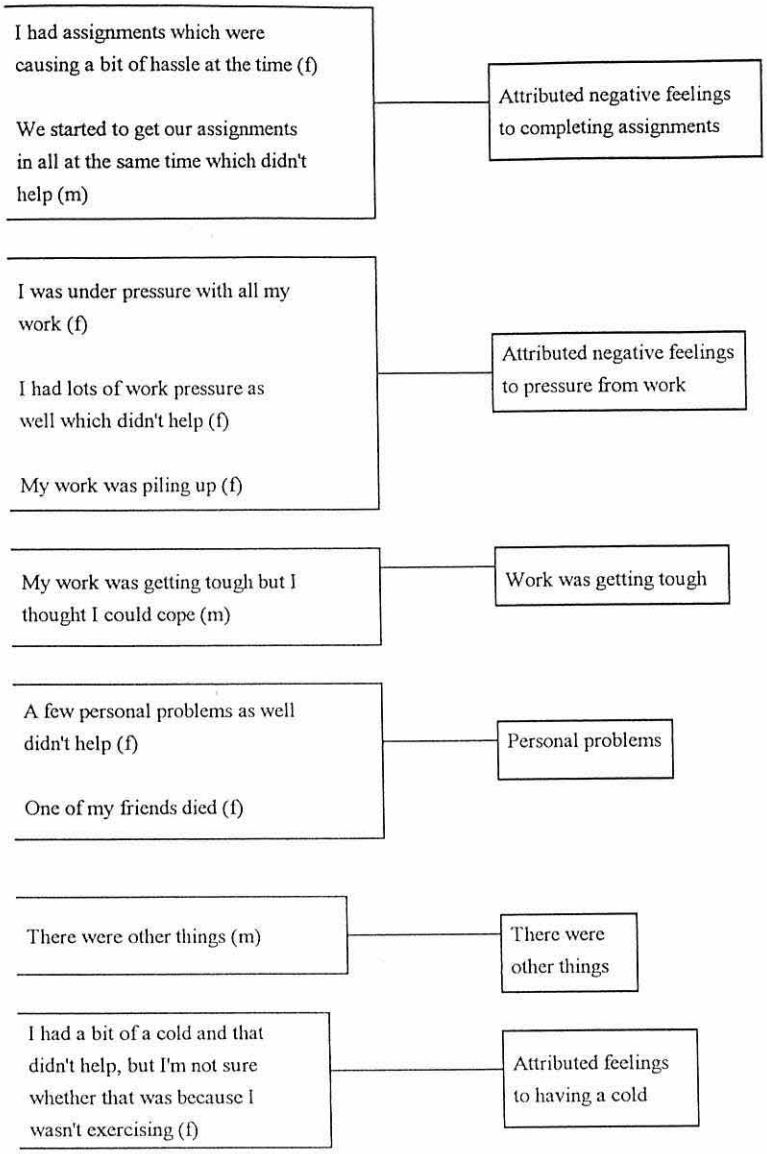

I ended up working all day and becoming more tired as a result (f)
More involved in work and felt more tired as a result
I felt more tired than I normally do (m)
More tired than usual
The worse part was the first 24hrs, I was really restless for the first part of the period (m)
Felt restless
Slow (f)
Sluggish (f)
My reactions just felt slow (m)
Felt sluggish
I felt totally run down and fed up (m)
I felt really run down (m)
Felt run down
No energy (m)
I just felt unfit (m)
Felt had no energy
I was kind of worried about my fitness and conditioning (m)
I thought 'where has by body gone?' (f)
Concerned with physical condition
I actually had quite a lot of work to do as well so it was quite a good rest actually (m)
Physically, I was glad of the rest
Felt exercise provided opportunity to rest


Psychologically it wasn't that bad (f)
Psychologically not that bad
I felt the same by the end physically (m)
No physical responses
Generally I was okay (m)
I felt okay about it (m)
Okay (f)
Generally felt okay
I got used to it (m)
Became used to exercise withdrawal
It wasn't a problem (m)
Felt exercise withdrawal wasn't a problem
It didn't bother me as much as I thought it would (f)
Not that much (m)
Didn't influence responses much
It wasn't too bad to begin with (f)
Exercise withdrawalwasn't too bad to begin with

Question 2.
What would you attribute this to?

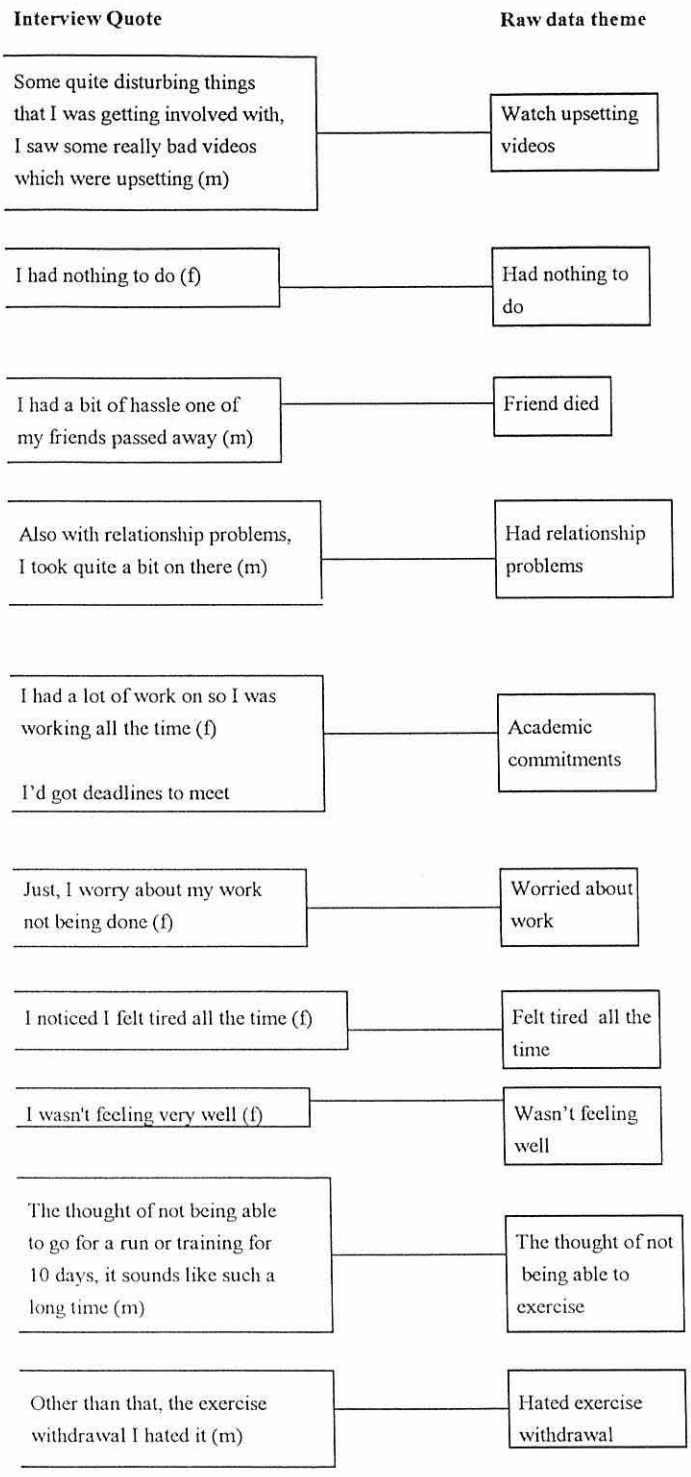


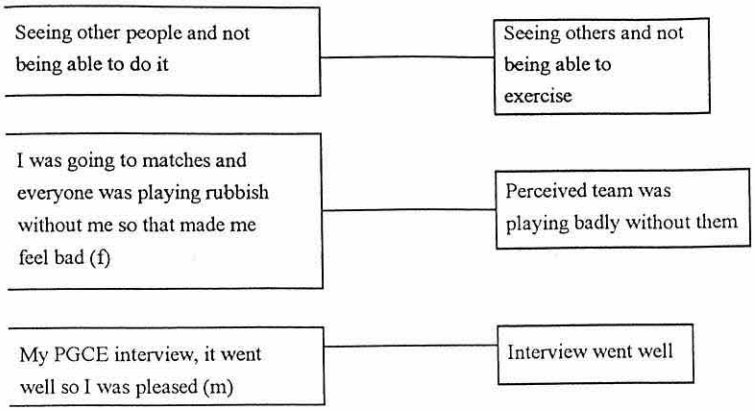

Because I usually use it as a stress release from my work and because I can't exercise I found my work being the focus of my mind (f)
I was [upset], I wanted to do it to get rid of it (stress), then I could feel better, then perhaps I could sit down and do some more work (m)
Usually exercise for stress release, couldn't exercise so worse
I could have done with some exercise to clear my mind (f)
Yes, running usually gets rid of it (f)
When I don't do that I find things get on top of me (m)
Felt upset because wanted to exercise to alleviate negative feelings
I missed her all the time, but I just missed her more, so I guess I missed her more because I wasn't exercising (m)
Not being able to exercise missed girlfriend more
At times I really wanted to get up and do sport (m)
I wanted to go out and do some sport (f)
Really wanted to take part in exercise/sport


I had assignments which were causing a bit of hassle at the time (f)
We started to get our assignments in all at the same time which didn't help (m)
Attributed negative feelings to completing assignments
I was under pressure with all my work (f)
I had lots of work pressure as well which didn't help (f)
My work was piling up (f)
Attributed negative feelings to pressure from work
My work was getting tough but I thought I could cope (m)
Work was getting tough
A few personal problems as well didn't help (f)
One of my friends died (f)
Personal problems
There were other things (m)
There were other things
I had a bit of a cold and that didn't help, but I'm not sure whether that was because I wasn't exercising (f)
Attributed feelings to having a cold

Question 3.

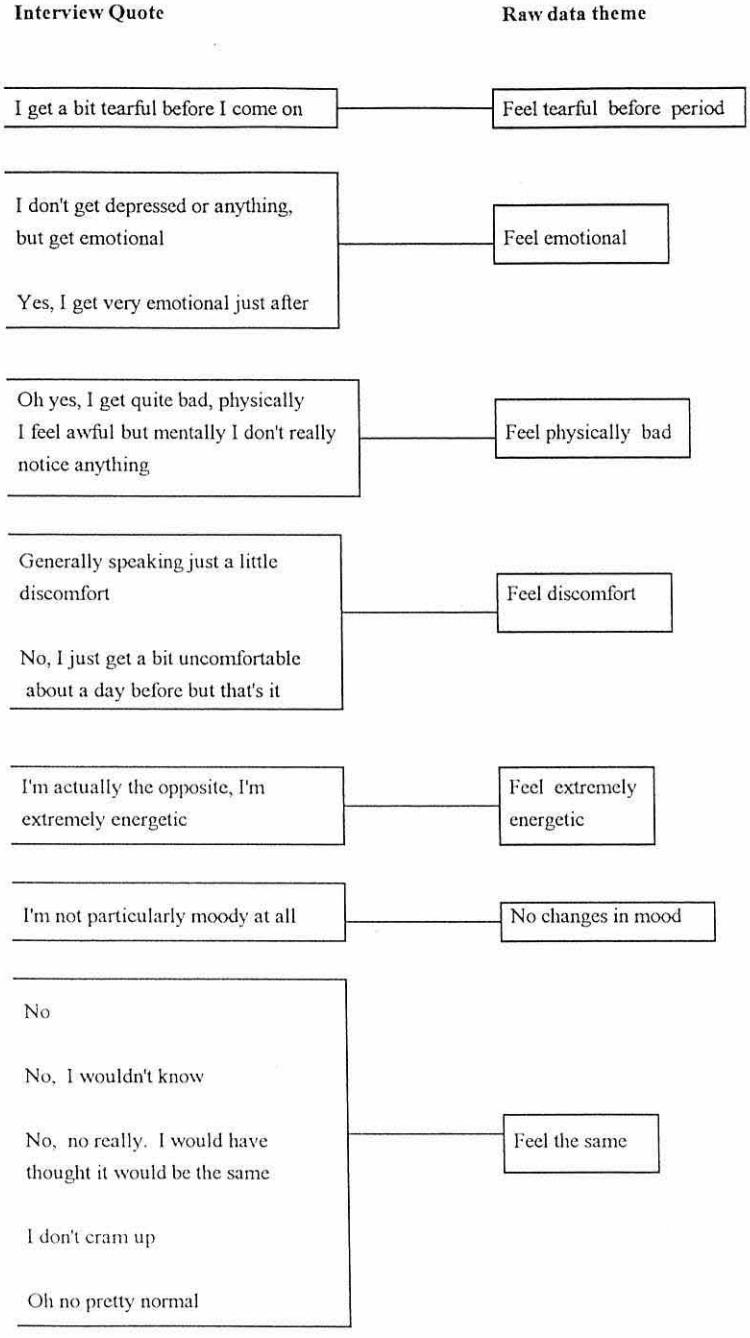
Was there anything else which may have contributed towards you feeling this way and/or experiencing these symptoms?




Seeing other people and not being able to do it
Seeing others and not being able to exercise
I was going to matches and everyone was playing rubbish without me so that made me feel bad (f)
Perceived team was playing badly without them
My PGCE interview, it went well so I was pleased (m)
Interview went well

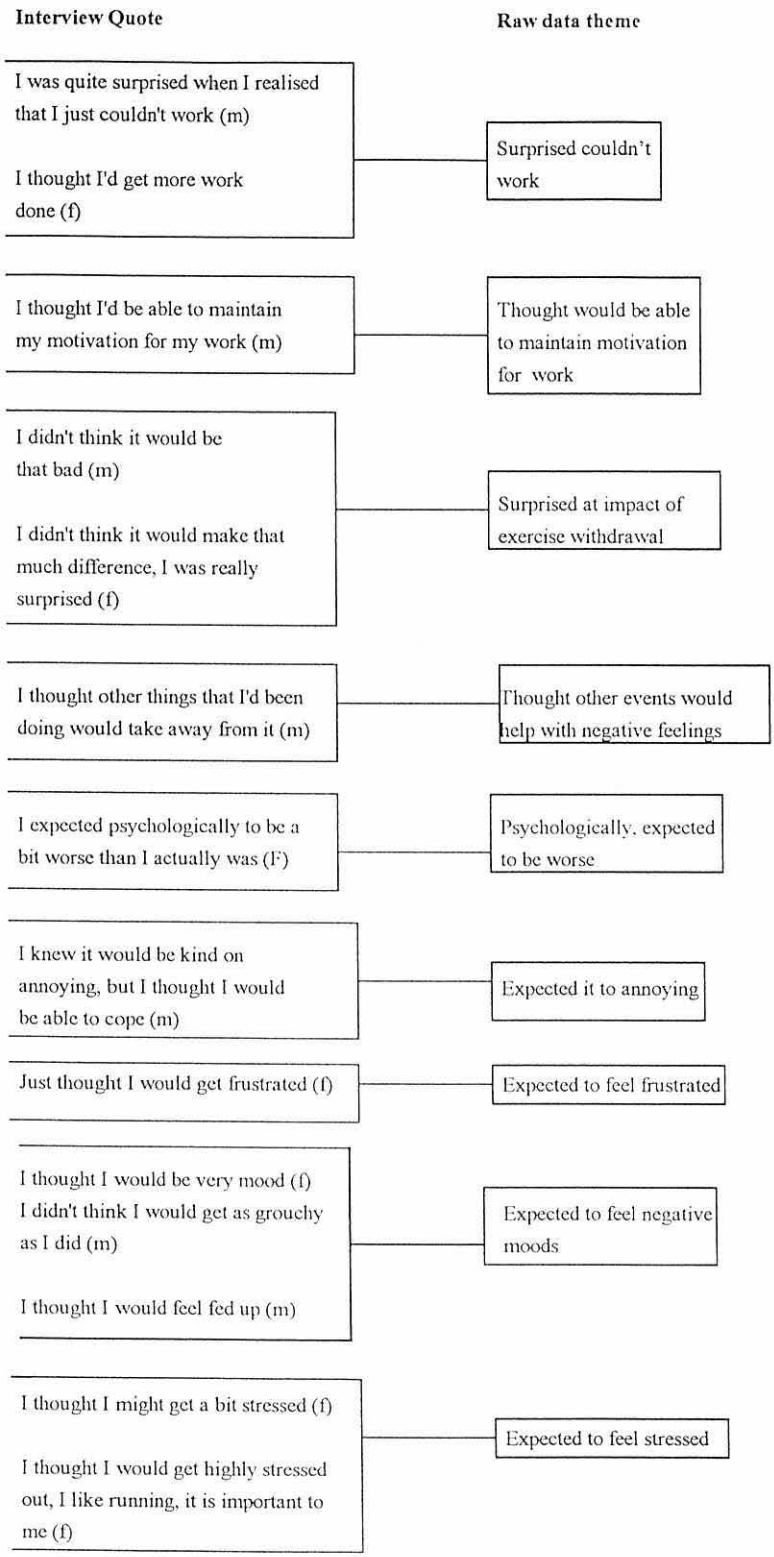
Question 4: FEMALES ONLY

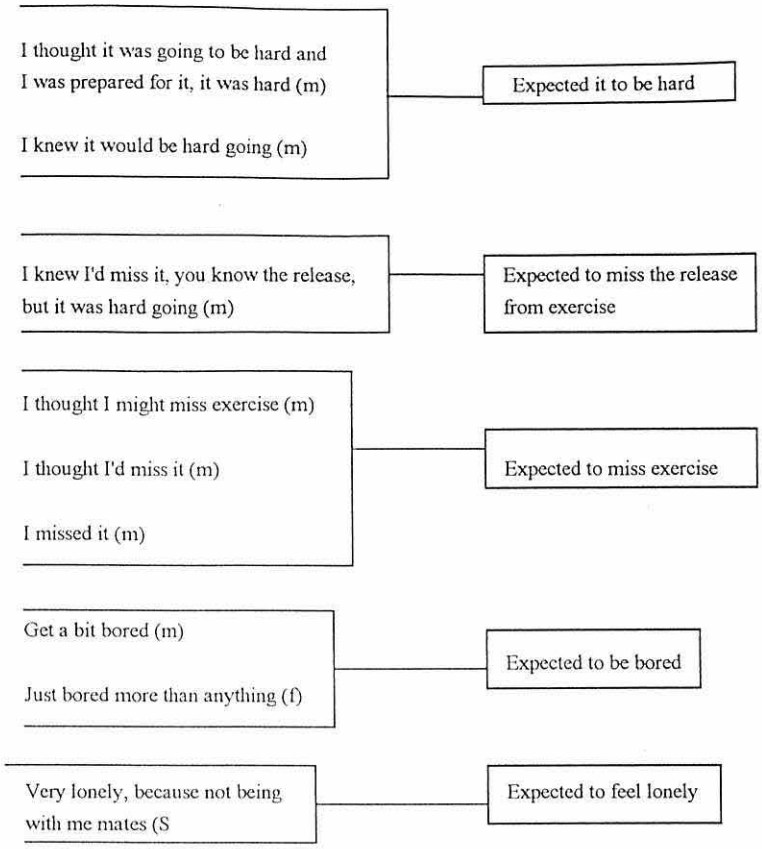
As you might know, some women find that their feelings fluctuate throughout their menstrual cycle, so linked to this statement - do you normally suffer from any noticeable fluctuations in your mood prior to or during your period?

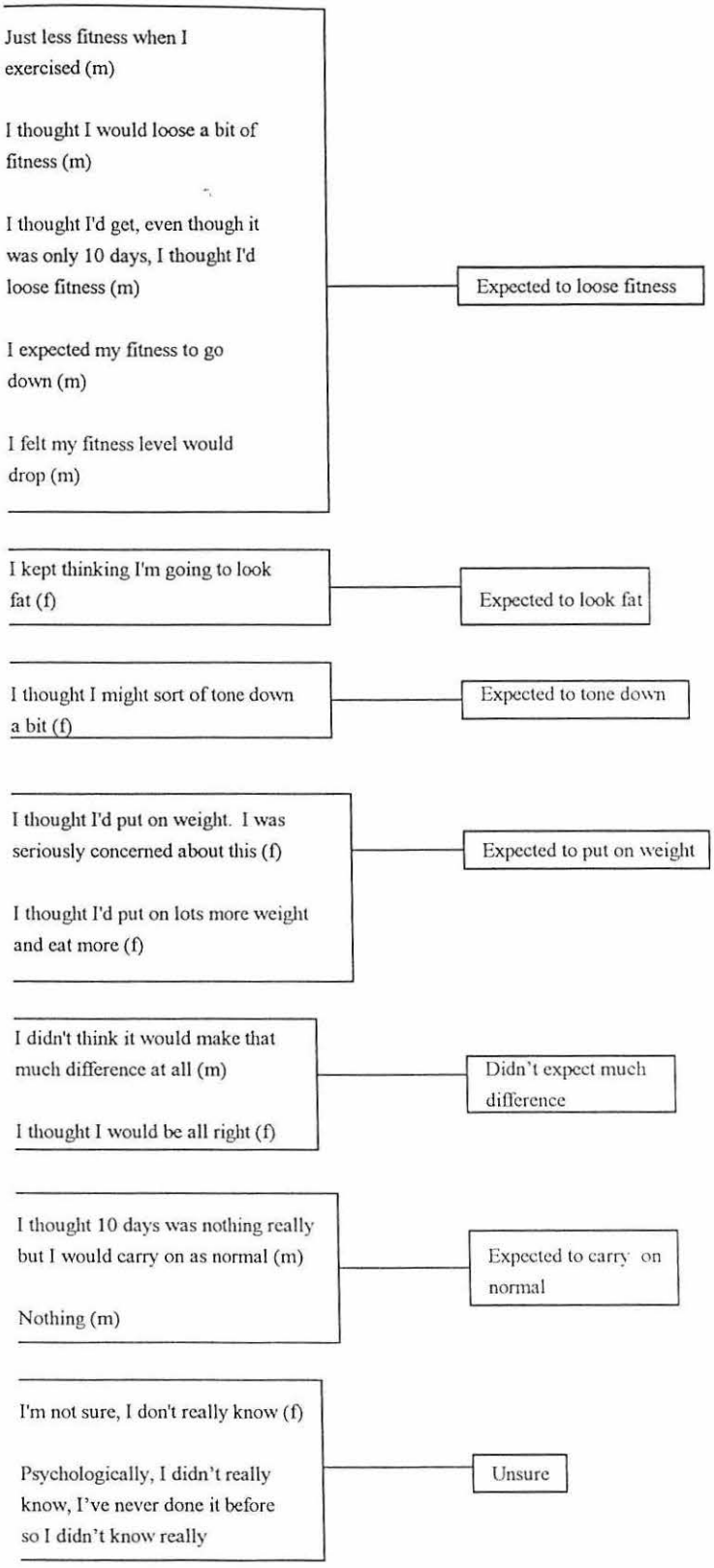


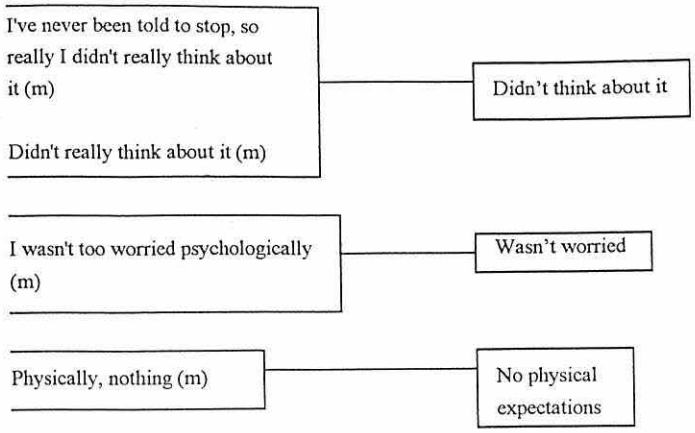
Question 7

What did you think would happen to you physically and psychologically when you were asked to withdraw from exercise




I thought it was going to be hard and I was prepared for it, it was hard (m)
I knew it would be hard going (m)
Expected it to be hard
I knew I'd miss it, you know the release, but it was hard going (m)
Expected to miss the release from exercise
I thought I might miss exercise (m)
I thought I'd miss it (m)
I missed it (m)
Expected to miss exercise
Get a bit bored (m)
Just bored more than anything (f)
Expected to be bored
Very lonely, because not being with me mates (S
Expected to feel lonely

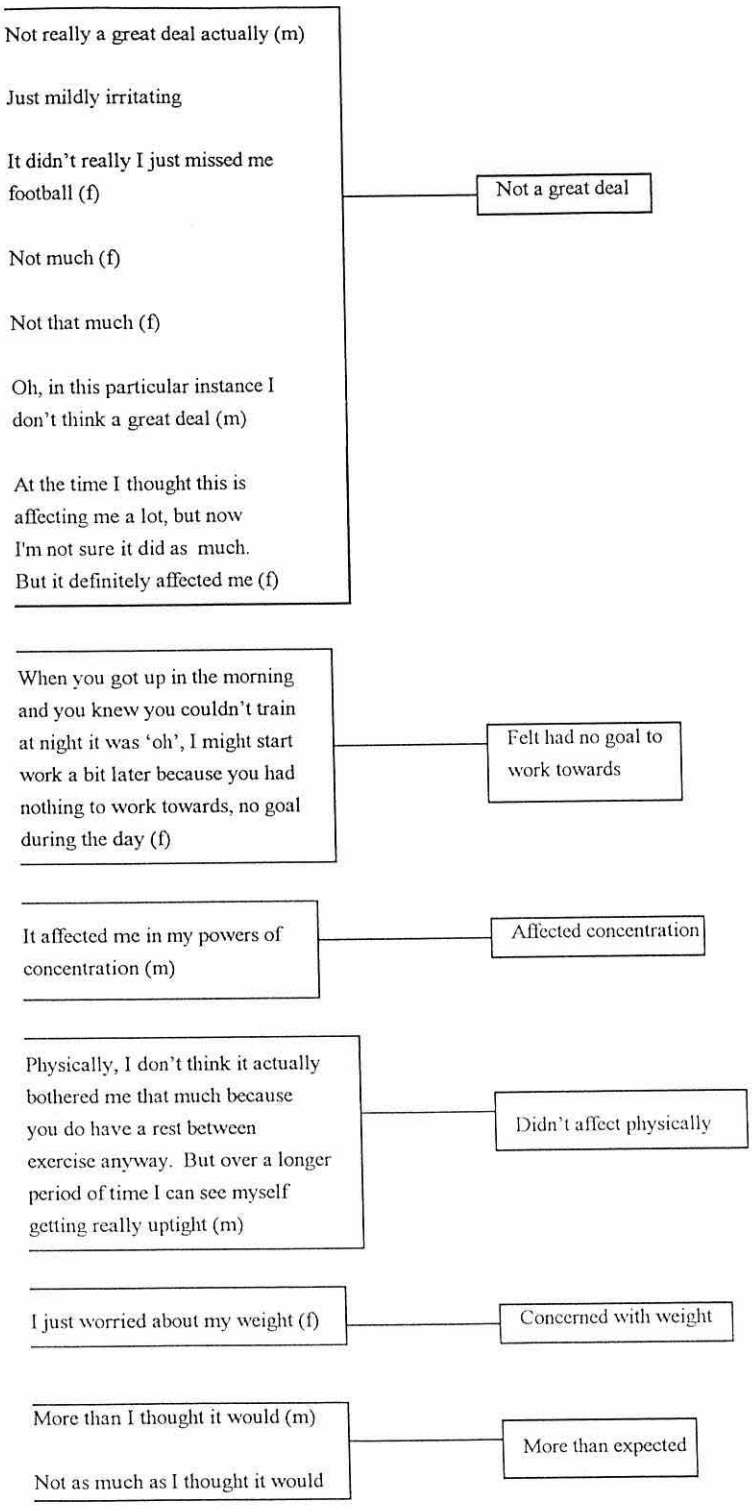

Just less fitness when I exercised (m)
I thought I would loose a bit of fitness (m)
I thought I'd get, even though it was only 10 days, I thought I'd loose fitness (m)
I expected my fitness to go down (m)
I felt my fitness level would drop (m)
Expected to loose fitness
I kept thinking I'm going to look fat (f)
Expected to look fat
I thought I might sort of tone down a bit (f)
Expected to tone down
I thought I'd put on weight. I was seriously concerned about this (f)
I thought I'd put on lots more weight and eat more (f)
Expected to put on weight
I didn't think it would make that much difference at all (m)
I thought I would be all right (f)
Didn't expect much difference
I thought 10 days was nothing really but I would carry on as normal (m)
Nothing (m)
Expected to carry on normal
I'm not sure, I don't really know (f)
Psychologically, I didn't really know, I've never done it before so I didn't know really
Unsure

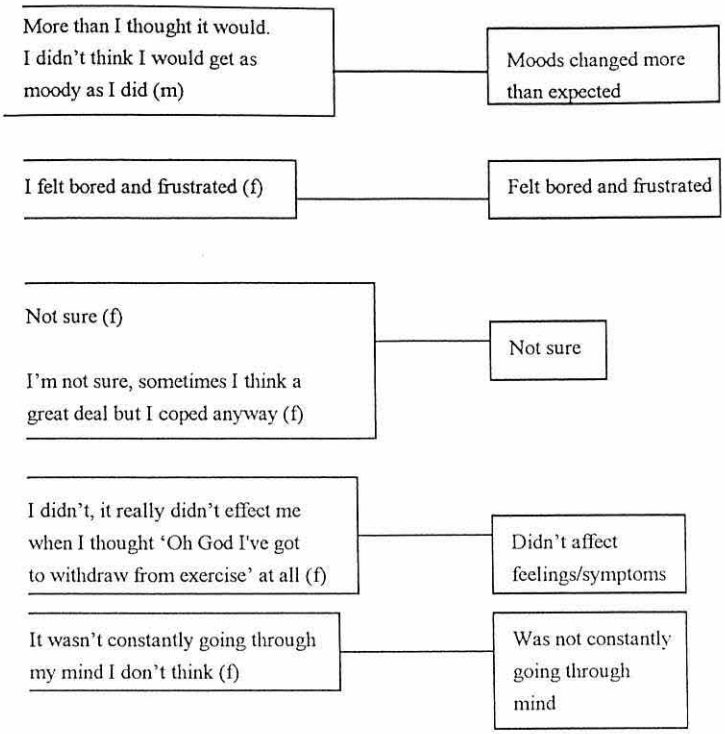

I've never been told to stop, so really I didn't really think about it (m)
Didn't really think about it (m)
Didn't think about it
I wasn't too worried psychologically (m)
Wasn't worried
Physically, nothing (m)
No physical expectations

Question 8.

To what extent do you believe being asked to withdraw from exercise affected you?

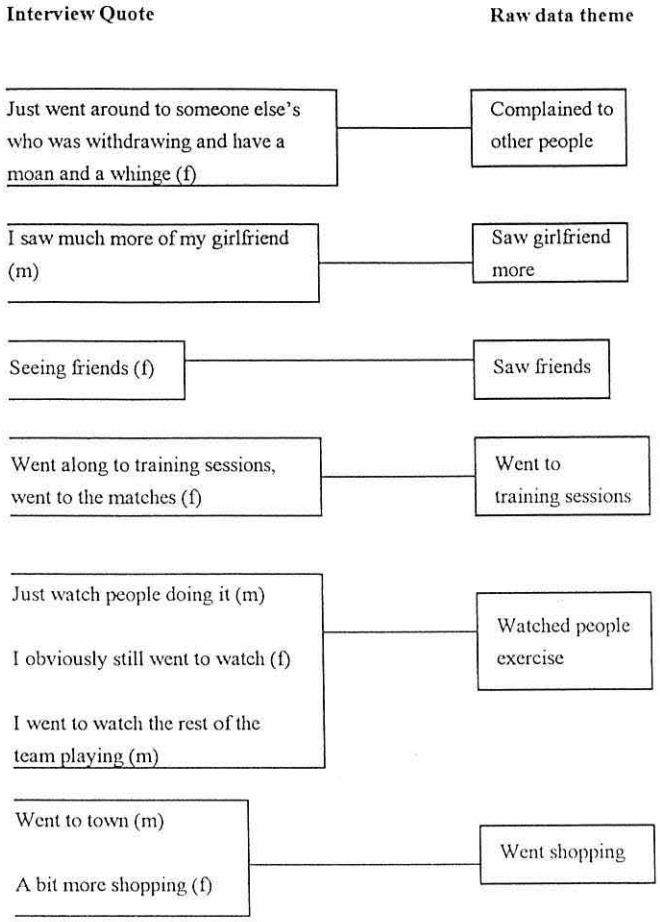
Interview Quote	Raw data theme
Quite a bit, I love exercise and I really missed it (f) Oh, a great deal, probably 8 out of 10 (f) A great deal I found it tough going (f) I thought it affected me a lot (m) Oh, a lot, I just couldn't do anything (m) A big lot (m) It definitely affected us (himself) (m)	A great deal
I don't think I would do it again (m)	Wouldn't do it again
It [upset] me basically (m)	Found exercise withdrawal upsetting
I wouldn't say it really affected me as I said I just felt a bit lonely and as if you couldn't go and see ya friends (f)	Felt lonely
I missed my girlfriend, so a small amount (m)	Missed girlfriend

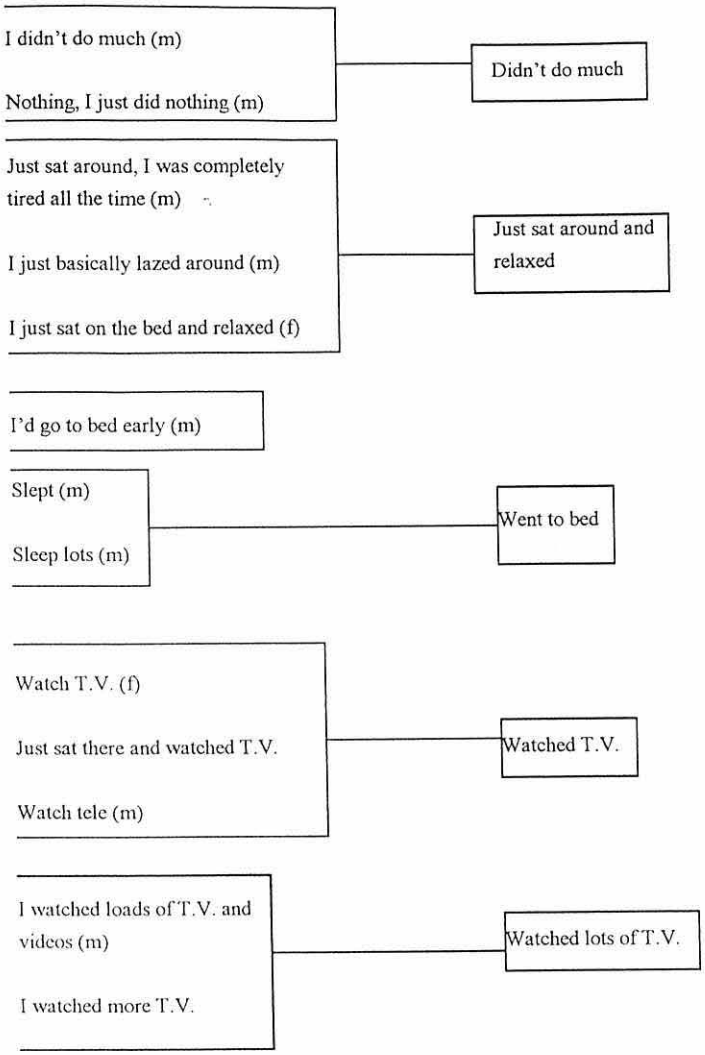

Not really a great deal actually (m)
Just mildly irritating
It didn't really I just missed me football (f)
Not much (f)
Not that much (f)
Oh, in this particular instance I don't think a great deal (m)
At the time I thought this is affecting me a lot, but now I'm not sure it did as much. But it definitely affected me (f)
Not a great deal
When you got up in the morning and you knew you couldn't train at night it was 'oh', I might start work a bit later because you had nothing to work towards, no goal during the day (f)
Felt had no goal to work towards
It affected me in my powers of concentration (m)
Affected concentration
Physically, I don't think it actually bothered me that much because you do have a rest between exercise anyway. But over a longer period of time I can see myself getting really uptight (m)
Didn't affect physically
I just worried about my weight (f)
Concerned with weight
More than I thought it would (m)
Not as much as I thought it would
More than expected

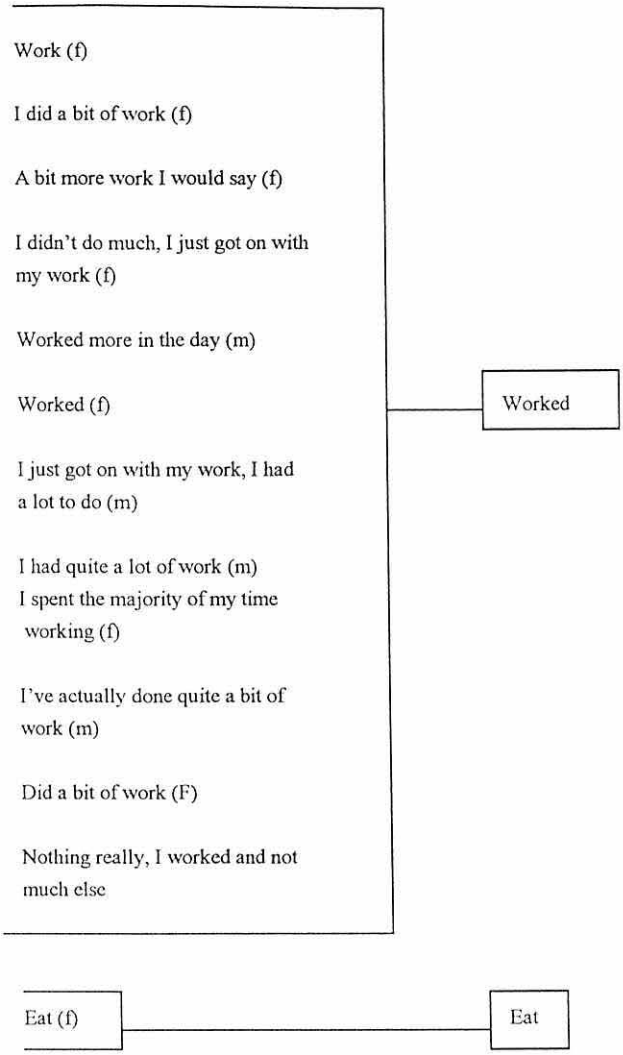

More than I thought it would. I didn't think I would get as moody as I did (m)
Moods changed more than expected
I felt bored and frustrated (f)
Felt bored and frustrated
Not sure (f)
I'm not sure, sometimes I think a great deal but I coped anyway (f)
Not sure
I didn't, it really didn't effect me when I thought 'Oh God I've got to withdraw from exercise' at all (f)
Didn't affect feelings/symptoms
It wasn't constantly going through my mind I don't think (f)
Was not constantly going through mind

Question 9.

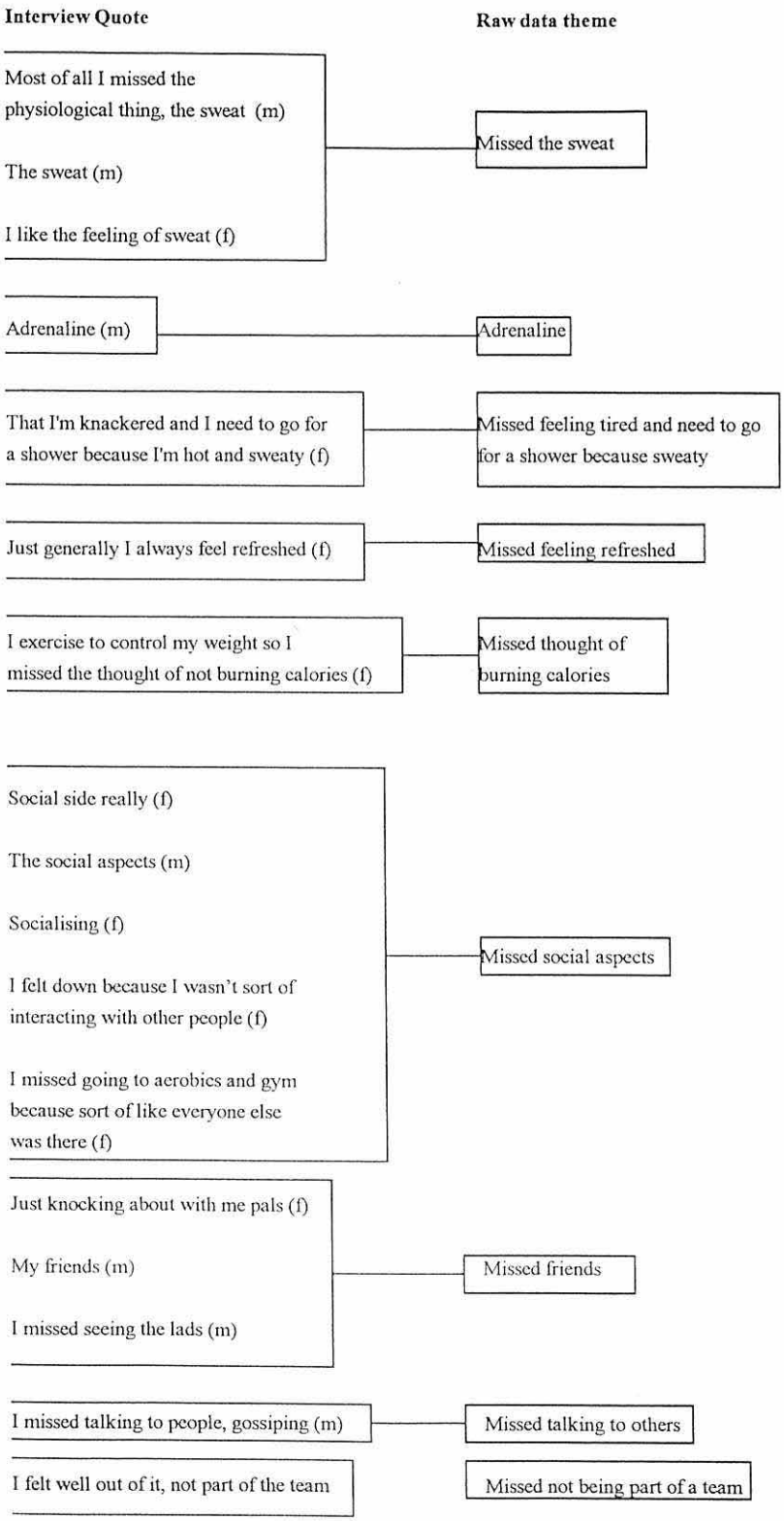
What sorts of things did you do during the time you would normally have been exercising?

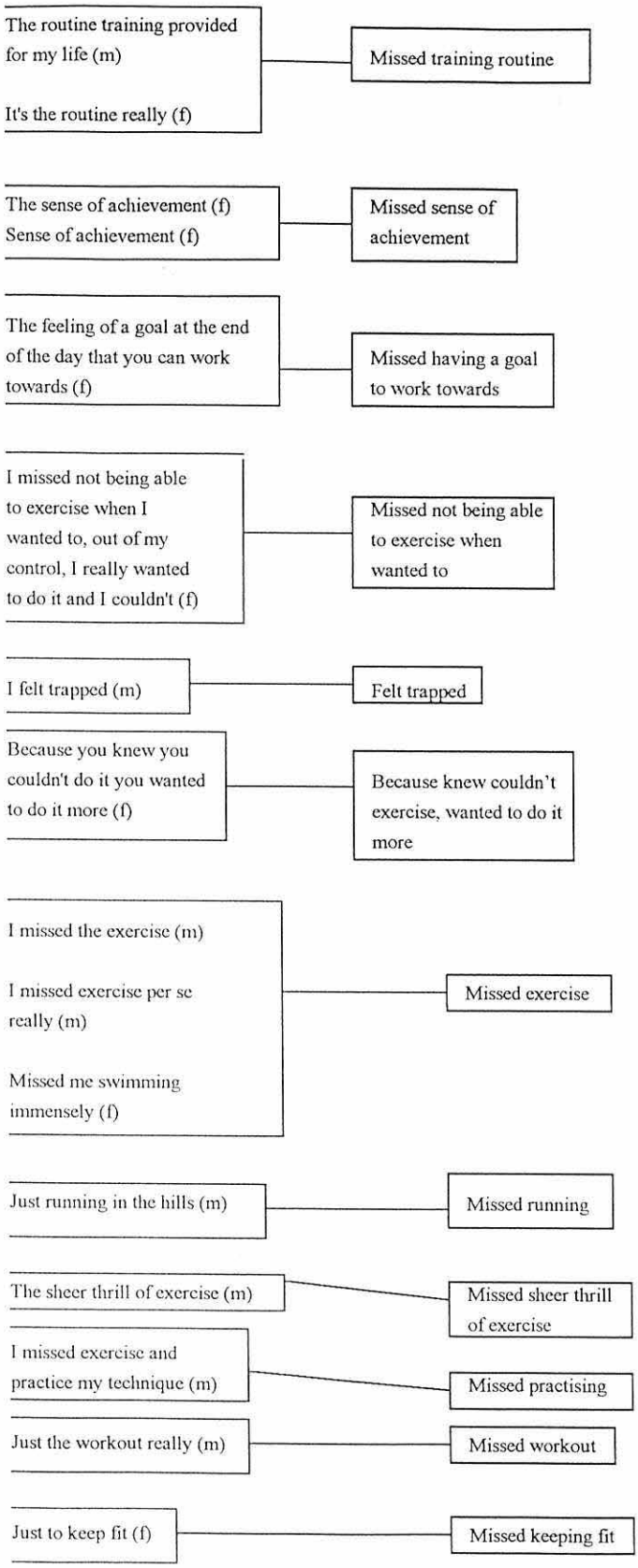


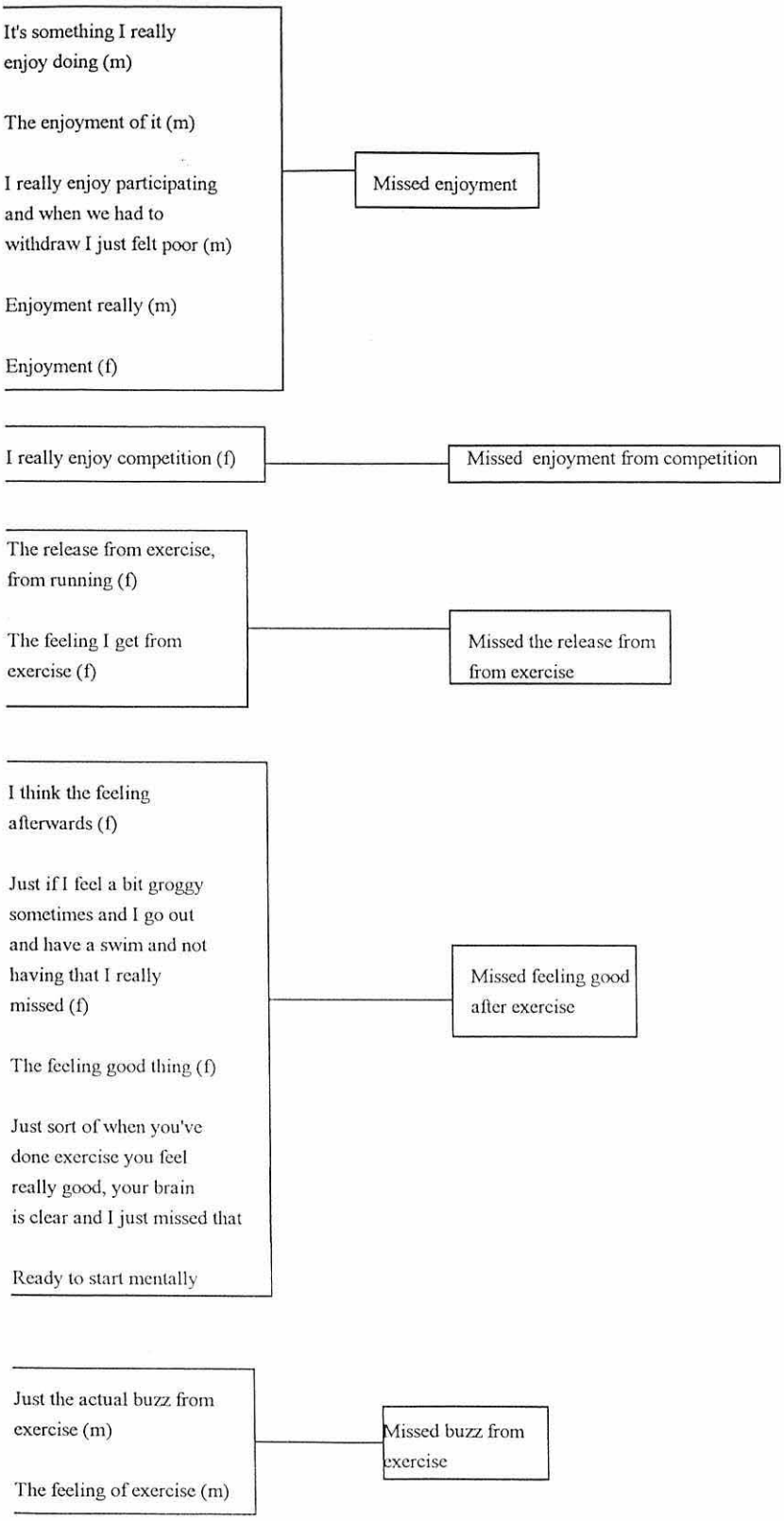

I didn't do much (m)
Nothing, I just did nothing (m)
Didn't do much
Just sat around, I was completely tired all the time (m)
I just basically lazed around (m)
I just sat on the bed and relaxed (f)
Just sat around and relaxed
I'd go to bed early (m)
Slept (m)
Sleep lots (m)
Went to bed
Watch T.V. (f)
Just sat there and watched T.V.
Watch tele (m)
Watched T.V.
I watched loads of T.V. and videos (m)
I watched more T.V.
Watched lots of T.V.

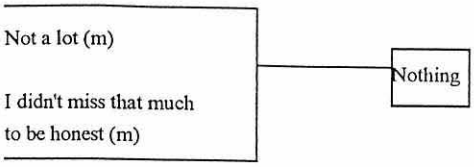

Work (f)
I did a bit of work (f)
A bit more work I would say (f)
I didn't do much, I just got on with my work (f)
Worked more in the day (m)
Worked (f)
I just got on with my work, I had a lot to do (m)
I had quite a lot of work (m)
I spent the majority of my time working (f)
I've actually done quite a bit of work (m)
Did a bit of work (F)
Nothing really, I worked and not much else
Worked
Eat (f)
Eat

Question 11.
What did you miss about not being able to exercise?




The routine training provided for my life (m)
It's the routine really (f)
Missed training routine
The sense of achievement (f)
Sense of achievement (f)
Missed sense of achievement
The feeling of a goal at the end of the day that you can work towards (f)
Missed having a goal to work towards
I missed not being able to exercise when I wanted to, out of my control, I really wanted to do it and I couldn't (f)
Missed not being able to exercise when wanted to
I felt trapped (m)
Felt trapped
Because you knew you couldn't do it you wanted to do it more (f)
Because knew couldn't exercise, wanted to do it more
I missed the exercise (m)
I missed exercise per se really (m)
Missed me swimming immensely (f)
Missed exercise
Just running in the hills (m)
Missed running
The sheer thrill of exercise (m)
Missed sheer thrill of exercise
I missed exercise and practice my technique (m)
Missed practising
Just the workout really (m)
Missed workout
Just to keep fit (f)
Missed keeping fit


It's something I really enjoy doing (m)
The enjoyment of it (m)
I really enjoy participating and when we had to withdraw I just felt poor (m)
Enjoyment really (m)
Enjoyment (f)
Missed enjoyment
I really enjoy competition (f)
Missed enjoyment from competition
The release from exercise, from running (f)
The feeling I get from exercise (f)
Missed the release from from exercise
I think the feeling afterwards (f)
Just if I feel a bit groggy sometimes and I go out and have a swim and not having that I really missed (f)
The feeling good thing (f)
Just sort of when you've done exercise you feel really good, your brain is clear and I just missed that
Ready to start mentally
Missed feeling good after exercise
Just the actual buzz from exercise (m)
The feeling of exercise (m)
Missed buzz from exercise


Not a lot (m)
I didn't miss that much to be honest (m)
Nothing