FIT Science in psychological and physical well being

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Abstract

The present programme of research discusses a series of studies which explore the relationships between individual characteristics and well being. The FIT theory (e.g. Fletcher & Stead, 2000a) was used as a framework. It attempts to explain individual's cognitions and behaviours using two broad dimensions: an 'Inner' dimension which details factors used to guide decision making (a cognitive dimension), and an 'Outer' dimension which focuses on behaviour. The research explored whether FIT was directly or indirectly related to well being.

Initial findings from an exploratory, cross-sectional, study revealed that individuals with greater 'Inner' FITness demonstrated significantly lower levels of anxiety and depression. They also perceived their work and personal projects more positively. Individuals with greater 'Outer' FITness were found to demonstrate better physical well being. This latter finding was replicated in the second study which explored why individuals with greater 'Outer' FITness would demonstrate a significantly lower Body Mass Index (BMI). The results showed that 'Outer' FITness did not relate to weight management behaviours, such as controlling calorie intake or regular exercise, measured over a week, via the components of the Theory of Planned Behaviour (e.g. Ajzen, 1991). It was hypothesised that it may instead be underpinned by habitual behaviour. Study 3 explored whether 'Outer' FITness could be trained and whether this would impact on habits and BMI. A longitudinal pilot intervention was run which encouraged individuals to Do Something Different in order to change habits and facilitate weight loss. Doing something different did increase 'Outer' FITness and this increase had a 'dose-response- relationship with BMI change – the greater the increase in 'Outer' FITness, the greater the decrease in BMI. This was accompanied by changes to dietary and exercise behaviours. A qualitative follow up of a sub-sample revealed that doing something different did facilitate changes to some habitual behaviours but the formation of implementation intention plans was also a significant contributor to weight loss. Further research is required to elucidate the exact relationship between behavioural flexibility, habitual behaviour and weight loss.

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Chapter 1.

Introduction To the Programme of Research

1.1 Introduction

Well being has been the subject of research across many fields of psychology including positive, occupational, health and clinical psychology. Researchers have spent a great deal of time attempting to uncover the factors which can improve or reduce well being. The aim of this dissertation is to examine some of the individual level factors that may be related to well being.

1.2 Well Being

As with most psychological concepts, the term 'well being' has no universally accepted definition. DeNeve & Cooper (1998) discuss a concept termed Subjective Well Being (SWB) and suggest it has four conceptualisations: happiness, positive affect, negative affect and life satisfaction. Ryan & Deci (2001), however, suggest that well being has, in recent publications, been viewed in two main ways. The hedonic approach defines well being in terms of what brings us happiness, satisfaction and pleasure, as well as sadness, dissatisfaction and pain. This approach seems more occupied with SWB and usually this is measured through self-reports which are subject to a variety of biases that may interfere with reliability and validity. The eudaimonic approach, however, considers well being in terms of the extent to which the individual is functioning at their full capacity. Waterman (1993; cited in Ryan & Deci, 2001) developed this perspective. He argued that well being, or eudaimonia, occurs when individuals engage in activities which hold true with their core values, which may offer a sense of 'completeness' or worthiness, providing 'Personal Expressiveness' (PE). As Deci & Ryan discuss, PE and SBW have been shown to be empirically related but they appear to tap different aspects of well being. PE appears to consist of personal growth, meaningfulness and development whereas SWB appears to be concerned with feelings of happiness and relaxation. This difference might be viewed in terms of time, with SWB indicating well being on a day to day basis but with PE indicating long term well being.

Self determination theory (SDT; e.g. Ryan & Deci, 2001) attempts to explain well being using facets of both perspectives. Ryan & Deci argue that well being requires the individual to be fully functioning, but to do this, three basic needs must be met: autonomy; competence and relatedness. Fulfilment of these three needs provides the ideal conditions for psychological growth, integrity, well being and vitality. To this end well being is the outcome of fulfilment of our three basic needs.

For the purpose of this thesis, well being will refer to positive physical and psychological health and reduced well being would therefore indicate ill health. A health psychology approach is adopted whereby the absence of ill health is not in itself enough to indicate well being – the presence of positive health, both physical and psychological, is also required. The thesis uses the term 'well being' in its widest possible sense since several outcomes, representing psychological and physical health (which might be seen to move beyond usual indicators of well being) are examined. With respect to psychological measures of well being, the present programme of research has focussed on negative affect aspects of well being (anxiety and depression) rather than measuring positive aspects as other studies have done. This was done because much of the earlier work from which this thesis has been developed concentrates on strain outcomes as indicators of psychological health. It also, however, moves on to examine a physical indicator of well being – Body Mass Index (BMI) – and the individual level characteristics which might influence it.

1.3. Methodological Limitations In Research On Well Being

There is a large body of research on well being but there are some significant methodological limitations. The bulk of research into well being in the 20th century was cross sectional (Zapf, Dormann & Frese, 1996). The short comings of cross sectional research are well known. More recently, longitudinal research has been employed (e.g. De Lange, Taris, Kompier, Houtman & Bongers, 2004) but this has not removed all of the methodological limitations. Firstly, as Zapf et al (1996) point out, longitudinal research may remove the reverse causal hypothesis when results are interpreted, but it does not remove the 'third variable' explanation. Thus causal relationships remain difficult to establish because third variables can affect independent and dependent

variables either through common method variance (for example via negative affectivity) or independently from the method used (e.g. social factors). Secondly, behaviour is complex and attempting to explain large portions of variance through single factors is unlikely to prove successful, partly because factors on their own will only account for a very small proportion of variance and partly because factors have complex relationships with other factors at different levels which produce different outcomes. Bliese & Jex (2002) and Ryan & Deci (2001) both note that authors are increasingly adopting a multi-level perspective when examining well being. Thus a researcher might move beyond just individual level factors to consider the role of group factors, organisational factors and societal or cultural factors in determining well being.

The adoption of multi-level analysis has gone hand in hand with more sophisticated statistical techniques. Earlier research may have relied upon regression analyses to establish the existence and strength of 'cause and effect' relationships, which is problematic because the relationships under investigation were assumed to have been linear. Yet, as Zapf et al (1996) point out, there are several ways of modelling how factors can bring about reduced well being, and some of these argue that improvements and reductions in well being do not necessarily run in parallel to increases or decreases in the predictor variables. Thus much previous research has employed statistical techniques that may have been neither appropriate nor have been sensitive or sophisticated enough to give an accurate picture.

One final point to make is that whilst some well being research has been experimental or quasi-experimental, much of it has been survey based. The problem of common method variance has been noted although Spector (1987) found little in a review of the literature and in his own work to support the existence of a significant role for common method variance. Another problem stemming from the measures used relates to the objectivity of measures taken – typically measures of potential environmental influences are taken through self reports and the problem with this can be demonstrated through an examination of the potential role of Negative Affectivity (an aspect of the individual) in stress research. NA has been proposed as a bias in self-report data and it has been argued that it should therefore be partialled out in an attempt to control for that bias. However, as Spector, Zapf, Chen & Frese (2000) have argued, it is not at all clear

whether NA does in fact play a biasing role – rather NA may play a substantive role, influencing self-reports of 'independent' and 'dependent' variables. To partial out NA would therefore be to remove one of the variables that is actually of interest since it may influence perceptions of environments *and* perceptions of well being. If the goal is to remove bias from subjective measures in order to make them objective, simply partialling out NA will not achieve this. NA, along with a host of other P Properties, undoubtedly play some complex role whereby they may be biases, or substantive agents, or both (see e.g. Payne & Morrison, 2002). The above discussion pertains to the role of NA in the occupational stressor –strain relationship but might easily apply to the study of predictors of well being in other domains since well being and the various potential predictors of it are typically measured using the same self-report methods in similar quasi-experimental designed research.

1.4. 'The Assumption of Effect' and Influences on Well Being

There is a variety of factors which might influence well being. At the most general level these may be classified into either external or internal factors. The former refers to environmental aspects whilst the latter refers to features of the individual. Fletcher (2003) has termed these two groups of factors E properties and P properties respectively. E properties are aspects of the environment, such as temperature or geographical location, and P properties are features of the individual which might include personality or biological aspects.

At first glance this distinction might seem an obvious one, however, in many cases E and P properties are not so easily dissected. This is well exemplified in research on occupational stress where the majority of studies use the individual's perceptions of their work (a P property) and not an objective measure of the environment (E property), when examining causal factors.

Whilst E properties are objective aspects of the world "that can be measured, or can be implied from measures, that is independent of the perceptions of it" (Fletcher, 2003, pp. 553), P properties are subjective and possibly unique to each individual (although it is

possible they are subconscious and as such might be measured by such things as Implicit Attitude Measurement, see e.g. Cunningham, Preacher & Banaji, 2001, since P properties may not actually be assessed any more accurately through questionnaires than E properties). P Properties may reflect how the individual perceives the world and are subject to individual differences because each individual may have a unique 'cognitive architecture', as termed by Fletcher (2003). The term 'cognitive architecture' used here differs from the notion of cognitive architecture typically used within cognitive psychology. Fletcher (e.g. 2003) has defined 'cognitive architecture' as the way in which individuals construe and process incoming data – a filter for thinking and decision making – which may include a bias or disposition such that there is a tendency to perceive or process information in a particular way. Thus the objective world may be construed very differently by individuals such that their perceptions of the same environment bare little similarity to each other.

Analyses in stress and other areas of research may therefore frequently be contaminated by the "assumption of effect" whereby researchers assume they are measuring E properties (objective or real properties) that are independent of the person, but are not. Many studies have failed to partial out the P properties from the measures of the environment that they take, meaning that they have really demonstrated a relationship between stress or well being, and some property that may be either a P property or a mixture of both E and P. This leads to the false assumption that true environmental properties influence stress. Fletcher (2003) argues that many researchers believe that this contamination of E properties by P properties can be controlled by methodology or elaborate statistical techniques (for example this is why we take measures from across groups of people and use measurement models that take account of errors in measurement) but he himself doubts this to be the case, arguing that nearly all the variables considered in occupational stress research, particularly psychological stressors, are prone to this affect.

Fletcher (2003) has argued that the 'assumption of effect' is more than mistaking subjective measures of the world to be an accurate representation of the objective reality. Individuals in jobs create variation at a number of levels, not just at the perceptual level. There *may* be differences in perceptions of the work, the physical

environment and other individuals, but there are also differences in how that individual interacts with the job and with other individuals as well as how the job and those individuals affect them – "the dynamic effects are multi-layered and person–dependent." (Fletcher, 2003, p.554). This has the practical implication that changing just the perceptions of individuals will be insufficient to 'remove' stress and/or improve well being. What is required is a much larger, more fundamental change in the person as a whole - something that alters their entire cognitive architecture such that their perceptions, evaluations, decisions, responses and outcomes are all transformed. Lazarus has certainly argued for changes of this kind – his model of primary and secondary appraisal and coping (e.g. Lazarus & Folkman, 1984) clearly states that individual differences in more than just perceptions account for differences in stress, however, Fletcher seems to make a case for taking this further to consider the person in an even wider sense. That is to say, he believes the individual's entire 'cognitive architecture', not just their primary and secondary appraisals and coping mechanisms, should be considered. This remains to be seen.

Much work on well being, in its various guises, has been cross-sectional or has employed unsophisticated measurement and statistical techniques, allowing the researcher, at best, merely to establish the existence of relationships rather than infer causal relations. Furthermore, the relative importance of E and P properties is not clear. Nonetheless, relationships have been suggested in the literature. Argyle (1999) examines several classes of variables which appear to be correlated with happiness: demographics (gender, age, education, income, social class, religion, ethnicity); lifestyle variables (employment status, nature of our work, involvement in daily activities, type of leisure activities engaged in), health behaviours (e.g. exercise, diet, smoking, drug taking); social relationships (marriage, family, friends) and individual characteristics (personality, intelligence, physical attractiveness, social skills). Other authors suggest that national level variables might also impact on well being. Frey & Stutzer (2002), for example, consider the influences of both politics and the economy and Wilkinson (1996) suggests that poverty itself is not a primary determinant of well being as much as inequality within a country.

Many of these variables may reflect both P and E properties - often they have been measured using self-report techniques so the relative effects of each are unclear. Furthermore, as with the research on work stress, those aspects of the individual which have been investigated are narrow in their focus. What may be required is a greater focus on the whole of the individual, for example their 'cognitive architecture'.

1.5. The Present Programme of Research

This thesis aims to examine well being in relation to cognitive architecture and will initially consider the role that work, leisure and health behaviours might play in relation to negative affect (as indicated by levels of anxiety and depression). These three areas have been selected because although they have been examined in relation to well being, they have also been examined in relation to each other, thus it will be of interest to investigate relationships between work, leisure, health behaviours and well being. Furthermore, there would be some practical value in elucidating such relationships given the current costs of occupational stress and poor health behaviours, not just to the individual but to society as a whole.

The following chapter will examine in depth relationships between work and well being, leisure and well being and health behaviours and well being before examining the inter-relationships between work, leisure and health behaviours. Chapter three is an in depth discussion of a new approach, termed FIT (Fletcher & Stead, 2000a), for considering personal development. It is concerned with trying to model Fletcher's view of 'cognitive architecture' and it may demonstrate relationships with psychological and physical health. This approach shifts the emphasis of study away from the environment and focuses solely on the individual as the determinant of well being. However, it attempts to take a wider view of the individual than might be followed in more traditional approaches such as personality theory.

Chapter four details an exploratory piece of research examining the relationship of FIT to reduced well being and perceptions of work, leisure and health behaviours. One set of findings from this exploratory research is followed up in chapter five which examines an indicator of physical well being (Body Mass Index) in relation to FIT,

using the Theory of Planned Behaviour to try to explain the relationships which were uncovered in the earlier study. Chapter six describes a pilot intervention run whereby FIT formed the basis of an intervention used to reduce Body Mass Index (BMI). Chapter seven outlines qualitative research designed to uncover the underlying psychological processes which took place in the participants of the pilot intervention study. This is followed by a general discussion and concluding remarks on the findings which provide some insight into the determinants of well being, in particular physical well being as indicated by BMI.

Chapter 2

Well Being and It's Relationships With Work, Leisure and Health Behaviour

2.1. Introduction

There are several areas of relevant research which will be discussed. Firstly, there is a wealth of literature examining the work and well being relationship: does work impact on well being? A second area of relevant research involves leisure: what activities people engage in, why they do it and whether it influences well being. A third area concerns health behaviour. Research in this domain has focused on what people do, why they engage in such behaviours (or do not) and whether they affect well being. In each of these areas the relative importance of E and P properties in determining perceptions of these activities and in determining well being remains unclear due to Fletchers (2003) 'assumption of effect'. Additional research has looked at work, leisure and health behaviours, with the aim of showing that these three areas tend to impact upon each other (e.g. Melamed, Meir & Samson, 1995) and this will also be reviewed.

2.2.Work and Well Being

It has been suggested that work is necessary for good health (see Hanisch, 1999 for a review). However, it also seems that work can be hugely damaging and reports of dissatisfaction, psychological and physical illness attributed to work are on the increase (Workplace Health & Safety Survey, 2005; Self-Reported Work Related Illness Survey 2004/5). A large proportion of the research has consequently been focused on examining aspects of work, particularly psychosocial aspects, and their relationship to occupational stress and associated outcomes. Where occupational stress occurs, individuals are prone to strain reactions which may be affective, cognitive, physical, behavioural and motivational (Le Blanc, de Jonge & Schaufeli, 2000), and may include anxiety, depression, dissatisfaction, increased smoking and drinking, cardiovascular disease and psychosomatic complaints. Clearly such strain outcomes detract significantly from well being.

Many different aspects of the work environment have been proposed as determinants of well being (particularly job demands, decision latitude and social support, Karasek, 1978; Johnson & Hall, 1988). In 1979, Payne developed a model which encompassed several of these variables, termed the job demands-supports-constraints model. It is based on the premise that stress results from an imbalance of job demands, job supports and job constraints.

In this model, the term 'demands' encompasses several general variables, all of which are stimuli within the environment (technical, financial, social, intellectual, natural or physical) which require the individual's attention and a response (Payne, 1979). These include such things as work overload, work underload, job pressure, role conflict, responsibility for equipment and people, over/under promotion, organisational change, office politics, and organisational climate.

In attempting to meet these demands, the individual will encounter various aspects of their work environment (technical, financial, social, natural, physical or intellectual) which may act to assist the individual in meeting these demands (supports) or may constrain the individual's ability to meet these demands (constraints). Some examples of supports or constraints are role clarity, role ambiguity, quality or relationship with colleagues and boss, quality of equipment and job control. These variables may act as supports or constraints, depending upon the individual and the situation (Payne, 1979). This would mean that a support for one person may act as a constraint on another. In this model, the idea of support includes both social /interpersonal aspects and job characteristics such as autonomy and control.

The balance of demands, supports and constraints is what determines whether well being is supported or impaired by work. This model therefore predicts that high demands will not necessarily lead to reduced well being, provided that constraints are not high and supports are. It also suggests that low demands may also be found stressful because they could be unchallenging and tedious. Indeed, jobs with low demands but which are highly constrained, especially in terms of control, and are lacking in support, can be very stressful, which Payne argues is reflected in the finding that individuals in "lower level occupations do suffer more" (Payne, 1979, pp89). Several studies have

examined Payne's model in relation to varying occupational groups (e.g. teachers, social workers, students and nurses; see Fletcher, 1991) and have shown the model to have some predictive value. Payne & Fletcher (1983) for example examined the role of job demands, supports and constraints in predicting psychological strain in school teachers and found modest support for the model. Similarly, Morrison & Payne (2001) examined the ability of the model to predict psychological distress in public sector workers. In this study, questionnaires were used to assess psychological distress and the extent to which the employees perceived their jobs to have demands, supports and constraints. Results showed there to be independent effects of demands, supports and constraints on psychological distress, but noticeably, no interaction effects. Nonetheless, the demands/constraints/supports variables did account for a significant amount of variance in psychological distress.

There are several significant criticisms of situational models, however. Firstly, they are limited because they fail to consider explicitly individual differences. Secondly, the models state that it is aspects of the *job itself* which predict strain (i.e. E properties). However, the majority of studies examining situational models tend to use subjective rather than objective measures of the job. This means that all such studies have measured P properties (or at best some unspecified mixture of P and E properties) and not objective elements of the job as is specified in the models. This implies that where significant associations between self-reports of the job environment and strain levels have been found, a more accurate description of what is being presented is that strain is related to the individuals perceptions of the job (a P property) and not necessarily to actual aspects of the job (E property). Morrison, Wall & Payne (2003) performed multi-level analyses of strain outcomes and found that whilst individual level perceptions of the job were related to these outcomes, job level measures were not.

One practical implication of this is that interventions based on such findings may not be effective because the intervention is designed to change actual aspects of the job and not individual's perceptions of the job. Thus it appears that the individual is crucial in determining how work is perceived and how it affects them.

The job characteristic – well being relationship may be in the other direction (e.g. psychological well being affects perceptions of the job) or may be bi-directional. Fletcher & Payne (1983) argued that environmental 'stressors' were not the true causes of strain. Differentiating between primary and secondary stressors, the environmental stressors (E properties) were argued to be secondary stressors, only appearing to be related to strain because the strained individual had come to view their world in a different way *because they were strained.* That is to say, there are fundamental changes in cognition when strain is suffered which affect interpretations of the world, and this change is often a negative one. This idea is not without support. Eysenck (1992) presents several chapters on the effects of anxiety on a variety of cognitive processes including attention, memory and processing. There is also evidence to suggest that depressed individuals display biased attention and may perform more poorly at work than non-depressed individuals (Hertel, 2002; Martin, Blum, Beach & Roman, 1996). An alternative view has been offered however. Some have argued that negative perceptions are actually realistic interpretations of the world and that individual's who hold more positive beliefs are unrealistic and deluding themselves – these individuals are less mentally ill than they should be (Judge, Erez & Thoresen, 2000).

De Lange, Taris, Kompier, Houtman & Bongers (2004) have pointed out that there is a limited body of longitudinal research examining the question of reversed and reciprocal causal relationships in the domain of work characteristics and mental health. Those studies which have examined this possibility have produced mixed results. De Lange, Taris, Kompier, Houtman & Bongers (2003) found only 2 studies which had considered the possibility and did not find evidence for either reversed or reciprocal relationships. Zapf et al (1996), however, found that almost half of the studies they reviewed *did* find evidence for reversed or reciprocal relationships. Looking specifically at depression, Taris, Bok & Calje (1998) and Taris (1999) have both reported evidence for reciprocal relationships between perceptions of job characteristics and depression.

A concept related to depression is that of Negative Affectivity (NA). There is considerable research in this area (see e.g. Spector et al, 2000), with many arguing that an individual's disposition is either a primary determinant of how they perceive, (and consequently feel about) their work, or is a moderator of the job characteristic – well

being relationship. Spector et al (2000) argue that when NA is partialled out the relationship between 'job stressors' and strain outcomes is substantially reduced although note that others have found that partialling out NA makes little difference (e.g. Spector, Chen & O'Connell, 2000).

Anxiety, depression and other strain related outcomes may all influence how individuals perceive their work and may even impact on how they perform within that job. Fletcher (2003) states that "people who are stressed at work have a very different way of looking at their organisation, their work, and their worlds in the widest sense." (pp. 551). Payne, Wall, Borrill & Carter (1999) provide evidence that levels of strain can influence feelings and thoughts about work. In a cross-sectional analysis of over nine thousand health care workers, they used multiple regression analyses to show that levels of strain moderated the relationship between perceptions of work characteristics (autonomy, role conflict, role clarity and workload) and work attitudes (intrinsic satisfaction, extrinsic satisfaction and organisational commitment). Thus those who displayed higher levels of strain demonstrated a weaker relationship between their perceptions of work characteristics and their work attitudes.

It would seem that research suggests that the job itself, as an objective unit, may be a less useful predictor of well being than the individual. At the very least, how the individual perceives the job is important and may be more so than any actual work characteristics. Furthermore, individual's perceptions of work may be biased if the individual is suffering from strain. If this is so, then it does not make intuitive sense to redesign jobs uniformly because, as Briner & Reynolds (1999) and Payne et al (1999) note, each individual perceives and interacts within the job differently, so whilst changing the job may be beneficial to one individual, the same change may be detrimental to another individual. Thus, the minimum requirement would be to modify the individual as well as modifying the job.

2.3. Leisure and Well Being

Work is not the only aspect of life which has been studied in relation to well being. Researchers have examined how individuals choose to spend their leisure time and have examined whether these choices might impact on both physical and mental well being.

What is leisure? Within the research there is some debate as to what leisure actually is (e.g. Kabanoff, 1980; Wilson, 1980) but Kabanoff (1980) has concluded that "leisure is a set of activities that individuals perform outside of their work context and excludes essential maintenance functions" (pp. 69). This definition holds that leisure is non-work, does not include 'chores', is based on choice, includes series of tasks and is intrinsically motivated.

Liptak (1991) suggests that there are many benefits of leisure including "the opportunity for self-expression, relaxation, entertainment, the development of social skills, the reduction of stress, the fulfilment of unmet needs, the development of autonomy, the enhancement of personality, companionship and relationships with others" (pp. 116). Further, it seems that leisure might provide clear benefits for learning, career progression and a variety of special populations (Liptak, 1991). Compton & Iso-Ahola's (1994) book contains five chapters discussing the use of leisure in therapy for various disorders such as depression. Research suggests that leisure can make us happy and provide life satisfaction (Argyle, 1987; in Iso-Ahola, 1994), more so than work (London, Crandall & Fitzgibbons, 1977; in Iso-Ahola, 1994, but see Czsikszentmihalyi, 1994), and can in fact predict life satisfaction (e.g. Riddick, 1985; in Iso-Ahola, 1994). Further to this, happiness appears to be causally related to physical well being (Argyle, 1987; in Iso-Ahola, 1994).

Researchers have also considered the effect of leisure on mood, a potential indicator of SWB. Iso-Ahola (1994) suggests that an active leisure lifestyle produces improved mood (e.g. Forgas & Moylan, 1987; in Iso-Ahola, 1994) which in turn may actually produce further health benefits such as improved immune function (Stone, Cox, Valdimarsdottir, Jandorf & Neale, 1987; in Iso-Ahola, 1994). One other benefit of active leisure which has been researched is that of 'flow' (Csikszentmihalyi, 1982,

1990). The term flow refers to a "state of consciousness that involves deep concentration, an intense participation in the environment, forgetfulness of the self and of everyday problems, a state that is experienced as enjoyable and valuable for its own sake." (Csikszentmihalyi, 1994, pp. 36) and it is active pursuits such as sports and mentally stimulating hobbies which are more able to deliver flow. Thus it seems that activities which involve mental and physical stimulation, and are therefore more likely to appropriate flow, provide enjoyment and consequently happiness.

How else might leisure induce well being? Other than improving mood, increasing happiness and inducing flow, it may be that leisure improves self-esteem (often used as an indicator of psychological well being, e.g. Deci & Ryan, 2001). Research has shown that increased self-esteem is related to intrinsically motivating leisure experiences (Graef, Csikszentmihalyi & Gianinno, 1983, cited in Iso-Ahola, 1994), and leisure experiences which produce feelings of mastery and competence (Iso-Ahola, LaVerde & Graefe, 1989 cited in Iso-Ahola, 1994). Finally, leisure participation often involves social interaction, something which may be important to psychological well being. Activities which provide such interaction allow the development and maintenance of friendships and family relations which in turn provide stimulation and support for individuals.

Leisure has also been viewed as an important route to well being because it permits recovery from work (e.g. Sonnentag, 2001) and Iso-Ahola (1994) also argues that active leisure (and on occasion passive leisure such as relaxation) can play a buffering role in the relationship between experienced stress and psychological well being. Thus leisure may be seen as a coping-mechanism which Iso-Ahola argues occurs in two ways: 1) Leisure assists in social interaction and the forming of relationships where individuals may seek social support. Social support helps to combat stress; 2) Leisure enhances the personality trait self-determination (reflected in locus of control and hardiness measures) and self-determination in individuals is linked to increased self-motivation, less illness, increased commitment and an enjoyment of challenges (see Iso-Ahola, 1994, pp53).

It seems that choice of leisure activities could be important for well being, but there is some evidence to suggest that choice of leisure activities is affected by individual differences such as gender, age, social class and personality type (e.g. Deem, 1982, Kirkcauldy & Furnham, 1980). With regard to trait differences, Kirkcauldy & Furnham (1980) found that extraverts preferred socially interactive, playful, dynamic and competitive activities (p48) whereas neurotic individuals tended to avoid such activities. Findings suggested that one third of the variance in predicting choice of leisure activity was explained by the measured traits, and the authors concluded that choice of leisure activity is an expression of personality needs.

Explaining choice of leisure activities remains difficult however and it may require a broader conceptualisation of the individual than is typically employed to explain these differences. Again 'cognitive architecture' may be useful in explaining whether certain activities are adopted and whether value and pleasure can be derived from them. Much of the research which has examined cognitive aspects of choice of leisure activity has focused only on physical leisure activities. This largely, but not exclusively, refers to exercise that is performed in leisure time. This might include familiar forms of exercise such as jogging, swimming, cycling, sports, aerobics and other gym classes, martial arts and yoga, but may also include activities such as walking, skiing, rock climbing and gardening.

2.4.Health Behaviours and Well Being

Health behaviours are an important research area since it is now apparent that lifestyle plays a significant role in the epidemiology of the main causes of death in the western world (heart disease, cancer, stroke) as well as several other debilitating diseases, including diabetes. Health behaviours and well being appear to be associated in at least two ways. Firstly, the most obvious impact they have is to improve physical health or well being. Regular exercise is associated with reduced weight, improved heart and lung function and increased muscular strength, whilst stopping smoking will decrease the risk of heart disease, cancer and stroke.

A second impact that health behaviours might have is the derivation of psychological benefits from the adoption and maintenance of such health behaviours. Individuals who have lost weight and eat healthily may report increased self-esteem (e.g. Forster & Jeffery, 1986) and lowering alcohol consumption might reduce feelings of depression since depression and alcoholism are often found to co-exist (Davidson, 1995). However, it seems that exercise may have the biggest impact. Research suggests, despite the inherent methodological problems, that exercise can have some significant psychological effects (see Biddle, Fox & Boutcher, 2000, for an extensive review).

Firstly it may change mood or emotional state – exercise has been shown to be an effective treatment for depression (e.g. Martinsen, 1994) and may have some benefit for individuals who are suffering from stress or anxiety (e.g. Holmes & McGilley, 1987; McDonald & Hodgdon, 1991). Exercise might also improve sleep quality and quantity and it is well documented that sleep is necessary for well being (National Commission on Sleep Disorders Research, 1993).

Health behaviours might therefore impact on both physical and psychological well being. As with general choice of leisure activities, however, there are individual differences influencing whether exercise is adopted and maintained. It appears that many individuals find it extremely difficult to behave in a healthy way. The National Audit Office (2001) reports, for example, that the English population is becoming increasingly over weight and sedentary.

There are many health behaviours which warrant investigation including cigarette smoking, alcohol consumption and diet. There is a vast literature on the variables which determine whether these behaviours are adopted and maintained. It is beyond the scope of this thesis to review it all. However, in brief, it seems that demographics such as age, gender, social class and ethnicity might be significant predictors of exercise behaviour, smoking behaviour, alcohol consumption and diet (e.g. Lynch, Kaplan & Salonen, 1997, Abraham, Connor & Norman, 2000).

A variety of psychosocial variables may also be important. Personality constructs, for example, have been implicated. Vollrath, Knoch, Cassano (1999) showed, in a path

analytical model, that three of the Big Five dimensions (Agreeableness, Conscientiousness and Neuroticism) were related to risky health behaviours. Cognitive variables have also been investigated. Self-efficacy as been heavily researched and it is argued that greater self-efficacy is associated with greater success at adoption and maintenance of positive health behaviours (e.g. Schwarzer & Fuchs, 1995). Locus of control has demonstrated some importance (e.g. Steptoe & Wardle, 2001) with an internal LOC often associated with the adoption of positive health behaviour. The Theory of Planned Behaviour (Ajzen, 1991) predicts behaviour via intentions which themselves are determined by attitudes, perceived behavioural control and subjective norms. This model has been extensively researched and can account for a moderate level of variance in health behaviours. This can be increased by including other variables such as past behaviour and implementation intentions (e.g. Gollwitzer, 1993). Other social cognition models have also been posited, usually with some degree of success (see e.g. Connor & Norman, 2005). However, even the most successful leave significant amounts of variance unaccounted for. There may be a need for a broader conceptualisation of the individual utilised in examining the determinants of adoption of positive health behaviours as has been noted above in the discussion of work and leisure.

2.5. Work, Leisure, Health Behaviours and Well Being

There are clear links between work and well being, between leisure and well being and between health behaviours and well being. However, there are studies which have examined the inter-relationships between work and leisure and work and health behaviours.

Looking firstly at the relationship between work and leisure, research suggests it is complex. Haworth & Veal (2004) present a number of edited chapters on the subject. Whilst there may be individual differences in the way that leisure and work interact (gender and age for example; see Haworth & Veal, 2004), it is possible that work does impact on leisure. Firstly, it provides an income which, to some extent, facilitates or limits the activities possible. Secondly, working hours determine what time there is to actually participate in activities. Thirdly, work might impact physically and

psychologically on an individual and thereby influence what the individual wants to do. Work, via both its demands on time and its interactions with psychological health, might influence health behaviours such that it can impact on drinking, smoking, dietary and exercise behaviour. Research typically shows an association between jobs that are perceived as stressful and uptake of negative behaviours (e.g. Green & Johnson, 1990; Payne; unpublished thesis). Some have argued, however, that leisure is a means to deal with the negative effects of stressful work on well being, as has been explored in the literature on recovery from work (e.g. Sonnentag, 2001). Iso-Ahola & Mannell (2004) argue that leisure can play an important role in reducing occupational stress and improving health, although they point out that this role is neither clear nor automatic.

Lindquist & Cooper (1999) hypothesised that lifestyle (e.g. diet, exercise level, drinking, drug and smoking behaviours) and coping strategies (adaptive versus maladaptive) might be influential in levels of work stress, and that adopting a healthy lifestyle and adaptive coping strategies would help to reduce it. They looked at government tax workers who were assigned to either a control group or an intervention group and measured work-related stress, coping strategies, physical health and lifestyle and physiological measures (blood pressure and body mass index). The intervention group participated in a series of workshops on stress, lifestyle education, stress-coping skills training, as well as some individual counselling sessions with a personalised action plan for them to follow. Post-programme measures revealed no significant differences in stress and health indicators, but a 12 week post-intervention follow-up revealed reductions in both home and work stress, even though workplace stressors remained the same. Thus behaviour outside of work may help to reduce occupational stress.

Trenberth, Dewe & Walke (1999) attempted to uncover the dimensions of leisure perceived by the individual to be important for coping with work stress. Over six hundred principals and deputy principals from schools throughout New Zealand (where major - and presumably stressful – organisational changes were occurring) completed questionnaires which were designed to evaluate work stressors and the motivations important for using leisure to cope with work stress. In addition they completed the General Health Questionnaire, the Hopkins Symptom Checklist and an eight-item scale

measuring tension. Their analysis revealed evidence for a two-factor structure, suggesting leisure is best measured in terms of active-challenge and passive-recuperative dimensions in its capacity as a coping strategy for work stress. For the group surveyed, the passive-recuperative dimension of leisure activities was more important in coping with work stress.

The notion that leisure activities are related to work is not new but an alternative explanation could be that supposed relationships between work and leisure, for example, exist because work and leisure are underpinned by the same decision making and perceptual processes, or as Fletcher (2003) has termed it, our 'cognitive architecture'. An exploration of the relationships between our 'cognitive architecture' and well being, perceptions of work, leisure and health behaviours might therefore provide some initial insight to this. The following chapter details a new theory within psychology which represents this 'cognitive architecture'.

Chapter 3.
The FIT Theory and Framework

Recently a new theory has been developed which offers another explanation for well being and an opportunity to explain those "person-level" cognitions. The theory is FIT, and has been developed by Fletcher & Stead (e.g. Fletcher & Stead, 1998, 2000a, 2000b) to provide a different perspective on personal development. This new approach grew from an examination of the strengths and weaknesses in a wide range of psychological literature including material on occupational stress, cognitive self-regulation theory, goals and personal project analysis, trait personality theory, reversal theory, cognitive experiential self theory and flow (see Fletcher & Stead, 2000a). It should be remembered that this is a new approach and as such requires further development and empirical testing and there is much scope for examining its relationships to existing psychological variables.

The FIT theory and framework (note capitals are used when referring to FIT and its constituent parts cf. Fletcher & Stead, 2000a) focuses on the properties and perceptions of the individual and pays no attention to the environment. According to FIT, altering organisational and work factors makes less sense than affecting transformation in the individual, as it is the individual's poor decision making and inflexible behaviour which is responsible for the negative outcomes experienced (whether those be stress, anxiety, depression or any other aspect of well being). It may share something in common with Ryan & Deci's self determination theory of well being in that it takes a positive psychological view of well being – it attempts to explain how individuals can reach their potential as well as how they might avoid ill health. Fletcher & Stead have described FIT as a programme for personal development.

FIT ('Framework for Internal Transformation' or 'Flexible, Innovative & Trainable'), is, in essence, a grand theory of the psychology of people, and can be used for personal development in all areas of life. The FIT theory could be argued to assume a positive psychology approach to individuals since it argues that a person's FITness is a measure of the potential they have yet to exploit, and in Fletcher & Stead's (2000a) book they do

provide a range of exercises which can be used to improve FITness (hence the acronym Framework for Internal Transformation).

FIT theory prescribes the living of every moment in the present tense, rather than in the past, and its central principles are held within a concept termed (Inner) FITness. FITness is used here to refer not to physical fitness but mental, or psychological, fitness.

FIT advocates maximising personal potential via personal control and the removal of psychological constraints (Fletcher & Stead, 2000a, p16). FIT individuals are proposed to be flexible, adaptable, receptive, innovative, unstressed and in good mental health, involved in self-development and able to respond appropriately in varying social and work contexts (Fletcher & Stead, 2000a). Less FIT individuals are hypothesised to be comparatively poor in these qualities and are more likely to fail to reach their full potential because of psychological and environmental constraints. In particular, less FIT individuals may lack the ability to adapt their behaviour to the current situation, so that they will often use previous behaviour as a guideline even though the new situation requires something else.

FIT has two broad dimensions: an 'Inner' dimension which details factors used to guide decision making (a cognitive dimension), and an 'Outer' dimension which focuses on behaviour. The Inner aspect of FIT is proposed by Fletcher & Stead to influence how individuals construe their world. Fletcher (2003) makes the case for Inner FITness acting as a "dominant contextual bias that determines many aspects of perception, decision and behaviour" (pp. 564). In this respect, more FIT individuals may see the world in a way that is qualitatively different to those who are less FIT, in much the same way that stressed individuals show differences in their cognitive architecture to 'unstressed' individuals (e.g. Stead, Fletcher & Jones, 1996, 1997). The FIT theory has proposed that individuals make use of five decision making templates, referred to as constancies, to guide decisions and actions. These have been termed Awareness (of internal and external events), Conscience (a moral or ethical code), Self-responsibility (self-determination, acceptance of personal control and liability), Balance (of work and life) and Fearlessness (tackling situations head on regardless of whether they may be frightening). The rationale for there being five constancies is not explicitly addressed in

Fletcher & Stead's book; however, later psychometric testing supports the notion of five constancies (Page & Fletcher, 2006, Internal Report)

Individuals are hypothesised to use these constancies to behave with 'Integrity'. This construct reflects the individual's capacity to behave in accordance with what the current situation demands and not in relation to past experience, random occurrences or short-term, trivial attractions and rewards. The constancies represent the internal or cognitive aspects of the individual, but these cognitive elements are qualitatively different from the sort of cognitive abilities discussed in traditional psychology. Whilst the authors have yet to specify exactly how these decision templates work in terms of cognitive processes, preliminary research suggests that FITness is not associated with intelligence as assessed by the Ravens Advanced Progressive Matrices (Fletcher, 2007, Internal Report). The FIT theory might share more in common with *emotional* and *social* intelligence. Bar-On's (e.g. 1999) conceptualisation of EI for example suggests that EI is comprised of awareness of the self and others, adaptability, stress management and a positive mood. There is clearly significant overlap with the constancies of FIT and this may be an area for future research.

More FIT individuals are hypothesised to have a definite set of internalized goals to which they adhere and are more likely to be able to ignore inappropriate or temporary rewards, fear and doubt. The goals (and consequent Integrity which arises from adhering to the goals) therefore act to remove random behaviour. Integrity is more than just moral integrity; it is behaving in accordance with the constancies and being entirely responsible for your future. Again, Fletcher & Stead (2000a) do not specify evidence for the existence of Integrity or behavioural flexibility but internal reports performed by Fletcher on the psychometrics of the measurement tool confirm the validity of these constructs (Page & Fletcher 2006, Internal Report).

The five constancies which underlie Integrity are "…psychological and behavioural templates…" (Fletcher& Stead, 2000a, pp 18) and are hypothesised to guide our every thought and action in both the short and long term. The Awareness constancy is seen as the primary component of FIT and it monitors FITness. Essentially, Awareness refers to the extent to which individuals monitor, are aware of and deal with their internal and

external worlds. Fearlessness represents the "emotional manager" (Fletcher & Stead, 2000a, p21) and requires the individual to meet any situation head on, even the unknown and potentially fearful, with courage and confidence, not fear. Self-responsibility provides direction and is a measure of the level of motivation to be FIT. Self-responsibility provides motivation and guidelines for the other four constancies, but is also a measure for the extent to which an individual is personally accountable for their life and environment, regardless of the external factors which may exert an influence on them. Conscience is seen as social conscience, and this constancy is responsible for differentiating right from wrong and advocating that which is right. Finally, Balance refers to the emphasis we place on each aspect of our life. To be FIT, it is necessary to provide the proper care, attention and effort for each aspect of one's life, such as work, friends, family, and so on.

Fletcher & Stead (2000a) have suggested that more FIT individuals have constancies that are in balance with each other and can be used to make decisions with Integrity. In less FIT individuals the constancies do not operate at optimal standards, having been formed from previous learning and bad decisions based on external factors, such as other people or past experiences. Furthermore, in less FIT individuals, constancies may be eschewed as guides to good decision making in favour of external forces (e.g. social pressures, conformity, work and/or environmental demands and parental pressure). FIT people have coherent, definite constancies which, theoretically, lead to behaviour that is appropriate to the situation, Integrity and total control of one's life. Less FIT individuals are hypothesised to use poorer decision making and inappropriate behaviours in the various situations they encounter which leads to negative outcomes.

The observable outcome of well-set constancies and Integrity, according to Fletcher & Stead (2000a), is behavioural flexibility – the 'Outer' or external dimension of FIT. FIT posits that in the majority of individuals, behaviour is 'automatic' (in that sufficient cognitive attention is not observed and not in the full sense as defined by Bargh, 1997) and consequently may often be inappropriate. There is a substantial body of evidence within social cognitive psychology suggesting that automatic behaviour plays an important role in helping us to navigate our day to day activities (e.g. Macrae, Milne & Bodenhausen, 1994), but Fletcher & Stead (2000a) argue that making use of past

learning is not always to our benefit. They suggest that behaviour is biased toward previous learning experiences regardless of their relevance to the current situation, appropriateness to us and to those with whom we interact. This tendency towards habit is not conducive to appropriate behaviour and does not allow situational demands to be considered.

In practical terms then, Fletcher & Stead (2000a) postulate that this tendency towards habit translates into reliance on tried and tested (but inappropriate) behaviours with less FIT individuals having a limited 'zone of comfort' in many situations. They may not feel comfortable in many environments, which in turn may influence their behaviour and the effectiveness of their interactions. In more FIT individuals, increased behavioural flexibility theoretically means that behaviour is not governed by feelings of comfort or discomfort. In the measurement of FITness, the behavioural flexibility aspect is measured by asking the individuals to indicate the *range* of their behaviour for each item, rather than by asking them to indicate which *one point* best describes them. FIT interventions would therefore attempt to get individuals to operate outside their zone of comfort.

Fletcher & Stead (2000a) hypothesise many personal and organisational benefits of being FIT. For the individual these include protection against psychological illnesses, increased self-responsibility and therefore an improved chance of success, more autonomy, greater emotional intelligence and improved efficiency and performance. These benefits also work their way into the social domain in such ways as increased family growth and caring and transmission of benefits of FIT to those around you (instead of negative affect as in the less FIT). With respect to the organisation, the FITness of that organisation is determined by the FITness of its employees. A FIT organisation is one that is self-developmental, transforming (not static), inherently strong and information rich (Fletcher & Stead, 2000a). Many of these supposed benefits remain theoretical, but research has begun to demonstrate the advantages of being FIT. For example, Fletcher & Stead (1998) found that students with greater FITness also score higher in university exams as compared to less FIT students and Fletcher & Stead (2000b) found that more FIT interviewees do better in job applications than less FIT interviewees. Finally, more FIT team players assist team performance more than less

FIT team members (Lee, Fletcher, Tan & Lai, 2000). As already mentioned, more FIT individuals are expected to be less prone to psychological ill-health, such as stress, anxiety and depression. Accordingly, they should report greater well being.

Chapter 4

Study 1: Exploring The Relationships Between FIT and Well Being

4.1. Introduction

E properties and P properties may both be important for determining well being (e.g. Ryan & Deci, 2001). However, the relative importance of the environment and the individual for determining well being is unclear. Variables that have been assumed to be environmental may have been contaminated by properties of the individual (P properties) and those aspects of the individual which have been examined have been, perhaps, too narrow in their focus. More recent attempts to explain well being have come from what may be seen as a positive perspective, with theories concentrating more on the steps individuals may take to improve well being (e.g. Ryan & Deci, 2001).

Within the literature there are two ways to view the role of individual differences in well being. The first has been termed the temperamental view (see e.g. DeNeve & Cooper, 1998; Diener & Lucas, 1999) which suggests that some personal dispositions are directly associated with well being. The second view is the instrumental view which suggests that some dispositions influence the sorts of situations people encounter and how they deal with them, and the sorts of activities in which they engage. These in turn may influence well being.

The present study is an attempt to explore whether FIT is significantly related to well being in either of these ways. This study will use Personal Project Analysis (PPA, e.g. Little, 1983, 1989) as a vehicle for examining personal development activities. PPA is a way of examining the nature, content and structure of what people do to promote personal growth. It examines the sorts of short and long term goals or projects people adopt and argues that these projects can be explored along several dimensions which can then be investigated in relation to well being. This is explored in greater detail below.

4.2. Literature Review

4.2.1. Individual Differences and Their Relationship with Well Being

This will be discussed in three parts. Part one discusses briefly those individual differences which have been directly linked to indicators of well being (temperamental view). Part two will briefly examine those individual differences shown to be important for dealing with negative events so as to reduce strain outcomes and negative affect. This will be done solely in relation to work since to look at general life events moves beyond the scope of the present study. Part three examines the individual differences which are related to personal development activities that can bring good health (instrumental view).

4.2.1.1 Individual Differences Directly Related to Well Being: The Temperamental View

Diener and colleagues have established over the years that although there may be many individual differences which contribute to well being, demographic factors such as age, gender, income, educational background and marital status fail to account for the majority of variance in measures of well being (e.g. DeNeve & Cooper, 1998; Diener, Oishi & Lucas, 2003). However, it appears that personality is a much stronger correlate of well being (in fact, it may be that well being can be viewed as a personality trait itself since it appears to remain stable over time, Diener et al, 2003) and so there is a large literature on the relationship between personality and well being. There have been several reviews (e.g. DeNeve & Cooper, 1998; Ryan & Deci, 2001). DeNeve & Cooper (1998) for example, examined the big five personality traits and their relationships to each of the four conceptualisations of SWB (happiness, life satisfaction, positive affect and negative affect). Happiness was best predicted by extraversion and neuroticism, life satisfaction by neuroticism, positive affect by extraversion and agreeableness and negative affect by neuroticism. Relationships between negative affect and the big five were much weaker than for the other three conceptualisations of SWB. Their meta-analytic review concluded that the variables most able to explain variance in SWB were health, personality and SES.

However, even these variables can demonstrate only weak to moderate correlations with SWB (ranging from 0.19 to 0.32, DeNeve & Cooper, 1998). A note of caution must be applied here however - the majority of research done in this field is cross-sectional and so causal inferences cannot be made.

Other individual differences, such as personal control and achievement orientation (e.g. Peterson, 1999; Cassidy, 2000) are also likely to be important with respect to well being although it appears they have an indirect or instrumental relationship with well being. It is to these indirect or instrumental relationships that we now turn.

4.2.1.2 Individual Differences Related to Strain Outcomes

Even within the literature on occupational stress, a massive array of variables have been investigated to see whether they alter the likelihood of developing strain outcomes, and there are many mechanisms by which this might occur. An exhaustive discussion of the variables and mechanisms is not possible here so only a brief analysis is presented. Authors (e.g. Parkes, 1994) have classified individual differences as genetic characteristics (e.g. gender), acquired characteristics (e.g. age, education social class) or dispositional characteristics (e.g. coping styles, personality, Type A/B behaviour). Whilst there seem to be differences between the genders in some aspects of the stress process (e.g. Gianakos, 2002), the set of characteristics which stand out as being important are dispositional characteristics (Le Blanc, de Jonge & Schaufeli, 2000). In terms of the Demands - Control – Support model, dispositional factors might either buffer the individual against the influence of situational factors or they may be a vulnerability factor in which case they may increase the impact of stressors. In terms of the transactional model of stress (e.g. Lazarus & Folkman, 1984), dispositional factors might influence how the individual perceives the potentially stressful situation *and* how they choose to cope with it. Both the appraisal and coping responses might determine levels of stress.

Semmer (2003) discusses hardiness, sense of coherence, locus of control, self-efficacy, optimism and NA (viewed as a personality trait as opposed to an indicator of well being as discussed earlier) and all seem to have some, if complicated role, in buffering against

stress or determining either appraisals or how individuals cope – individuals with greater self-efficacy, an internal loc, greater hardiness, optimism and sense of coherence may be less prone to feeling strain outcomes. Another variable which has received a huge amount of attention is the Type A personality. Individuals holding such a personality have been characterised by a need for high achievement, time urgency and hostility and may have an increased likelihood of strain (see Parkes, 1994 for a review). One final variable which seems to be important is how the individual chooses to cope although there may not be 'one best way' (Semmer, 2003).

4.2.1.3 Individual Differences Related to the Pursuit of Personal Development (The Instrumental View)

One final way of examining factors related to well being has been to examine goals or projects and progress made with those goals or projects. The premise here is that adoption and success with goals or projects, which are integrated with the individual, facilitate a range of positive emotional and cognitive states, such as satisfaction or self-efficacy, which bring well being. There is a body of literature on goal pursuit and it suggests that well being is related to the feelings of competency and confidence that come with successful attainment of goals, that well being is also related to progress of goal attainment, and that optimal well being is likely to be achieved when the goals are appropriately challenging (see Ryan & Deci, 2001). Since the present study uses Personal Project Analysis (e.g. Little, 1983, 1989) as a means of examining personal development activities, the remainder of this section of the review will focus on PPA and well being.

One way of examining people's activities is via Brian Little's unit of analysis for studying personality in its social, physical and temporal contexts. These units are termed Personal Projects and are regarded as a series of interrelated acts carried out over time in an attempt to reach a certain state envisaged by the individual. Personal projects reflect cognitive, affective and behavioural aspects of human action in addition to environmental and temporal aspects. Personal projects have been conventionally defined as "extended sets of personally relevant action" (Little, 1989, pp.15), and these may range from mundane actions to life improving strategies. Personal Project Analysis

provides a way of examining the individual's feelings toward performing such projects as exercising, taking up new leisure activities, learning to relax, improving relationships and stopping smoking.

The various aspects of personal projects allow different types of analyses. With respect to the temporal aspect of projects, Little (e.g. 1983) suggests that projects move through stages which allow sequential analysis. Most projects are seen to progress through four stages (although not necessarily in an invariant fashion): Inception; Planning; Action; and Termination. Each of these stages represents a "…sequential constraint on project development." (Little, 1983, pp. 277-278). Within each stage there is a series of sub-stages (see Little, 1983), each of which provides ways of studying individual differences in personality in project terms (Little, 1983).

Another way of examining projects is to examine project dimensions. Five major dimensions have been determined: meaning; structure; community; efficacy and stress. Each of these dimensions consists of core assessment dimensions; meaning for example is assessed by asking individuals to rate their projects on their importance, their value-congruency, the enjoyment they provide, the absorption they provide and whether the project is compatible with their self-identity. The individual is typically asked to rate each of their current projects on each of these assessment dimensions to give total scores for each of the five project dimensions. These project dimensions can be related to various indicators of well being.

There has been research on personal projects which has investigated whether they can be used to predict quality of life and subjective well being. Such research typically uses measures of well being as outcome measures (for example self-ratings of life satisfaction and positive/negative affect), and tests the assumption that the five major project dimensions (meaning; structure; community; efficacy; and stress) can predict these measures. Research evidence provides some support for the general hypothesis that personal project factors and measures of global well being are interrelated (Little, 1989, 1993). Wilson (1990; cited in Little, 1993) however, showed that project meaning dimensions (with the exception of enjoyment) were among the worst predictors of well being. Project efficacy and lack of stress however did seem to have significant and

robust correlations with well being (see e.g. Christiansen, Backman, Little & Nguyen, 1999).

The lack of correlation between some project dimensions and well being may be caused by the fact that the dimensions used are not readily understood by participants or that certain dimensions, especially meaning, may not be directly related to well being. Rather, it may be that they have an indirect, mediating or moderating role in influencing well being (e.g. Christiansen et al 1999, Christiansen, Little & Backman, 1998). Perhaps cognitive architecture determines perceptions of projects and, to some extent, success with them. It may also determine how much value, pleasure and satisfaction can be derived from them. This, in turn, might determine whether projects actually influence well being or not. Certainly, Lawton et al (2002) found that most of the indices of personal projects were correlated with positive affect. Furthermore, Jackson, Weiss, Lundquist & Soderlind (2002) found that differences in perception influenced ratings of projects. Jackson et al examined whether optimists and pessimists perceived their personal projects differently. They found that those participants rated as highly optimistic tended to rate their projects more highly on the factors Positive Identity Fulfilment and Mastery-Control and lower on Perceived Strain. The authors discussed the less optimistic participants' perceptions of their projects in terms of the sorts of outcomes they might elicit. Specifically, they suggested that such perceptions may relate to learned helplessness, this itself being related to depression (e.g. Peterson & Seligman, 1985). This implies that cognition might influence feelings regarding activities, just as it might influence perceptions of work. This in turn might influence the outcomes of personal projects, one such outcome being well being.

In another study, examining the effect of perceptions, Wallenius (1999) examined whether an individual's environment was perceived to be supportive of their personal projects and whether this in turn was related to life satisfaction and depression. The study also attempted to uncover which personal project characteristics were related to perceived supportiveness of the environment. The results showed that the extent to which individuals perceived their environments to be supportive of their projects was related to life satisfaction but not depression. Those environments perceived as being highly supportive were associated with attainable and socially supportive projects.

Those individuals rated as more depressed, however, were likely to be engaged in projects which were described as stressful, abstract and self-related and to not perceive their projects as particularly well supported. The data collection was cross-sectional, so cause and effect cannot be established. However, these findings might be viewed as tentative support for the hypothesis that psychological ill health changes how an individual perceives his environment in terms of how constraining or supportive it is.

Other studies have also found the link between negative well being and negative ratings of projects. Lecci, Karoly, Briggs & Kuhn (1994) looked at the personal projects of individuals who scored highly on scales of depression and anxiety. Both depression and anxiety were associated with high ratings of stress and difficulty, poor structure, low feelings of control and low expectations of a positive outcome. This pattern of findings has since been replicated by Meyer, Beevers & Johnson (2004). This study examined over 400 college students' personal goal appraisals (a modified version of Little's personal project analysis) in relation to hypomania and depressive symptoms, both past and present. Participants reporting high levels of positive affect or hypomania appraised their goals positively – they were more efficacious in achieving them, felt more in control, enjoyed them and did not find them stressful or difficult. Those participants reporting higher levels of depression however, both past and present, found their goals to have less meaning and be less important. Finally, Salmelo-Aro (1992) showed that students experiencing psychological distress found it more difficult to complete self-related projects than their peers. Those who had low expectations of success were also found to have lower self-esteem and appeared to be less satisfied with their lives than those with higher expectations.

Other authors have suggested that E properties are important in determining the uptake and perceptions of projects. Phillips, Little & Goodine (1997) studied senior managers and their personal projects, revealing the existence of barriers and facilitators within the participant's organisations which influenced both the work and domestic projects of the managers. Outside of an occupational context, Christiansen et al (1999) looked at personal projects and well being, and, like Phillips et al (1997), they also concluded that achievement of projects was either hindered or supported by the contexts created by environmental characteristics in this case competing demands and relationships with

others. However, this research suffers from the same limitations that much of the research on occupational stress does – it has not measured actual E properties so what it has shown is that achievement of projects is related to how supportive individuals *perceive* their environments to be. Perhaps, then, individuals who are psychologically well perceive their environments to be supportive and unconstrained which improves self-efficacy and increases likelihood of completion.

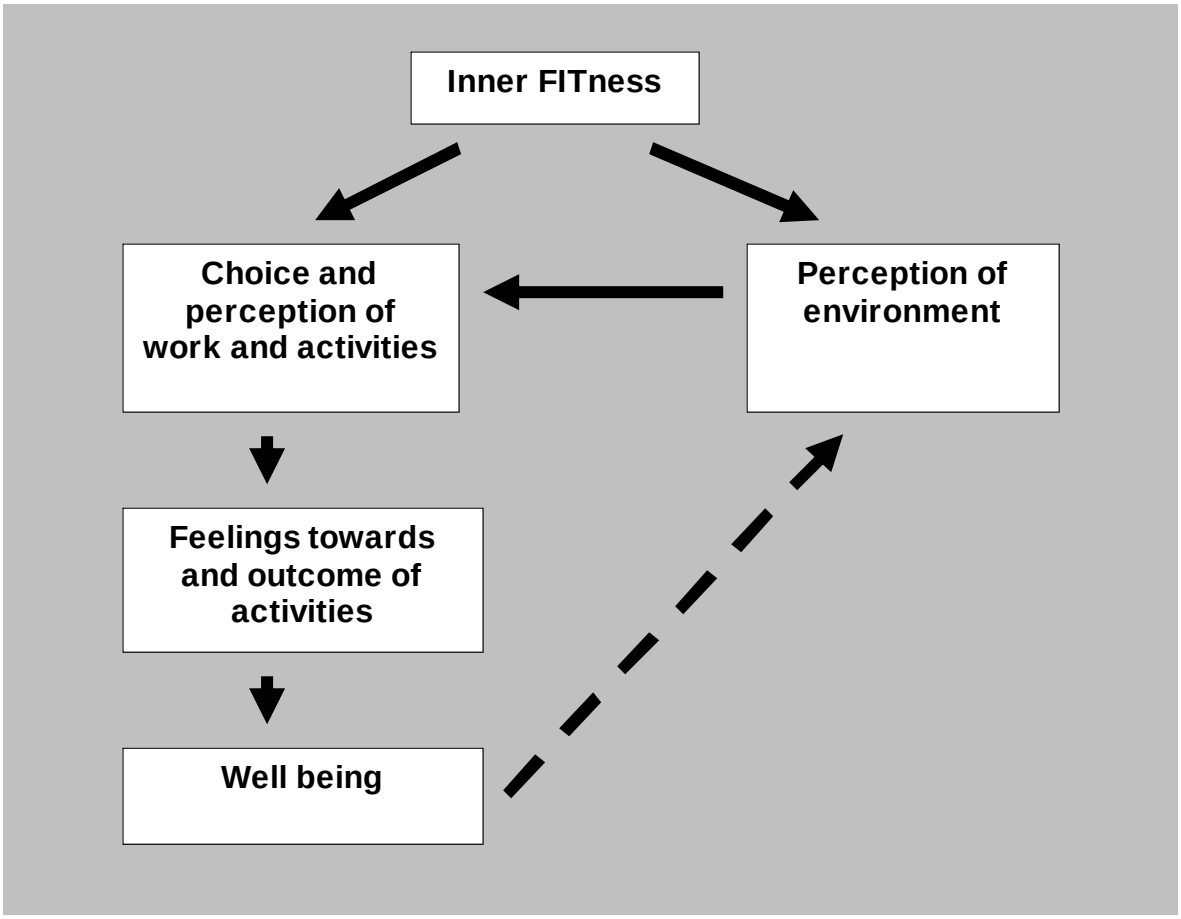
The present study will make use of PPA to explore the sorts of personal development projects individuals adopt, how they perceive the projects in terms of demands, constraints and supports, how individuals rate their projects, and whether any of these measures are related to measures of negative affect and FIT.

4.3. Rationale

Given the findings of the literature review, the present study will examine whether or not FIT may be a useful framework to explain individual differences in perceptions of work and choice of personal development activities and well being. The research outlined so far suggests that there are many individual characteristics which are related to well being, however often these variables capture only a small part of the individual and consequently may always be limited in their ability to predict well being. The FIT framework may be useful in this regard, especially since it was conceptualised as a broader individual variable than others to date. It is also a practical predictor and lever of change. Furthermore, those traditional variables which have shown to be able to account for significant amounts of variance in personal development and well being may have done so because they are outcomes of being FIT, for example having an internal LOC may be a feature of the individual high in Self-responsibility.

The initial study will examine individual's perceptions of their work and their leisure activities, looking particularly (but not exclusively) at health behaviours as leisure pursuits. Specifically, what might be the nature of FIT's role in well being? Figure 4.1. outlines a hypothetical model of expected relationships between FITness, perceptions, activities and well being.

Figure 4.1. Hypothetical relationships between FITness, personal development and well being.



The research discussed suggests that perceptions of leisure, work and health may be related to psychological states such that individuals who are depressed or anxious come to see their work and leisure in a more negative way (as indicated by the broken arrow). For example they report it to be more demanding, more constrained and less supported. Whilst this may be true, it is also possible that FITness is related to perceptions of the environment, and is important for decision making with respect to project adoption. Cognitions may be related to perceptions of work, leisure and health behaviours, as well as consequential success in these areas. In turn, these cognitions and outcomes are related to various aspects of psychological and physical well being. The relationships between FITness, perceptions of work and activities and well being needs therefore need to be elucidated.

4.4. Objectives and Predictions

The objectives for the present study are as follows:

1). To examine the relationship between FIT, locus of control and well being.

2). To investigate relationships between FIT, perceptions of work (demands, supports, constraints) and well being.

3) To investigate relationships between FIT, selection of personal projects, perceptions of personal projects and well being

4). To investigate relationships between FIT and health behaviours

There are several predictions which are discussed below.

FIT and psychological well being: One of the assumptions of the FIT framework is that while mental health is not dependent upon FITness, being FIT precludes mental ill health. Thus FIT individuals are not likely to suffer from, for example, anxiety or depression. In the FIT, those problems which give rise to mental ill health are never allowed to do so. Behavioural flexibility and harmonious constancies do not allow it. Rather, they facilitate adoption and execution of projects or activities that are part of personal development. It is therefore expected that increased FITness will be related to reduced anxiety and depression, with behavioural flexibility, Fearlessness and Self-responsibility being particularly important.

FIT and physical well being: Fletcher & Stead (2000a) make some substantial, but as of yet unsupported, claims regarding the relationships that exist between psychological FITness and physical fitness, specifically that they have a reciprocal relationship. They argue that for more FIT individuals, it is important to maintain good health and look after themselves, not just because of the physical health connotations, but also because physical health aids FITness. It is therefore hypothesised that increased FITness will be related to positive health behaviours.

FIT and work: The FIT theory argues that strain (for the most part) is not inherent in the work environment or in characteristics of the job. Rather, strain is felt if the individual is not FIT, because they perceive and deal with things in a less appropriate

manner, bearing some similarity to Lazarus' theory of stress. It is therefore expected that there will be differences in the way in which less FIT individuals view their work, specifically that these individuals will see their jobs as being constrained and more demanding, whereas more FIT individuals will find them well-supported with a moderate level of demands which they use as stimulation and for personal development.

FIT and Personal Projects: It is suggested that as with occupation, more FIT individuals will perceive their leisure activities, in the form of personal projects, as being less constrained and demanding than less FIT individuals. Furthermore, Personal Project Analysis examining the core dimensions is expected to show that more FIT individuals will perceive their projects more positively. With respect to personal projects that are also health behaviours, it is expected that less FIT individuals may already perform more positive behaviours than less FIT individuals, or may perhaps be planning to adopt more than less FIT individuals. One further area of interest here is whether participants who do select projects differ from those who do not, and what the non-selectors reasons are for their decisions. The nature of their reasons may be linked to their FITness.

FIT and locus of control: It was discussed above that some measures of individual differences have been used in an attempt to help explain well being and choice of activities. This study will examine locus of control. This variable has previously been shown to be related to health behaviours and well being but another reason for choosing locus of control is that it may be related to FIT. That is, more FIT individuals should display an internal locus of control as they believe themselves to be the architect of their world.

4.5. Method

A cross-sectional, exploratory research design was adopted for this study in order to examine inter-relationships between FIT, work, leisure, health and well being. Whilst longitudinal research is required to establish cause and effect, the present study did not employ this design since it was exploring potential relationships between FIT and well being rather than examining the nature of any such relationships.

4.5.1. Measures

The following variables were measured: health and lifestyle; FITness; perceptions of occupation demands and supports/constraints; personal project dimension ratings; perceptions of personal project demands and supports/constraints; locus of control and well being. Well being here was conceptualised as negative affect and two indicators were used: anxiety and depression. These indicators were chosen because these are two outcomes often assessed in the literature on occupational stress and because they have already been shown to be related to how individuals perceive their environments.

4.5.1.1 Biographical Data

Participants were asked to indicate their age, gender, marital status, number of children, and ethnic origin (*see Appendix one*).

4.5.1.2. Health and Lifestyle

The following measures were used (*see Appendix one*):

a) Height and weight – these measures were taken to allow Body Mass Index (BMI) to be calculated.

b) Lifestyle information was taken for several indicators. Firstly, participants stated how many cigarettes they smoked in a week and how many units of alcohol they consumed in a week (a description of how many units are in a pint, measure of spirit and glass of wine was provided). Participants were then asked to rate the frequency of eating fried foods/fatty foods/foods high in fibre/fruit and vegetables by circling a number between 1 and 5 on a Likert response scale where 1 indicated ‘never’ and 5 indicated ‘every day’. A

composite 'diet' score was calculated by summing scores on each item, however the eating of fruit and vegetables and of foods high in fibre was scored positively and the eating of fried/fatty foods was scored negatively. Thus higher diet scores indicated a healthier diet.

c) Exercise information: frequency which participants performed cardiovascular exercise (running, swimming etc); played sport; performed martial arts; took exercise classes; performed strengthening exercises (weight lifting etc); performed flexibility training (yoga etc). This was scored using a Likert response scale ranging from 1 (never) to 5 (every day). Again participants rated how often they engaged in these activities on a Likert response scale with 1 indicating never and 5 indicating every day. A composite score was calculated by summing scores on each item with higher scores indicating more frequent, varied exercise patterns.

4.5.1.3. FIT (see Appendix two)

The FIT Profiler (Fletcher & Stead, 1999) was used to measure FITness (see Appendix two). This comprises two sections, one which assesses the individuals behavioural flexibility, integrity and score on each of the five constancies (and consequently an additional overall FIT score), and one section which assesses the individuals current anxiety and depressions levels. The first section takes the form of 75 questions which are concerned with how the respondent might think and behave in any given circumstance. The 75 items provide scores for three aspects of FIT: Inner FITness which is comprised of the five constancies as well as the construct of Integrity which is calculated from the five constancy scores, and Outer FITness which is comprised of behavioural flexibility, and Overall FITness which is a composite measure of Integrity and behavioural flexibility. Integrity is the mean of the five constancy scores. The 75 items provide scores for the following variables: constancies (Awareness; Balance; Conscience; Fearlessness and Self-responsibility); Integrity and behavioural flexibility.

For each of the 75 items, respondents have an 11 point scale to respond on. The scale represents the two extremes of the behaviour in question, with 0, the middle point, representing behaviour that is neither one nor the other. Respondents are asked to

indicate the *range* that they might exhibit at any given time, in terms of what is referred to as the zone of comfort, or their preferred zone. This essentially means doing what they would be comfortable, as opposed to uncomfortable, doing.
For example, upon being asked the question:

"Do you show your feelings freely or keep them to yourself?"
The respondent would indicate his/her answer on the following scale:

5	4	3	2	1	0	1	2	3	4	5
Freely					Neither one nor the other				Keep to myself	

The respondent might feel that they generally show their feelings freely, in which case they should indicate a narrow range and just circle the 5 above 'freely'. However, they might feel that they are somewhere in the middle although on occasion they show their feelings freely, in which case they could circle the 0 and the 5 above the 'freely' and join the two. Some individuals may feel that they are prone to both, so that they should circle both the 5's and join them together, thereby indicating the entire range. The point is that this type of scale allows for a range to be indicated, provided that that range includes only those thoughts and behaviours which feel comfortable to the respondent and by their own choosing.

Each of the constancies are measured by 10 items (examples of items for each constancy are given below, Table 4.1) and an average score for those ten items is calculated. Each constancy is therefore given a final score out of ten with higher scores indicating a higher level of that constancy.

Outer FITness, or behavioural flexibility, is assessed through fifteen items, each item assessing the range of the individuals comfort zone for a different behavioural dimension. There are fifteen behavioural dimensions, outlined below in Table 4.2., with measurement items given for each dimension

Table 4.1. Example FIT profiler items for the constancies

Constancy	Example Items
Awareness	*"Do you often find yourself daydreaming?"* *"Do you monitor or analyse the words or actions of others?"*
Balance	*"Is it important to develop a balance between work and home?"* *"When you are at work do you wish you weren't?"*
Conscience	*"Do you think that moral and ethical standards have to be comprised to achieve success?"* *"Do you think you have to tell lies to achieve success?"*
Fearlessness	*"Does the thought of failure fill you with fear?"* *"Do feelings of insecurity make you fearful?"*
Self-responsibility	"Do you fell you have a choice in life or no choice at all?" "Do you feel you have control over what happens to you?

The range of behaviour indicated for each item is calculated and summed to give a total score for behavioural flexibility out of 100. The higher the score, the more behaviourally flexible the individual.

The final measure that the FIT profiler provides is an Overall FIT score. This can range from 0-1000 and it is calculated by multiplying the behavioural flexibility score by the Integrity score.

A psychometric report produced by Fletcher & Page (2007) demonstrates the FIT profiler has good internal consistency (calculated from a sample of 1325 individuals). Cronbach alphas for the constancy scales range from 0.67 (Self-responsibility) to 0.87 (Fearlessness) and for the behavioural flexibility scale it was 0.91. Cronbach's alpha for the Integrity and Overall FIT score scales were 0.87 and 0.90 respectively. Test-retest reliability coefficients for the various scales ranged from 0.40 for Balance to 0.89 for Overall FIT score.

The second section in the FIT profiler consists of 8 statements which refer to thoughts and feelings commonly associated with anxiety and depression. These scales have demonstrated good internal consistency and test-retest reliability (Page & Fletcher, 2006) with all coefficients above 0.76 and have shown themselves to be strongly

correlated with other measures of anxiety and depression (e.g. DASS, STAI-T and BDI, see Page & Fletcher, 2006).

To measure anxiety and depression, the respondent is asked to consider each item in turn and indicate how often each statement has applied to them over the last few weeks : Never; Rarely; Now and Again; Very frequently. The statements include such things as: Feelings of sadness in the morning; Finding it difficult to think on the spot and concentrate; Feeling low and wanting to give up; Feeling uneasy and needing to escape; Worrying about things which causes feelings of tension and strain. Separate anxiety and depression scores were calculated by summing responses to the relevant items for each variable. A response of ‘never’ was awarded a score of 1, ‘rarely’ a 2 and so on. Total anxiety and depression scores could range from 4 (no anxiety or depression) to 16 (very anxious or very depressed).

Table 4.2. Behavioural flexibility dimensions and measurement items

Behavioural Dimension	Measurement Item
Unassertive - assertive	*"Do you behave in an assertive or unassertive manner?"*
Trusting of others - cautious of others	*"Are you trusting or cautious of others?"*
Calm/relaxed - Energetic/driven	*"Are you calm/relaxed as a person or are you energetic/driven?"*
Reactive - Proactive	*"Are you a reactive or proactive person?"*
Definite - Flexible	*"Are you a definite or a flexible person?"*
Outer-directed - Inner-directed	*"Are you an introverted or an extroverted person?"*
Risky - Cautious	*"Are you a risk taker or a cautious person?"*
Behave as expected - Behave as you wish	*"Do you behave as you wish or as others expect?"*
Spontaneous - Systematic	*"Are you a spontaneous or a systematic person?"*
Single-minded – Open-minded	*"Are you a single-minded or open-minded person?"*
Introverted - Extroverted	*"Are you an introverted or extroverted person?"*
Conventional – Unconventional	*"Do you have a conventional of unconventional manner?"*
Individually centred – Group centred	*"Are you group or individually centred?"*
Firm-Gentle	*"Would you consider yourself to be a firm or gentle person?"*
Lively – Not lively	*"Would you consider yourself to be a lively person?"*

4.5.1.4. Work Factors (see Appendix one)

Participants were first asked to provide some information about their job. They were asked to state their job title, how long they had been in their present position, how many staff they are responsible for, how many hours they work in a typical week in their place of work and how many hours they work (job related) in a typical week at home. Participants also provided information on the business sector they worked in (manufacturing, service/utilities, financial, academic, other) type of employment (self-employed, employed, voluntary, student), salary (less than £10 000, £10 000 - £19 000, £20 000- £29 000, £30 000 - £39 000, £40 000 - £49 000 or more than £50000) and

time taken to travel to work (less than 30 minutes, 30-60 minutes, 1-2hrs or more than 2 hours).

The method selected for assessing how individuals view their jobs was the Job Demands – Supports – Constraints (DSC) model devised by Payne (1979). He suggested that occupational stress arose from the interrelationship of work demands and factors within the work environment which would serve either to support or constrain the workers ability to meet these demands. Payne's DSC model allows several demands and supports/constraints to be evaluated. This provides a more explicit picture than, for example, Karasek's demands /control model (Karasek, 1978). The participant is presented with a list of items which they must rate according to how demanding they feel each item is. Each item is a generic demand which they may have to meet at work and that they might find stressful: Job pressures; having too much to do; having too little to do; being responsible for people; being responsible for equipment; demands from others; conflicting demands/roles; over-under promotion; keeping up with other organisations; organisational climate; office politics; organisational structure; organisational/job changes; major decisions; expectancies of others/organisations.

For each of these demands, they were asked to indicate on a five point Likert scale how demanding they felt that item, within their own job, to be. The scale ranged from 1 (not at all demanding), to 5 (highly demanding), (see Appendix one). Scores for each item were summed to give an overall demand score that could range from 15 (job not at all demanding) to 75 (very demanding). The demands scale was tested for internal consistency and reported a Cronbach's alpha of 0.826.

Participants were then given a list of items which Payne (1979) has proposed as serving as potential supports or constraints: Being clear about my role; Job discretion, autonomy or control; Quality of relationship with boss; Quality of relationship with colleagues; Quality of relationship with subordinates; Union membership; Role ambiguity; Variety level/skill utilisation; Social perception of job; Participation in decisions; Payment/reward system; Quality of equipment; Physical working conditions; How work is planned/managed. Again participants rated each item for the extent to which it serves as a support or constraint in their own job. The Likert response scale

ranged from 1 (supports me in meeting demands) to 3 (neither supports or constrains) to 5 (constrains me in my ability to meet demands). Cronbach's alpha for the supports-constraints scale was 0.752.

4.5.1.5. Personal Projects Analysis (see Appendix one)

Little's (e.g. 1983) method was followed but with some variations. For Little, personal projects can include very mundane unimportant activities which are not of interest here. Rather, the focus was on personal development projects. The main alteration therefore to Little's method was to provide the participants with a list of 12 projects, drawn from salient aspects of life: health behaviours; work activities and lifestyle/leisure activities. The twelve projects used within the study were:

1. Exercise regularly
2. Stop smoking
3. Eat a balanced diet
4. Reduce alcohol consumption
5. Learn to relax/relax more often
6. Develop my spirituality
7. Begin therapy/counselling
8. Take up new activities or leisure pursuits/learn new things
9. Spend more time with family and friends
10. Improve relationship with partner
11. Work harder/take on more responsibility/get a promotion
12. Change career.

Participants indicated which of the projects, if any, they had begun within the last month or were planning to begin in the coming month.

This alteration represents a departure from Little's method, because respondents are not providing their own choice of project but are faced with a forced choice. It is not valid to use 'type of project' as an indicator of choice as Little does. Rather, it was intended

that respondents should rate the offered projects using Little's dimensions. This would permit examination of how individuals view such self-improving activities in terms of Little's project dimensions. Participants rated each project they had selected, on each of the project dimensions, using a 10 point response scale where 1 = not at all and 10 = very much so). The dimensions to be rated were:

1. Importance (how important that project is)
2. Enjoyment (how enjoyable that project is)
3. Difficult (how difficult that project is)
4. Visibility (how visible to others that project is)
5. Control (how much control the individual feels they have over the project)
6. Initiation (the degree to which the individual is responsible for initiating that project)
7. Stress (how stressful that project is)
8. Time adequacy (the extent to which the individual is happy with the time spent on the project)
9. Self-identity (how typical the project is of the individual)
10. Other's view (how important others close to the individual feel the project is)
11. Value-congruency (the extent to which the individual feels the project consistent with their values)
12. Progress (how successful the project has been so far)
13. Challenge (how challenging that project is)
14. Absorption (how absorbing and engrossing that project is)
15. Outcome (how likely the individual is to achieve that desired outcome)

Little's original fifteen dimensions underlie 5 separable factors:

1. Efficacy (the degree to which the individual is able to carry out the project, as measured by outcome and progress)

2. Stress (the degree to which the project represents challenge and difficulty, as measured by stress, challenge, difficulty)

3. Structure (relates to the notion that one's projects are organised and under control, as measured by control, initiation and time adequacy)

4. Community (represents a social dimension relating to the concept that others view one's personal goal-related endeavours as important and worthwhile, and is measured by visibility and others view)
5. Meaning (how rewarding, worthwhile and valuable the projects are, measured by importance, enjoyment, value congruency, self-identity and absorption)

Scales for each of these five dimensions are calculated by summing each of the underlying items and calculating the mean score.

Participant's perceptions of work demands, supports and constraints were to be compared with their perceptions on their projects demands, supports and constraints so a further section was added. This section required participants to respond to a list of factors which might serve as demands and supports or constraints for each project they selected – these demands and supports-constraints were individually selected by the author for each project since one standard set of demands-supports-constraint would not easily apply to all projects. The full lists for each project are not set out here due to lack of space, however, typical examples of demands included items such as "Demands from others", "Meeting the financial cost", "Finding the time" and "Learning new behaviours". Typical supports-constraints items were "Other people", "Level of motivation" and "Work" (*see Appendix one*).

The same conceptualisation for demands and support-constraints was used here as for work: demands are things which one has to respond to, and the supports/constraints are aspects of the individual, social and work environment or physical environment which may serve to either constrain or support the individuals ability to meet those demands. For example, for the stop smoking project, the individual has to meet the demands of not smoking despite the physical and psychological cravings. Factors such as support from friends and family, smoking policy at work, commitment and previous attempts to stop smoking may serve to either help or hinder the individual meet these demands. For each demand and support/constraint listed, the participant was required to indicate how demanding it was and how supporting or constraining it was (both on a five point Likert scale as was used for assessing perceptions of work demands, supports and constraints). The support/constraints items devised attempted to cover the primary environmental

and personal variables that individuals might typically encounter. Note that the items used for each project were not based on existing theory or research. Alpha coefficients for the internal consistency of the scales for demands and supports-constraints, for each of the projects, are given below in Table 4.3.

Table 4.3. Cronbach alpha coefficients for project demand and support-constraints scales

Project	Demand scale	Supports-constraints scale
Exercise regularly	.512	.765
Stop smoking	.601	.734
Eat a balanced diet	.502	.852
Reduce alcohol consumption	.691	.843
Learn to relax/relax more often	.740	.930
Develop my spirituality	.825	.815
Begin therapy/counselling	.401	.775
Take up new activities or leisure pursuits/learn new things	Coefficient not computed due to too few cases	Coefficient not computed due to too few cases
Spend more time with family and friends	.661	.770
Improve relationship with partner	.787	.601
Work harder/take on more responsibility/get a promotion	.830	.827
Change career	.705	.614

For those participants who declined to select projects, a section was provided with a general list of reasons for not selecting the projects. The reasons were not specific to any project. They included a mixture of environmental constraints and personal constraints, and the participant was required to tick which they felt applied to them. For example: ‘I cannot be bothered’; ‘Not enough time’; ‘Work is too far from home’; ‘I do

not need to achieve these goals'; 'I cannot afford it' and so on. Further space was provided for the participants to add any reasons not covered

4.5.1.6. Locus of Control (see Appendix one)

To measure internal and external locus of control, a shortened version of Park's (1995; cited in Park & Kim, 1998) scale was used. This scale was originally constructed through interviews and open-ended questionnaires completed by students. The respondents rated the extent to which they agreed with each item (see Appendix one). The original scale consisted of 40 items, twenty of which measured internal locus of control and twenty which measured external locus of control. Cronbach's alpha for the internal locus of control scale was 0.90 and for the external scale this was 0.86. In the present study, time was limited so those items from the original forty item scale which loaded most strongly on the internal and external scales (as reported in Park & Kim, 1998) were selected (5 items for each scale), with some items reversed. Items used included "Those who try their best will achieve the most", "Hard work is not enough" and "Other people can have strong influences on one's life". Participants rated the extent to which they agreed with each statement on a five point Likert scale (1 = strongly agree and 5 = strongly disagree). Cronbach alpha coefficients for the internal and external LOC scales in the present study were 0.73 and 0.71 respectively. Individual items were summed for each scale to give a total internal loc score and a total external loc score which could range from 5 (strong internal or external loc) to 25 (weak internal or external loc).

4.5.2. Participants

The sample size was 109, 51 of which were male. An attempt was made to make the sample as representative of the population as was possible, with participants ranging in age from 20 to 63. Forty-one individuals were aged between 20 and 29, twenty-two individuals were aged between 30 and 39, twenty-seven were aged between 40 and 49 and finally, nineteen were aged over 50. Within the sample, 106 participants were Caucasian and 3 were Asian. Ethics approval was received for this study (protocol number BS/R/003 I).

The only stipulation regarding participant involvement was that participants be in full time employment or be carrying out full-time further education, so that they had sufficient occupation to use as a frame of reference. Occupations of participants varied widely. Participants worked in a variety of different business sectors. One individual worked in manufacturing, fifteen worked in finance, twenty-three individuals worked in the service/utility industry, fifty-three worked in academia (this included post-graduate students as well as academic staff) and seventeen individuals worked in other sectors.

With respect to the employment status of the sample, eighty-seven individuals were in full-time employment, eight were self-employed, one individual performed voluntary work and thirteen participants were students. Salaries were varied. Twenty-three participants earned les than £10000 a year, twenty-four were earning between £10000 and £19000, thirty participants were earning between £20000 and £29000, fifteen were on between £30000 and £39000, seven participants were earning between £40000 and £4900 and finally, ten participants were earning more than £50000 a year.

Working hours also varied. Hours spent in the workplace ranged from 0 (some individuals worked entirely from home) to 75, mean number of hours being 37.63. The number of hours spent working from home ranged from 0 to 50, with the mean number of hours worked from home being 5.03. Participants were recruited through acquaintances, colleagues and the internet.

4.5.3. Procedure

Participants were mailed or handed questionnaires with stamped, addressed envelopes to post them back in. This allowed the participant to fill the questionnaire in their own time, an important factor given the length of the questionnaire and the time necessary to complete it. It also provided participants with complete anonymity and removed any influence the researcher might have had on participant responses. The questionnaire contained detailed instructions, and although they were not uncomplicated, responses suggested that participants had understood the instructions.

4.6. Results

The raw data was collected and inputted to SPSS. It was primarily in the form of numerical (interval level) data. Transformations are outlined for each group of data in the relevant sections below.

4.6.1. Objective One: To examine the relationship between FIT, loc and well being

4.6.1.1 Descriptive Statistics

FIT constancy and Integrity scores can range from 0 (low level of that constancy) to 10 (very high level of that constancy). Behavioural flexibility scores may range from 0 (very limited behavioural flexibility) to 100 (very behaviourally flexible) whilst Overall FIT scores can range from 0 (very limited FITness) to 1000 (perfect FITness). Note for the Overall FIT scores individuals typically report scores between 0 and 100 (see Fletcher & Stead, 2000a) and these scores should really be used to indicate the level of untapped potential an individual has (Fletcher & Stead, 2000a).

Well being scores (anxiety and depression) ranged from 4 to 16 with 4 indicating no anxiety or depression and 16 indicating very high levels of anxiety or depression. For internal and external loc (measured as separate dimensions), scores ranged from 5 to 25 with lower scores indicating a stronger internal or external loc.

Table 4.4 shows that the mean Overall FIT score was low at 140.71 (recall that scores can range from 0 – 1000). Furthermore it can be seen that the SD was large (133.61), indicating that there were large variations within the sample. Examination of the data revealed that there were two main outliers scoring over 800 and 600 respectively (these were removed from further analyses), with all other cases falling between 0 and 400.

A similar picture arose for behavioural flexibility. The mean score was low – 22.78 – but again the SD was large (19.15). This time there was one main outlier scoring 95, which was removed from further analyses.

The mean Integrity score was 6.0 and the SD was small (0.92). Mean scores on each of the constancies were all similar, falling between 5.6 and 6.9 and again SD's were low and similar to each other. There were no real outliers for any of the constancy or Integrity variables.

Table 4.4: Mean scores and standard deviations for FIT variables (N=109)

Variable	Mean score	Standard Deviation
Overall FIT score	140.7	133.6
'Outer' FITness		
Behavioural flexibility	22.7	19.2
'Inner' FITness		
FIT Integrity	6.0	0.9
Awareness	6.1	1.0
Balance	5.6	1.2
Conscience	6.8	1.5
Fearlessness	5.3	1.7
Self-responsibility	6.3	1.1
Well Being		
Anxiety	9.5	2.4
Depression	8.0	2.6

Anxiety and depression scores may both range from 4 to 16 with a lower score indicating a lower level of anxiety or depression. The average anxiety score was slightly larger than the average depression score but the data suggests that the sample was both mildly anxious and mildly depressed. Standard deviations were low for anxiety and depression.

The next step was to consider whether FIT, loc and well being were correlated with each other. This is discussed below.

4.6.1.2 Correlation Analyses

This analysis is presented in two parts. Firstly, potential relationships between FIT and loc are presented, followed by the analysis of relationships between FIT, loc and well being.

Firstly, a correlation analysis was performed with FIT and loc, the results of which are shown in Table 4.5 (the full correlation analysis results with FIT, loc and well being measures can be seen in Appendix three). Significant correlations are highlighted in bold. One tailed analyses were performed since predictions were made about the nature of the potential relationships between FIT and loc, namely that more FIT individuals would demonstrate greater internal loc and weaker external loc.

The additional problem of 5% of the coefficients being significant through chance alone was considered. Two rules have been proposed to counteract this. The first is based, on the rationale that the more hypotheses to be tested, the more conservative the test should be (the Bonferroni correction). The significance cut-off level should therefore be set at .05/C, where C is the number of hypotheses to be tested. A less conservative rule following the same rationale is to test the highest coefficient at .05/C, the next highest at .05/(C-1), the third-highest at .05/C-2), etc. However, even the less strict approach is still very stringent. Since social science research is often hampered by small sample sizes these rules can significantly increase the chance of a Type II error being made. This is mainly a danger when doing post *hoc analysis* without *à priori* hypotheses to be tested which was not the case here. Additionally, the sample size was not large (N=109). Thus the rules have not been applied here and a standard cut off of 0.05 has been applied. It is to be remembered that one in twenty of the correlations could be spurious.

Table 4.5 Correlations and significance levels between FIT and other psychological variables

Variable	Internal LOC	External LOC
Overall FIT score	**-.196**	-.091
	p=.021	p=.172
Outer FITness		-.099
Behavioural flexibility	-.134	p=153
	p=.082	
Inner FITness	**-.264**	**.159**
FIT Integrity	**p=.003**	**p=.049**
	-.170	.009
Awareness	**p=.039**	p=.462
Balance	**-.202**	.095
	p=.017	p=.163
Conscience	**-.198**	.147
	p=.019	p=.064
Fearlessness	-.124	**.160**
	p=.100	**p=.049**
Self-responsibility	**-.277**	.113
	p=.002	p=.121

Table 4.5 highlights several significant relationships, in particular between FIT and internal loc. Internal loc was related to Overall FIT score (r = -.196, p = .021) indicating that more FIT individuals also rated themselves as having a stronger internal loc. This relationship appears to have arisen because of internal loc's relationship with Inner FITness – internal loc was significantly correlated with Integrity (r = -.264, p = .003), Awareness (r = -.170, p = .039), Balance (r = -.202, p = .017), Conscience (r = -.198, p = .019) and Self-responsibility (r = -.277, p = .002). In each case a stronger internal loc was associated with higher scores on the FIT variables. External loc was also found to correlate with Inner FITness: Integrity (r = .159, p = .049) and Fearlessness (r = .160, p = .049). In both cases a weaker external loc was associated with increased FITness. However, both these relationships were weak and not statistically significant when two tailed correlations were run. It is possible that these relationships arose through chance.

The second part of the analysis was concerned with examining whether either of the measures of well being taken (anxiety and depression) was related to FIT or to loc. Pearson correlation analyses were run (full results can be seen in Appendix three). Table 4.6 indicates several significant associations between anxiety, depression and FIT (highlighted in bold) but neither measure of well being was related to loc.

Table 4.6. Correlations and significance levels between FIT, other psychological variables and well being

Variable	Anxiety	Depression
Overall FIT score	-.123 p=.102	-.108 p=.131
Outer FITness Behavioural flexibility	-.050 p=.301	-.068 p=.241
Inner FITness **FIT Integrity**	**-.502** **p=.000**	**-.345** **p=.000**
Awareness	**-.280** **p=.002**	-.133 p=.083
Balance	**-.323** **p=.000**	**-.305** **p=.001**
Conscience	-.157 p=.052	-.020 p=.417
Fearlessness	**-.558** **p=.000**	**-.453** **p=.000**
Self-responsibility	**-.423** **p=.000**	**-.292** **p=.001**
Locus of Control Internal loc	.087 p=.184	.107 p=.134
External loc	-.071 p=.233	.036 p=.354

Anxiety was not found to correlate with Overall FIT score (presumably because of the weight given to behavioural flexibility in determining this score) or with the measure of Outer FITness (behavioural flexibility), but it did correlate significantly with Inner FITness. Anxiety was related to Integrity (r = -.502, p = .000) and to the FIT constancies Awareness (r = -.280, p=.002), Balance (r = -.323, p =.000), Fearlessness (r = -.558, p = .000) and Self-responsibility (r = -.423, p = .000). In each case the correlation was negative showing that high levels of anxiety were associated with reduced FIT levels. Depression was similarly found to correlate only with aspects of

Inner FITness – Integrity (r = -.345, p = .000), Balance (r = -.305, p = .001), Fearlessness (r = -.435, p = .000) and Self-responsibility (r = -.292, p = .001). All the correlations were negative, showing that less FIT individuals reported feeling more depressed. Interestingly, anxiety and depression were also found to be correlated (r = .769, p = .000) such that individuals high in anxiety also scored high on depression.

The results of the analyses are clear. FIT was associated with loc and in the manner predicted. Individuals with greater FITness were more likely to have a stronger internal loc than less FIT individuals. Furthermore, loc was not related to anxiety or depression unlike Inner FITness. Individuals with greater Integrity (and in particular Fearlessness) were less anxious and less depressed, although with respect to Fearlessness, the correlations may have been so strong because the measures had tapped into the same thing.

4.6.2 Objective Two: To investigate relationships between FIT, perceptions of work and well being

To answer this objective several analyses have been performed. Firstly, descriptive statistics pertaining to work factors are presented. Next, a correlation analysis between work factors and measures of well being is reported. This is followed by multiple regression analyses using well being measures as the dependent variables in order to determine which factors were best able to predict them. Finally, a Pearson correlation analysis was performed on FIT and work factors in order to see if FITness was associated with perceptions of work.

4.6.2.1 Descriptive Statistics

As already discussed, demand items were summed. This composite score ranged from 15 (individual found every aspect of work undemanding) to 75 (individual found every aspect of work very demanding). The scale for rating whether a variable acted as a support or constraint was transformed. Initial scores ranged from 1 (supportive) to 5 (constrained). These were transformed such that scores ranged from –2 (very supportive), through 0 (neither supportive nor constraining), to +2 (very constraining).

Thus aggregate scores were compiled with final scores of less than 0 representing the belief that overall, the work environment was supportive, and scores over 0 representing environments felt to be constraining. Scores approaching 0 suggested either that the environment was neither supportive nor constraining, or that supportive and constraining aspects were found in equal measure. There were fourteen support-constraints, meaning that scores could range from –28 (very supportive) to +28 (very constraining). Cronbach's alphas were 0.826 for the demand scale and 0.752 for the supports-constraints scale. A total demand-supports-constraints score was calculated by summing the total demands score with the supports-constraints score, giving a potential range of -13 to 103. Lower scores here represented jobs that were perceived to be undemanding and supported with higher scores representing jobs perceived to be demanding and constrained. Descriptive statistics for the work variables can be seen in Table 4.7.

Table 4.7: Mean scores and standard deviations for perceptions of work characteristics (N=109)

Variable	Mean score	Standard Deviation
Demand score	41.70	9.58
Support-constraint score	-8.39	7.12
Demands, supports, constraints score	33.30	12.81

The sample as a whole found their work to be moderately demanding. They also reported their work to be supported as opposed to constrained. The demand/constraints/supports scores indicated that overall the sample found their work to have weak to moderate demands and to be neither particularly supported nor constrained.

Payne's model suggests that the demand items underlie one factor, as are the supports-constraints items proposed to underlie one factor. Before analyses with well being were performed, factor analyses of all fifteen demands all support-constraint items were performed in order to check this assumption.

The fifteen items of the demands scale were subjected to principal components analysis (PCA) using SPSS. Prior to performing PCA the suitability of the data for factor analysis was assessed. Inspection of the correlation matrix revealed the presence of many coefficients of .3 and above. The Kaiser-Meyer-Oklin value was .770, exceeding the recommended value of .6 (Kaiser, 1960; cited in Pallant, 2001). The Bartlett's Test of Sphericity was statistically significant ($p < .001$), signifying that the correlation matrix was suitable for factor analysis. Principle components analysis suggested the existence of four components with eigenvalues exceeding 1, explaining 32.55%, 12.70%, 8.97% and 7.62% of the variance respectively. Varimax rotation was performed and the rotated solution (see Table 4.8) suggested that four factors could be extracted:

- Factor 1 - Organisational variables: organisational climate; office politics; organisational structure; organisational job changes
- Factor 2 –Pressures: job pressures; having too much to do; demands from others; conflicting demands / roles.
- Factor 3 – Competition: over/under promotion; keeping up with other organisations; major decisions; expectancies of others/organisations; having too little to do.
- Factor 4 – Responsibility: being responsible for people and equipment.

Table 4.8. Varimax rotation of four factor solution for demand items

	Component 1 Pressures	Component 2 Organisational factors	Component 3 Under-stimulation & competition	Component 4 Responsibilities
Job pressures	.759			
Having too much to do	.819			
Demands from others	.699			
Conflicting demands and roles	.696			
Organisational climate		.825		
Office politics		.722		
Organisational structure		.800		
Organisational job changes		.695		
Having too little to do			.739	
Over/under promotion			.572	
Expectancies of company/others			.510	
Keeping up with organizations			.542	
Major decisions			.570	
Being responsible for people				.753
Being responsible for equipment				.617

Since the items were found to load on four factors rather than one, all further analyses considering perceptions of work demands needed to consider the four factor solution. A similar procedure was followed with the supports-constraints scores since it was hypothesised that there maybe multiple factors underlying the single score. Prior to performing PCA, the suitability of the data for factor analysis was assessed. Inspection of the correlation matrix revealed the presence of many coefficients of .3 and above. The Kaiser-Meyer-Oklin value was .754, exceeding the recommended value of .6 (Kaiser, 1960; cited in Pallant, 2001). The Bartlett's Test of Sphericity was statistically

significant ($p < .001$), suggesting the correlation matrix was suitable for factor analysis. The fourteen items of the supports-constraints scale were subjected to principal components analysis (PCA) using SPSS, however, initial results suggested that the item 'Union membership' could not easily be absorbed into the solution and was consequently dropped, leaving only thirteen items for the PCA. Principle components analysis suggested the existence of four components with eigenvalues exceeding 1, explaining 28.80%, 13.50%, 10.22% and 9.88% of the variance respectively. Varimax rotation was performed and the rotated solution (see Table 4.9) suggested that four factors could be extracted:

- Factor 1- Work hygiene: quality of equipment; physical working conditions; payment/reward system; how work is planned
- Factor 2 - :Structure: role clarity; job discretion/autonomy/control; participation in decisions
- Factor 3- Working relationships: quality of relationship with boss; quality of relationship with colleagues; quality of relationship with subordinates.
- Factor 4 - Job attractiveness: role ambiguity; variety of skill utilisation; social perception of job.

Again, further analyses with perceptions of work supports-constraints took this four factor structure in to consideration.

Table 4.9. Varimax rotation of four factor solution for support-constraint items

	Component 1 Work hygiene factors	Component 2 Structure	Component 3 Working relationships	Component 4 Job attractive-ness
Role clarity		.836		
Job discretion, autonomy or control		.704		
How work is planned		.455		
Participation in decisions		.672		
Quality of relationship with boss			.632	
Quality of relationship with colleagues			.812	
Quality of relationship with subordinates			.749	
Role ambiguity				.734
Variety of skill utilisation				.549
Social perception of job				.677
Payment/reward system	.522			
Quality of equipment	.839			
Physical working conditions	.870			

4.6.2.2 Correlation Analyses

The first part of the analysis examined work and well being variables. Since theory predicts the direction of the relationships, one tailed correlations were performed but there were no significant findings, i.e. anxiety and depression scores did not correlate to perceptions of work demands or supports-constraints. This is in direct contrast to many other studies and so further analyses were conducted. In Payne & Fletcher (1983), the analysis of the demand, supports and constraints model used cluster analysis to separate participants into groups on the basis of their scores on factors identified through PCA.

Group membership was then tested against strain scores to see if it could predict strain. Cluster analysis was performed here, however, in this instance, participants were clustered on their overall demand score and their overall support-constraint score as introducing many more variables would have made extracting clusters difficult and could have given rise to a very large number of clusters each containing a number of members that was too small to use in any further analysis. K means cluster analysis was performed testing for 7, 6 and 5 clusters. Although 7 clusters gave a better array of support-constraint scores, there were too few participants in some of the clusters to carry out any further analysis. Similarly, 6 clusters also presented 2 clusters with very small numbers of participants and this time some of the clusters also had the same levels of support-constraint scores. It was decided that 5 clusters provided the most practical solution for allowing further analysis and so this was used, however, it was compromised because three of the clusters have nearly identical support-constraint scores. Cluster numbers and numbers of participants are shown below in Table 4.10.

Table 4.10. Number of participants in each cluster

Cluster Number	**Number of participants**
1	24
2	37
3	6
4	17
5	25

Final cluster centres are shown below in Table 4.11 with demand and support-constraint levels also presented.

Table 4.11. Final cluster centres with demand and support-constraint scores

Cluster number	**Demand score and level**	**Support-constraint score and level**
1	36 Low demands	-14 Supported
2	49 Med-high demands	-12 Supported
3	20 Very low demands	-13 Supported
4	52 High demands	2 Mildly constrained
5	35 Low demands	4 Mildly constrained

As Table 4.11 shows, cluster one represents a group that works in an environment perceived as being undemanding and well supported. Theoretically this type of job should not result in strain but neither should it be particularly challenging. Cluster two's environment is perceived as being more demanding but still supported – this type of job should still not result in strain but should be more challenging. Cluster three's work was perceived as being very undemanding and well supported (again not likely to result to in strain but not at all challenging or stimulating). Cluster four's work was seen to be significantly more demanding (quite high demands) and as being mildly constrained – this job type should result in higher levels of strain than the previous three clusters. Cluster five's work was also seen as being mildly constrained but with low demands – this last cluster might represent jobs that are both unchallenging and constrained which may result in strain outcomes.

With participants classified according to their cluster, further analyses were run examining the difference between each cluster on strain scores. One way ANOVA's were run using anxiety and depression as the dependent variables and cluster

membership as the independent variable, but no significant differences were found on these measures across the cluster groups.

In the present sample there were no statistically significant relationships between perceived work demands, supports and constraints, whether they were analysed as underlying factors or as parameters for clusters of employees, and the two measures of well being used here (anxiety and depression).

4.6.2.3 Regression Analyses

The above analyses show then that there are several variables which appear to be related to well being. With respect to FIT, the constancies were strongly related to anxiety and depression, particularly Fearlessness. How individuals perceived their work did not appear to relate to anxiety or depression no matter how the work variables were configured.

In order to determine which of the variables were best able to predict anxiety and depression, two multiple regression analyses were run. Only FIT variables had been shown to be related to anxiety and depression and these were selected for the multiple regression analyses. In either analysis, the significant correlates were entered according to the strength of their relationship with the dependent variable.

i. Anxiety

A multiple regression analysis was run using anxiety as the dependent variable and the following variables as independent predictor variables: Fearlessness; Self-responsibility; Balance and Awareness. Note that the individual constancies were selected for entry rather than the composite score of Integrity because it was necessary to check to see if the constancies would each be able to account for unique variance in anxiety.

To avoid problems of multicollinearity, Pallant (2001) suggests it is preferable that all independent variables show at least a .3 correlation with the dependent variable but it was decided to retain Awareness as it did approach the .3 coefficient. Tabachnick &

Fidell, 1996; cited in Pallant, 2001) further suggest that variables with a bivariate correlation of .7 or over should perhaps not be used in multiple regression analyses. In this case, no variables correlated over the .6 level so it was decided that the variables could all be retained. The data was further checked to make sure that there was no multicollinearity amongst the variables. Collinearity statistics reported by SPSS showed that the Tolerance figures for each of the variables were all well above .5 suggesting there was little possibility of multicollinearity (*see Appendix four).* The normality probability plot of the regression standardised residuals and residuals scatterplot showed the data to be normal with no cases falling above .3 or below -.3. Standardised beta coefficients for each of the variables are shown below in Table 4.12.

Table 4.12. Regression analysis of anxiety on to FIT

Variables	**Standardised coefficients (Beta)**	**t value**	**sig.**
Constant		11.212	.000
Awareness	-.005	-.056	.956
Balance	-.085	-.911	.364
Self-responsibility	-.113	-1.018	.311
Fearlessness	-.453	-4.431	.000

R square = .330
Adjusted R square = .304

Table 4.12 shows that in the above model, the only independent variable to account for unique variance in anxiety was Fearlessness. A problem with this finding is that Fearlessness may be viewed as essentially measuring much the same thing as anxiety since anxiety is one form of fear. A second multiple regression analysis was run entering only Self-responsibility, Balance and Awareness. In this analysis only Self-responsibility was the only significant predictor of anxiety (see Table 4.13), with adjusted R square for the whole model being .180.

Table 4.13. Regression analysis of anxiety on to Self-responsibility, Balance and Awareness

Model	B	Std. Error	Beta	t	sig.
Constant	16.481	1.478		11.151	.000
Self-responsibility	-.740	.238	-.335	-3.109	.002
Balance	-.338	.207	-.163	-1.636	.105
Awareness	-.075	.254	-.031	-.294	.769

R square = .203
Adjusted R square = .180

A single regression analysis was run in order to establish whether the composite variable of Integrity might be better able to predict anxiety, however Integrity on its own was only able to account for 25.2% of the variance in anxiety. Fearlessness, when entered as a sole predictor, accounted for 31% of the variance.

The results of the multiple regression analyses suggest then the strongest predictor of anxiety was Fearlessness – although Awareness, Balance and Self-responsibility were significantly correlated with anxiety (see Table 4.6) and appeared able to account for 2% of variance in anxiety, they did not significantly improve the amount of variance accounted for in the model when tested using multiple regression analysis. Again it should be noted that this may be problematic since the items for Fearlessness and anxiety may have measured the same thing. Nonetheless, the variables best able to predict anxiety were aspects of FIT and not perceptions of work.

ii. Depression

A similar procedure was adopted for examining depression. A multiple regression analysis was run with all variables found to correlate with depression entered: Fearlessness, Balance and Self-responsibility. No variables correlated over the .6 level so it was decided that the variables could all be retained. The data was furthered checked to make sure that there was no multicollinearity amongst the variables.

Collinearity statistics reported by SPSS showed that the Tolerance figures for each of the variables were all well above .5 (*see Appendix five*) which suggested that there was little possibility of multicollinearity. The normality probability plot of the regression standardised residuals and residuals scatterplot showed the data to be normal with no cases falling above .3 or below -.3 (*see Appendix five*).

The multiple regression analysis showed that the above model accounted for 20.8% of the variance in depression. Standardised beta coefficients for each of the variables are shown below in Table 4.14.

Table 4.14 Regression analysis of depression on to FIT

Variables	**Standardised coefficients (Beta)**	**t value**	**Sig.**
Constant		8.855	.000
Balance	-.151	-1.53	.129
Self-responsibility	-.006	-.056	.956
Fearlessness	-.369	-3.340	.001

R square = .208

Adjusted R square = .186.

Table 4.14 shows that in the above model, the only independent variable to account for unique variance in depression was Fearlessness. Again, the possibility that this finding exists because Fearlessness is tapping into much the same thing as depression does exist. A second analysis (see Table 4.15), with Fearlessness removed, showed that Balance was the primary determinant of depression but Self-responsibility just reached significance and therefore may contribute as well.

Table 4.15 Regression analysis of depression on to Balance and Self-responsibility

	B	Std. Error	Beta	t	sig.
Constant	13.673	1.510		9.054	.000
Self-responsibility	-.466	.240	-.196	-1.950	.050
Balance	-.489	.226	-.219	-2.165	.033

R square = .124
Adjusted R square = .107

A further standard multiple regression analysis was run in order to establish whether the composite variable of Integrity might be better able to predict depression, however, Integrity on its own was only able to account for 11.9% of the variance in depression. Fearlessness, when entered as a sole predictor, accounted for 18.9% of the variance in depression.

The results of the multiple regression analyses suggest then the strongest predictor of depression was Fearlessness – although Balance and Self-responsibility were significantly associated with depression and appeared able to account for a small amount of variance in depression, they did not significantly improve the amount of variance accounted for when tested using multiple regression analysis.

The variables best able to predict depression were not perceptions of work, but aspects of FIT. Furthermore, loc was not able to account for any variance in depression either. Thus it appears that in the present sample the variables most strongly associated with well being were the constancies of the FIT theory, and Fearlessness in particular. This may be because Fearlessness is actually measuring much the same thing as depression. However, when Fearlessness was removed from the regression analyses, aspects of FIT were still able to account for significant amounts of variance in both anxiety and depression. For anxiety the only significant predictor was Self-responsibility but for depression both Balance and Self-responsibility were significant.

4.6.2.4. FIT and perceptions of work

The above analyses have demonstrated that in the present sample, perceptions of work were not related to well being. However, FIT was. This part of the analysis investigates whether FIT is also related to perceptions of work.

The first analysis that was run was a one tailed correlation analysis into which all the FIT variables and perceived demand and support-constraint factors were entered. Several significant relationships were found (the full results can be seen in *Appendix six*) which are highlighted in bold below in Tables 4.16 and 4.17.

Looking first at perceived work demands (Table 4.16), factor 3 (Competition and under-stimulation) was found to correlate significantly with Overall FIT score ($r = -.280$, $p = .002$) and with behavioural flexibility ($r = -.277$, $p = .002$). Thus being more behaviourally flexible and having a higher Overall FIT score was associated with perceiving Competition and being under-stimulated to be less demanding.

Factor four – Responsibilities - was found to correlate firstly with Overall FIT score ($r = .164$, $p = .045$) and with Integrity ($r = -.204$, $p = .017$). Responsibilities also correlated with the following constancies: Awareness ($r = -.254$, $p = .004$); Fearlessness ($r = -.219$, $p = .011$) and Self-responsibility ($r = -.218$, $p = .011$). Thus those individuals who were more Aware, more Fearless and more Self-Responsible perceived being responsible for others and equipment to be less demanding than less FIT individuals.

With respect to perceived work support-constraint underlying factors, the results from the correlation analysis revealed that factors 1 (Work hygiene) and 3 (Working relationships) were not correlated significantly with any of the FIT variables. However, Components 2 (Structure) and 4 (Job attractiveness) were found to correlate significantly with several of the FIT variables (Table 4.17).

Table 4.16. Pearson correlation coefficients for FIT and work demand factors

FIT Variables	Factor 1 Organisation Features	Factor 2 Pressures	Factor 3 Competition	Factor 4 Responsibilities
Overall FIT Score	.072	-.134	.100	-.125
	p=.229	p=.082	p=.151	p=.098
Behavioural flexibility	.054	-.053	.072	-.079
	p=.289	p=.292	p=.227	p=.206
Integrity	.088	**-.314**	-.003	**-.276**
	p=.183	**p=.000**	p=.486	**p=.002**
Awareness	.014	**-.301**	.049	**-.265**
	p=.441	**p=.001**	p=.306	**p=.003**
Balance	.131	**-.297**	-.154	-.060
	p=.088	**p=.001**	p=.055	p=.269
Conscience	.077	**-.204**	-.150	-.074
	p=.214	**p=.017**	p=.060	p=.222
Fearlessness	.092	-.152	.098	**-.332**
	p=.171	p=.057	p=.155	**p=.000**
Self-responsibility	-.032	**-.210**	.151	**-.231**
	p=.371	**p=.014**	p=.058	**p=.008**

As Table 4.17 shows, Component 2 (Structure) was found to correlate with Integrity (r = -.314, p < .01), Awareness (r = -.301, p < .01), Balance (r = -.297, p <.01) Conscience (r = -.204, p <.05) and Self-Responsibility (r = -.210, p <.05). Thus those individuals with higher levels of Integrity, Conscience, Awareness, Balance, Self-responsibility rated their work as being better supported in terms of structure.

Factor 4 (Job attractiveness) was found to correlate significantly with Integrity (r = -.342, p <.001), Awareness (r = -.265, p <.01), Fearlessness (r = -.233, p < 0.5) and Self-responsibility (r = -.220, p <.01). Again, those rated as being more Aware, more Fearless and has having greater Self-responsibility rated their work as being more supported in terms of the attractiveness of the job. Since so many of the constancies were significantly associated with this component, this also meant that individuals with

greater Integrity also rated their work as being better supported in terms of attractiveness.

Table 4.17. Pearson correlation coefficients between perceived work support-constraint components and FIT variables

FIT Variables	Factor 1 Work hygiene	Factor 2 Structure	Factor 3 Working relationships	Factor 4 Job attractiveness
Overall FIT score	.072 p=.459	-.134 p=.158	.100 p=.302	-.125 p=.196
Outer FITness **Behavioural Flexibility**	.054 p=.577	-.053 p=.583	.072 p=.455	-.079 p=.412
Inner FITness **FIT Integrity**	.088 p=.365	**-.314** **p=.001**	-.003 p=.972	**-.276** **p=.004**
Awareness	.014 p=.882	**-.301** **p=.001**	.049 p=.612	**-.265** **p=.005**
Balance	.131 p=.176	**-.297** **p=.002**	-.154 p=.110	**-.060** **p=.005**
Conscience	.077 p=.427	**-.204** **p=.033**	-.150 p=.121	**-.074** **p=.445**
Fearlessness	.092 p=.341	-.152 p=.114	.098 p=.310	**-.332** **p=.000**
Self-responsibility	-.032 p=.743	**-.210** **p=.028**	.151 p=.117	**-.231** **p=.016**

More FIT individuals do perceive some aspects of their work to be less demanding than less FIT individuals, and there appears to be differences in how more and less FIT individuals perceive supports and constraints within their work as well. With respect to perceived work demands, competition and under-stimulation was found to be less demanding by those higher in behavioural flexibility. Furthermore, responsibilities at work were found to be much less demanding by those individuals higher in Awareness, Fearlessness and Self-responsibility. More FIT individuals also found several aspects of their work to be less constrained, or more supported, than less FIT individuals. More

Aware individuals perceived their work to be better supported/less constrained than less Aware individuals. Looking at the underlying components of the supports/constraints factor, both job structure and job attractiveness were perceived as less constrained/more supported by individuals scoring higher on the constancies within the FIT framework. Each of the constancies was found to be related to viewing at least one of the support-constraint aspects as being less constrained/more supported.

With respect to the objective then, the results suggest that more FIT individuals may perceive their work differently from less FIT individuals, seeing some aspects as less demanding and better supported. The data further suggests that well being, as measured through anxiety and depression, was not related to perceptions of work demands, supports or constraints. Well being was related to Inner FITness (but notably not to Outer FITness – behavioural flexibility- or Overall FITness). Thus individuals with greater Inner FITness demonstrated greater well being and had more positive perceptions of their work in terms of the level of demands they face and the level of support which is available to them.

4.6.3. Objective 3: To investigate relationships between FIT, selection of personal projects, perceptions of personal projects and well being

There are several analyses pertinent to this objective. Results will be presented in the following way. Firstly, well being and its relation to selection of projects will be presented. This is followed by an analysis of well being and perception of projects (both in terms of demands, supports and constraints, and Little's PPA dimensions). Finally, an examination of FIT's relation to the selection of projects and individual's perceptions of their projects is presented.

4.6.3.1 Well being and personal project selection

For this part of objective three, descriptive statistics for project selection and well being are presented followed by descriptive statistics for project perceptions. Correlation analyses between project perceptions and well being measures follow this.

Table 4.18 Project selection and well being

Projects Selected	**Statistic**	**Anxiety**	**Depression**
Yes **N=87**	**Mean** **SD**	9.7 2.4	8.2 2.6
No **N=22**	**Mean** **SD**	8.7 2.3	7.1 2.5

As Table 4.18 shows, anxiety and depression scores for those who did not select projects were lower than for those who did.

4.6.3.2. Well Being and Perceptions of Personal Projects

Participants could choose which projects they were likely to do so not every participant selected a project and they did not all select the same number of projects. To calculate project demands, supports and constraint scores then, the demand rating for each project selected was added together and divided by the number of projects selected to give an 'average' demand score. Again, demand scores could range from 15 to 75, with lower scores representing projects being viewed as less demanding. A similar process was followed with the supports-constraint scores. As for the work supports-constraints ratings, the project scores had been inputted on a -2 through 0 to +2 scale with negative scores representing supported projects and positive scores representing constrained projects. These scores were summed and divided by the number of projects selected to give an 'average' support-constraint score. Of note here is the fact that project demands and support-constraint items were not factor analysed firstly because of space constraints and secondly because the items differed from project to project and there were too few participants choosing each project to make such an analysis reliable.

Descriptive Statistics

Descriptive statistics for average project demand, supports and constraints scores are shown below in Table 4.19.

Table 4.19. Descriptive statistics for perceptions of project demands, supports and constraints.

	Mean	SD
Average project demand score	41.4	18.05
Average project support-constraint score	40.06	11.89
Average project demand-support-constraint score	1.10	19.34

The mean and SD scores show that the sample as a whole did not find the projects they selected to be very demanding but they did report them to be more constrained than their work.

Project perceptions and well being measures were correlated in a one tailed analysis (see Table 4.20).

Table 4.20 Pearson correlation coefficients for well being and project perceptions

	1	2	3	4	5
1 Average project demand score					
2 Average project support constraint score	. .219 p=.021	.			
3 Average project demands supports constraint score	.871 p=.000	670 p=.000			
4 Anxiety	.206 p=.029	.206 p=.029	.263 p=.007		
5 Depression	.219 p=.021	.188 p=.040	.263 p=.007	.769 p=.000	

The analysis revealed that project demands were significantly and positively related to project supports-constraints such that individuals who viewed their projects as more demanding also viewed their projects as more constrained. Project demand score was

significantly and positively correlated with depression and with anxiety. This means that individuals who reported their projects as being more demanding also reported feeling more depressed and more anxious. Further to this, perceived supports and constraints of projects was also related to anxiety and depression – those individuals who perceived their projects to be less well supported (more constrained) also reported feeling more anxious and depressed. Accordingly, the combined project demands supports and constraints score was also correlated with anxiety and depression. Overall then, individuals who reported feeling more anxious and more depressed also reported self-improvement personal projects to be more demanding and more constrained than individuals who reported lower levels of anxiety and depression.

Personal projects may also be viewed in terms of Little's dimensions (structure, meaning, efficacy, stress and community) and these dimensions have in the past been found to relate to measures of well being. A one tailed correlation analysis was performed but only project structure was found to correlate significantly with well being. It correlated with both anxiety ($r = -.233$, $p = .005$) and with depression ($r = -.257$, $p = .004$). Individuals who found their projects to have a better structure reported lower levels of anxiety and depression.

4.6.3.3. Personal Projects and FIT

The first step here was to examine whether FIT was related to selection of projects. The mean FIT component scores were calculated for those who did and did not select projects, and these can be seen in Table 4.21. The mean Overall FIT and behavioural flexibility scores appear to differ from one another. The mean behavioural flexibility score for those who did select projects was 24.08 compared to 17.61 for those who did not. Mean overall FIT scores were 148.45 for those selected projects and 110.12 for those who did not

One way ANOVA's were run comparing those who did and did not select projects on each FIT variable. There were no statistically significant differences. It is suggested that these mean differences were not significant because the FIT scales are very large and people may vary from 0 to 1000 on the overall FIT scale, with the majority of people

falling around the 100 – 200 mark. In this sample, Overall FIT scores ranged from 2.95 to 869.04, with the mean score being 140.71. A difference of 38 points on the Overall FIT score and 5 on the behavioural flexibility score is quite large but not statistically significant because of the extreme variability within the sample. Analyses were re run this time removing outliers however analyses were still non-significant.

The hypothesis that more FIT individuals would be more likely to select projects was not statistically borne out, however, there is tentative evidence that there may be some differences between those who did and did not select projects in terms of their FITness and behavioural flexibility in particular.

Table 4.21 Mean scores on FIT components for those who did and did not select projects

FIT component		Projects Selected	Projects Not Selected
Overall	**Mean**	148.45	110.12
FIT score	**SD**	135.48	124.14
Behavioural	**Mean**	24.08	17.61
flexibility	**SD**	19.33	17.91
FIT Integrity	**Mean**	6.04	5.95
	SD	0.90	1.01
Awareness	**Mean**	6.02	6.28
	SD	0.94	1.26
Balance	**Mean**	5.66	5.51
	SD	1.19	1.09
Conscience	**Mean**	6.91	6.43
	SD	1.41	1.64
Fearlessness	**Mean**	5.25	5.32
	SD	1.73	1.67
Self-responsibility	**Mean**	6.32	6.22
	SD	1.06	1.26

4.6.3.4 Project Perceptions, Dimensions and FIT

A second analysis was performed, looking at the individual's perceptions of their projects. The average project demand and support/constraint scores were correlated with FIT components in a one-tailed analysis. There were several significant findings, as shown below in Table 4.22. Significant correlations are highlighted in bold.

Firstly, average project demand scores were found to correlate with Self-responsibility (r = - .258, p = .008), thus individuals higher in Self-responsibility found their projects less demanding.

Table 4.22. Pearson correlation coefficients for project perceptions and FIT

FIT Variables	Project demands	Project supports constraints	Project demands supports constraints
Overall FIT Score	.078	-.103	.007
	p=.239	p=.170	p=.476
Behavioural flexibility	.121	-.052	.066
	p=.133	p=.318	p=.274
FIT Integrity	-.156	**-.395**	**-.319**
	p=.076	**p=.000**	**p=.001**
Awareness	-.042	**-.201**	-.134
	p=.350	**p=.031**	p=.109
Balance	-.059	**-.266**	**-.179**
	p=.294	**p=.006**	**p=.049**
Conscience	-.017	**-.233**	-.130
	p=.440	**p=.015**	p=.117
Fearlessness	-.172	**-.359**	**-.314**
	p=.056	**p=.000**	**p=.002**
Self-responsibility	**-.258**	**-.309**	**-.352**
	p=.008	**p=.002**	**p=.000**

Average project support/constraint scores were found to correlate significantly with Inner Fitness: Integrity (r = -.395, p = .000); Awareness (r = -.201, p = .031); Balance (r = -.266, p = .006); Conscience (r = -.233, p = .015); Fearlessness (r = -.359, p = .000) and Self-responsibility (r = -.309, p =.002). This suggests that those with greater Inner

FITness found their projects, on average, to be more supported. Accordingly several aspects of Inner FITness also correlated significantly with the overall project demand support constraint score: Integrity (r = -.319, p = .001); Balance (-.179, p = .049); Fearlessness (r = -.314, p = .002) and Self-responsibility (r = -.352, p = .000). Overall then it appears that individuals with greater Inner FITness found their projects to be less demanding and better supported.

It appears that having higher scores on the constancies, and Fearlessness and Self-responsibility in particular, is related to perceiving one's personal projects to be less demanding and to be better supported.

Project dimensions and FIT

One final aspect which was investigated was the relationship FIT had with Little's project dimensions (structure, meaning, efficacy, stress and community). The five project dimensions were correlated with the FIT components in a two-tailed analysis since no predictions had been made about how FIT and the project dimensions would be related. Results are shown below in Table 4.23 with the significant correlations highlighted in bold.

Structure was found to correlate with Overall FIT Score (r = .259, p = .015), behavioural flexibility (r = .214, p =.045), Balance (r = .329, p=.002), Fearlessness (r = .251, p = .019) and Self-responsibility (r = .361, p= .001). Thus individuals with higher FIT component scores also felt that the projects they selected were better structured.

Efficacy was found to correlate with Overall FIT Score (r = .272, p = .010), behavioural flexibility (r = .280, p = .008) and Balance (r = .245, p = .021) thus having a life that is in Balance and being more behaviourally flexible was associated with feeling more efficacious towards the selected projects.

Meaning was not found to correlate significantly with any aspect of FIT.

Finally, stress did not correlate significantly with any of the constancies or with behavioural flexibility, but it did correlate with Integrity (this is based on all the constancy scores) - r = -.219, p = .042 - suggesting that lower Integrity scores are related to feeling that the selected projects were more stressful (difficult, stressful and possibly challenging).

More FIT individuals did perceive the projects they selected differently to less FIT individuals – more FIT individuals viewed their projects more positively such that they felt more able to complete them, felt more in control of them and felt that they were less stressful than less FIT individuals.

Table 4.23: Pearson correlation coefficients for FIT and project dimensions

	Structure	**Meaning**	**Efficacy**	**Stress**	**Community**
Overall FIT Score	**.259**	-.032	**.272**	-.108	.075
	p=.015	p=.766	**p=.010**	p=.320	p=.488
Beh. flexibility	**.214**	.001	**.280**	-.110	.071
	p=.045	p=.991	**p=.008**	p=.312	p=.509
Integrity	**.295**	-.066	.126	**-.219**	.087
	p=.005	p=.540	p=.241	**p=.042**	p=.421
Awareness	.088	-.055	.062	-.018	.089
	p=.414	p=.612	p=.564	p=.868	p=.412
Balance	**.329**	.069	**.245**	-.173	-.113
	p=.002	p=.522	**p=.021**	p=.108	p=.293
Conscience	.028	.171	.098	-.187	.159
	p=.796	p=.111	p=.365	p=.083	p=.138
Fearlessness	**.251**	**-.216**	.018	-.208	.064
	p=.019	**p=.044**	p=.868	p=.054	p=.552
Self-responsibility	**.361**	-.187	.046	-.128	.101
	p=.003	p=.110	p=.564	p=.234	p=345

Objective three sought to examine the relationships between well being, personal project selection, project perceptions and FIT. The results suggested that whilst there were no reliable differences in well being or FITness between those who did and did not select projects, individuals who were more anxious and depressed perceived the projects they did select to be more demanding and constrained. They also perceived the projects they selected to have poorer structure. Recall that these individuals were also found to be significantly less FIT. With respect to FITness and project perceptions, more FIT individuals found their projects to be less demanding and better supported, to have better structure, to be less stressful and felt more efficacious towards them.

4.6.4 Objective 4: To Investigate Relations Between Health Behaviours, Well Being and FIT

To answer this objective, several analyses were performed. The FIT variables and well being measures were examined in conjunction with each health behaviour in turn.

4.6.4.1 Inter-relationships Between Health Variables

Before examining health variables in relation to FIT, an analysis was run to establish whether there were any relationships between diet, exercise, weight, smoking and drinking behaviour.

A Pearson correlation analysis showed that the number of units of alcohol drunk per week was significantly related to both the number of cigarettes smoked per week ($r = .504$, $p = .001$) and to composite diet score (based on how often they ate fried/fatty foods, fibre, fresh fruit and vegetables) – $r = -.265$, $p = .011$. Thus drinking more units of alcohol per week was associated with smoking more cigarettes and having a poorer diet (one that is lower in fresh fruit, vegetables and fibre and higher in fried and fatty foods).

There were no other significant associations found between any of the health variables.

4.6.4.2 Exercise, Well Being and FIT

Participants were grouped according to the frequency with which they exercised: frequently (most days or every day); occasionally (e.g. once a week) and rarely (almost never or never). The mean FIT component scores and well being measures for these groups were then examined, (see Table 4.24).

Since previous research has demonstrated a relationship between exercise and well being, this was explored here. Whilst anxiety scores did not appear to vary greatly between exercise groups, depression levels did. Depression was lowest for those who exercised frequently (mean = 7.03) and highest for those who exercised occasionally (mean = 8.59). Those who exercised rarely recorded a mean depression score of 7.91.

A one way ANOVA revealed that whilst there was no difference in anxiety scores between exercise groups, the difference in depression between exercise groups did approach significance $F(2,106) = 3.091$, $p = .05$. Post hoc comparisons (Tukey, Sidak and Bonferroni) revealed there to be a significant difference between the frequent and occasional exercise groups ($p = .044$).

With respect to levels of FITness across the exercise groups, the descriptive statistics revealed that those exercising frequently had the highest Overall FIT and behavioural flexibility scores, whilst those who exercised rarely show the lowest (see Table 4.24). One way ANOVA's were run comparing the three exercise groups on each aspect of FIT. Although Overall FIT scores and behavioural flexibility scores were not statistically significant between groups, the actual difference between mean scores was quite large. Overall FIT mean scores for frequent, occasional and rare exercisers were 183.56, 136.67 and 112.38 respectively. Means for behavioural flexibility were 29.45 for frequent exercisers, 21.91 for occasional exercisers and 18.68 for rare exercisers. Again it is thought that the extensive variation of the FIT scores within the sample caused the findings to be non-significant.

Table 4.24: Mean well being and FIT scores for exercise groups.

		Exercise Frequently (N=27)	Exercise Occasionally (N=48)	Exercise Rarely (N=34)
Overall FIT score	**mean**	183.56	136.67	112.38
	SD	190.73	112.03	97.64
Behavioural flexibility	**mean**	29.45	21.91	18.68
	SD	25.64	16.30	15.79
FIT Integrity	**mean**	6.05	4.97	6.04
	SD	1.04	0.94	.82
Awareness	**mean**	5.95	5.98	6.29
	SD	1.20	1.06	0.74
Balance	**mean**	5.57	5.69	5.59
	SD	1.10	1.25	1.12
Conscience	**mean**	6.74	6.92	6.73
	SD	1.68	1.28	1.57
Self-responsibility	**mean**	6.44	6.25	6.25
	SD	1.18	1.12	1.03
Fearlessness	**mean**	5.58	5.04	5.31
	SD	1.46	1.86	1.70
Anxiety	**mean**	9.22	9.79	9.17
	SD	2.34	2.55	2.42
Depression	**mean**	7.03	8.56	7.91
	SD	2.15	2.65	2.61

With respect to exercise then, depression may be related to frequency of exercise, such that those who exercise frequently (more than three times a week) have lower levels of depression. There may also be tentative evidence that those with greater behavioural flexibility (and consequently Overall FITness) also exercise more frequently.

4.6.4.3 Smoking, Well Being and FITness

Participants were grouped into smokers and non-smokers and mean well being and FIT scores compared for the two groups. There were no significant differences and so no data has been presented.

4.6.4.4. Diet, Well Being and FITness

The diet scale ranged from 8 (diet high in fresh fruit/vegetables and fibre and low in fried and fatty foods) to -8 (diet high in fried and fatty foods and low in fresh fruit/vegetables and fibre). This was entered into a two-tailed correlation analysis (see Table 4.25) significant results are highlighted in bold). The results show that composite diet score was not significantly correlated with either anxiety or depression, but it was with several aspects of FITness: Awareness ($r = .269$, $p = .003$); Conscience ($r = .226$, $p = .018$) and Overall FIT Score ($r = .193$, $p = .044$). Thus individuals scoring higher on the composite diet score (indicating a healthier diet) were also more Aware, and had greater Conscience and Overall FITness.

4.6.4.5. Alcohol Consumption, Well Being and FITness

The levels of alcohol consumed (in units) were correlated with FIT and well being measures. The number of units consumed per week was significantly correlated with Conscience ($r = -.275$, $p < .01$), thus higher levels of Conscience were related to lower alcohol consumption. There was also a significant correlation with Fearlessness ($r = .201$, $p < .05$) - higher levels of Fearlessness were related to greater alcohol consumption.

4.6.4.6. BMI, Well Being and FITness

Body Mass Index (BMI) was calculated for each individual using their height and weight measurements. This measure is a good indicator of whether an individual is over -, under- or of a reasonable weight. BMI was correlated with aspects for FIT and well

being but there were no significant relationships. However, exploratory data analysis of BMI groups did reveal an interesting finding. Global cut-off points for BMI groups have been set by the World Health Organization (see Table 4.26. below). For the purpose of this study, the WHO cut offs were adapted to form three classes: Underweight BMI (<18.50); Normal BMI (18.50 – 24.99) and Overweight BMI (>30.00).

Table 4.25 Pearson correlation coefficientss for composite diet score and measures of well being and FIT

		Composite Diet Score
Overall FIT Score	r	**.193**
	p	**.044**
Behavioural flexibility	r	.184
	p	.056
Integrity	r	.180
	p	.061
Awareness	r	**.269**
	p	**.005**
Balance	r	.117
	p	.225
Conscience	r	**.226**
	p	**.018**
Fearlessness	r	-.036
	p	.712
Self-responsibility	r	.135
	p	.162
Anxiety	r	-.049
	p	.614
Depression	r	-.117
	p	.225

Table 4.26: The international classification of adult underweight, overweight and obesity according to BMI

Classification	**BMI(kg/m²)**
Underweight	<18.50
Normal range	18.50 - 24.99
Overweight	25.00 – 29.99
Obese	30.00

Source: Adapted from WHO (1995)

Mean well being and FIT scores were calculated for each BMI group (see Table 4.27). The data suggests that the three BMI groups score similarly on the majority of well being and FIT measures although there is some variation in scoring on Overall FITness, behavioural flexibility and Depression. Mean behavioural flexibility and Overall FIT scores were lowest for those in the overweight BMI group and highest in those registering an underweight BMI. Depression scores were lowest in the underweight BMI range and highest in the overweight BMI group.

One way ANOVA's were run for each measure of well being and FITness but there were no significant differences. Thus although there appeared to be large differences on Overall FIT score, behavioural flexibility and depression between the different BMI groups, these were not statistically significant. This may be because of small numbers in the underweight BMI group and large variation of scores within the sample (particularly within the Overall FIT score and behavioural flexibility score).

Table 4.27: Mean well being and FIT scores for groups based on BMI.

		Underweight (N=3)	Normal (N=52)	Overweight (N=54)
Overall FIT Score	**Mean**	196.30	160.31	118.75
	SD	84.10	159.62	102.
Behavioural flexibility				
	Mean	36.22	25.73	19.19
	SD	17.84	21.85	15.63
Integrity	**Mean**	5.53	6.02	6.05
	SD	0.35	0.93	0.93
Awareness	**Mean**	5.18	5.99	6.20
	SD	0.67	1.02	1.00
Balance	**Mean**	5.45	5.78	5.50
	SD	0.26	1.30	1.06
Conscience	**Mean**	7.21	6.83	6.78
	SD	1.89	1.43	1.51
Fearlessness	**Mean**	4.35	5.10	5.47
	SD	0.95	1.68	1.76
Self-responsibility	**Mean**	5.47	6.37	6.28
	SD	0.45	1.11	1.09
Anxiety	**Mean**	11.00	9.38	9.44
	SD	1.73	2.16	2.68
Depression	**Mean**	5.33	7.90	8.20
	SD	1.53	2.31	2.86

4.6.4.7 Health Behaviours, Well Being and FITness: Summary

Well being was found to be related to exercise levels (the most frequent exercisers were significantly less depressed than occasional exercisers). FITness was related to diet where Awareness, Conscience and Overall FIT score were associated with a healthier diet. It was also associated with alcohol consumption. There were large differences in Overall FIT score and behavioural flexibility between different exercise groups and different BMI groups. It is possible that these differences were not statistically significant because of small numbers within the comparison groups and large variations on the measures of FIT and certainly the lack of significant correlations between FIT and BMI would support that.

4.7. Discussion

Findings for each objective are discussed followed by a general discussion and comments on the limitations of this study.

4.7.1. FIT, Loc and Well Being

Objective one examined whether FIT was related to Locus of Control (loc). It was hypothesised that more FIT individuals would be more likely to have a stronger internal loc than less FIT individuals. This was partially supported. Individuals with greater Awareness, Balance, Conscience and Self-responsibility all demonstrated a stronger internal loc. Note that these relationships were not found with external loc. The results here support the idea that external loc and internal loc are indeed two independent variables as opposed to two extremes of a continuum. Individuals with greater FIT Integrity (i.e. those with higher scores on the constancies) are proposed to see themselves as being responsible for their own lives and are causal agents in how these lives proceed - are theorised to be architects of their own lives and to believe they have control - this is supported by the finding that Inner FITness was related to internal loc. Internal loc showed a strong relationship with Self-responsibility as expected, since internal loc shares much in common with this aspect of FITness. Self-responsibility is proposed to be the mission setter – it is used to decide upon the most suitable courses of action but is also used to make sure they are completed. This may be why other studies have found internal loc to be associated with weight loss, cessation of smoking and adoption of exercise behaviour – individuals with a stronger internal loc also have greater Self-responsibility which assists them in tackling these activities successfully.

Only Fearlessness was related to external loc such that more Fearless individuals reported a stronger external loc. This does not support Fletcher & Stead's (e.g. 2000a) conceptualisation of Fearlessness. Higher levels of external loc might indicate a lack of perceived control which has been associated with *greater* levels of anxiety and depression and not greater levels of Fearlessness. One possibility is that the finding was spurious, although it may also be the case that perhaps higher levels of Fearlessness are not always such a positive attribute. Alternatively, it could be that external loc was

stronger in some individuals with greater Fearlessness but this Fearlessness was not in balance with the other constancies, allowing the individuals to eschew Self-responsibility and adopt the view that external influences are influential.

Well being, as assessed through anxiety and depression, was found to only relate to aspects of Inner FITness and not loc or indeed behavioural flexibility or Overall FITness. The lack of relationship to internal loc is surprising since individuals scoring high on this construct should have greater levels of perceived control – something that may be lacking in depressed or anxious individuals demonstrating cognitive biases such as learned helplessness (e.g. Seligman, 1992) or reduced feelings of coping ability (see Clark, 2001). There were, however, several significant associations between FIT and well being, as hypothesised. Individuals with greater Awareness, Balance, Self-responsibility and Fearlessness reported lower levels of both anxiety and depression, as Fletcher & Stead (2000a) hypothesised. Neither measure of well being was associated with behavioural flexibility however. This may not be surprising since the constancies are the aspect of FIT which is concerned with cognition and emotion whereas behavioural flexibility is the aspect of FIT concerned with behaviour - anxiety and depression may have behavioural symptoms but key factors of these syndromes appear to be changes in cognition and emotion (e.g. Austin, Mitchell & Goodwin, 2001; Clark & Watson, 1991; Clark, 2001; Hertel, 2002). Nonetheless, the constancies are linked, theoretically, to behavioural flexibility and it might be assumed that individuals who have small comfort zones should also demonstrate higher levels of anxiety because there are many situations in which they will be out with their comfort zone. Perhaps this aspect of FITness is more likely to have relationships with other conceptualisations of well being – positive affect for example.

The relationship between Inner FITness and well being was significant but comparable to the relationships found between well being and other measures of individuals such as the personality and cognitive constructs discussed earlier (see e.g. Peterson, 1999; Semmer, 2003). Further research would be required to explore the possibility that FIT is more able to account for differences in well being than the personality and cognitive constructs typically examined.

4.7.2. FIT, Work Perceptions and Well Being

The second objective in this study was to examine whether FIT and work perceptions could predict well being, as measured by anxiety and depression. Anxiety and depression were shown to be very strongly related to one another, and both increased in intensity with decreasing levels of the FIT constancies (with the exception of Conscience). Fletcher & Stead's (2000a) assertion that FITness, via one's Integrity, inoculates against some forms of mental ill health has some initial, tentative support. Decreased anxiety and depression are clearly related to increased FITness. Although this is not evidence of a causal relationship, it does act as support for Fletcher & Stead's argument that unbalanced constancies lead to anxiety and depression and that reduced Fearlessness may be a particular source of anxiety and depression. There is a cautionary note to be made here in that the relationship between Fearlessness and anxiety in particular was strong enough to suggest that the measurement items were tapping into the same thing. This warrants further investigation although an alternative view, put forward by Fletcher & Stead (2000a), is that anxiety is an outcome of the failure to cope with fears whereby individuals use negatively interpreted information in a harmful way. More FIT individuals have balanced constancies with sufficient levels of Fearlessness. This is hypothesised to be useful in two ways. Firstly, it facilitates less biased interpretation of information – much research suggests that a common feature of both anxiety and depression is that information is interpreted with a negative bias (e.g. Eysenk, 1992). This is less likely in more FIT individuals. Secondly, increased FITness may mean less likelihood of interpreted information being used in a harmful way (as in the less FIT). Rather, this information and feedback is used in a constructive way to make informed choices.

Both anxiety and depression were negatively related to Self-responsibility – individuals with greater levels of Self-responsibility reported lower levels of anxiety and depression. This may mean that control and autonomy are important. Feeling that one is not in control and cannot meet the challenges faced each day has been proposed as a common symptom of mental ill health. Seligman (1992), for example, discusses at length the 'learned helplessness' theory of depression which postulates that depressive individuals have learned to believe that they are not in control and mistakenly believe

that there is consequently little point in trying to exercise control. They have learned to be helpless and this is a permanent cognitive state. Being low in Self-responsibility is presumed to result in just such feelings and Self-responsibility was closely related to depression.

FIT was associated with both anxiety and depression in this study. Previous research has shown these variables are related to perceived work characteristics such as demands, supports and constraints. However, this study was unable to find significant relationships between perceived job demands, supports or constraints and the measures of well being, either when the job characteristics were entered as single variables or when entered as a series of underlying factors. Furthermore, when respondents were clustered into groups based on their levels of perceived demands, supports and constraints, there were still no significant relationships between these groups and the two measures of well being. This is an interesting finding. In Van der Doef & Maes' (1999) meta analysis of Karasek's model, some studies demonstrated a relationship between depression, anxiety and perceived demands, control and support, for example Baker, Israel & Schurman, (1995), Jones & Fletcher (1993) and Karasek, Triantis & Chaudry (1982). However, Carayon (1993), Kawakami, Haratani & Araki (1992) and Kushnir & Melamed (1991) did not find that anxiety and depression were related to perceived demands, control or support as has been found here.

One potentially significant difference between previous studies and the present one is that this study used Payne's model rather than Karasek's, and whilst the two models have some similarities they are not identical. Payne's model is somewhat broader both in conception and in measurement. A study by Quine (1998) looked at the ability of both Payne's and Karasek's model to predict a variety of outcomes (including stress, anxiety and depression) in nurses. This study used perceived work characteristics rather than objective measures as was performed here, and the data was supportive of both Karasek's and Payne's models.

There were, however, some methodological differences which may account for the lack of significant relationship between perceptions of work and anxiety and depression in this study. Firstly, many of the previous studies have tended to use participants from a

single workforce whereas the participants here worked in a variety of different jobs from a range of sectors. Furthermore, as Payne & Fletcher (1983) have argued, the observed relationship between perceived demands, supports and constraints might be a reflection of social class – in this study participants came from a variety of social classes and this could also be responsible for the lack of any significant findings. Finally, the measures of anxiety and depression were taken from the FIT profiler. These were based on items from the General Health Questionnaire but only four items apiece were used to measure anxiety and depression and they were not oriented towards work in particular. It might be that this in some way served to reduce the effect.

One final point is that although Karasek's and Payne's models both suggest that actual work characteristics will predict well being, research does not readily support this (e.g. Morrison, Payne & Wall, 2003). Future research might therefore attempt to use less subjective ratings of work characteristics and investigate their ability to predict well being compared to FITness.

The fact that FIT, and not perceived work characteristics, was associated with the well being measures is interesting and supports the view that P properties are important for determining well being. This proposition is further supported by the finding that people's perceptions of how demanding their jobs were related to their level of FITness. Underlying demand factors did show some relation to FITness. Self - responsibility for people and equipment and the factors related to competition and career advancement were significantly correlated to aspects of FIT. The higher the FIT scores, the less demanding people found being responsible for people and equipment. This was also true for having to keep up with the competition and striving for career advancement.

The competition/career advancement demand factor was significantly associated with scores of behavioural flexibility. Thus it appears that those with a more flexible repertoire of behaviour, or who feel comfortable in a wider range of situations, were less likely to find organisational competition and working towards career advancement as something that was significantly demanding. They may feel more comfortable making major decisions or may not be troubled by competition with others, perhaps

seeing this as an opportunity rather than as a negative experience, because they have the behavioural repertoire to support it.

Responsibility for people and equipment was seen as more demanding by those who have less Integrity, with Awareness, Self-responsibility and Fearlessness being particularly important. It may be the case that being responsible for others is more difficult if you do not believe you are Self-responsible and cannot behave as such. Being more Aware might allow one to monitor the status of staff or equipment more easily because being more Aware means the individual is 'automatically' more conscious of both internal and external events. Increased Fearlessness might allow an individual to perceive responsibility as less demanding because they are not afraid – they may have more confidence in their ability to tackle any problems that arise.

With respect to the support/constraints aspect of job characteristics, perceiving work to be generally well supported was associated with being more Aware. Being more Aware, both of internal and external factors, allows one to perceive the world in a less biased fashion, so that the work environment is not seen as a battle ground where an individual has to fight to meet the demands of the job. Rather, being more Aware may provide both the ability to use internal resources and the ability to see that external factors can be used in a positive way.

Looking at the specific support/constraints factors, those of structure, job attractiveness and role ambiguity were significantly related to increased FITness. Those with higher levels of Integrity felt that their jobs were well supported, with respect to the control they had over them and the extent to which they were allowed to utilise various skills. Individuals rated as more Fearless did not feel that role ambiguity constrained their ability to meet demands. This is interesting because role ambiguity is often thought to act as a stressor whilst role clarity is seen as a positive aspect. Here less FIT individuals did perceive this to be constraining whereas FIT individuals were less likely to find role ambiguity as constraining. This provides further support for the idea that employers might find it more useful to affect changes in the employee rather than the design of work, as argued by Briner & Reynolds (1999) and Fletcher (2003).

Payne's model suggests that jobs with high *and* low demands can be stressful, if they are perceived as constrained. Payne (1979) employed a cluster analysis to form groups of cases, based upon the degree to which they felt their job was both demanding and supported/constrained. No such relationship was found here. However, it was the case that those with higher FIT scores found some aspects of their jobs less demanding and some aspects more supported, than less FIT individuals. Given that there is evidence that being less FIT is also related to increased feelings of anxiety and depression, it may be that characteristics of the individual (i.e. FITness) determine perceptions of work characteristics *and* determine mental health. Certainly in this study there were no direct links between perceived work characteristics and well being. This would suggest that characteristics of the job, no matter how one categorises them, are not adequate predictors of the stress that workers may suffer doing that job.

Fletcher & Stead (2000a) make the case for using FIT as a tool to help reduce felt anxiety and depression. The evidence from this study would support this - in particular, increasing Fearlessness (if it were shown to be distinct from anxiety and depression) and Self-responsibility could be beneficial.

4.7.3 FIT, Personal Projects and Well Being

Another possible predictor of well being was hypothesised to be whether or not people engage with personal development projects. It was further suggested that how individuals perceive such projects might be related to well being, in the same way that work demands, supports and constraints might be related to well being. However, the present studies findings did not support this - only one significant relationship was found and that was that those individuals scoring higher on the depression scale also rated their projects as more demanding. Whilst it may be the case that individuals perceive their projects to be demanding and consequently feel depressed, it is likely that, as previously discussed, strain outcomes such as depression, anxiety and stress actually moderate our perceptions. If depression involves biased cognition, including biased perception, then it is likely these biases will be evident across all areas of life and would not be limited to perceptions of work. One symptom of depression is the loss of

interest in social activities and depression has been shown to influence leisure activities (e.g. Elliot & Shewchuck, 1995). It might be that depressed individuals view such leisure activities as too demanding to deal with.

An additional finding, also noted by Lecci et al (1994), was that individuals reporting that their projects lacked structure also reported higher levels of both anxiety and depression. The relationship between project structure and well being (as measured in this case by depression and anxiety) could be reciprocal: more depressed and anxious individuals may be more likely to view their projects as not being under their control (Seligman, 1992) and individuals struggling with their projects may find that this increases their anxiety and depression. It is also plausible that a third factor is responsible for both increased depression and anxiety as well as project perceptions, as was the case with perceptions of work, FITness and well being. In this study there was some evidence that FIT has significant links to anxiety and depression as well as project structure. Self-responsibility, Fearlessness and Balance were all significantly related to anxiety, depression and project structure. It is therefore possible that these constancies serve to determine both 'well being' *and* project structure, but that these two relationships are independent from each other. Jackson et al (2002) reported that optimists and pessimists viewed their projects differently and this might relate to the present studies findings. It does appear that individuals viewed their project's structure differently, depending on their FITness. One area of future research might therefore be to explore optimism, pessimism and projects in relation to FIT, especially given the findings of the literature on Negative Affectivity which suggest this might be an individual difference that influences our perceptions of work (e.g. Spector et al, 2000).

Wallenius (1999) reported that depression was not related to whether individuals perceived their projects to be supported by their environment. This finding was replicated in the present study; average ratings of perceived supportiveness were not associated with depression or anxiety.

Other researchers have reported links between project efficacy and stress and well being (e.g. Christiansen et al 1999). However, in the present study neither anxiety nor depression was associated with either of those project dimensions. This difference in

findings might have arisen because different measures of well being were used or because projects were not chosen freely. Rather, participants did or did not select projects from a list provided.

Phillips et al (1997) and Christiansen et al (1999) both reported that individuals found that achievement of projects was either hindered or supported by barriers or facilitators emerging from their work contexts. This was not measured directly in the present study, but individuals who found their projects to be demanding, also rated their work to be demanding. Again this could be due to a third, underlying factor, such as FIT, and it would be interesting to investigate whether FIT might be a determinant of whether individuals perceive barriers to achieving projects in their work. One hypothesis is that more FIT individuals see neither work nor projects as being hindered by each other, and levels of Balance might be especially important for this. Individuals who are more in Balance will have adequate time resources for work and for leisure and consequently one is less likely to be perceived to impact on the other.

Unlike measures of well being, increased levels of FITness were found to be related to viewing one's projects as less demanding and better supported. The FIT constancies were implicated here. Increased Self-responsibility was associated with viewing one's projects as less demanding, and with viewing them as better supported, as were increased Fearlessness, Balance, and Conscience. As argued in relation to the perception of work, the individual may be more likely to perceive their projects as demanding when they are lower in Self-responsibility and Fearlessness. This may arise because Self-responsibility acts as the 'mission setter' for action. Those who are more self-determined may feel more able to complete their projects and therefore to see them as less demanding. Increased Fearlessness was found to be related to perceiving projects as less demanding and this may be because being more Fearless provides the individual with the confidence to deal with issues, making them appear to be less of a demand and more of a challenge or opportunity. With respect to Balance and projects, it seems that having the areas of your life in Balance allows projects to be perceived as less demanding. This may be because the individual allows adequate time and resources to devote to projects and organises matters accordingly. Finally, increased Conscience was also associated with viewing projects as less demanding. As a constancy, Conscience

should contribute to the formation of perceptions of the world and decision making, but the precise way in which Conscience might impact on perceptions of the 'demandingness' of projects is not immediately clear. One possibility is that, according to Fletcher & Stead, (2000a) Conscience requires taking the longer term view. Since the projects were all based on the different aspects of longer term personal development, (e.g. losing weight, getting a new job, taking up exercise), perhaps higher levels of Conscience help the individual to decide whether the project was worthy of pursuit. The combination of greater Conscience *and* greater levels of the other constancies might work together such that projects are seen as worthwhile and achievable (less demanding).

Higher levels of FITness were also found to be related to higher levels of perceived project support. This may be because increased FITness (especially Self-responsibility) is associated with increased control and a lower likelihood of perceiving one's environment to be constraining. That is, being Self-responsible involves viewing internal factors as important in determining outcomes, not external ones, and it is therefore less likely that more FIT individuals will see aspects of their environment as constraining because they are not viewed as pivotal in determining outcomes. This view is supported by the fact that for those who did not select projects, those who gave primarily environmental based reasons for not doing projects, were also less FIT. Again this suggests that reduced FITness may be associated with seeing one's environment as a barrier to achievement, rather than seeing that the barriers exist primarily within oneself.

Self-responsibility was not the only aspect of FIT related to project supports/constraints – Fearlessness, Balance and Conscience were also significantly correlated such that greater FIT scores were associated with perceiving projects to be better supported. As with the perceptions of project demands, having a life that is in Balance is likely to aid in viewing projects as better supported because adequate time and resources are available to devote to the projects. Increased Fearlessness may help people to perceive projects as better supported in the same way it allows individuals to perceive their work as better supported: being Fearless may make it less likely that the world is seen as threatening. Increased confidence for tackling projects might make the environment

seem less constraining. Finally, it is again not immediately obvious why having a stronger Conscience would be associated with viewing one's projects as better supported but as before it could be related to role Conscience plays in determining the worthiness of pursuits in the long term. Alternatively, having a strong moral code facilitates positive perceptions and that is why Conscience is linked to positive perceptions of projects.

There were several relations between Little's measures of project dimensions (meaning, structure, efficacy, stress and community) and the FIT variables. The results showed that individuals with higher FIT scores did view their projects more positively than less FIT individuals. These links arise despite the fact that the project analysis was based not upon freely chosen projects but projects determined by the author. Another relevant factor may be that in this study a smaller number of projects were sampled than in other research (see Little, 1993, 1998).

Looking firstly at structure (the degree to which one is responsible for beginning the project, is in control of the project and is able to spend adequate time on it), several aspects of FIT appear to be related. Both Integrity and behavioural flexibility were associated with projects that were perceived to be better structured. The specific FIT constancies which were related to structure were Self-responsibility, Balance and Fearlessness. It is easy to see how having the different areas of life in Balance would allow adequate time to be spent on projects, as it is not difficult to see how increased Self-responsibility would allow feelings of control over projects. Fearlessness may be associated with structure because it may play a role in allowing individuals courage to begin projects, which, in more fearful individuals, could not be broached.

The second aspect, efficacy, was found to be associated with increased behavioural flexibility and Balance. Being able to operate comfortably in a wider range of situations may increase feelings of general self-efficacy, so that, in the main, the individual feels more able to tackle any form of project. It is suggested that increased Balance helps feelings of efficacy by way of allowing the individual adequate time and resources to spend on the project (as in the case of project structure), so that progress can be made.

Project stress – Little's third project factor - was found to be negatively related to FIT Integrity - low constancy scores were associated with individual projects being rated as stressful (difficult, challenging and stressful). Note that ratings of the degree to which the project was found to be challenging were not associated with FITness or anxiety or depression, so it would appear that project stress associations are based upon ratings of difficulty and stress. This may be important because individuals may or may not feel that challenging projects are a good thing. Some people do not want to challenge themselves, others seem to thrive on it.

With respect to project selection, the data initially suggested that there may be profile differences between those who did and did not select projects. Mean FIT scores for those who did and did not select projects were not statistically significantly different but mean behavioural flexibility and mean Overall FIT scores did appear to be disparate. It was argued that the huge variability in the behavioural flexibility and Overall FIT scores scales made significant statistical differences less likely, so further research could investigate this potential relationship. The trend suggests that those scoring higher on behavioural flexibility may be more likely to begin projects that are oriented towards self-improvement, whether that be in the domain of health or work, for example. Being more behaviourally flexible might allow individuals to feel more able to begin new projects as they have increased feelings of efficacy or self-confidence due to a wider repertoire of behaviours within their comfort zone as well as greater comfort in a wider array of situations.

Many of the projects involved in this study were leisure activities such as exercising or developing one's spirituality, with only two relating to work. Bearing this is in mind, we can make some tentative speculations about leisure and its relationships with other variables. The way that people choose to spend their leisure time has been shown to be related to individual differences (e.g. Iso-Ahola, 1994). In this study, FIT was related to how participants viewed their projects but was not statistically related to whether they selected them or not, and neither was loc. Recall however that there were large differences in mean Overall FIT score and mean behavioural flexibility score between those who did and did not select projects. It is therefore possible that more FIT

individuals are more likely to engage in personal development projects in their leisure time. This requires further study.

Leisure activities have been linked to well being (satisfaction, for example, e.g. Iso-Ahola, 1994) however in the present study neither project selection nor how participants rated projects was related to either of the two measures of well being taken. This may be due to the fact that individuals were given a list of projects to choose from rather than measuring what they were currently doing, so future research should attempt to investigate these relationships using conventional personal project analysis.

It may be that relationships between FIT variables and personal projects would be different if the projects were directly focused on 'leisure activities' per se. It might be useful to measure leisure activities using a different form of measurement (e.g. Leisure Interest Inventories, see Frisbie, 1984). The data here, with personal projects, is similar to that found between FIT, work perceptions and well being: FIT is related to anxiety and depression (but perceptions of projects are not) and FIT is related to perceptions of projects. FIT's relationships with perceptions of projects and with well being appear to be independent from each other.

4.7.4. FIT, Health Behaviours and Well Being.

Objective four aimed to investigate whether FITness was related to an array of health behaviours (diet, smoking behaviour, alcohol consumption and exercise behaviour), a health outcome (BMI) and whether these measures were related to well being (as measured through anxiety and depression).

Exercise was found to be associated with the measures of well being taken here. Individuals who participated in exercise more often also reported lower levels of depression. This finding supports other studies which have demonstrated a link between exercise and depression, for example exercise has been shown to be an effective treatment for mild to moderate depression (Dunn, Trivedi, Kampert, Clark & Chambliss, 2002). The exact manner in which exercise might have these effects is

unknown. A variety of theories have been proposed in the past. Some of these theories argue that exercise results in psychological changes which influence depression (increased feelings of mastery, control and self-esteem) and others suggest the mechanism is essentially chemical in nature (changes in endorphin levels for example). A reasonable assumption is that both processes are likely and that psychological changes are at least partly responsible, particularly in the long term (see Biddle et al, 2000, for a review).

There was some indication here of a relationship between FITness and exercise, such that FITter individuals appeared, tentatively, to have exercised more frequently, although the trend did not reach statistical significance. It could be that FITter individuals exercise more as well as having lower anxiety and depression levels. This series of potential relationships needs further research to clarify whether such relationships do exist and to elucidate underlying mechanisms.

Findings for BMI and FIT suggested that behavioural flexibility is lower in those individuals who are overweight and who do not exercise on a regular basis. Although the differences in behavioural flexibility scores between BMI groups and exercise level groups were not statistically significant, it is argued that the lack of statistical significance is a result of two things. Firstly, the sample size was small which resulted in different BMI and exercise level groups having only a small number of cases. The low BMI group for example consisted of only 3 people. Secondly, behavioural flexibility and Overall FIT scores were extremely variable within the sample.

These potential relationships between behavioural flexibility, BMI and exercise levels were not expected. It was hypothesised that Self-responsibility, not behavioural flexibility, would be an important factor. Fletcher & Stead (2000a) discuss the notion that less FIT individuals have behaviour habits, which means they fall back on 'automatic' behaviours even in situations where these are not appropriate. New behaviours can feel uncomfortable, and people have comfort zones (of behaviour habits) which they do not want to leave. Perhaps beginning exercise or maintaining a fitness/health programme is for many people out with their zone of comfort – individuals might find exercising embarrassing, especially if they are uncomfortable

with their bodies, and often exercise can involve learning new skills. It can take a lot of effort and determination to become fit, lose weight etc, and perhaps for people with low behavioural flexibility, it may be just too 'discomforting'. Another possibility is that adhering to exercise and other health programmes seems to require that the individual can overcome barriers to their intentions and increased behavioural flexibility might allow the individual to be prepared for these barriers.

In this study it was found that the number of units of alcohol consumed per week was significantly related to two aspects of FIT: Conscience and Fearlessness. Although the majority of individuals consumed less than the government recommended allowance (14 units per week for women, 21 for men), many individuals consumed more, some even consuming 50 units per week. If levels of consumption had been within the government recommended limits, then relations with FIT would perhaps have been of less significance. However, in this case, recommended limits were exceeded and it appears that those individuals who drank more were more likely to have lower levels of Conscience but greater levels of Fearlessness. This latter result is slightly counterintuitive because it was hypothesised that less FIT individuals would consume more alcohol compared to the more FIT individuals. It might be in this case that the association arises as a result of higher Fearlessness which is out of harmony with the other constancies; Fletcher & Stead suggest that high levels of Fearlessness, without accompanying levels in the other constancies, may be associated with 'stupidity', which may be considered an aspect of drinking too much. It is a curious finding however because lack of Fearlessness is associated with anxiety, depression and an inability to face daily demands, and such mental states might lie behind excessive drinking (e.g. alcohol might be used as a coping behaviour by the 'stressed'). With respect to Conscience, being more morally and ethically strong seems to pre-empt the desire to drink to unsafe levels, what is more curious however is the fact that being more Fearless does not.

One final aspect of health which produced interesting findings was in relation to diet. What people actually eat is difficult to measure (self-report tools can be unreliable at the best of times) and bearing this in mind, results are highly tentative, especially since the measure of diet adopted here was so basic. Nonetheless, it was found that

individual's that were more likely to have a low fat/sugar diet with high fibre and plenty of fresh fruit and vegetables, were also more likely to have higher levels of Conscience and consequently Integrity. As with the reduced alcohol consumption, increased Conscience might provide a strong code for dietary behaviour, dictating what is good and bad for the individual to eat - beliefs towards specific foodstuffs have been shown to be predictive of intention to eat or not eat them (see the Theory of Planned Behaviour, e.g. Ajzen, 1991).

4.7.5. General Discussion

The primary aim of this thesis was to explore possible relationships between FIT and the negative affect conceptualisation of well being. It has been suggested that there are two ways in which an individual might influence their well being (e.g. Diener & Lucas, 1999). Firstly, the sort of individual they are might be directly associated with well being. For example, some personality traits have been shown to be directly related to some measures of well being (e.g. DeNeve & Cooper, 1998). Secondly, the sort of person they are, might influence other factors which might contribute to well being, such as how they think and behave in relation to goals, activities, even in every day situations. This study attempted to explore whether FITness might be an individual difference that was directly or indirectly related to well being.

The most unusual finding here, given the cross-sectional nature of the study, was the lack of relationship between perceptions of work characteristics and well being. This is puzzling because 1). Many other studies have demonstrated this relationship (see e.g. Van de Doef & Maes, 1998, 1999) and 2). The cognitive biases found in anxious and depressed individuals often result in a significantly more negative view of the world (e.g. Clark, 2001). Methodological limitations might explain this – the measures used to assess perceptions of work may have lacked reliability and validity. The measure adopted was that of Payne (1979) which assesses two factors; work demands and supports-constraints. Factor analysis in the present study however revealed that the items loaded on to four demand factors and four support-constraint factors so there may be underlying problems with the models conceptualisation as well as with the measurement approach. A further point to note here is that the majority of research

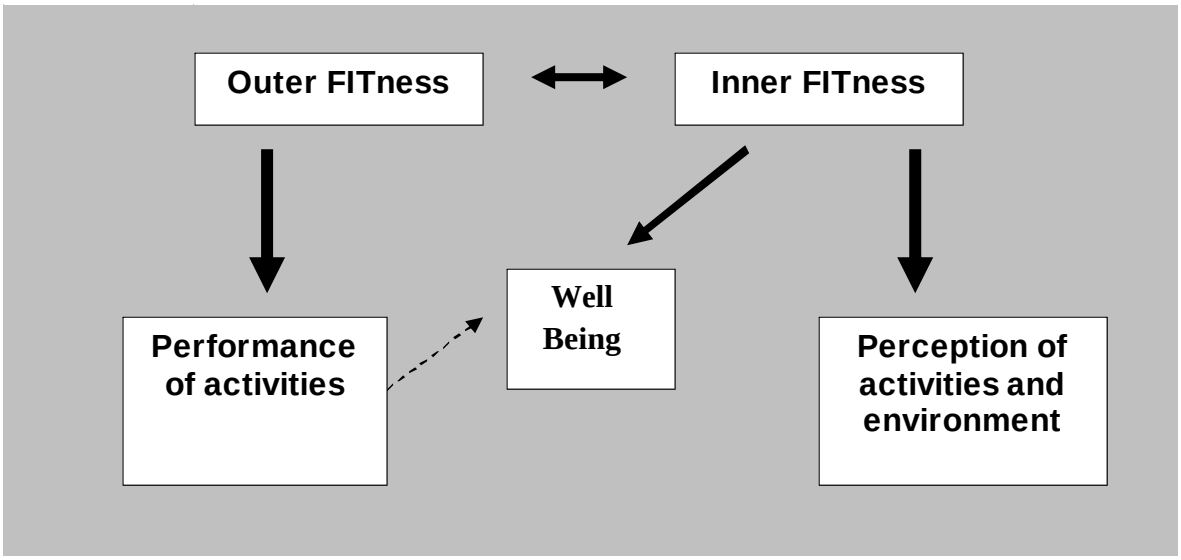
demonstrating a relationship between well being and perceptions of work does so using Karasek's model as a framework and not Payne's. The two models are similar in terms of the items they consider to be demands and supports but at the end of the day they are qualitatively different. In Van der Doef & Maes (1999) review they concluded that the studies which tended to find relationships between perceptions of work and well being were those who used specific demand items in conjunction with specific, matched control items. Studies employing broader conceptualisations of demands and control were less likely to find associations. This study would fall into the latter category as demands and support-constraint items were not closely matched or specified to that extent.

A hypothetical model was proposed to account for personal development and well being (see Figure 4.1). The model suggested that Inner FITness would determine how we perceive our environment, what we choose to do in terms of work and leisure, and how we then perceive those activities. In turn, it was proposed that these perceptions influence our feelings about the activities as well as the outcomes. Feelings of success or failure within these activities could, in turn, impact on well being. Well being levels might, in turn, have a feedback effect on the perception of the environment.

Overall this model was not supported because perceptions of work and project demands, supports and constraints did not relate to well being. Whilst Inner FITness was related to perceptions of work and personal projects and engagement in some health behaviours, perceptions of work and personal projects did not predict well being. The only variables significantly associated with well being were those of Inner FITness. Outer FITness (behavioural responsibility) might also be important, however, since there may be some potential associations between behavioural flexibility and exercise, BMI and project selection. A relationship between behavioural flexibility and variables which are representative of actions (as opposed to cognitions), is not surprising. Whilst Inner FITness was related to cognitive measures, Outer FITness might be related to behavioural measures. Self-responsibility might well be related to perceptions of health behaviours and other personal development activities, for example, but the actual behaviours have stronger associations with behavioural flexibility. Thus actual performance of behaviours (exercise or adoption of projects for example) is more likely

when there is a greater array of behaviours in the individual's repertoire. The findings from the present study suggest a different model such as the one outlined below in Figure 4.2.

Figure 4.2. Hypothetical relationships between FITness, personal development and well being

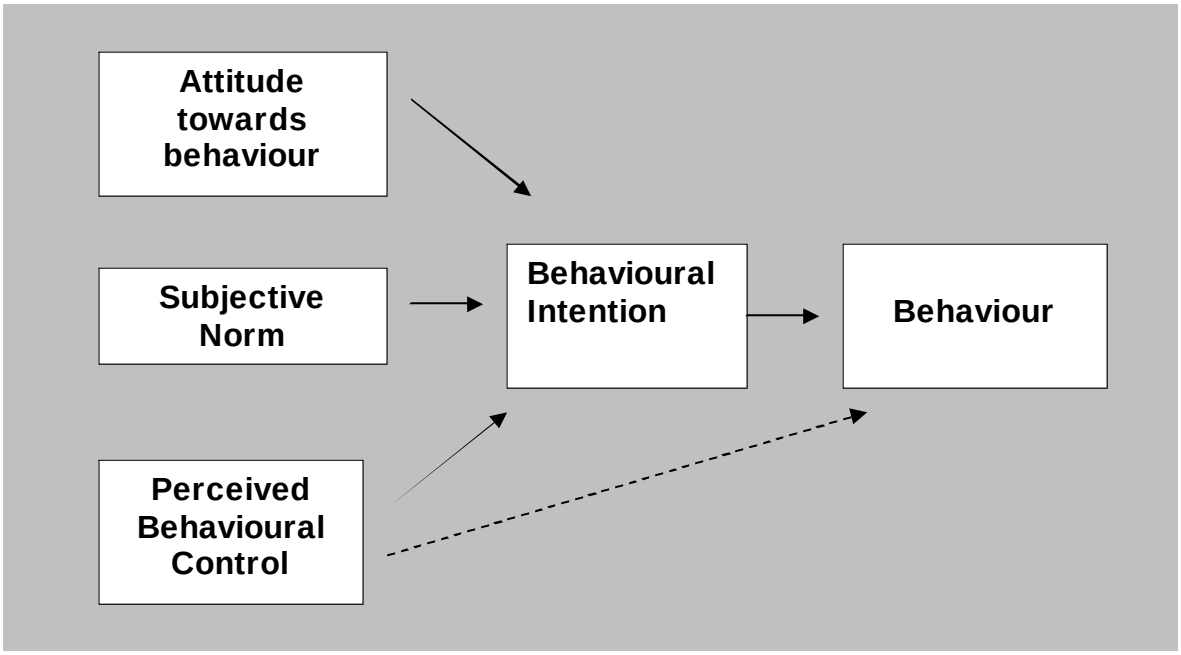


Fletcher & Stead (2000a) hypothesise that the constancies (Inner FITness) are templates for decision making and therefore will influence Outer FITness (behaviours) and will also impact on cognition. This includes perceptions (of the environment and of specific activities) and cognitive components of well being, for example the cognitive bases of anxiety and depression. Outer FITness however has an influence on actual adoption and performance of activities since it prescribes the behaviours in which we are willing to engage. In some cases performance of some of these behaviours might directly influence well being – for example engaging in exercise might directly influence both physical and psychological aspects of well being. On other occasions performance of behaviours might have a more indirect influence, for example well being might be improved by mastery of a skill which may then lead to increased self-esteem.

The model depicted in Figure 4.2 may share something in common with another model that attempts to explain behaviour through cognition: The Theory of Planned Behaviour

(e.g. Ajzen, 1991). This model argues that behaviour is primarily determined by a series of cognitions. Behaviours are directly determined by the intention to perform that behaviour, intentions are determined by attitudes, subjective norms and perceived behavioural control (see Figure 4.3).

Figure 4.3. The Theory of Planned Behaviour



4.7.6. Limitations and Future Research

As a cross-sectional study, this research was useful in exploring potential relationships, however, it does not permit causal inferences to be made and there were several other significant shortcomings. Firstly, sample size was limited – given the large range of variables assessed, many more participants would have been helpful as this would have permitted better analyses to be performed, such as path analysis and structural equation modelling. The usefulness of drawing participants from such a wide range of occupations and job sectors is also questionable. Certainly it would be of value to explore relationships between FIT, work perceptions and well being within a homogenous sample as is typically employed.

There were several conceptual and measurement issues. As a framework, it may have been better to employ Karasek's model of job strain since this has been more widely investigated. Using this as a framework would have permitted the examination of FIT's ability to moderate the effects of demands and control as other individual differences, such as type A behaviour, have been studied. A related issue concerns the measurement of work perceptions. More specific measures of perceived job demands, control and support might have been employed, especially given the potential lack of validity of Payne's measurement tool. Furthermore, to compare the relative importance of E and P properties it would have been useful to find some objective measure of work characteristics, although this is neither straightforward nor necessarily possible (see Fletcher, 2003).

The present study focused on the negative affect conceptualisation of well being and, in retrospect, positive affect should really have been measured as well. Negative affect and positive affect are independent and show different relationships with other variables (e.g. Clark & Watson, 1991). Clark & Watson (1991) note that it is positive affect which tends to be associated with patterns of "social activity, exercise and reports of pleasant events" (pp. 325) and individuals high in positive affect also "tend to be socially masterful, to be forceful leaders who enjoy being the centre of attention, and to be achievement oriented" (pp.325). These associations suggest that positive affect might have some interesting relationships with FIT, personal projects and health behaviours and it is frustrating to not be able to examine this here.

There were significant shortcomings in the measures used to assess health behaviours. It would have been useful to have developed more sophisticated measures of diet and exercise levels as the measures used here may not have reached credible reliability and validity levels. Diet is difficult to measure. Participants have to be aware of what they are eating, the quantities and frequencies, nutritional values and so forth. Many are not – they do not pay attention to these things and consequently the likelihood of them completing exhaustive questionnaires is low. To explore relationships between diet and FITness further, the level of paperwork to be completed by the participant would have to be restricted, perhaps by making diet the only dependent measure studied.

With respect to the study of leisure activities through personal project analysis, hindsight suggests that using a forced choice assessment of projects was not helpful and a conventional PPA may have been of more value. Although this could potentially have been more complicated, the results would be more comparable to those of other studies and typical personal Project Analyses could have been completed. Future research might examine whether FIT relates to a traditional PPA in the same way. A final point here was the method for determining demand and support-constraint items for each of the projects offered. The items were not necessarily all selected on a theoretical or research evidence basis, and despite the fact that the scales largely reached acceptable levels of internal consistency, the measurement technique remains highly questionable.

4.8. Conclusion

Psychological indicators of well being were most strongly associated with aspects of Inner FITness (that aspect of FIT which is directly concerned with cognition and emotion), not Outer FITness (the aspect of FIT which is concerned with behaviour) and were not related to perceptions of work or personal projects. This, however, is possibly because of poor measurement. Health behaviours were also largely unrelated to the psychological measures of well being taken here, although exercise levels and depression were weakly related. As well as being related to anxiety and depression, FITness was found to be related to perceptions of some aspects of work and perceptions of personal projects. Descriptive statistics suggested that there may be some relationship between FIT and health behaviours and this warrants further investigation since there is extreme practical significance in learning as much as possible about what underlies the adoption and maintenance of positive health behaviours.

One very interesting finding was that the level of demands, supports and constraints people found in their jobs was not at all related to anxiety and depression levels. Other studies have found this to be the case, however, the lack of findings here could be due to using participants from a variety of different jobs rather than a uniform job sample and using unreliable/invalid measures of work characteristics. It does warrant further investigation because anxiety and depression are argued to involve an array of cognitive biases which could drastically alter the way an individual perceives his work or leisure

activities. This was not found here – perhaps because of the differences in methodologies.

It appears then that FIT, which can be viewed as a representation of an individual's cognitive architecture, is related to individual perceptions of the world, behaviour and emotions. In short, it may turn out to be a useful predictor of well being.

With respect to health, another interesting finding was that Self-responsibility did not appear to be related to health behaviours as was predicted. Rather, it was found that behavioural flexibility may be related to exercise and to weight, as indicated by BMI. This potential relationship needs further investigation and clarification – if behavioural flexibility was shown to be related to BMI or exercise levels why should this be? One possibility is that being more behaviourally flexible allows the individual to follow healthy routines even when environmental or personal reasons may arise that threaten adherence to such routines – it might for example increase the likelihood of an intention to behave in a given way actually being translated into behaviour. The individual who is behaviourally flexible has a wider range of appropriate behaviours at their disposal and this might facilitate the transformation of intention to act into performance of the actual behaviour.

Future research should address the shortcomings of this research (small sample size, poor measures and conceptualisations of frameworks, unsophisticated statistical analyses and cross-sectional methodology) as well as perhaps replicating the findings relating to work demands, supports, constraints and mental well being within a longitudinal design. One key area which could benefit from further research is the tentative relationships found between FIT, exercise and BMI – it would be beneficial both from a theoretical and practical viewpoint to discover whether there actually are any relationships there. Furthermore, if there were relationships, how might they work? There are several existing models which attempt to explain the adoption and maintenance of health behaviours (see Connor & Norman, 2005) with one of the most popular and widely researched being the Theory of Planned Behaviour (e.g. Ajzen, 1991). This model suggests that a variety of cognitions predict behaviour and several researchers have explored and expanded this model to help explain how intentions are

translated into behaviour (see e.g. Armitage & Conner, 2001). It has been suggested here that if behavioural flexibility were shown to be related to health behaviours it could be because it facilitates this translation of intention into behaviour – this is one avenue for further research.

Chapter 5

FIT, the Theory of Planned Behaviour and Weight Management

5.1 Introduction

The previous studies findings suggested there may be a relationship between FITness, BMI and exercise levels. Weight levels, exercise behaviour and food consumption are becomingly an increasingly important area of research. After smoking, obesity (often the result of a poor diet and lack of exercise) is the main cause of cancer and heart disease - it has been linked to colon, breast and stomach cancer, as well as diabetes, arthritis, high blood pressure, infertility and strokes (Mokdad, Marks, Stroup & Gerberding, 2005; Schlosser, 2001). In the USA at least a third of the adult population are now considered to be obese (2003–2004; National Center for Health Statistics, 2006). Unfortunately, Europe appears to be following America's example – in 2003 27.7% of children in England aged 2-10 years old were overweight (Jotangia, Moody, Stamatakis & Wardle, 2005). Both poor eating habits and overeating are key factors in obesity, as is the failure to exercise on a regular basis. Consequently, if FIT is shown to be related to BMI, exercise or indeed any other behaviour which underlies weight management, then it may have utility within weight loss programmes.

There is a real need for the population to stick to a healthy, balanced diet (one that is low in calories, fat, sugar, and salt and rich in fresh fruit, vegetables and fibre) and to exercise regularly, in order to regulate their weight. With respect to exercise, for example, studies in North America have suggested that as few as 20% of the population exercise regularly enough to affect cardiovascular fitness (Stephens, Jacob and White, 1985) and of those who do adopt an exercise program, as many as 50% will drop out within 6 months (Dishman, 1982). Given the long term nature of the treatment of the diseases which result from obesity, it is clearly in the interest of both the individual and society as a whole to work towards preventing them, in part by increasing exercise participation and improving diet.

The aim of the present study then is to investigate whether FIT is related to BMI and the primary behaviours which underlie BMI (exercise and dietary habits) and if so the nature of that relationship. The previous study suggested that the two aspects of FIT might have different influences. Inner FITness might impact on the cognitions underlying behaviour but Outer FITness may either influence the behaviour itself or moderate the intention – behaviour relationship. A social cognition model of health behaviours will be adopted as a framework for investigating these relationships. The Theory of Planned Behaviour (TPB, e.g. Ajzen, 1991) has been chosen since it models cognitions and their relationship to behaviour and can be used to explore the specific behaviours that might underlie BMI. There is an extensive body of literature demonstrating that, for some behaviours, the model has reasonably good predictive ability which the following literature review will now discuss. The review will begin with a discussion of the model itself before moving on to examine literature on the TPB's ability to predict the type of dietary and exercise behaviours which could underlie BMI.

5.2. Literature Review

There is a wealth of research aimed at discovering why people find it difficult to adhere to healthy regimes and the cognitive and personality attributes that are held by those who do. Locus of control, self-efficacy and attitudes for example (see e.g. Godin, 1994) have all been extensively studied both in respect to exercise behaviour and dietary habits. It appears from the findings of the previous study that an antecedent of exercise behaviour and BMI may be behavioural flexibility. A significant amount of variance in weight management behaviour remains unexplained by current literature. An investigation into the ability of FIT to determine such health behaviours is clearly of value since central to the notion of FIT is that it aims to provide a way for individuals to transform both their cognitions and behaviours so as to aid personal development and the fulfilment of potential (see Fletcher & Stead, 2000a). As such, FIT lends itself to interventions.

5.2.1 The Theory of Planned Behaviour

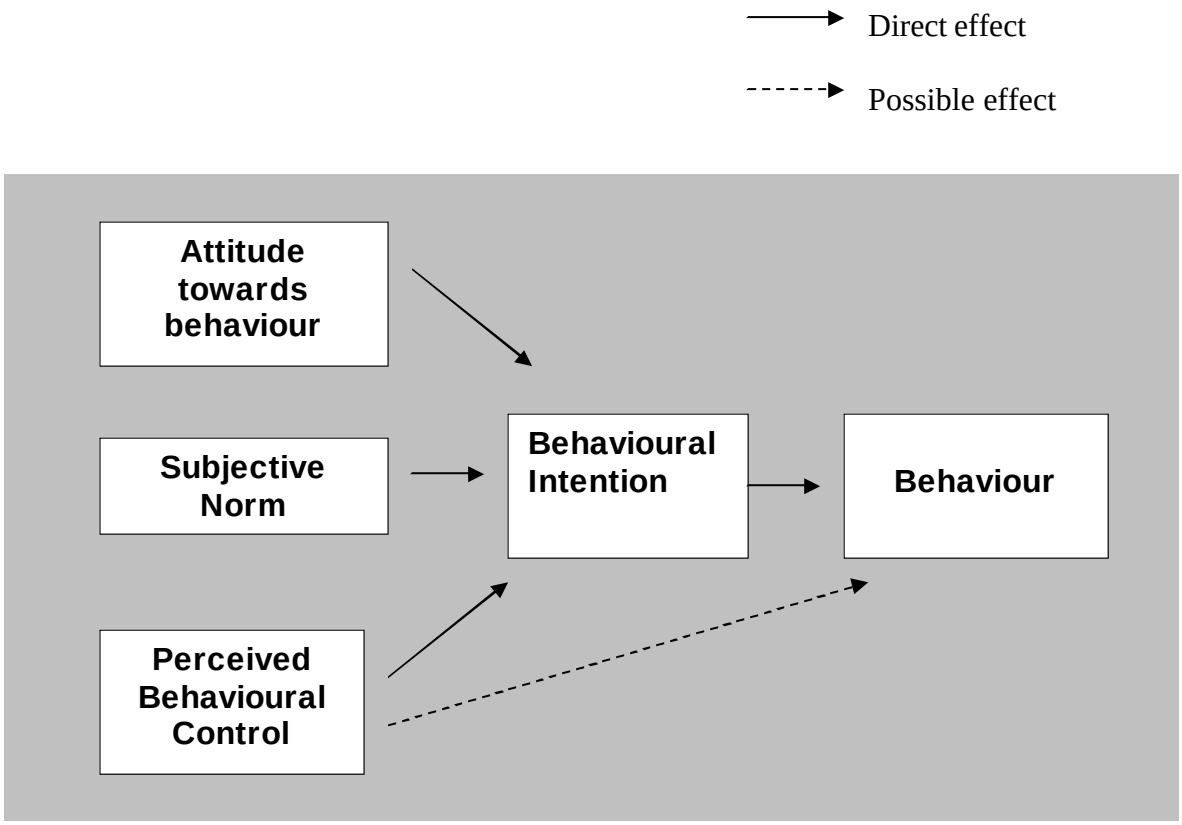
One popular approach to predicting exercise and diet behaviour has been to examine some of the variables which underlie decision making. The Theory of Planned Behaviour (Ajzen, 1991) is an expansion of the Theory of Reasoned Action and attempts to predict both volitional and non-volitional behaviours. The TPB (see Figure 5.1) argues that the primary determinant of behaviour is the intention to perform that behaviour. In turn, intentions are predicted by attitudes and subjective norms (SN). The TPB also includes the individual's perceptions of control over execution of behaviour.

Inclusion of the PBC factor is based on the assumption that individuals will be more likely to execute behaviours if they have control over them. Although it is actual control which is thought to be important (Ajzen, 1988), such measures are clearly very difficult to obtain so perceptions of control are substituted. PBC refers to the degree to which individuals perceive executing a behaviour to be easy or difficult. PBC may therefore vary across situations and actions, and as such does not represent Rotter's (1966) construct of Locus of Control. Rather, it simulates to a large extent Bandura's (1977, 1982) perceived self-efficacy construct.

Other possible influences upon behaviour are seen as doing so via the above components, thus the TPB is "a complete theory of behaviour" (Conner & Sparks, 1995, p128). However, Ajzen (e.g. 1991) has acknowledged that if other factors should be shown to have a significant impact then they should be incorporated into the model. Further, it has been suggested (e.g. Conner & Sparks, 1995) that the model is more adequately viewed as a model of the *proximal* determinants of behaviour.

Others have criticised the model as being too elaborate for a model of human decision making processes (e.g. Fischoff, Goiten & Shapira, 1982). However, as Conner & Sparks point out, the model attempts to demonstrate how people form attitudes and intentions. These constructs may be stored in memory and then retrieved when required. This would drastically reduce the amount of effort an individual would have to engage in whilst making a decision to perform a behaviour or not.

Figure 5.1: The Theory of Planned Behaviour.



Source: Conner & Sparks (1995, pp 128)

5.2.2. Summary of Research

5.2.2.1 Food Choice

Research on the TPB and food choice has in general tended to focus on changing towards a healthy diet. Sometimes this involves looking at an individual's intentions and actual behaviours for increased or reduced consumption of specific foodstuffs such as low fat milk or wholemeal bread, whilst, for others, it involves investigating more general behaviour such as reducing fat intake. Whilst earlier research appears to have focussed more on investigating the strength of each individual component of the TPB to predict the associated outcomes, more recent research has moved on to consider how the models predictive powers might be increased through the addition of other variables.

Several studies have looked at multiple different behaviours designed to improve one's diet, most often by reducing fat intake. Sparks, Shepherd, Wieringa & Zimmerman (1995) for example discuss a study where they examined the TPB in relation to five behaviours which would contribute to reduced fat intake in one's diet (reducing the consumption of: cheese; meat; margarine and butter; biscuits/cakes/pastries/buns; total amount of fat in one's diet). Results showed some support for the TPB. Attitude was a significant predictor of intentions for every behaviour, but PBC predicted only three out of five. Only the amount of variance accounted for by the various predictors in intentions (with respect to expectations) were reported, with these ranging from 0.42 for sweet food consumption to 0.58 for reducing meat consumption. Saunders & Rahilly (1990) and Lloyd, Paisley & Mela (1993) report similar values from research examining reducing fat and sugar intake, reducing intake of cakes and biscuits, reducing butter and margarine consumption, reducing red meat consumption, increasing fruit and vegetables, changing to reduced fat products and changing from whole to skimmed or semi-skimmed milk.

More recent reviews (e.g. McEachen, Conner & Lawton, 2005; cited in Conner & Sparks, 2005) have shown through meta-analysis that intention is reliably predicted by attitudes, SN and PBC but that attitude remains the strongest predictor. With respect to actual behaviour, intention and PBC both contribute but intention has the stronger effect.

Whilst attitudes, SN and PBC are important for forming intentions to eat or not to eat specific foods, there can still be a significant proportion of variance unaccounted for, so other factors must play a role. It might be that some aspects of Inner FITness play a role here such as Self-responsibility or Awareness. Further, given that intention is not always translated into behaviour (as has been noted elsewhere, see e.g. Sheeran & Abraham, 2003), it has become necessary to investigate the factors which either strengthen or mitigate the intention – behaviour relationship. PBC alone is insufficient to account for variance implying that there are other factors which differentiate between those who do translate intention into behaviour and those who do not. It is possible that

Outer FITness (i.e. behavioural flexibility) could moderate the intention – behaviour relationship.

5.2.2.2 Exercise

There have been several reviews of the TPB and its ability to predict physical activity (e.g. Godin & Kok, 1996; Hausenblaus, Carron & Mack, 1997, Hagger, Chatzisarantis & Biddle, 2002). Hagger et al (2002) reviewed 72 studies and found that the basic TPB model was a good fit for the data. Attitude and PBC were the strongest predictors of intention (accounting for 44.5% of the variance) and both intention and PBC were significant predictors of behaviour, accounting for 27% of the variance.

There are some differences across studies in the variables that are most important for determining intention and behaviour (see e.g. Godin, Valois & Lepage, 1993 and Theodorakis, 1994). Differences in findings are not easily accounted for. It may be that differences in the nature of participants can explain it – in some studies individuals who are regular exercises (perhaps because they participate in team sports) have been used, in others randomly selected college students have been used. In the latter case some of these participants may be regular exercisers and some may not, but there may be significant differences between these two types of participant which mediates or moderates the effect of PBC. Other potential factors might be the time frames used, the behavioural measures used or the type of exercise behaviour in question. In any case there still remains unexplained a significant proportion of variance both in intention and in actual behaviour. FIT might be able to account for some of this variance in intention (possibly via Inner FITness) as well as some of the variance in behaviour (via Outer FITness).

5.2.2.3. Additional Variables

The TPB does enable prediction of behaviour to some extent, but there is room for improvement. This study proposes that FIT might aid prediction, but other authors have suggested several variables which might be added to the model as additional variables or moderators (e.g. Conner & Sparks, 2005).

With respect to food and the TPB, early research suggested that perceived (moral) obligations, unrealistic optimism and self-identity could all increase the ability of the TPB to explain behaviour (Raats, Shepherd & Sparks, 1993; Raats, Shepherd & Sparks, 1995, Sparks, Shepherd, Wieringa & Zimmermans, 1995 and Sparks & Shepherd, 1994).

With respect to exercise, early research examined exercise habits, prior behaviour, role identity, self-efficacy, attitude strength and perceived barriers to see if they could increase the TPB's power to predict exercise intentions (e.g. Godin, Vezina & Leclerc, 1989, Hagger et al, 2002). Godin & Gionet (1991), for example, found that within the TPB and exercise habit, the strongest correlation was between habit and intention. Regression analysis showed there to be a significant increase in variance that could be accounted for in intention when habit was added to the TPB components. Similarly, Hagger et al (2002) concluded that past behaviour was a significant predictor not just of future behaviour and intention, but also attitude, SN and PBC and in fact the inclusion of past behaviour into the TPB made it the most effective model they tested, accounting for over 60% of the variance in intention and over 45% in behaviour.

It is not surprising that past behaviour has been found to impact strongly on intention – as FIT argues, the majority of individuals use past experience (often inappropriately and unsuccessfully) to guide future behaviour. However, there is the issue of whether adding past behaviour to the model actually tells us anything useful. It does not tell us why exercise was adopted (or not adopted) in the first place, nor does it explain how that behaviour was maintained (or not maintained). Its usefulness, especially in terms of practical applications, might therefore be limited, as Verplanken (2006) notes, it is a psychologically empty construct.

Other authors have examined variables which might mediate or moderate the intention – behaviour relationship. Sheeran & Abraham (2003) have shown that intention certainty, temporal stability of intentions, attitudinal versus normative control, past behaviour, self-schemas and anticipated regret are all moderators of the intention-behaviour relationship, and furthermore, they demonstrated that the temporal stability

of intentions can also act as a mediator of the other moderators. Thus stability of intentions occurs when individuals are certain about their decisions, have past experience of the behaviour, see the behaviour as important to their self-image, base their decisions on attitudinal (internal) factors as opposed to normative (external) factors, and have high levels of anticipated regret should they not carry out the behaviour. This means that intention is more likely to be translated into behaviour.

It has been shown that intentions might be more often turned into behaviour when individuals plan out what has been termed implementation intentions (e.g. Gollwitzer, 1993). Implementation intentions are formed by the individual and specify how, where and when the given behaviour will be performed. Producing these plans increases the likelihood of behaviour enactment in several possible ways. They might support attentional and memory processes required for successful performance, which in turn means that opportunities for behaviour enactment are less likely to be missed (e.g. Sheeran & Orbell, 1999). This might also help to explain another finding that forming implementation intentions results in a speedier enactment of the behaviour (Gollwitzer & Brandstatter, 1997). Sheeran & Orbell (1999) investigated individual's intentions to take vitamin C pills every day over several weeks and whether implementation intentions increased translation of intention into behaviour. Participants who formed implementation intentions were significantly more likely to remember to take the vitamin C every day. Further, it was suggested that implementation intentions were helpful because they established environmental cues (place etc) which served to remind individuals to take the pill.

Sniehotta, Scholz & Schwarzer (2006) have taken the concept of implementation plans one step further with respect to increasing the strength of the intention – behaviour relationship in the domain of exercise. In an intervention based study looking at increasing exercise participation in cardiac rehabilitation participants, they examined the efficacy of what they term action plans and coping plans. Action plans are formulated after the intention and essentially are implementation plans as discussed above. Coping planning is also post intention, but this type of plan is concerned with preparing the individual with techniques that can be used when situational cues arise that might elicit undesired responses (i.e. a response that drives the individual away

from carrying out the intended exercise). These responses could be unintended – a reversion to an old habitual behaviour – or they could be intended when for example a newly intended behaviour takes it place. With respect to the coping plans, these allow the individual in a sense to anticipate situations when they may be likely to deviate from their intentions and to devise strategies which they can then employ in order to actually follow through with their intention. The study took place over a ten week trial period and the 211 participants were assigned to either a control group or to one of two treatment groups. The first treatment group formed only action plans for exercising whereas the second treatment group formed both action and coping plans for exercising. Results showed that at both follow ups, those individuals who had formed both action and coping plans engaged in significantly more exercise and cycling on a daily basis than the control group and the action plan only treatment group.

Adoption of, or adherence to, a new behaviour (which is what healthy eating and exercising is for the majority of the population) is apparently difficult for most people. 'Unhealthy' habits enforce a strong influence on behaviour, and it requires significant and continuous effort to overcome them. On top of this individuals might have to expend potentially huge amounts of energy (both physical and mental) in actually performing the new behaviours. If habits place a strong influence on behaviour and hinder the adoption of or adherence to new behaviours, it could be that individuals who exhibit less habitual behaviour might be more able to adopt new forms of behaviour. Whether they can maintain these behaviours in the long term is a different question.

Cognitive attributes already held by the individual, such as intention stability or anticipated regret, might increase translation of intention into behaviour. Therefore, it also possible that cognitive aspects of FIT might determine intentions to behave in a given way. It further appears that forming plans can also increase the likelihood of intention becoming behaviour. Despite the development of several additional and moderating variables, it appears that there is still variance in behaviour which is unaccounted for and it might be that behavioural flexibility can contribute. The nature of the FIT theory should also lend itself to the forming of plans, both action and planning, because the FIT theory comes with FIT exercises (Fletcher & Stead, 2000a)

that the individual can use in order to increase their FITness. Such exercises can easily be modified to include the development of plans

5.2.3 The TPB and FITness

The TPB's components might each be directly related to an individual's FITness, or it might be that FITness moderates various relationships within the TPB. With respect to direct relationships, the most obvious potential relationship is that of Self-responsibility to PBC, since Self-responsibility is theoretically concerned with control. PBC has been conceptualised in a manner similar to Bandura's notion of self-efficacy (Bandura 1988), but the idea of perceived barriers and facilitators has also been discussed in reference to it, particularly with respect to exercise. Terry (1993) has suggested that self-efficacy might be important in relation to perceived internal barriers but is less likely to be related to perceptions of external barriers. However, if FIT is related to differences in perceptions, more FIT individuals could be less likely to perceive both internal and external barriers to performing such behaviours.

If FITness influences the determinants of intentions, and in a positive way, i.e. to strengthen intentions to control weight, then it would be expected that more FIT individuals might have stronger intentions to manage their weight. It is also possible that FIT may play a moderating role such that it serves to influence the strength of the intention – behaviour relationship. One hypothesis is that more behaviourally flexible individuals could be more able to translate intention into behaviour. This might be the case because behavioural flexibility facilitates translation of intention to behaviour, perhaps, for example, because it makes the sorts of unpredictable events that occur and threaten intentions or plans more easy to overcome.

5.3. Objectives

1. To retest the relations between BMI and FITness
2. To examine the relationships between the TPB, FIT and a series of dietary and exercise behaviours

5.4 Method

5.4.1 Design

A longitudinal design was adopted with measurements of attitudes to, subjective norms about, perceived behavioural control towards and intentions to follow specific diet and exercise behaviours over the coming week being recorded at Time one. At Time two, exactly one week later, actual behaviour of the specific diet and exercise behaviours was measured.

5.4.2 Participants

One hundred and six second and third year undergraduate students from the University of Hertfordshire volunteered to participate. Informed consent was obtained. The sample was comprised of 48 males and 58 females. Ages ranged from 21 to 30. Ethics approval was received for this study (protocol number BS/R/003 I).

5.4.3 Procedure And Measures

5.4.3.1 Time One

Students were approached at the start of tutorial classes and asked if they would like to volunteer to take part (choosing specific classes meant the same students could easily be found when follow up measures had to be obtained). If they did so, they were given a questionnaire to complete there and then. The questionnaire assessed all variables and came in two main parts.

Part one assessed the attitudes, PBC, SN and intentions to follow several diet and exercise behaviours. Conner & Sparks (1995) note than when attempting to predict achievement of general goals, for example managing one's weight, the TPB's ability to predict is actually quite weak. However, if the specific behaviours required to manage weight are examined (e.g. following a low calorie/fat diet and exercising), predictive ability is increased. Thus in this study specific behaviours which are thought to be necessary if one is successfully managing one's weight were examined instead.

The TPB has far greater predictive powers when very specific behaviours are assessed over specific frames (see Conner & Sparks, 1995) so specific behaviours which might underlie weight management attempts were investigated:

1. Keeping daily calorie intake to under the recommended levels (2000 per day for women and 2500 – 3000 per day for men) for the next week.
2. Eating at least five portions of fruit and vegetables every day for the next week.
3. Exercising at least three times over the coming week

5.4.3.2 FIT Profiler

The second part of the questionnaire was the FIT profiler (Fletcher & Stead, 1999) which assesses an individuals FITness (overall) as well as providing scores for each FIT component and measures of anxiety and depression (*see Appendix Two).*

5.4.3.3 TPB Variables Measured

The psychosocial part of the questionnaire assessed the main variables of the TPB as identified by Ajzen (e.g. Ajzen, 1991), that is, attitude, subjective norm (SN), perceived behavioural control (PBC) and intention to perform the measured behaviours. Cronbach's alphas for each TPB scale and each behaviour are shown below in Table 5.1. With one exception all scales recorded internal consistency of between 0.73 and 0.92 (the alpha value for PBC for controlling daily calorie intake was 0.68).

At the start of the questionnaire, participants were provided with a brief definition of what constitutes recommended calorie intake and a 'healthy' diet, that is, a diet which is low in fat and sugar and high in fresh fruit, vegetables and fibre, where food is predominantly fresh and grilled or steamed rather than fried. They were also informed that current recommendations suggest exercising at least three times a week for at least 30 minutes at a time. Further, this exercise should include some cardiovascular or aerobic element such as swimming, cycling, running and so on.

Items for the questionnaire were devised following the recommendations made by Conner & Sparks (1995), with the same level of specificity used with respect to action (e.g. eating), target (e.g. fruit), context (every day) and frame (over the coming week) for attitudes, SN, PBC, intentions and behavioural outcome.

Behavioural intention (I) was assessed via multiple measures. Conner & Sparks (1995) suggest that although a single item measure could be used, "from a psychometric point of view, multiple-item measures are more appropriate" (pp. 134). Multiple-item measures include not just the intention/plan aspect but also desire and self-prediction with respect to the performance of the behaviour (e.g. Norman & Smith, 1995). Each of the three behaviours was therefore assessed with six items which Conner & Sparks (1995) found to have high internal reliability (alpha > 0.9) for a range of behaviours. In their analysis they found that principle components analysis revealed one factor accounting for 70% of the variance.

The specific items used for each behaviour, using fruit/vegetable consumption as an example, were thus:

a). Intention :
'I intend to eat five portions of fruit/vegetables every day for the next week'
'I plan to eat five portions of fruit/vegetables every day for the next week'
Answers were scored using a seven point Likert scale with the end points marked as definitely do not (1) and definitely do (7).

b). Desire:
'I would like to eat five portions of fruit/vegetables a day for the next week'
(Definitely do not (1) to definitely do (7)).
'I want to eat five portions of fruit/vegetables a day for the next week'
(strongly disagree (1) to Strongly agree (7)).

c). Expectations:
'I expect to eat five portions of fruit/vegetables a day for the next week'

(Unlikely (1) to Likely (7)).

'How likely is it you will eat five portions of fruit/vegetables every day for the next week?'

(Unlikely (1) to Likely (7)).

Attitude (Att) was assessed for each behaviour with subjects being asked to record on a 7 point scale whether each behaviour would be:

1. Bad (1) to Good (7)
2. Harmful (1) to Beneficial (7)
3. Unpleasant (1) to Pleasant (7)
4. Unenjoyable (1) to Enjoyable (7)
5. Foolish (1) to Wise

Subjective Norm (SN) was assessed with one item per behaviour:

'People who are important to me think I should eat at least five portions of fruit/vegetables per day for the next week'

Respondents recorded their answers on a 7 point scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Perceived Behavioural Control (PBC) was assessed for each behaviour with 3 items:

'How much control do you feel you have over eating at least five portions of fruit/vegetables every day for the next week?' (No control-1, to Complete control – 7),

'For me to eat at least five portions of fruit/vegetables a day for the next week would be' (Difficult (1) to Easy (7)).

'Whether I eat five portions of fruit/vegetables every day for the next week is entirely up to me' (Strongly disagree (1) to Strongly agree (7)).

Due to the length of the questionnaire, further measures such as control beliefs and outcome beliefs, which serve as the determinants of PBC and attitudes, were not measured.

Scores from the Likert scales in the questionnaires were used to develop total scores for each of the TPB components – for components that were assessed using multiple items

these scores were added together and z scores computed. Several variables within the TPB have sub-components. Attitudes are based on three: Global attitudes (the average response to each of the five attitude items); Perceived benefit (whether the behaviour was perceived to be beneficial, good or wise) and positive affect (unpleasant - pleasant and unenjoyable – enjoyable). Finally, behavioural intentions were measured by summing three different measures (pure behavioural intention, behavioural expectation and behavioural desire).

5.4.3.4 Time Two

Exactly one week later, students were asked to complete a behavioural outcome measure which asked them to record the extent to which they had carried out the 6 behaviours. Two items were used to assess whether participants behaviour for each of the six behaviours examined in the study:

"I ate at least five portions of fruit/vegetables every day last week"

"I found it easy to eat at least five portions of fruit/vegetables every day"

Respondents recorded their answers on a seven point scale 1 (definitely did not) to 7 (definitely did). Scores were summed and a z score computed.

Table 5.1. Cronbach's alphas for TPB multiple item scales and assessed behaviours

Assessed behaviour	Attitude	SN	PBC	Intention	Behaviour
1. Control daily calorie intake	.89	n/a	.68	.84	.85
2. Fruit/vegetables	.87	n/a	.76	.78	.88
3. Exercise regularly	.86	n/a	.73	.87	.92

5.5 Results.

Data was inputted to SPSS. Analysis and presentation throughout this section are done so in terms of the objectives.

5.5.1 Objective One: To retest the relations between BMI and FITness

Body Mass Index was calculated for each participant using their height and weight. WHO classifications were adapted as described in Chapter 4 (Underweight BMI <18.50; Normal BMI 18.50 – 24.99 and Overweight BMI >30.00). An individual's BMI is a good indicator of whether they are underweight, within healthy limits or overweight, provided the individual does not carry large amounts of muscle (i.e. provided they do not engage in large mounts of weight/resistance training). The FIT scores were calculated from the FIT profiler.

Examination of the data revealed two outliers which were removed from subsequent analyses. Descriptive statistics for BMI groups and Inner and Outer FITness are presented below in Tables 5.2, 5.3 and 5.4. It can be seen that the mean BMI for the sample was within the normal range (mean = 23.09). Mean Overall FIT score was 169.72 with mean behavioural flexibility being 30.19. Standard deviations were found to be high even with the outliers removed (SD for behavioural flexibility = 15.15 and for Overall FIT score = 84.43). With respect to Inner FITness, mean constancy scores ranged from 4.38 for Fearlessness to 6.04 for Conscience. SD's for Inner FITness measures were comparatively small.

Table 5.2 Mean BMI and FIT scores and SD's for entire sample

	Mean	S.D
Overall FIT Score	169.72	84.43
Behavioural flexibility	30.19	15.15
Integrity	5.36	.67
Awareness	5.57	1.05
Balance	4.95	.86
Conscience	6.04	1.32
Fearlessness	4.38	1.32
Self-responsibility	5.89	0.98
Body Mass Index	23.14	3.04

Table 5.3 BMI group means, SD's and significance test results for primary FIT components

BMI level and group size	**Mean Overall FIT score and SD**	**Mean Behavioural Flexibility (Outer FITness)and SD**	**Mean Integrity (Inner FITness) and SD**
BMI low mean	243.47	40.26	5.74
N = 7 SD	42.30	8.96	0.88
BMI normal mean	180.26	32.39	5.29
N = 69 SD	74.09	14.25	0.57
BMI high mean	129.38	22.89	5.45
N = 29 SD	97.22	15.85	0.72
F value and significance	6.830 p = .002	5.925 p = .004	1.515 p = .225

Table 5.4 BMI groups, mean constancy scores, SD's and significance test results

BMI level		Awareness	Balance	Conscience	Fearless.	Self-responsibility.
LOW	**mean**	6.15	5.31	6.78	4.28	6.17
N=7	**SD**	1.45	0.89	1.21	2.35	0.76
NORMAL	**mean**	5.48	4.92	5.89	4.33	5.84
N=69	**SD**	.922	.92	1.23	1.18	.859
HIGH	**mean**	5.66	4.93	6.14	4.54	5.94
N=29	**SD**	1.24	.71	1.47	1.47	1.25
F VALUE		2.031	2.624	2.720	.559	1.445
SIGNIFICANCE		p = .137	p = .077	p = .071	p = .574	p = .241

Looking at mean FIT scores for the different BMI groups, it can be seen that Overall FIT score and behavioural flexibility scores varied across the three groups but that Integrity did not.

For the Overall FIT score, the low BMI group had an Overall FIT score that was much larger than either the BMI normal or high groups. The behavioural flexibility scores followed a similar trend – the mean behavioural flexibility score for the low BMI group was much larger than for the normal BMI or high BMI groups and the difference between groups on both FIT measures was significant ($F(2,101) = 6.830$, $p = 002$ for Overall FIT score and $F(2,101) = 5.925$, $p = .004$ for behavioural flexibility). Tukey post hoc comparisons showed that the BMI low group was significantly different from both the BMI normal and BMI high group ($p<.01$ in either case) and that the BMI normal group was also significantly different from the BMI high group ($p<.05$). Tukey post hoc comparisons on the BMI groups and behavioural flexibility scores revealed that the significant difference existed between the BMI low and high groups ($p<.05$).

Inner FITness was also examined in relation to BMI groups. One way ANOVA's revealed there to be no significant differences on any aspect of Inner FITness between the different BMI groups.

It can be seen then that lower BMI's are related to having higher Overall FIT scores and that this is likely to be due to differences in behavioural flexibility (more behaviourally flexible people also have greater Overall FITness and also have lower BMI's).

5.5.2. Objective Two: To examine relationships between the TPB, FIT and a series of dietary and exercise behaviours

To answer the above objective several analyses were performed. Results are presented by dietary/exercise behaviour. Each of the three behaviours is examined with respect to the TPB and is discussed individually with correlations between the original TPB components noted. This is followed by an examination of FIT's relationship to the TPB and the behaviour. Finally, moderator and regression analyses were performed to establish whether FIT moderated the intention – behaviour relationship and the best fit model for each behaviour.

5.5.2.1 Behaviour One: "Keeping daily calorie intake to under the recommended levels (2000 per day for women and 2500 – 3000 per day for men) for the next week."

Pearson correlations were computed for the TPB components. Results are shown below in Table 5.5. Within the basic TPB model, it can be seen that intention was positively correlated with attitude and PBC, but negatively with SN (all p's <.01). Individuals with stronger intentions to stick to a calorie intake that was within government recommended limits had very positive attitudes towards doing this and felt that this behaviour was something they could control. However, they did not feel that this behaviour was perceived as important by other people in their lives. SN, unusually, was found to correlate negatively with attitude, but positively with PBC. This suggests that individuals who had positive attitudes towards this behaviour did so regardless of what others felt but their perceived ability to control this behaviour was less when significant others held less favourable views of this behaviour.

Table 5.5: Pearson Correlation Coefficients for TPB variables in Relation to Keeping Daily Calorie Intake to Under Recommended Limit

	Attitude	***SN***	***PBC***	***Intention***	***Behaviour***
Attitude	1.00				
SN	-.323**	1.00			
PBC	.293**	.251**	1.00		
Intention	.622**	-.221**	.269**	1.00	
Behaviour	.362**	-.091	.307**	.577**	1.00

** Correlation significant at p <.01

* Correlation significant at p <.05

Behaviour itself was most strongly correlated with intention but attitude and PBC were also strongly correlated with intention (all p's < .001). Those individuals who actually carried out the behaviour had a stronger intention to do so, held more favourable attitudes towards the behaviour and perceived themselves as having more control over the behaviour. SN was not related to actual behaviour.

The next step was to examine whether FIT was related to any aspects of the TPB. A correlation analysis was run with all of the FIT variables, TPB components and sub components entered. FIT was not found to correlate with attitudes or SN for controlling daily calorie intake. However, there were a number of significant relationships between FIT and PBC for calorie intake as shown in Table 5.6. Both Inner FITness and Outer FITness were related to PBC for calorie intake. With respect to Inner FITness, Awareness and Conscience were both positively related such that greater Awareness and Conscience were associated with increased PBC for controlling daily calorie intake. Behavioural flexibility however was also positively correlated with PBC so individuals with greater behavioural flexibility also reported increased PBC for controlling daily calorie intake.

Table 5.6. Significant pearson correlation coefficients for FIT variables and PBC for the assessed behaviours

FIT component		PBC calorie intake	PBC fruit/veg	PBC regular exercise
Overall FIT Score	**r**	**.214**	**.201**	.083
	p	.028	.039	.401
Behavioural Flexibility	**r**	**.207**	.130	.029
	p	.034	.187	.769
FIT Integrity	**r**	**.310**	**.351**	**.268**
	p	.001	.000	**.006**
Awareness	**r**	**.322**	**.317**	.180
	p	.001	.001	.068
Conscience	**r**	**.249**	**.213**	**.251**
	p	**.010**	**.029**	**.010**
Self-responsibility	**r**	.178	**.241**	**.237**
	p	.071	.013	**.015**

B1 – Controlling Daily Calorie Intake
B2 – Eating five portions of fruit/vegetables per day
B3 – Exercising Regularly
Significant correlations are highlighted in bold.

PBC was not the only TPB variable found to be related to FIT for calorie intake. Behavioural intention expectations (a sub component of the intention variable of the TPB) for daily calorie intake was significantly related to Awareness (r = .300, p = .002), Balance (r = .222, p =.01) and Integrity (p = .212, p = .0). Consequently, individuals with more Awareness, greater Balance and Integrity were more likely to expect to be able to control their daily calorie intake. Finally, actual behaviour was also positively associated with FIT. Awareness, Balance and Integrity correlated significantly with actual behaviour for daily calorie intake (r = .340, p < .001; r = .259, p < .001 and r = .226, p < .05 respectively). Thus the individuals who actually controlled their daily calorie intake were more Aware, had greater Balance and had more Integrity.

In summary, FITness was related to several aspects of the TPB when applied to controlling daily calorie intake. PBC, intentions and actual behaviour were all more positive for those individuals with greater FITness. Most often this was due to increased Inner FITness (Awareness was particularly important) but Outer FITness, or behavioural flexibility, was also related to PBC.

Regression Analyses

Regression analyses were run to establish which variables predicted PBC, intention and behaviour for controlling daily calorie intake and to explore the possibility that FIT moderated the intention-behaviour relationship. Prediction of PBC is discussed first followed by intention and then behaviour. There is then a discussion of possible moderators. Path analysis was considered but the sample size was considered to be too small given the large number of variables involved.

i. PBC

Neither attitudes nor SN were related to any aspects of FIT so no regression analyses were run on these variables. However, PBC for controlling ones daily calorie intake was significantly related to several aspects of FIT.

Awareness, Conscience and behavioural flexibility were regressed on to PBC - FIT is assumed to represent our underlying cognitive architecture so it would be FIT that determines PBC and not the other way round. The FIT variables were entered into the regression analysis using the enter method. The collinearity diagnostics and normality plots showed the data not to violate any assumptions. The regression analysis showed that only Awareness was a significant predictor of PBC for controlling calorie intake, as shown in Table 4.5.7. A second analysis run without Conscience and behavioural flexibility left Awareness with a Beta weight of .322 and this alone accounted for 10.3% of the variance in PBC for controlling daily calorie intake

Table 5.7 Regression analysis of FIT on to PBC for controlling daily calorie intake

Variable	B	SE B	Beta weight	t	sig.
Constant	4.900	2.419		2.026	.045
Awareness	0.953	.398	.239	2.395	.018
Conscience	.513	.311	.160	1.650	.102
Behavioural flexibility	.035	.025	.132	1.387	.169

R square = .144
Adjusted R square = .119

ii. Intention

The next variable in the TPB that was investigated was intention. Attitude, SN, PBC and Awareness were all found to be related to intention and so were entered into a regression analysis using the enter method. At step 1, attitude and SN were entered, followed by PBC at step 2 and Awareness at step 3. The results of this analysis are shown in Table 5.8. The results showed that at step1 only attitude was a significant predictor of intention for controlling calorie intake with SN not contributing significantly. The model at step one accounted for 38.8% of the variance in intention.
At step two, PBC was found not to contribute significantly and again only attitude was a significant predictor. The model at step two accounted for 40% of the variance in intention but the change in R square was not significant ($p>.05$).

At step three, results suggested that both attitude and Awareness were significant predictors of intention to control calorie intake but that SN and PBC did not contribute significantly. The increase of .054 in R square, via the addition of Awareness, was found to be significant ($F(1,100) = 9.927$, $p <.01$). Thus, Awareness had a direct effect on intention and an indirect effect on intention through its effect on attitude. Intention was best predicted by attitudes and Awareness.

Table 5.8 Regression analysis of TPB variables and Awareness on to intention to control daily calorie intake.

	Variable	B	SE B	Beta weight	t	sig.	Adjusted R square
Step 1	**Constant**	4.782	3.865		1.237	.219	
	Attitude	.829	.111	.613	7.494	.000	
	SN	-.143	.416	-.028	-.344	.732	**.376**
Step 2	**Constant**	3.636	3.931		.925	.357	
	Attitude	.759	.121	.562	6.299	.000	
	SN	-.384	.448	-.076	-.857	.393	
	PBC	.274	.195	.123	1.409	.162	**.382**
Step 3	**Constant**	-6.992	5.058		-1.383	.170	
	Attitude	.792	.116	.586	6.826	.000	
	SN	-.286	.431	-.056	-.663	.509	
	PBC	.070	.198	.032	.357	.722	
	Awareness	2.203	.699	.247	3.151	.002	**.432**

R square for the full model = .454
Adjusted R square for the full model = .432

iii. Behaviour

Actual behaviour was found to be significantly related to attitudes, intention, PBC, Awareness and Balance. A hierarchical regression analysis was run using the enter method. At step 1, intention was entered as this is hypothesised by the TPB to be the primary determinant of behaviour. At step 2, PBC and attitudes were entered in order to establish whether these variables had direct effects on behaviour. At step 3, Awareness and Balance were entered in order to establish whether they could increase the amount of variance accounted for in behaviour by the TPB.

Collinearity diagnostics and normality plots showed the data not to violate any assumptions. The regression analysis (see Table 5.9) showed that intention was the strongest predictor of controlling daily calorie intake. Attitudes did not have a direct

effect on behaviour although PBC's direct effect was just significant (but change in R square was not significant). Neither Awareness nor Balance had a direct effect on Behaviour. The results suggest that only intention had a reliable and significant effect on the behaviour of controlling one's daily calorie intake. Adjusted R square at step 1 was .327, increasing to .339 at step 2. This change was not significant (p>.05). Adjusted R square increased again at step 3 to .365 (this change approached significance, p =.051).

Table 5.9 Regression analysis of TPB predictors, Awareness and Balance on to controlling daily calorie intake

	Variable	B	SE B	Beta Weight	T	sig.	Adjusted R square
Step 1	**Constant**	2.548	.660		3.861	.000	
	Intention	.179	.025	.577	7.174	.000	**.327**
Step 2	**Constant**	1.1394	1.038		1.343	.182	
	Intention	.171	.032	.551	5.375	.000	
	Attitudes	-.013	.043	-.030	-.291	.772	
	PBC	.116	.058	.168	1.996	.049	**.339**
Step 3	**Constant**	-2.316	1.815		-1.276	.205	
	Intention	.143	.033	.461	4.314	.000	
	Attitudes	.018	.044	.042	0.401	.689	
	PBC	.069	.060	.100	1.147	.254	**.365**
	Awareness	.410	.242	.148	1.693	.094	
	Balance	.407	.261	.128	1.559	.122	

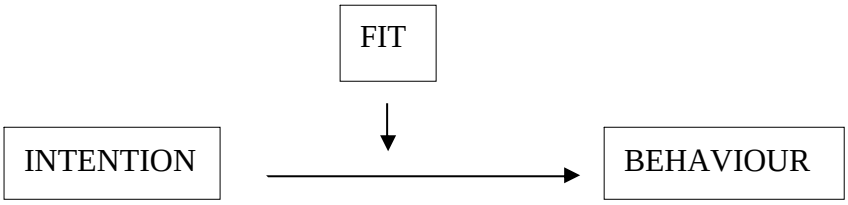
R square for the full model = .396
Adjusted R square for the full model = .367

iii. FITness as a Moderator of the Intention – Behaviour Relationship

In order to examine whether FITness moderated the intention-behaviour relationship, regression analyses were carried out, testing for a moderating effect with a variable created that serves to represent the interaction effect. This was been done following

Miles & Shevlin's (2001) guide. Each of the FIT variables was entered into a regression analysis to see if they moderated the intention – behaviour relationship. The predictor variables were standardised to produce z scores and an interaction term was calculated as a product of the two predictor variables (as advised by Miles & Shevlin, 2001). The variables were entered into the regression analysis using the enter method because the testing was not exploratory – rather it was testing the following model:

Figure 5.2 Hypothetical model of effects of FIT on the Intention – Behaviour relationship



Awareness – Awareness was found to be significantly and positively correlated with both intention to control daily calorie intake and performance of the actual behaviour. Although Awareness and intention did correlate, the correlation was not large (r = .276) and Tabachnick & Fidell (1996; cited in Pallant, 2001) suggest that if the correlation is less than .7 then analysis can proceed. Collinearity diagnostics were also consulted. The tolerance values were all above 0.9 and the VIF values were all below 1.10 suggesting a low likelihood of multicollinearity (Pallant, 2001; Field, 2000). Outliers, normality, linearity, homoscedasticity and independence of outliers were checked using the Normal Probability plot of the regression standardised residuals. The points all fell along a straight line and a scatterplot of the residuals showed that the data did not fit any clear pattern, nor did any fall out with the +3 to -3 limits, which suggests the data do not violate any of the above assumptions (Pallant, 2001). The model produced showed that intention, Awareness and the interaction term accounted for 37.8% of the variance in actual behaviour and this result was found to be highly significant ($F(3,101) = 20.496$, $p < .001$). Each variable's contribution can be seen in Table 5.10. However, as Table 5.10 clearly shows, whilst intention was the primary predictor of actual

behaviour, and Awareness did contribute significantly, it only had a direct affect on behaviour – it did not moderate the intention – behaviour relationship

Table 5.10 Regression analysis of moderating effect of Awareness on controlling daily calorie intake

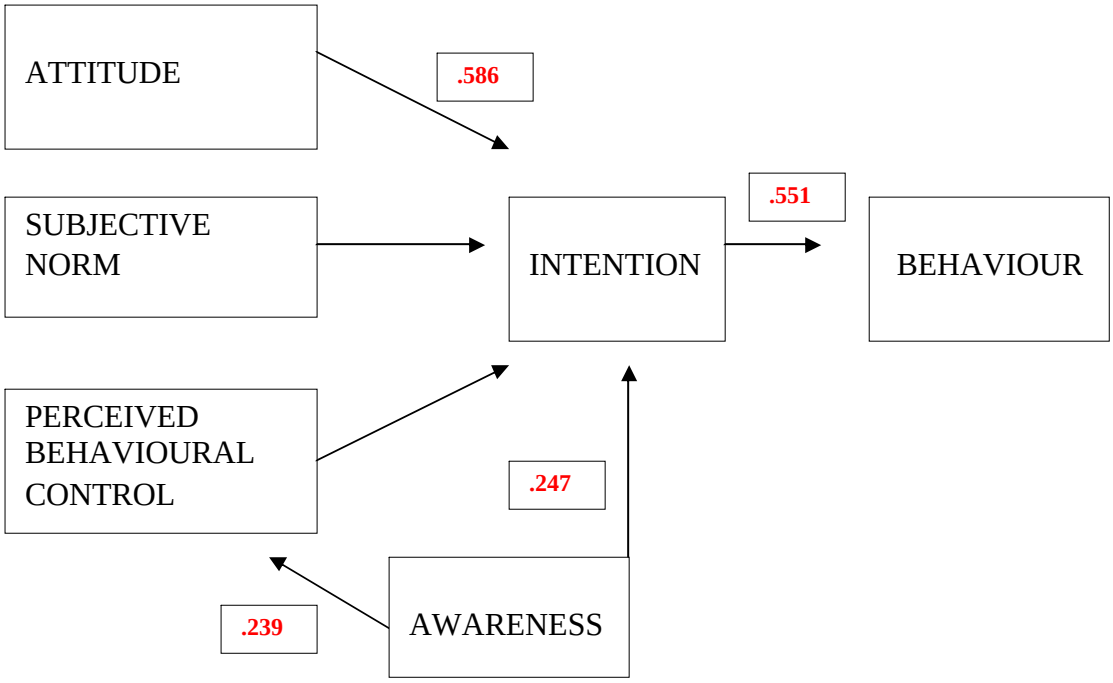
Model	**B**	**SE**	**Beta weight**	**t**	**sig.**
Constant	-.026	.081		-.321	7.49
Intention	.513	.082	.513	6.255	.000
Awareness	.203	.082	.203	2.481	.015
Intention x Awareness	.095	.075	.100	1.2481	.015

R square = .378
Adjusted R square = .360

Subsequent analyses revealed no other aspects of FIT moderated the intention – behaviour relationship.

The results of the regression analyses suggest that the model shown in Figure 5.3 is applicable to predicting the behaviour of controlling daily calorie intake. PBC was in part determined by Awareness and intention was determined by attitudes and Awareness. Behaviour itself was directly influenced by intention. FITness was not found to moderate the intention – behaviour relationship.

Figure 5. 3. Prediction of controlling daily calorie intake



5.5.2.2. Behaviour 2 - Eating five portions of fruit/vegetables a day

The TPB and eating fruit and vegetables

Pearson correlations were computed on the TPB variables for eating fruit and vegetables. Results are shown below in Table 5.11. Attitude and PBC were found to correlate significantly ($r = .390$, $p < .01$). Intention was significantly and positively correlated to attitude ($r = .459$, $p < .01$) and to PBC ($r = .365$, $p < .01$), such that more positive attitudes and greater levels of PBC were related to having a stronger intention to perform the eating of five portions of fruit/vegetables every day. SN was negatively related to intention however, ($r = -.165$, $p < .05$), with individuals who reported having significant others who held an unfavourable view of the behaviour actually holding a stronger intention.

With respect to actual behaviour, intention, attitude and PBC were all positively correlated to actual behaviour (r = .475, p <.01, r = .192, p <.05; and r = .195, p <.05 respectively). SN was negatively related to actual behaviour (r = -.198, p <.05).

Table 5.11: Pearson correlation coefficients for TPB variables in relation to consuming at least five portions of fruit and vegetables every day

	Attitude	**SN**	**PBC**	**Intention**	**Behaviour**
Attitude	1.00				
SN	-.114	1.00			
PBC	.390**	.075	1.00		
Intention	.459**	-.165*	.365**	1.00	
Behaviour	.192*	-.198*	.195*	.475**	1.00

** Correlation significant to p <.01
* Correlation significant to p <.05

The TPB, FIT and Eating Fruit and Vegetables

FIT variables, components and sub components of the TPB were entered into a correlation analysis. For this behaviour PBC was found to be related to several aspects of FITness (see Table 5.6)

The results show that PBC for eating fruit and vegetables was related to Inner FITness and by extension Overall FITness. Those individuals who felt more able to control their consumption of fruit and vegetables also recorded greater Awareness, Conscience and Self-responsibility (and therefore Integrity).

Intention to eat fruit and vegetable significantly related to Awareness, r = .276 (p < .01). Thus, individuals who were more Aware also recorded stronger intentions to eat the recommended portions of fruit and vegetables per day.

iii. Regression Analyses

As before, regression analyses were conducted for PBC, intention, behaviour and moderation of the intention – behaviour relationship.

PBC

Several of the FIT constancies were correlated to PBC for eating fruit and vegetables: Awareness; Conscience and Self-responsibility (and consequently Integrity, which is a composite of the five constancies). Awareness, Conscience and Self-responsibility were entered into the regression analyses using the enter method and regressed on to PBC. Collinearity diagnostics and normality statistics showed the data to be suitable for analysis. Results of the regression analysis can be seen in Table 5.12.

Table 5.12 Regression analysis of FIT variables on to PBC for eating five portions of fruit and vegetables per day

Variable	**B**	**SE B**	**Beta Weight**	**t**	**sig.**
Constant	5.905	2.700		2.187	.031
Awareness	.963	.376	.254	2.564	.012
Conscience	.228	.318	.075	.718	.475
Self-responsibility	.565	.141	.141	1.372	.173

R square = .109
Adjusted R square = .105

Intention

Intention to eat fruit and vegetables was found to be significantly related to attitude, PBC and Awareness. Each of these related variables was entered into a regression analysis, using the enter method, with attitude being entered at step 1, PBC being entered at step 2 and Awareness being entered at step 3. Results are shown below in Table 5.13.

Model 1 accounted for 20.3% of the variance in intention, the addition of PBC to the model increased this to 23.7% and this change in R square was found to be significant ($p<.05$). When Awareness was added in at step 3, the amount of variance accounted for increased to 24.4% but the change in R square was not found to be significant ($p>.05$). Thus Awareness did not have a direct effect on intention to eat fruit and vegetables.

Table 5.13 Regression analysis of TPB and FIT variables on to Intention to eat five portions of fruit and vegetables per day

	Variable	**B**	**SE B**	**Beta Weight**	**t**	**sig.**	**Adjusted R square**
Step 1	**Constant**	7.245	3.756		1.929	0.56	
	Attitude	.660	.126	.459	5.246	.000	**.203**
Step 2	**Constant**	3.712	3.970		.935	.352	
	Attitude	.537	.134	.374	4.018	.000	
	PBC	.445	.189	.219	2.353	.021	**.237**
Step 3	**Constant**	-.656	5.043		-.130	.897	
	Attitude	.549	.133	.382	4.120	.000	
	PBC	.358	.199	.176	1.800	.075	
	Awareness	.968	.694	.126	1.394	.166	**.244**

R square for the full model = .266
Adjusted R square for the full model = .244

Behaviour

Intention was regressed on to Behaviour at step 1 and this was followed with PBC at step 2, using the enter method. The collinearity statistics and normality plots showed that the data did not violate these assumptions. The results of the hierarchical regression analysis (see Table 5.14) showed that intention was the only significant predictor of behaviour – PBC did not significantly increase the amount of variance accounted for in the behaviour (of eating five portions of fruit and vegetables per day). Intention accounted for 21.9% of the variance in behaviour.

Table 5.14 Regression analysis of intention and PBC on to fruit/vegetable consumption

	Variable	B	SE B	Beta Weight	t	sig.	Adjusted R square
Step 1	**Constant**	1.853	.963		1.923	.057	
	Intention	.190	.035	.475	5.485	.000	**.219**
Step 2	**Constant**	1.620	1.291		1.255	.212	
	Intention	.186	.037	.466	4.985	.000	
	PBC	.021	.076	.025	.272	.787	**.211**

R square for the full model = .219
Adjusted R square for the full model = .211

Moderator Analysis of the Intention – Behaviour Relationship

For the behaviour of eating five portions of fruit/vegetables a day, each of the FIT variables were entered into the regression analysis to see if they moderated the Intention – Behaviour relationship. The predictor variables were standardised to produce z scores and an interaction term was calculated as a product of the two predictor variables (as advised by Miles & Shevlin, 2001). The variables were entered into the regression analysis using the enter method. Intention was entered at step 1, the relevant FIT constancy at step 2 and the interaction term at step 3.

Awareness - Awareness was found to be significantly correlated to intention but not to behaviour. Although Awareness and intention did correlate, the correlation was not large (r = .206) and Tabachnick & Fidell (1996; cited in Pallant, 2001) suggest that if the correlation is less than .7 then analysis can proceed. Collinearity diagnostics were also consulted. The tolerance values were all above 0.94 and the VIF values were all below 1.07 suggesting a low likelihood of multicollinearity (Pallant, 2001; Field, 2000). Outliers, normality, linearity, homoscedasticity and independence of outliers were checked for using the Normal Probability plot of the regression standardised residuals. The points all fell along a straight line however a scatterplot of the residuals showed that although the data did not fit any clear pattern, there was one point falling out with

the +3 limits. Pallant (2001) suggests that if only a few outliers are found it may not be necessary to take action and since only one was found the data was accepted.

The model produced showed that intention alone accounted for 21.9% of the variance in behaviour, intention and Awareness for 21.3%, and intention, awareness and the interaction term for 24.7% (change in R square was not significant). Adding the interaction term into the model produced a significant increase in variance explained (R square increase p = .027). Each variables contribution can be seen in Table 5.15. Intention was the primary predictor of actual behaviour and Awareness did not have a direct effect on behaviour. However, Awareness did have a moderating effect on the intention – behaviour relationship.

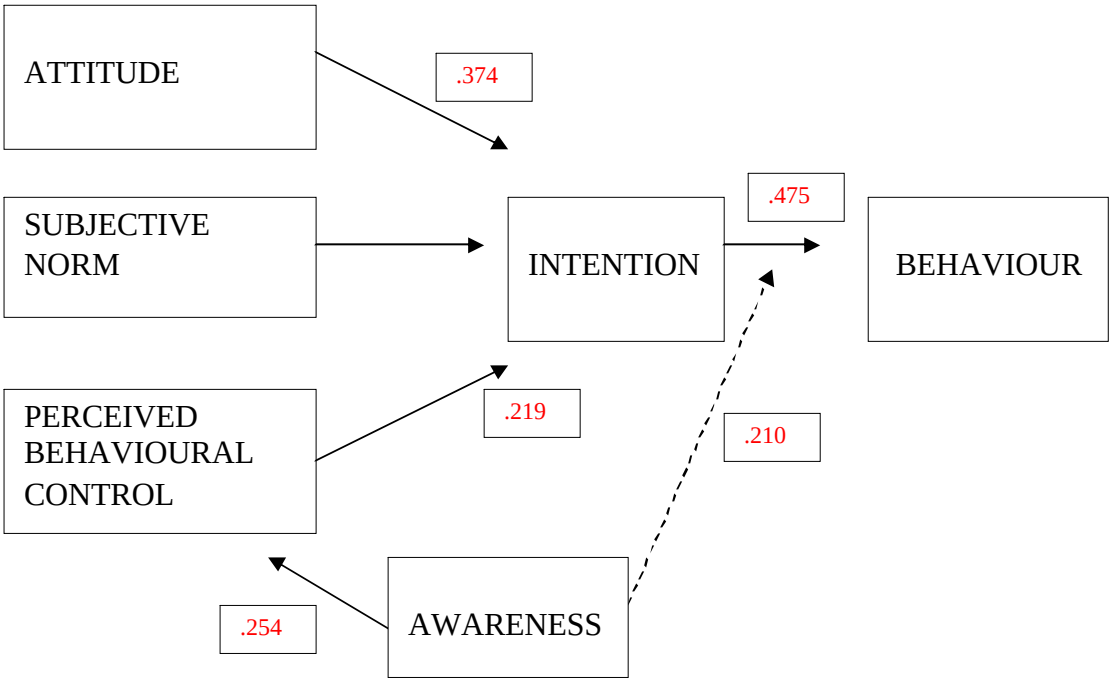
Table 5.15 Regression analysis of moderating effect of Awareness on eating fruit and vegetables

		B	Std. Error	Beta	t	sig.	Adjusted R square
Step 1	**Constant**	1.96	.97		2.012	.047	
	Intention	.55	.10	.460	5.237	.000	**.219**
Step 2	**Constant**	1.34	1.68		.799	.426	
	Intention	.54	.10	.453	5.045	.000	
	Awareness	.12	.27	.041	.454	.651	**.213**
Step 3	**Constant**	11.23	4.69		2.391	.019	
	Intention	-.64	.54	-.534	-1.193	.236	
	Awareness	-1.66	.83	-.539	-1.978	.051	
	Intention x Awareness	.21	.09	1.248	2.248	.027	**.247**

R square = .269
Adjusted R square for the model = .247

Participants were split around the mean Awareness score into a low Awareness group and a high Awareness group. The Pearson correlation for participants low on Awareness only between intention and behaviour was r = .326, p <.05. The correlation between intention and behaviour for individuals high on Awareness was r = .587, p <.001. Thus Awareness was found to moderate the intention – behaviour relationship: when Awareness was greater, intentions were more likely to be translated into actual behaviour than when Awareness was low. No other aspect of FIT moderated the relationship. The final revised TPB model for eating five portions of fruit and vegetables per day is outlined below in Figure 5.4.

Figure 5.4 Path analysis diagram for consumption of fruit and vegetables showing individual beta weights



Attitude was the primary determinant of intention, however PBC did significantly contribute to prediction of intention, with the change in R square being significant. However, only intention was included in the regression equation for behaviour as adding PBC did not significantly improve prediction. With respect to FIT, only Awareness was a significant predictor. Awareness influenced PBC and it also moderated the intention – behaviour relationship, with more Aware individuals being more likely to translate intention into actual behaviour than less Aware individuals.

Note that PBC is not a mediating variable for the Awareness – intention relationship since Awareness and intention are not directly related and for PBC to serve as a mediator this relationship has to be present.

5.5.2.3 Behaviour 3 – Exercising Regularly

The TPB and Exercise

The TPB variables were analysed using a Pearson correlation analysis. Results are shown below in Table 5.16.

Table 5.16 Pearson correlation coefficients for the TPB, FIT and regular exercise

	Attitude	***SN***	***PBC***	***Intention***	***Behaviour***
Attitude	----------				
SN	-.224*	----------			
PBC	.358**	-.186	----------		
Intention	.573**	-.183	.545**	----------	
Behaviour	.267**	-.165	.307**	.628**	----------

** Correlation is significant to p <.01
* Correlation is significant to p <.05

Attitudes towards exercise were significantly related to SN (negatively), and to PBC, intention and behaviour (positively). PBC was significantly and positively correlated to intention and behaviour. Exercise behaviour was most strongly related to intention (r = .624, p <.001), with stronger intentions to exercise being associated with a greater likelihood of actually performing the behaviour. Both attitude and PBC were also directly related to performance of the behaviour (r = .338, p =.001 and r = .453, p =.001 respectively). More favourable attitudes towards regular exercise and greater levels of PBC for the behaviour were directly related to actually performing the behaviour

The TPB, FIT and Exercise

Global attitudes towards exercise were found to be related to Overall FIT Score (r = .209, p < .05). More FIT individuals held more favourable attitudes towards exercising than less FIT individuals. PBC for exercise was related to several aspects of FIT (see Table 5.6): Awareness (r = .193, p = .049); Conscience (r = .266, p = .009); Self-responsibility (r = .255, p = .009) and Integrity (r = .286, p = .003). Individuals with increased FITness also reported higher levels of PBC for exercising regularly. Intention was found to be related to Conscience (r = .204, p <.05), thus a stronger Conscience was related to having a stronger intention to exercise.

Regression Analysis Modelling of Exercise

Attitude

For this behaviour, attitude was actually found to be related to one aspect of FIT (Overall FIT score), so OFS was regressed on to attitude (see Table 5.17).

Table 5.17 Regression analysis of OFS on to Attitude towards exercising

Variable	**B**	**Std. Error**	**Beta**	**t**	**sig.**
Constant	28.419	1.095		25.961	.000
Overall FIT score	.012	.005	.209	2.165	.033

R square = .044

Adjusted R square = .034

Overall FIT score accounted for 3.4% of the variance in Attitude.

PBC

As before, PBC was examined in relation to the FIT components and several of these were found to be significantly correlated with PBC – Awareness, Conscience and Self-responsibility. All variables were entered in one step using the enter method, however, Awareness, Conscience and Self-responsibility were all significantly correlated with each other and as a result none of these variables were found to contribute significantly. When there is a high degree of inter-correlation between the predictor variables it is recommended that they be combined into a single variable and this be entered instead (see e.g. Pallant, 2001; Miles & Shevlin, 2001). Therefore Integrity was regressed on to PBC instead. The results of this analysis can be seen in Table 5.18. The data was not found to violate any the assumptions of multicollinearity or normality.

Table 5.18 Regression analysis of Integrity on to PBC for exercising

Variable	**B**	**SE B**	**Beta Weight**	**t**	**sig.**
Constant	8.543	2.756		3.100	.002
Integrity	1.537	.507	.286	3.034	.003

R square = .082
Adjusted R square = .073

The model was found to account for 7.3 % of the variance in PBC.

Intention

With respect to the prediction of intention, only original TPB variables were found to be related so attitude was entered into the regression analysis at step 1 followed by PBC at step 2. Results are shown below in Table 5.19. Attitude on its own accounted for 32.1% of the variance in intention to exercise regularly, the addition of PBC increased this to 45% with this change in R square being highly statistically significant ($p<.001$).

Table 5.19 Regression analysis of intention for regular exercise

	Variable	B	SE B	Beta Weight	t	sig.	Adjusted R square
Step 1	**Constant**	-.956	4.569		-.209	.835	
	Attitude	1.045	.147	.573	7.087	.000	**.321**
Step 2	**Constant**	-10.173	4.506		-2.258	.026	
	Attitude	.709	.142	.433	5.561	.000	
	PBC	1.009	.201	.390	5.010	.000	**.450**

R square for the full model = .461
Adjusted R square for the full model = .450

Behaviour was found to correlate significantly only with the original TPB variables which were entered into a hierarchical regression analysis using the enter method. Intention was entered at step 1 followed by PBC at step 2. Results (see Table 5.20) showed that only intention was a significant predictor of actual exercise behaviour (accounting for 38.8% of the variance in exercise behaviour) – PBC did not contribute any unique variance and the R square value did not increase significantly when PBC was added to the model.

Table 5.20 Regression analysis of intention and PBC on to exercise behaviour

	Variable	B	SE B	Beta weight	t	sig.	Adjusted R square
Step 1	**Constant**	.498	1.008		.494	.622	
	Intention	.254	.031	.628	8.184	.000	**.388**
Step 2	**Constant**	1.038	1.415		.733	.465	
	Intention	.265	.037	.655	7.135	.000	
	PBC	-.052	.096	-.050	-.545	.587	**.384**

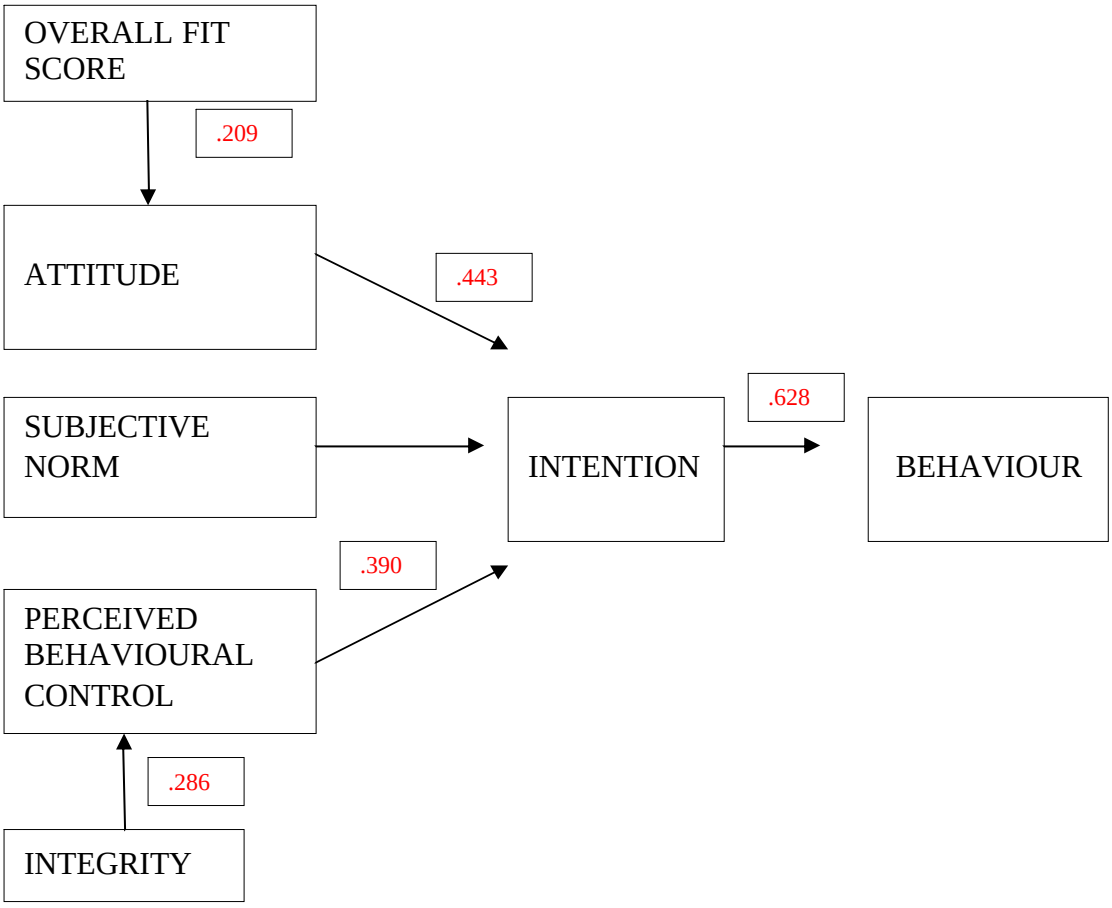
R square for the full model = .396
Adjusted R square for the full model = .384

Moderation of the Intention – Behaviour Relationship

No FIT variable was found to moderate the intention – behaviour relationship for regular exercise.

The final model for prediction of regular exercise behaviour is outlined in Figure 5.5. Attitude was the strongest predictor of intention, with PBC increasing the amount of variance accounted for by .196 ($p < .001$). Intention was the strongest predictor of actual behaviour with PBC having no significant effect over and above that. Integrity again was a significant predictor of PBC

Figure 5.5 Path analysis diagram for regular exercise with individual beta weights



5.6. Discussion

This section will firstly look at BMI and FITness and will then discuss prediction of the three behaviours by the TPB and FIT components.

5.6.1 BMI and FITness

The results from this study show that BMI and FITness were indeed related such that a lower BMI was related to being more FIT. It appears the aspect of FIT responsible for this association was behavioural flexibility (Integrity was only significantly related when outliers were included in the analysis). Thus those individuals who were more behaviourally flexible were more likely to have a lower BMI. The group recording the highest levels of behavioural flexibility had a BMI that was below the normal range, i.e. they were slightly underweight. This group's behavioural flexibility was significantly greater than both the normal BMI high BMI group's behavioural flexibility. These findings support the interpretations of the data in study one. Hypothetical reasons for why behavioural flexibility should be related to BMI will be discussed below with reference to the TPB.

5.6.2 The TPB, FITness and Healthy Eating and Exercise Behaviours

5.6.2.1 Behaviour One – Controlling Daily Calorie Intake

Within the original TPB model, attitude was the only significant predictor of the intention to perform this behaviour, however, regression analysis showed that an individual's level of Awareness also helped to predict intention. More favourable attitudes and greater levels of Awareness were both related to forming stronger intentions to control daily calorie intake. The TPB predicts that attitudes will be related to intention because they allow the individual to evaluate whether the behaviour is something that will result in a positive, desirable or favourable outcome – if so then the individual is likely to form the intention to perform the behaviour to achieve that outcome. Awareness however, was also important for forming the intention of

controlling one's daily calorie intake. Being more Aware of internal and external events may be important for knowing that part of maintaining a healthy diet is to monitor how much energy is being consumed daily in relation to the levels recommended by the government. In order to do this, the individual really does have to be very aware because it requires the individual to look at packaging or find out from other sources how many calories are in various different foodstuffs, add up these calories and so on. Calorie counting can be a mentally challenging activity for some, more so than thinking about how many pieces of fruit and vegetables have been eaten that day, for example. In this respect, calorie counting is likely to require one to be Aware.

PBC did not contribute to the prediction of intention, however, PBC was related to Awareness. Having greater levels of Awareness was related to stronger perceptions of control over calorie intake. Being more Aware might allow this because it permits the individual to have a realistic view of what the behaviour entails and it also allows the individual to know their abilities. An unaware individual might not have given much thought to what their abilities realistically are, nor might they understand what performing the behaviour actually requires. Understanding the behaviour and one's own abilities could lead to an enhanced sense of control. Bogers, Brug, van Assema & Dagnelie (2004) performed a study examining the TPB in relation to the consumption of two pieces of fruit and 200g of vegetables every day. They also examined the extent to which individuals were realistic about their diet and categorised participants into 'realists' or 'overestimators'. Their results suggested that for realists, PBC did predict fruit and vegetable intake but for the 'overestimators' it did not. This was interpreted in terms of the conceptualisation of PBC. PBC is a proxy measure for actual behavioural control and it may be the case that realist's PBC is much closer to actual behavioural control than in 'overestimators' whose PBC is not accurate. Bogers et al (2004) concluded that "awareness of personal behaviour should be taken into account when applying the theory of planned behaviour to explain dietary behaviours…" (pp. 157). For controlling calorie intake that conclusion is supported as Awareness does in fact appear to play a role in the prediction of this dietary behaviour via PBC and intentions.

With respect to behaviour, intention was the primary determinant of controlling daily calorie intake, however, PBC was also found to be a significant determinant, having a

direct influence on whether individuals were able to control their daily calorie intake. PBC had no significant effect on intention once attitudes have been factored in, but it did impact on behaviour. Attitudes towards calorie control and PBC for calorie control are related and it is quite likely that this could be associated with past behaviour. Controlling calorie intake may be closely associated with dieting behaviour such that it is more likely to be performed when the individual is actually attempting to lose weight. Having past experience of controlling calorie intake should ensure that the individual has knowledge of, and is adept at, this behaviour. This knowledge and experience could increase their PBC. Individuals who have never seriously attempted to lose weight may be largely ignorant of the various cognitions and behaviours involved in controlling calorie intake.

It was hypothesised that FITness might moderate the intention – behaviour relationship. In particular, it was thought that behavioural flexibility (Outer FITness) might play this moderating role. However, behavioural flexibility was not a moderator and was not related to intention or behaviour. Inner FITness, particularly Awareness, did relate to intention and behaviour but for this behaviour it only contributed significantly to the prediction of intention and it did not moderate the intention – behaviour relationship. Increased Awareness may permit the individual to form the intention to control daily calorie intake, as discussed above, but other factors are presumably required as well as, or instead of, to turn the intention into actual behaviour. Those factors do not seem to be aspects of Inner FITness – to date the strongest moderators of the intention – behaviour relationship remain explicit processes such as the formation of implementation intentions.

The control of daily calorie intake is a form of dietary behaviour which has not received much attention within the TPB literature. Rather, studies have used the consumption of specific foodstuffs as the basis for their investigations. Nonetheless, the TPB is largely supported with respect to this behaviour and findings are not radically different from those for specific foodstuffs. Although PBC does often significantly predict intention to eat specific foodstuffs (e.g. Bogers et al, 2004) this finding is not always present (see e.g. Raats et al, 1993; Sparks et al, 1995; Sparks et al, 1992). PBC has however been

directly related to actual behaviour in other studies (e.g. Bogers et al, 2004) as was found here.

5.6.2.2 Behaviour Two – Eating Fruit and Vegetables

The TPB was largely supported and in addition FIT was found to be significantly related to the TPB as well. PBC for eating fruit and vegetables was related to three of the constancies which increased in level as PBC for the behaviour increased. Thus, being more Aware and having greater levels of Conscience and Self-responsibility was associated with having greater PBC over the behaviour of eating five portions of fruit and vegetables every day. In the regression analysis however, only Awareness was shown to account for a significant and unique amount of variance in PBC but this is not surprising since Awareness, Conscience and Self-responsibility do correlate strongly. It is not surprising that PBC increases with Awareness. PBC is likely to be greater in individuals who are more Aware of their abilities and who are also more Aware of the practicalities and difficulties of performing given behaviours. This finding provides further support for the argument made by Bogers et al (2004) that the individual's awareness of their behaviour should be a consideration when predicting dietary behaviour.

The relationship between Awareness and intention for this behaviour was not however supported. Attitude was the strongest predictor of intention to eat five portions of fruit and vegetable, but PBC did also significantly contribute to the prediction of intention for this behaviour. Bogers et al (2004) also found PBC to predict intentions, however, when they examined prediction of fruit and vegetable consumption, they found PBC to be a stronger predictor of intention than attitude. Other studies also report such findings (e.g. Armitage & Conner, 2001 and Godin & Kok, 1996). It is not immediately obvious why attitudes were the strongest predictor of intention in this study as opposed to PBC (as in Bogers et al, 2004 study). The prediction of behaviour was primarily through intention, unlike Bogers et al study, with PBC failing to contribute. Bogers et al argued that one possible reason for their finding that PBC, and not intentions, predicted actual fruit/vegetable consumption was that this behaviour could be habitual. This might have

the effect of weakening the intention – behaviour relationship. They suggested that in the Netherlands, where this study took place, eating vegetables as part of the evening meal is a regular occurrence (i.e. is habitual). It could be that this is not habitual in the UK where this study was performed. Another possible explanation for the difference in findings is the difference in measure of intention used in this and the Bogers et al study. They appeared to have used a categorical measure of intention but a continuous measure of behaviour (this may have reduced the correlation) whereas this study used continuous measures for every variable.

One final finding for this behaviour was that Inner FITness moderated the intention – behaviour relationship. Individuals with greater Awareness were more likely to translate their intention into behaviour i.e. more likely to actually five portions of fruit and vegetables if that was their intention. Possibly, being more Aware allowed the individuals to develop action and coping plans which have been shown to moderate the intention – behaviour relationship (Sniehotta, Scholz & Schwarzer, 2006). The finding is curious however because the utilisation of such plans might be more intuitively associated with behavioural flexibility. This would certainly be an area meriting further investigation.

5.6.2.3 Behaviour Three - Exercising Regularly

For this behaviour, FIT was actually shown to be a predictor of attitudes towards exercising regularly (three times a week) such that more FIT individuals held more favourable attitudes towards exercise. As for the three previous behaviours (eating foods high in fibre and avoiding fried, fatty, junk and processed foods), PBC for regular exercise was associated with Awareness, Conscience and Self-responsibility. Integrity, consequently, was shown to be a significant predictor of PBC.

Intention to perform regular exercise was predicted both by attitude and PBC. Individuals holding greater levels of PBC and more favourable attitudes also had a stronger intention to perform regular exercise. As with the previous behaviours, PBC did not contribute directly to the prediction of actual behaviour and the previous reason

given for this might also hold here. Individuals might initially imagine that exercising three times a week is not necessarily difficult and is therefore something they can achieve and something that they can intend to do. However, there may be 'temporal instability' to this PBC. As actual performance of the behaviour approaches, previously unconsidered factors could appear which may impact upon perceived or actual ability to perform the behaviour. For example, an individual, if asked the week before, if they believe they can perform regular exercise, might feel they can. However, there could be 'unexpected' factors which may arise such as feeling really tired or hungry, or the need to run an errand.

Research does show that PBC predicts intention to exercise (e.g. Kimiecik, 1992) but findings regarding whether PBC directly influences exercise behaviour are equivocal. Some research has found PBC to predict behaviour such as Theodorakis (1994), however in such studies it has been suggested that past exercise behaviour may be an important factor. In Theodorakis (1994), for example, the participants were selected from a fitness programme and were all regular exercisers. In the present study, no measures were taken of current exercise levels but the participants were undergraduate students and were not selected from fitness programmes or gyms. It is possible that their past experience of exercise is qualitatively and quantitatively different from participants in other studies. Other research has found similar results to this study and shown PBC to influence only intention (e.g. Godin, Valois & Lepage, 1993; Dzewaltowski, Noble & Shaw, 1990) and this has been explained in terms of the time frame between measurement of intentions and PBC and performance of the actual behaviour. When time frames are shorter and explicit PBC is more likely to be able to account for variation in intention.

FITness was not associated with intention or behaviour and it did not moderate the intention-behaviour relationship. For exercising regularly FITness was only related to the motivational aspect of the model – attitudes and PBC – and not the volitional aspects (behaviour).

5.6.3 Behavioural Flexibility, Weight Related Behaviours and BMI

Behavioural flexibility was not able to predict intention or behaviour nor did it moderate any of the intention-behaviour relationships. This leaves important questions unanswered – why does it not predict behaviour and how does it influence BMI? It could be that the behaviours investigated were not associated closely enough with BMI – it might be primarily determined by something else – genetics for example. This is supported by the finding that BMI correlated with only one behavioural outcome measure – for behaviour two (eating fruit/vegetables) and did so only very weakly. Thus actual behaviour does not seem to relate to BMI. It could be argued that the timeframe was only one week and it is unlikely that one week's worth of behaviour would actually impact on BMI anyway, although presumably behaviour each week is indicative of long term behaviour. In the present sample, the participants were all within the 18-25 age range and it could be that, at this age, the impact of diet and exercise levels on BMI is considerably less than at later ages when our metabolism slows down and that only behaviour over months would actually be statistically related.

Another possibility is that behavioural flexibility impacts upon variables not investigated here. It is possible that behavioural flexibility is linked in some way to the deployment of the action/coping plans discussed above which have been shown to moderate the intention – behaviour relationship (Sniehotta, Scholz & Schwarzer, 2006) but that were not included in this investigation. One further thought is that the notion of habit may be important. Although behavioural flexibility conceptually implies the direct opposite of habit, it might be that past behaviours (not investigated here) are somehow linked to behavioural flexibility. Research does show that past behaviour is a significant predictor of both intentions and future behaviour and often may be the strongest predictor (Bozionelos & Bennett, 1999) and there may be some third variable which is confounding relationships.

5.6.4 Limitations and Future Research

There are some limitations within this study that should be addressed in future research. Firstly, it would have been useful to attempt to take more potentially accurate measures

of food consumption, perhaps by using the Food Frequency Questionnaire (e.g. Bogers et al, 2004) or perhaps even food diaries, rather than relying on vague subjective measures. Secondly, the antecedents of some of the TPB components were not measured, in particular those of PBC. What could be worthwhile is further research which examines the antecedents of Attitudes, SN and PBC to see exactly where FITness might be involved – what is the exact nature of the relationship between PBC and FIT for example? Does FIT relate to the aspect of PBC that has been conceptualised as perceived barriers and facilitators or does it relate to PBC when it is conceptualised as a construct akin to self-efficacy?

One other interesting avenue for research could be to examine whether FITness is related to the production of action and coping plans (Sniehotta, Scholz & Schwarzer, 2006) since this has been hypothesised as being one way in which FIT may have moderated the intention – behaviour relationship. It might be that the explicit formation of plans is a third variable which confounds results. Further research might also examine other health behaviours to see if FIT influences cognitions involved in these – such behaviours might include other dietary behaviours or the consumption of specific foodstuffs or they might diversify to examine behaviours such as health screening, flossing, wearing seat belts and so forth. Finally, the most obvious avenue for further research is to attempt to uncover how behavioural flexibility actually relates to BMI, habitual behaviour and whether manipulating behavioural flexibility might assist individuals in weight loss.

5.7. Conclusion

Importantly, this study was able to show that BMI and FITness (specifically behavioural flexibility) were statistically related. This is noteworthy because although study 1 suggested such a finding, the results were not statistically significant. This study does therefore suggest that being less FIT is somehow linked to an increased likelihood of being overweight.

It was hypothesised that this link might be via some of the cognitive processes behind the performance of weight control behaviours such as diet and exercise, specifically via

the cognitions within the TPB. In particular, it was hypothesised that behavioural flexibility may moderate the intention – behaviour relationship such that more behaviourally flexible individuals would be more likely to translate intention into behaviour. This might be because such individuals are able to produce action and coping plans (see Sniehotta, Scholz & Schwarzer, 2006) which serve to facilitate the implementation of intentions in the face of adversity.

However, the results did not support this. What was found was that behavioural flexibility (Outer FITness) was not related to any of the cognitions nor did it moderate the intention – behaviour relationship. Rather, it was found that Inner FITness (the constancies) were related to some of the cognitions (primarily PBC) for some of the behaviours and for predicting the consumption of five portions of fruit/vegetables every day, *Awareness* were found to moderate the intention – behaviour relationship. This behaviour could be argued to be qualitatively different to the others investigated since it was more specific (i.e. it specified the number of items to be consumed every day) and it was also concerned with actively doing something rather than avoiding something. These differences may explain why FIT was able to moderate the intention – behaviour relationship for this behaviour and not the others.

Whilst the results do not show how behavioural flexibility is involved in the control of BMI, they are not entirely surprising. It makes intuitive sense that Inner FITness would be related to levels of PBC and that Awareness in particular would be important – the more internally Aware we are of ourselves, our past behaviours and abilities, and the more externally Aware we are of what behaviours actually involve, the more likely we are to feel we have control over these behaviours. Awareness may also play a moderating role in the intention – behaviour relationship, possibly because Awareness is required to anticipate problems and form plans to overcome them (i.e. develop and employ action and coping plans - Sniehotta, Scholz & Schwarzer, 2006).

Further research is required to elucidate the exact nature of the impact of behavioural flexibility on BMI and this might be done by investigating whether changing behavioural flexibility does actually result in changes in BMI. Would increasing behavioural flexibility have a direct effect on BMI, or would there be an indirect,

mediating or moderating effect, such that increased behavioural flexibility changes some other factor which in turn changes BMI? Behavioural flexibility was not related to food consumption or exercise behaviours in the present study, but the participants were all students under the age of 30 and it is not known whether they were attempting to lose weight or regulate their BMI. Changing behavioural flexibility in individuals who are trying to lose weight may have some effect on weight control behaviours, for example it may allow the individual to adopt and maintain such behaviours more easily.

Chapter 6

FIT as an intervention to improve well being

6.1 Introduction

The previous two studies have highlighted the relationship between FITness and well being. The constancies have been shown to be closely related to psychological well being (anxiety and depression) and behavioural flexibility to be related to physical well being (BMI). There may also be an association with exercise and behavioural flexibility. The present study aimed to investigate whether FIT could be used in an intervention to improve both mental and physical aspects of well being. The primary aim was to investigate whether an individual's BMI could be decreased by increasing their behavioural flexibility. BMI is an important indicator of well being since being over weight has been shown to be a determinant of several illnesses. Obesity is the second biggest cause of cancer (after smoking), and it has also been linked to CHD, type 2 diabetes, high blood pressure and osteoarthritis (e.g. Mokdad et al, 2005; Schlosser, 2001). Such illnesses place a tremendous burden on health care systems, yet this burden could be significantly reduced if individuals followed a healthy lifestyle. Two factors which can underlie obesity in many individuals are physical inactivity and overeating. In order to control weight, the individual must use up the same number of calories that are consumed but in order to lose weight expenditure must exceed intake. This will not be achieved if the individual's diet is high in calories, rich fats and sugars but low in physical activity.

Despite the knowledge we have of obesity and its negative impacts on well being, the prevalence of obesity is not decreasing, it is increasing. Over the last 20 years it has almost trebled – approximately 50% of the adult UK population are now overweight or obese (Frost, Lyons, Bovill-Taylor, Carter, Stuttard & Dornhurst, 2002) as are over 20% of children aged between 2 and 10 (Jotangia et al, 2005). In parallel, there has been an increase in dieting behaviour (Bacon, Keim, Van Loan, Derncote, Gale, Kazaks & Stern, 2002) with studies indicating an increase from 14% of the population dieting in the 1950/'60's to 44% in 1996 (Bacon et al, 2002). There is considerable research on the efficacy of various diets and weight loss programmes, and on the extent to which

psychological factors may play an important role. However, some programmes appear to be successful in the short term (e.g. the Trevose Programme; Latner, Stunkard, Wilson, Jackson, Zelitch & Labouvie, 2000) no such programme has shown itself to be really effective in the *long* term. Long term success is much more elusive. It is argued here that this is because these programmes and diets require the individual to rely on will power and this is a resource which quickly becomes depleted (Baumeister, Heatherton & Tice 1994). Consequently, what is required is a programme that lends itself to behavioural and cognitive changes that do not require will power. This might therefore prove effective in the long term. Such a programme is outlined and piloted here in order to examine whether these underlying behavioural and cognitive changes can be achieved and explore the possibility that they can facilitate dietary and exercise changes to such an extent that weight loss, or BMI change, can occur. Furthermore, this study will investigate whether the variables underlying this intervention are more able to predict change than the conventional psychological variables which have been recently implicated within the literature as predictors of successful weight loss.

6.2. Literature Review

An increasing number of individuals are dieting but the number of people who are obese is also increasing. This may be the result of two main factors. Firstly, adhering to a diet and exercise regime, even in the short-term, appears to be extremely difficult. Attrition rates for commercial programmes are high – figures reported by Volkmar, Stunkard, Woolston & Bailey (1981) for Weight Watchers are 50% at 6 weeks and 70% at 12 weeks. Secondly, even for those who do manage to lose weight, maintaining the weight loss is a very difficult struggle, with the majority of individuals having regained almost all the weight previously lost within five years (Thomas, 1995). Individuals struggling with their weight can often end up in a pattern of weight cycling – periodically losing weight only to regain it.

For weight loss to occur, the dieter must expend more energy than is consumed. Clearly there are two main ways of achieving this: 1. Reduce the number of calories that are consumed (change your diet) and 2. Increase the number of calories used up (become

more physically active). As a result, weight loss programmes tend to focus on at least one of these aspects, although usually often the focus is often on changing diet. In order to reduce calorie intake, programmes tend to recommend eating smaller amounts of food and cutting out high calorie and high fat foods in favour of low calorie and low fat foods. Individuals participating in weight loss programmes are usually required to have to reduce their daily calorie intake to around 1000 – 1500 calories (recommended levels for adults to maintain current weight are approximately 2000 p/day for females and 2500 p/day for males, although this varies according to height and age). In some severe cases calorie intake might be restricted to as little as 800 per day. When exercise is prescribed, individuals are advised to begin with at least 30 minutes of gentle exercise (e.g. walking) every day. Individuals can find it extremely difficult to adopt such behaviours and even more difficult to maintain these behaviours in the long term. An intensive intervention designed to increase the physical activity levels of teenage girls succeeded in doing so by only 1.6 minutes per day (Webber, Catellier, Lytle, Murray, Pratt, Young, Elder, Lohman, Stevens, Jobe & Pate, 2008).

6.2.1 Traditional Weight Loss Interventions

Other than drug therapies and surgery, several approaches have been taken in response to the fact that individuals find it extremely difficult to adhere to a strict diet and exercise regime. The first has been to include behavioural techniques for changing diet and exercise levels alongside an exercise programme and restricted diet. In this type of programme individuals are taught how to perceive and treat food and exercise differently, as well as how to control stimuli (e.g. Bacon et al, 2002, Latner, Stunkard, Wilson, Jackson, Zelitch & Labouvie, 2000). The second approach has been to ignore a strict calorie controlled diet in favour of improving health behaviours.

A good example of the former approach is the work of Latner and colleagues. Latner, Stunkard, Wilson, Jackson, Zelitch & Labouvie (2000) and Latner, Wilson, Stunkard and Jackson (2001) have examined the efficacy of the Trevose Behaviour Modification Program. The Trevose program is a volunteer run self-help programme that does not charge participants. The Trevose program shares similarities with other behavioural programmes using standard techniques. Members attend 1 hour weekly meetings in

groups of around ten. Members are weighed weekly, self-monitor their food intake and physical activity, are taught to slow their rate of eating and are given social support. Acceptance into the programme is based on their weight loss goals and this measure precludes the very obese or those seeking to lose weight for cosmetic purposes only. The Trevose programme, unusually, strictly enforces attendance and achievement of weight loss goals. Within the first five weeks, participants are required to have lost 15% of their total weight loss goal and to have attended every meeting – if they fail to do this they are not accepted as full members. Goals for the coming months are increased so that 22% of their total weight loss goal must have been lost by the second month, 30% by the third month and so on until 90% of the original goal has been achieved. Absences have to be approved two weeks in advance and members are still required to deliver their weekly weights by mail, even when on holiday. Within the first four months, failure to meet any of the requirements results in dismissal. After four months, attendance at meetings is reduced to twice monthly and this is decreased again if targets continue to be met. One very important feature of the programme is that once dismissed, participants can never come back, thus the programme is seen as a 'once in a life time' opportunity.

Latner et al (2000) followed 171 individuals who joined the Trevose programme during 1992 and 1993 over five years. Subjects stayed in the programme for an average of 27.1 months with just under half still in the programme at 2 years and 1/5 still in at 5 years. Nearly all subjects lost at least 5% of their initial weight and over 80% lost at least 10%. For those who stayed in the programme for at least 2 years, weight loss was an average of 19% of their initial weight. This figure was 17% for those still in the programme at 5 years. However, after leaving the programme, participants did regain weight, although not enough to bring them back to their pre-programme levels.

Latner et al (2001) carried out a second study comparing the efficacy of satellite groups with the original centre group. The satellite group's results were similar to those of the central group. Mean weight loss for all participants was approximately 14% of initial body weight. For the 48% of participants still in treatment at 2 years, weight loss was on average 19% of initial body weight, and at five years, the 23% still in treatment had lost an average of 18% of initial body weight. This is in comparison to Dansinger,

Gleason, Griffith, Sleker & Schaefer's (2005) finding that popular diets (including the Atkins diet, Zone diet and Weight Watchers) produce average weight losses of only 2.1kgs to 3.3kgs after a year and recall that Thomas (1995) found that the majority of individuals will have regained this weight within five years.

The authors surmised that the programme had several features responsible for its higher success rate. These included the fact that the treatment prescribed by the programme was technically indefinite (that is, the participants could stay in the programme for the rest of their lives, assuming all targets were maintained), the strict enforcement of rules and the fact that the programme is run by highly motivated successful members. A key point appeared to be the fact that participants have to turn up every week and meet their targets, with failure to do so resulting in permanent dismissal.

An alternative approach to dealing with problems of adherence to a diet and exercise regime and maintenance of weight loss is to eschew diets in favour of health behaviour training. Individuals are taught about healthy lifestyles and the positive health behaviours they should adopt (e.g. Bacon et al, 2002), such as eating a balanced diet, becoming more physically active, going for regular health screenings, not smoking, flossing every day and controlling alcohol intake. Increasing individual's knowledge about what constitutes a healthy lifestyle without placing severe restrictions on what should be eaten, for example, should improve health and this in turn should reduce incidence of serious illnesses such as CHD and cancer.

The 'non-diet' approach has come about because energy-restrictive diets have high failure rates, particularly in the long – term (e.g. Tiggemann, 1994). As already discussed, Dansinger et al,, Gleason, Griffith, Sleker & Schaefer (2005) note, in a comparison of popular diets (including the Atkins diet, WeightWatchers and the Zone diet), found that average weight loss over a year ranges from 2.1kgs to 3.3kgs. This is a very modest loss. Furthermore, failing at such programmes can be detrimental to both psychological functioning (e.g. Polivy & Herman, 1999) and physical functioning because prolonged 'yo-yo dieting' (the repeated failure and trial of further diets) has been shown to impact negatively on immune system functioning (Shade et al, 2004). Indeed, Sorensen, Rissanen, Korkeila & Kapiro (2005) found evidence that repeated

dieting might increase mortality rates in the long term. Finally, restrictive diets may fuel the dieting/overeating cycle (e.g. McFarlane, Polivy & McCabe, 1999) with the majority of individuals who have lost weight returning, at some point, to their original eating habits (Freedman, King & Kennedy, 2001) and in many cases the individual can end up heavier than before (Baumeister, Heatherton & Tice, 1994). Consequently, it appears that there is a real need for some form of programme that assists the individual in losing weight and in maintaining that weight loss in the long term. The focus of this paper is to suggest one such programme.

Two of the main reasons for losing weight are to improve physical well being and to improve psychological well being (e.g. increase self-esteem and improve body image, etc.). It has been argued that both of these can be achieved through 'non-diet' programmes. Bacon et al's (2002) study compared this non-diet approach to a traditional diet programme focussed on weight loss. In the non-diet group, individuals were given training and/or counselling in order to encourage the participant to adopt a wide range of positive health behaviours such as a balanced, healthy diet, increased physical activity, reduced alcohol intake, avoidance of smoking and drug taking and going for regular check ups. Further, they were trained to eat only in response to physiological cues, using hunger and satiety to control their food intake. The socially driven desirability of being thin was counteracted with psychological counselling given in order to enhance body acceptance.

The traditional restrictive diet group followed a behavioural weight loss programme. They were given information on nutrition, counting calories and fat, exercise and support, as well as on behavioural techniques such as self-monitoring, keeping food diaries, stimulus control, reinforcement and cognitive change. The authors took measures of BMI and fitness (blood pressure, pulse and vital signs), energy expenditures (time spent in physical activity over the last week), eating behaviours (such as cognitive control of eating and susceptibility to perceptions of hunger) and psychological measures such as depression and self-esteem. These were taken at baseline, 3 months, 6 months and one year follow up.

Participants in both groups received treatment sessions before and after the end of the programme. Attrition and attendance were significantly better in the 'non-diet' group than in the diet group, however, significant weight loss (and BMI reduction) was achieved only in the diet group and this was maintained through to post-aftercare. With respect to other physiological markers however, both groups significantly improved their total cholesterol levels, as well as LDL and triglyceride levels and systolic blood pressure. These changes occurred more rapidly in the diet group. Activity levels in both groups did significantly increase during the course of the study but were not maintained at one year follow up. Total energy expenditure did significantly increase, however, but only in the non-diet group which was maintained at one year follow up.

With respect to psychological measures, both groups reported significantly reduced depression scores and improved self-esteem ratings, however, in the diet group this occurred post-treatment but was not sustained through to post-aftercare. In the non-diet group it did not occur until post-aftercare. Both groups recorded an improvement in body image avoidance behaviours and this was significantly better in the non-diet group. Finally, participant evaluations of the programmes revealed that the non-diet group was significantly more likely to rate their programme as helping them to feel better about themselves and less likely to rate themselves as feeling a failure. So despite the non-diet group not losing weight, their health did improve and their psychological functioning was also improved. It may be that once a generally healthier lifestyle has been adopted then levels of physical activity can be gradually increased or diets gradually moved towards being lower in fat and calories. These smaller and more gradual changes may be more easily adopted. One possible problem with this study was Bacon et al's measure of weight level (BMI). BMI is calculated only from height and weight, and does not take relative muscle and fat content in to consideration. Muscle weighs more than fat, and if the non-diet group were expending more energy by exercising, they may have developed more muscle than the non-diet group. This could mean that the non-diet group may have lost fat but still maintained the same weight.

Heshka, Anderson, Atkinson, Greenway, Hill, Phinney, Kolotkin, Miller-Kovach & Pi-Sunyer (2003) compared a traditional weight loss focussed programme to a less conventional programme, however, they looked at the efficacy of a self-help

programme. Participants were randomly assigned to either the self-help or commercial programme and were monitored for two years, attending the centre at weeks 0, 12, 26, 52, 78 and 104. The self-help programme provided no strict diet or exercise regime, rather it provided information on how to eat a healthy diet (conducive to gradual weight loss) and recommended safe exercise levels. They were further directed to agencies or other support networks which may provide practical, and in some cases, social assistance (note it was up to the participant whether they actually made use of these agencies).

The commercial programme provided participants with vouchers allowing them to attend Weight Watchers at no cost (usual participation cost is £5 per weekly visit). This commercial plan provided participants with a food plan (moderately restrictive), an activity plan (based on current guidelines) and a behaviour modification plan focussed on cognitive restructuring. These weekly sessions were led by individuals who had successfully lost weight following the plan and included support and a weekly weigh in. Results showed that after two years, equivalent percentages of participants in each group had completed the programme. Weight loss was greater in the commercial than in the self-help group at 1 year and at 2 years, and decreases in waist circumference and BMI were also greater in the commercial group. It would seem therefore that explicitly providing cognitive restructuring and social support can help individuals lose weight more effectively than simply making resources available.

6.2.2. The Role of Psychological Constructs

The final approach to assisting weight loss has focussed on the role of specific psychological variables. There is a huge literature on psychological variables (out with those involved in behavioural and cognitive training) that may be implicated in successful dieting, exercising and weight loss. These include attitudes, intentions and perceived behavioural control (e.g. Sheeran, Conner & Norman, 2001), self-efficacy (e.g. Stotland, Zuroff & Roy, 1991), coping skills (e.g. Dohm, Beattie, Aibel & Steriegel-Moore, 2001), and perceived barriers and facilitators (e.g. Johnson, Corrigan, Dubbert & Gramling, 1990).

Holt et al (2001) examined psychological constructs in relation to weight loss. The study investigated the influence of Weight Locus of Control, (WLOC) on weight related attitudes and behaviours of overweight individuals and whether it might predict the success of Health Education Materials (HEM) as a way of encouraging individuals to adopt weight loss/positive health behaviours. The aim of the HEM was to provide individuals with information on health issues as well as to encourage them to adopt positive health-related behaviours such as a healthy, low-fat diet and more physical activity, with constructs such as motivation and support also being discussed. Results suggested that having an internal WLOC was positively associated with confidence, motivation, behavioural intent and actual behaviour (Holt,Clark & Kreuter, 2001), as well as the extent to which the HEM had influenced the intention to try the idea contained within it. An external WLOC, on the other hand, was associated with attributing weight to external causes, to perceiving several external barriers to physical activity and with having a negative perception of social support. Unfortunately this study did not follow up on actual BMI or weight loss, but at one month, internal WLOC individuals had tried more of the recommendations in the HEM than external WLOC individuals

Several other authors have in fact recently reiterated the importance of understanding the psychological processes that may underlie obesity and overeating (Dansinger & Schaefer, 2006; Elfhag & Rossner, 2005; Wardle, 2005). In a review of intervention studies, for example, Teixeira, Going, Sardinha & Lohman (2005) note that predicting

weight loss is extremely difficult since there are a large number of genetic and environmental factors which may be important, having both direct effects and interaction effects. Furthermore, there are several psychological differences that can be observed between obese individuals including the extent to which their obesity is emotionally disturbing, body image, quality of life, relationship with food and psychological effects of previous dieting experiences. Thus interventions which attempt to affect change in psychological constructs may work well for some individuals but not others because they are targeting factors which are not problematic for that individual.

Given the wide array of differences between over weight individuals, Teixera et al (2005) note that whilst any treatment programme might have value for some individuals, no treatment programme could hope to be effective for all. This is reflected in their review findings. A huge array of constructs had been examined in the studies they reviewed including binge/emotional eating, initial weight, depression/mood/psychopathology, eating disinhibition/external eating, body image/satisfaction, perceived hunger, cognitive eating restraint and chronic dieting, eating self-efficacy, personality, general cognitive style, self-esteem, locus of control, social support, goals and expectations, exercise self-efficacy and perceived barriers. For any one construct there were usually studies showing no association, studies showing a positive association and studies showing a negative association. They concluded that there was consistent evidence for only a few predictors of weight management: less previous dieting; fewer weight loss attempts; self-motivation, general efficacy and autonomy. Texeira et al (2005) suggest the need to examine moderators of treatment efficacy and to match treatment programme to individual and concluded that successful weight loss is more likely to occur in those individuals with an autonomous and self-motivated cognitive style.

6.2.2.1. Motivation and Volition

Cognitions and techniques built on cognitive models could, potentially, be useful in interventions designed to encourage the behaviours required to improve well being. The previous study examined the Theory of Planned Behaviour which can account for approximately 20-30% of the variance in health behaviours (see Sheeran & Orbell,

1999). However, the intention-behaviour stage, or the volitional phase, of the TPB needs work in order to increase the variance it can explain because even a strong intention to perform a given behaviour does not readily convert itself in to actual behaviour.

One concept which has been utilised in an attempt to increase prediction of actual behaviour is that of the Implementation Intention (Gollwitzer, 1993). Once an intention to act has been formed, it needs to be acted on. This volitional phase, Gollwitzer argues, will be most successful if plans (implementation intentions) are formed which specify how, where and when the intended act(s) will be performed, and indeed this appears to be the case. Milne, Orbell & Sheeran (2002) compared the efficacy of motivational intervention (based on Protection Motivation Theory) for exercise with the same intervention supplemented with a volitional intervention based on the notion of implementation intentions. The study was longitudinal in design but lasted only two weeks, so long term efficacy cannot be assumed. Nonetheless, whilst the motivational intervention increased intentions to exercise, actual behaviour was not significantly increased. Adding the volitional component, however, had a highly significant effect on exercise behaviour with over 80% of participants exercising according to the place/time/day they specified in their plans. This success of the implementation intention is a concept employed here. The programme outlined below requires the individuals to engage in novel behaviours in a variety of different circumstances. It was hypothesised that designing the programme to include 'diaries' where individuals might plan out how, where and when they would engage in these behaviours (i.e. devise implementation intentions), might facilitate performance of them.

Two other variables which are receiving an increasing amount of attention in relation to successful weight loss are fantasies and expectations (e.g. Oettingen & Wadden, 1991 and Milne, Orbell & Sheeran, 2002) as it seems they may affect both motivation and volition.

Expectations (beliefs about the future) contain some evaluation about the probability of occurrence which is based on past events (e.g. Oettingen & Mayer, 2002), fantasies on the other hand, "...embellish future events regardless of past performance and

probability of future occurrences" (Oettingen & Mayer, 2002, page 1199) and as such they do not provide a solid basis for action. All the difficulties that could be faced in attempting to reach the goal are ignored so that the pleasure of the desired future may be enjoyed. This is at the cost of motivation and the planning required to actually perform the behaviour. Oettingen & Wadden (1991) looked at weight loss in 25 obese women who were attending a behavioural weight reduction programme, measuring their expectations and fantasies. Both expectations and fantasies were coded as either positive or negative. The results suggested that those with positive expectations but negative fantasies were more likely to have lost weight than those with positive fantasies but negative expectations. Programme attendance over the year long course was predicted only by expectation. So, expectations have been implicated then as an important factor in determining weight loss. Possibly, individuals with positive expectations but negative fantasies might be more successful in losing weight. Positive expectations might be important in much the same way self-efficacy has been found to be important (e.g. e.g., Brownell, Marlatt, Lichtenstein, & Wilson, 1986; Kincey, 1981; cited in Williams, Grow, Freedman, Ryan & Deci, 1996). Self-efficacy has been implicated as a determinant of the motivation to lose weight although the evidence is by no means conclusive (see e.g. Williams et al, 1996).

6.2.3. Rationale

Even this brief review of the weight loss literature is sufficient to demonstrate the benefit of providing some form of psychological training for individuals trying to lose weight, especially if they are to maintain their weight loss in the long term. However, such psychological training might be better focussed focus on the underlying causal factors that can be manipulated to be successful in the long term. Some may be more amenable to change than others. It is not easy, for example, to increase an individual's will power, and in any case, because will power diminishes the more it is required (Baumeister et al, 1994), it does not seem to make a sensible basis for intervention. Any programme requiring active self-control or self-regulation where multiple choices are on offer is likely to fail in the long term, which is perhaps another reason why straightforward diets or exercise programmes are successful at best for only short

periods of time. Many of the strategies suggested by health professionals or governmental bodies may not take this into consideration. In the USA, the National Institutes of Heath provides clinical guidelines which recommend strategies such as self-monitoring, stress-management and problem solving. These may be more suited to short term projects and what appears to be a workable may be a more effective solution is something that tackles behaviour and cognition without relying on will power. FIT may be a good basis for this.

Earlier research here has shown there to be a link between BMI and psychological FITness (as measured by the FIT profiler). Behavioural flexibility in particular appears to be important. It may be that training in order to increase FITness could be beneficial to those trying to lose weight. Study two suggested that behavioural flexibility did not appear to be related to the short-term performance of health behaviours or the cognitions employed in the TPB. Nonetheless a relationship between low BMI and higher behavioural flexibility exists. One possible explanation for this is that increased behavioural flexibility permits individuals to reduce the amount of habitual behaviour in which they engage.

It has been suggested that human beings are predisposed to develop routines and habits so as to free up resources for other cognitive processing (e.g. Aarts & Dijksterhuis, 2000). The evolution of a process that initially requires significant conscious effort to perform, to a habitual process that is performed relatively 'unconsciously', frees up mental work space for other activities. However, once these routines have become habitual, they are incredibly difficult to alter, requiring serious, prolonged, conscious effort to do so. If an individual's eating and exercise behaviour exists as a series of life long 'habits', then changing them could prove to be very difficult, particularly when the environment in which they are performed remains the same. Not only would it require serious effort to forgo the habitual behaviour, but effort would also be expended in planning and performing a new set of behaviours. This is likely to occur in the same environment that is potentially more conducive to the continuance of old habits since habits may be cued by aspects of the environment (Aarts & Dijksterhuis, 2000).

FITness, and in particular behavioural flexibility, is primarily concerned with moving away from habitual behaviour that is usually based on past experiences instead of facets of the current situation. It encourages a wider behavioural repertoire which in turn permits the individual to select a more appropriate behaviour in a given situation. If an individual can be given training to increase his behavioural repertoire, he may be more likely to behave in a manner appropriate to the situation instead of resorting to habit. In this context, it may be that being more behaviourally flexible would help the individual to overcome habitual impulses to overeat, to eat the wrong sorts of food, or to not exercise. An interesting problem arises here however because long term maintenance of positive health behaviours might also be viewed as habitual behaviour and, on the basis of the previous argument, increased behavioural flexibility would not support long term habitual behaviour. Fletcher & Stead (2000a) would argue that behavioural flexibility is used to determine behaviour that is *appropriate* to the situation, so it may be that behavioural flexibility would not interfere with long term maintenance of positive health behaviours since they are appropriate; they are related to better physical and psychological well being.

Research suggests that improvements in physical well being can be brought about without the need for strict diets and difficult exercise regimes that individuals fail to adhere to in the long term (see e.g. Bacon et al, 2000). The intervention outlined here could be viewed as a non-diet approach because the emphasis is not on following a strict diet, nor is it on exercising a prescribed number of times a week. Rather, the focus is on more general, every day behaviours, only some of which may be food or exercise related. This weakening or removal of habitual behaviours may change behaviour in general and one outcome of this might be a specific change in food or exercise behaviour. The intervention prescribes no strict diet or exercise programme, it merely provides information on what constitutes a healthy diet and on the levels of exercise recommended by the government for maintaining good health. Thus this approach attempts to facilitate the alteration of existing habitual behaviours by increasing behavioural repertoires and comfort zones. In turn it is hypothesised that this will allow individuals to change the negative health behaviours which may underpin their weight.

Other weight loss related cognitions might also be determined by FITness. As discussed previously, fantasies and expectations appear to be important in determining whether individuals can successfully lose weight. FIT theory might predict that more FIT individuals would be less likely to hold fantasies and would be more likely to hold realistic expectations. Furthermore, these individuals may feel more self-efficacious. Since more FIT individuals should have greater levels of Self-responsibility, they should perceive themselves as the architects of their own outcomes, feel more in control and should also be more aware of what is going to be required of them in achieving said outcomes. Furthermore, increased behavioural flexibility should equip them with a greater array of behaviours with which to reach those outcomes. Less FIT individuals, alternatively, may be less aware and be less behaviourally competent when it comes to planning and carrying out all the behaviours necessary to reach such long term goals. They may consequently form fantasies rather than realistic expectations. Another aim of this study then is to examine whether self-efficacy, expectations and fantasies do adequately predict successful weight loss and whether they are related to FITness.

Thus there are several aims within this study. Firstly, the study aims to administer a pilot intervention the aim of which is to explore whether behavioural flexibility can be increased and whether this might relate to weight loss or BMI change. The underlying hypothetical mechanism for this would be that helping individuals lose weight - primarily through facilitating the alteration of habitual behaviours.

A special programme has been developed, derived from exercises in Fletcher & Stead (2000a), which aims to increase individual's behavioural flexibility by encouraging them to do something different each day. This Do Something Different (DSD) programme involves changing how individuals interact with other people, how they behave in relation to food, exercise behaviour and the general day to day activities in which they engage. Thus the study will examine whether the programme can effect changes in behavioural flexibility, whether changes in diet and exercise occur, whether weight loss occurs and whether psychological well being changes.

One final aim is to explore whether behavioural flexibility is more able to predict BMI change than fantasies and expectations which have recently been shown to be important

for predicting weight loss. A second aim is to examine the concepts of expectations, fantasies and self-efficacy in relation to FITness (do more FIT individuals have higher self-efficacy, more realistic expectations and less positive fantasies) and in relation to their ability to predict weight loss/BMI change. A final aim is to examine whether psychological well being (measured by anxiety and depression levels) is affected by the intervention.

6.3. Objectives

1. To investigate whether BMI and behavioural flexibility were related at study outset (T1).
2. To investigate whether changes in behavioural flexibility occurred as a result of the DSD programme.
3. To investigate whether the DSD programme was related to BMI change, specifically, is there a dose-response relationship between the extent to which behavioural flexibility changed and BMI changed?
4. To investigate whether diet or exercise changed over the DSD programme.
5. To investigate if there is a dose-response relationship between the extent to which diet and exercise changed and behavioural flexibility changed.
6. To investigate changes in psychological well being.
7. To model BMI and BMI changes.

6.4. Method

6.4.1 Design

This was a pilot study which was longitudinal in design with two groups undergoing an intervention programme, called the Do Something Different (DSD) programme which aimed to increase behavioural flexibility and explore whether BMI change would occur in conjunction with the behavioural flexibility changes. The first group, group A, served as a waiting list group who began the DSD programme one month after the second group, group B. In the present pilot programme there were several difficulties in designing a useful control group scenario. The primary reason was that this study was a pilot study to explore the efficacy of the DSD programme exercises in increasing behavioural flexibility. Furthermore, finding a suitable control condition would have been problematic since traditional diet-activity interventions are assumed to work in very different ways.

A more significant issue relates to the DSD programme and BMI change. In order to be able to conclude that it was the DSD programme which facilitated BMI change, a control group would be required so as remove the possibility of 'demand characteristics'. That is, without a control condition, it could be argued that it is not the habit breaking DSD programme that matters, rather, it is just the effect of doing any kind of behavioural programme which facilitates change. There is some power in this argument. The study could have had another group do a different kind of behavioural programme however the above reasons hold here too – the present study was serving as a pilot. As is discussed later, the results demonstrate certain relationships which do not support the argument that effects arose solely from demand characteristics, so as far as the present study is concerned, this may be less of an issue.

Group A began the DSD programme one month after group B and kept food and exercise diaries for the month before beginning the DSD programme, i.e. it served as a waiting list group. The study was designed to run for four months, with the option of continued follow up.

6.4.2. Participants

Recruitment for this study was via articles in the local press and on the local radio stations. The study was advertised as one aimed at which aimed to explore whether participant's mental fitness could be increased and whether this would facilitate weight loss. Participants' BMI's were recorded and individuals who fell in to the low BMI category (or approached it) were not permitted to take part. It was a requirement that participants wanted to change their behaviour, could lose weight safely without moving into the low BMI group, and were required to be eighteen years of age or over. Ethics approval was received for this study (protocol number BS/R/003 I).

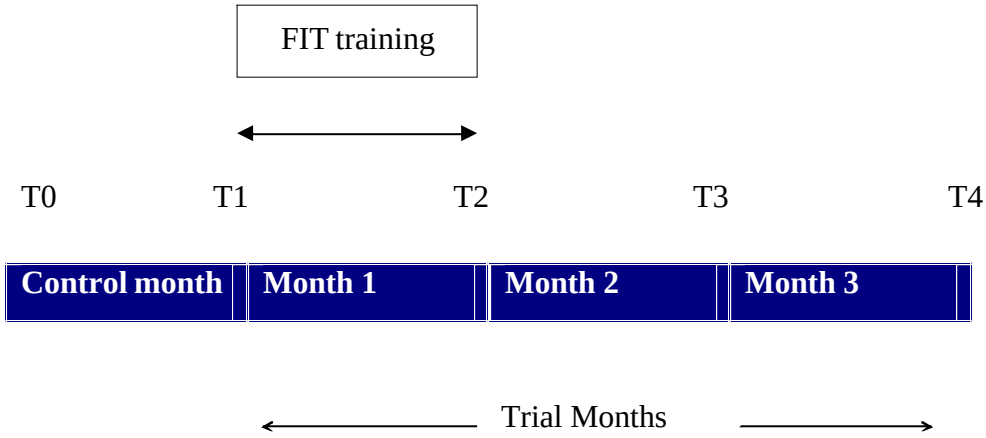
Originally, sixty five participants enlisted. However ten dropped out during the course of the study. Of the fifty five who finished the trial, ages ranged from 23 to 61, mean age was 44 and 9 participants were male.

Mean weight at the beginning of the study was 210.89 lbs for the males (N=9) and 183.2 lbs for the females (N= 46). BMI's ranged from 22.15 to 48.41, thus at the start of the study, there were 6 individuals in the acceptable weight range. These participants indicated their primary motivation was to improve their diet (eat more healthily) and wanted only to lose a very small amount of weight and were therefore included. There were 23 participants in the overweight range and 26 in the obese range.

6.4.3. Procedure

There were four important time points in the pilot study, as shown below in Figure 6.1.

Fig 6.1 Timescale of study



At T0, The timeline for this study is shown below in Figure 6.1. Participants were assigned at random to one of two groups; group A (waiting list group, N=14)) or group B (who began the DSD programme immediately N=42). At the outset of study group A was larger than N=14, however, the majority of the drop outs came from this group. This group was effectively a waiting list group. Participants in this group were not invited to the DSD induction until one month into the study. Instead they were advised that a baseline measure of their diet/exercise behaviour was required before entering the DSD programme. Participants in this waiting list group were sent one month's supply of food/exercise diaries with explicit instructions on how to complete them.

The use of the 'waiting list' group allowed for two important things. Firstly, it allowed a baseline measure of diet and exercise levels to be taken against which future (post-training) diet and exercise behaviour could be compared, thereby allowing any significant changes to be established. Secondly, it allowed for the control of the effect of monitoring food intake and exercise levels (via the daily diaries). Self-monitoring is used with behavioural modification programmes to aid with weight loss and could therefore confound any potential effects of the DSD programme.

After one month of keeping the diaries, these 'waiting list' participants also attended a 2 hour induction at the University of Hertfordshire. This followed exactly the same format as for the experimental group. They completed the same measures as the experimental group had done (see below) at the induction. As with group A, group B completed the DSD programme over the course of the second month, and completed FIT profiles at the end of the study. Again participants were advised that they should contact the author should they have any questions.

Participants in group A were advised that a baseline measure of their diet/exercise behaviour was required before entering the DSD programme. Participants in group A were sent one month's supply of food/exercise diaries (*see Appendix nine* and section 6.4.4) with explicit instructions on how to complete them.

The use of the waiting list group allowed for two important things. Firstly, it allowed a baseline measure of diet and exercise levels to be taken against which future (post-training) diet and exercise behaviour could be compared. This allowed any significant changes to be established. Secondly, it allowed for the control of the effect of monitoring food intake and exercise levels (via the daily diaries). Self-monitoring is used with behavioural modification programmes to aid with weight loss and could therefore confound any potential effects of the DSD programme.

After one month of keeping the diaries, group A participants attended a 2 hour induction at the University of Hertfordshire – this is shown as T1 in Figure 6.1. Group B (N = 42) also attended a 2 hour induction at T1. During the induction session participants completed the relevant measures (see section 6.4.5). Following this they were given a presentation on FIT and the Do Something Different (DSD) programme (see section 6.4.4) and given the opportunity to ask questions. Instructions on how to carry out the tasks in the DSD programme were given as well as instructions on how to complete the daily food intake/exercise diaries (for group B) and DSD task diaries (for both groups). Participants at no time were told to follow any specific diet or exercise regime, only to perform the tasks outlined in the DSD programme and to record their progress in daily diaries (see 6.4.4). Participants were however provided with information on government recommendations regarding diet and exercise. This was to

ensure that all participants had the same knowledge on how to eat healthily, to exercise and to lose weight safely.

Participants spent one month, from T1 to T2, completing exercises from the DSD programme. At T2 participants were mailed the FIT profiler for them to complete a second time. They were provided with prepaid envelopes in which to return the profiler. This was done again at T4 – a further two months later. The formal DSD programme was to be followed for the first month (T1-T2) with completion of tasks thereafter at the participant's discretion. Participants were able to contact the author at any time if they felt they needed assistance with any part of the DSD programme (task or diary completion). A more complex randomised control design was not adopted here as the primary purpose of the study was to pilot the intervention and explore the practicalities of the programme.

6.4.4. The DSD Programme

The DSD programme was based on exercises devised by Fletcher & Stead (2000a), designed to increase FITness in various ways, but primarily through encouraging the individual to DO Something Different. For this study, the important facet of FITness was behavioural flexibility. This construct is based on an individual's ability to encompass the whole range of behaviours on 15 dimensions:

1. Unassertive - Assertive
2. Trusting of others – Cautious of others
3. Calm/relaxed – Energetic/driven
4. Reactive - Proactive
5. Flexible - Definite
6. Outer-directed – Inner-directed
7. Risky – Cautious
8. Behave as I wish – Behave as expected
9. Spontaneous - Systematic
10. Single-minded – Open-minded
11. Conventional - Unconventional
12. Individually-centred – Group-centred
13. Firm – Gentle
14. Introverted – Extroverted
15. Lively – Not Lively

The focus of the DSD exercises was to encourage participants to increase their flexibility on these dimensions, and any other relevant dimensions they could think of, by doing something different. Participants were given instructions which asked them to do this in three ways (see *Appendix Eight*). Firstly, they were asked to think of six relationships (boss, colleague, children, partner, friend etc) and about their behaviour within those relationships. The exercises involved them thinking about what might be the most appropriate way to behave and whether this was how they did actually behave. If this was not the case, they were asked to try to carry out the more appropriate behaviour. For example, if they felt they were always unassertive with their boss, their task was to behave in a more assertive manner. These tasks were to be carried out daily.

Secondly, participants were asked to think of six diet or exercise situations where they were strongly tempted to either eat unhealthily or to not exercise. Having thought about their behaviour in these situations, they were asked to think of a more appropriate way to behave that would also increase their flexibility. For example, if they were always cautious in choosing foods at the supermarket, they were encouraged to be more risky and try something new and healthy. These tasks were to be carried out daily.

Thirdly, participants were given a list of 50 activities from which they had to select two to carry out every week. These tasks had to be new to them (i.e. they had to do something different) and the object of this was to get them to drop old habits and try new things. These activities included things such as buying a different newspaper, listening to a different radio station, switching off the phone, shopping in a different supermarket, trying a new sport and so on.

Participants were given 'DSD diaries' designed to help them think about how they normally behave within relationships and situations and about how they could/should behave. The diaries were designed such that they should also help the participants to plan out where and when they could try these new behaviours (see *Appendix Nine).*

6.4.5. Measures

6.4.5.1 Behavioural Flexibility and Well Being

The FIT Profiler (Fletcher & Stead, 1999) was used to measure behavioural flexibility and psychological well being (anxiety and depression – *see Appendix two*) with reliabilities as already discussed in Chapter 2.

6.4.5.2. Past and Present Health Behaviours

A food intake and exercise questionnaire (*see Appendix ten*) was designed to capture demographic information (age, gender, occupation) as well as information pertaining to dietary and exercise behaviour. For dietary behaviour participants were asked whether they were currently on a diet and if so which one (e.g. Atkins or Weight Watchers). If they were currently on a diet they were asked to report how much weight they had lost, how many months they had been following the diet and how easy they had found it to adhere to the diet (on a scale of 1 to 7 where 1 = very difficult and 7 = very easy). Participants were asked to list the reasons they had for wanting to lose weight and were given some examples of possible reasons, e.g. change body shape, improve fitness or improve health. Participants were then asked to provide information about any previous diets they had tried: diets attempted; number of times attempted; amount of weight lost each time and ease with which they had adhered to the diet. Finally, participants were asked about why they had failed to adhere to such diets, whether they had successfully lost weight in the past only to regain it (and if so how many times) and what the reasons were for weight regain.

With respect to exercise, participants were provided with a definition of what was considered to constitute exercise and were asked to report how often, in a typical week, they exercised. They were asked to provide information on the different types of exercise they performed, how often then engaged in that exercise, how long they practised that exercise on each occasion and how intensely (low intensity, medium intensity or high intensity; definitions for these were provided) they performed it. Participants were asked to record how long they had

been following this pattern of exercise behaviour, how easy they found it to exercise (on a Likert scale where 1 = very difficult and 7 = very easy) and how much they enjoyed exercising (1 = not at all and 7 = very much so). Participants also provided information on past exercise behaviour: if they had exercise regimes in the past; if so how many; if so how easy had they found them to adhere to them (1=very difficult to 7= very easy) and if so why had they abandoned them.

6.4.5.3 Fantasies and expectations (see Appendix ten)

Expectations and fantasies were measured following Oettingen & Mayer (2002; see *Appendix ten*), however, subsequent analyses revealed there to be no relationship at all between the measures of expectations and fantasies and BMI, BMI change or FITness. Due to the large number of other, more relevant analyses performed, expectations and fantasies, or their measurement, are not discussed further.

6.4.5.4. Diaries (see Appendix nine)

Daily food intake and exercise diaries were devised. Participants record their daily calorie in intake (approximate values derived from the values provided on the foodstuffs) and indicated on a table the number of times they ate the following groups of foods throughout the day: carbohydrates (white and brown: cereals/rice/pasta/bread/potatoes), red meat, white meat/fish, dairy high fat, dairy low fat, fruit/vegetables, alcohol, sweets/biscuits/crisps/cakes. Diaries also asked participants to record any exercise they had done that day, giving type, duration and intensity.

In addition there were six 7-point Likert scales for participants to record the following:

1. How well they had adhered to their diet that day
2. How healthily they had eaten that day
3. How easy they found it to stick to their diet that day
4. How well they adhered to their exercise regime that day
5. How much they enjoyed exercising that day
6. How easy they found it to exercise that day.

Only 1 item was used to assess each of the above measures and each item used the same 7 point Likert response scale, where 1 = not at all and 7 = very much so.

At the end of each of month, participants posted back completed diaries for that month, as well as a brief questionnaire in which they recorded their new weight.

In order to analyse the data, foods were categorised according to their primary constituent, e.g. carbohydrate (white and brown), fat, protein, fruit/vegetables and alcohol also being afforded a category. These categories were used to calculate a combined food in intake score. Participants recorded how many portions of each major food group they consumed each day (guidelines were provided for participants on what constituted one portion) and each portion was awarded one point. Brown carbohydrates, protein, fruit and vegetables were counted as positive scores whilst fats, white carbohydrates and alcohol were treated as negative scores. Thus higher total food in intake scores represented a healthier diet whereas lower or negative scores represent a diet higher in fats, alcohol and white carbohydrates.

6.5. Results

The study design included a 'waiting list' group. In order to establish whether any changes that may have occurred were not due to the process of keeping diaries or some previous or past diet/exercise factor, it was necessary to establish that group A (waiting list) and group B did not differ significantly on any of the assessed variables and that they progressed through the study in a similar manner. Before the objectives are addressed, an initial comparison of the two groups on biographical, past and present dietary behaviour and past and present exercise behaviour is presented. Comparisons of group A and group B on BMI, FITness and other study variables, both at onset and throughout the study, can be found below in the results for the relevant objective.

6.5.1. Group comparisons

A series of Chi square analyses and t-tests were run on the data in order to compare the two groups on their biographical data (gender, age, occupation), dietary and exercise behaviour (past and present behaviour).

Group A and group B were not found to be significantly different on any variable– equivalent age ranges and gender ratios existed in both groups, equivalent numbers had dieted previously (and were doing so at study onset) and similar diets had been adopted in each group. Similarly, exercise levels (both past and present) were equivalent for the two groups. Thus groups A and B were equivalent on all biographical variables and were also similar in terms of what diets they were following currently, had followed in the past, what exercise they were doing currently and what exercise programmes they had adopted in the past. There were equivalent numbers of individuals who had lost weight. Descriptive statistics from the comparison of the two groups on current and past dietary and exercise behaviour can be found in *Appendix eleven*.

6.5.2 Objective One: To investigate whether BMI and behavioural flexibility were related at study outset (T1).

Descriptive Data

Descriptive data was computed for groups A and B, results are shown below in Table 6.1. Inferential tests to compare these two groups are discussed below, but the descriptive data suggested a small difference between the groups on both BMI (group A recording a lower mean BMI than group B) and behavioural flexibility (group A recording a higher mean score than group B).

Table 6.1 Mean BMI and behavioural flexibility scores for group's A and B at T1.

Group		**Behavioural flexibility**	**BMI**
A	Mean	35.50	28.32
(N=14)	SD	18.41	2.87
B	Mean	31.30	32.35
(N=41)	SD	18.61	6.79

The next step was to form BMI groups using the WHO classification as discussed in Chapters 4 and 5, to give three BMI groups: normal (18.50-24.99); high (25.00 – 29.99) and obese (30.00). Mean behavioural flexibility scores for the different BMI groupings were then calculated and are shown below in Table 6.2.

Table 6.2. Mean behavioural flexibility scores for BMI groups at T1

BMI Group	**N**	**Mean**	**SD**
Normal	6	48.22	17.22
High	23	35.06	17.76
Obese	26	26.33	17.21

A Pearson correlation coefficient was computed for behavioural flexibility and BMI at T1, for the sample as a whole and this was found to be significant ($r = -.362$, $p = .007$). The

higher the behavioural flexibility score, the lower the BMI. This is in line with the results from the previous studies.

Inferential Statistics

A two-way ANOVA examining the effects of study group (2 levels: A and B) and BMI group (3 levels: normal; high and obese) was run however the results showed the data violated the assumption of homogeneity of variance – Levene's test indicated that variances for all levels of time were significant. Consequently, the variables were transformed through standardisation, however, subsequent analyses revealed that Levene's tests for homogeneity of variance were still highly significant which meant the data was unsuitable for this analysis.

Two analyses were therefore run using tests for nonparametric data. Firstly, a Mann Whitney test was run comparing groups A and B on BMI at T1. The Monte Carlo method of calculating significance was adopted as this gives a more accurate figure (Field, 2005). Since there was no specific hypothesis about the direction of any possible difference between the two groups, two-tailed significance levels were used. Medians, mean ranks and sum of ranks are shown below in Table 6.3. Test results showed the difference between groups A and B, on BMI at T1, to be non-significant.

Table 6.3. Mean ranks and sum of ranks for BMI at T1 for groups A and B.

	Group	N	Median	Mean Rank	Sum of Ranks
BMI1	**A**	14	28.62	21.07	295.00
	B	41	30.73	30.37	1245.00

Next a Kruskal-Wallis test was run to compare the three BMI groups on behavioural flexibility. Mean Ranks for the normal, high and obese groups were 41.50, 30.70 and 22.50 respectively, and the test statistic was significant, X_2 (2) = 7.984, p = .014 (Monte Carlo estimate reported). The confidence interval for significance was .011-.017. Mann Whitney post hoc comparisons revealed that BMI groups normal and obese were significantly different, U = 25, p = .008, r = -.045 (one-tailed significance reported) and medians were 50 for the normal group and 21 for the obese group.

It can be seen that BMI and behavioural flexibility were significantly related to each other at study outset (T1), before the DSD programme was begun, but that there was no effect of study group. The relationship between behavioural flexibility and BMI was such that individuals with higher behavioural flexibility reported lower BMI's, as was found by the previous study.

6.5.3. Objective Two: To investigate whether changes in behavioural flexibility occurred as a result of the DSD programme

The Do Something Different (DSD) programme was designed to increase FITness, in particular, it was designed to increase the participants behavioural flexibility. Descriptive statistics relating to FITness across the DSD programme for the group as a whole are presented first followed by data for the two groups.

FIT scores were gathered at three points over the study – firstly at programme onset (T1), then again after the initial month across which the DSD programme was carried out, and finally at the end of the study (three months after study onset). Mean scores for each of the FIT components were calculated for each of the three measurement points and can be seen below in Table 6.4.

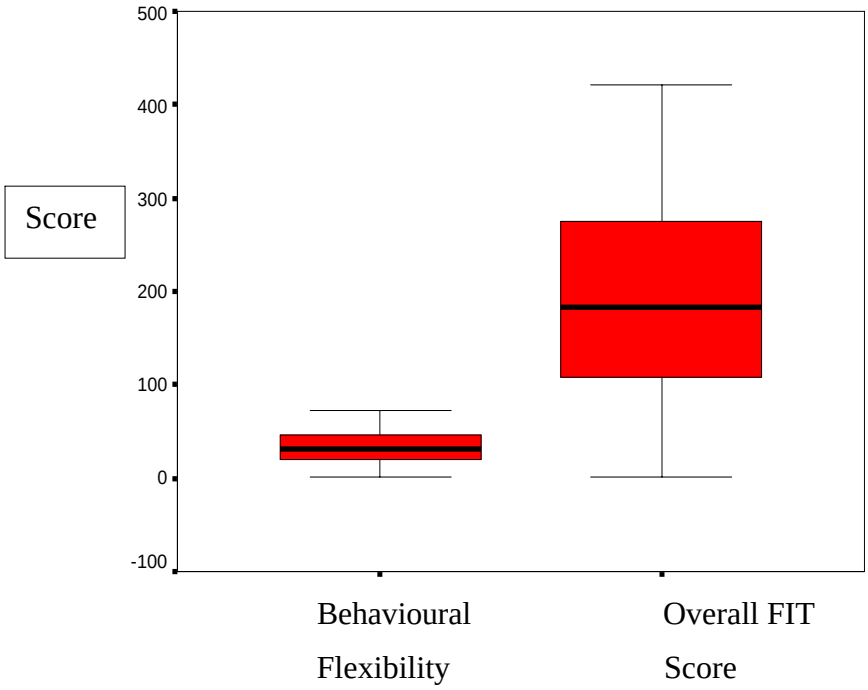
For the group as a whole, the constancies show only very small variations over the course of the DSD programme. However, mean behavioural flexibility, and consequently mean Overall FIT score, both appear to increase consistently over the study. Mean behavioural flexibility score was 32.37 at DSD onset (T1) and rose to 46.76 at T2 after one month of the DSD programme. At the end of the programme, at T4, mean behavioural flexibility score was 47.37. Mean Overall FIT score was 190.91 at T1, increasing to 277.86 at T2 and finishing at 281.31 at T4. In both cases it can be seen that once again, standard deviations for behavioural flexibility and Overall FIT Score were very high indicating a high degree of variability within the group. An examination of the data revealed there to be no obvious outliers however, as demonstrated in the box plot graph below (Figure 6.2.).

The next step was to investigate whether there was an effect of training (or time) on FIT scores and whether there was an effect of group (A v B) on FIT score over time. Mixed ANOVA's were run on each FIT variable. In each case, the within subjects variable was time (3 levels: T1(DSD onset); T2 (one month into the DSD programme) and T4 (DSD programme end) and the between subjects variable was group (two levels: A and B).

Table 6.4. Mean FIT scores across the DSD programme (N = 55)

		T1 (DSD onset)	**T2 (1 month after DSD onset)**	**T4 (3 months after DSD onset)**
Overall FIT score	Mean SD	190.91 111.31	277.86 151.62	281.31 147.52
Behavioural	Mean SD	32.37 18.49	46.76 24.75	47.37 24.08
Integrity	Mean SD	5.85 0.70	5.88 0.67	5.88 0.67
Awareness	Mean SD	5.95 0.80	6.02 0.86	6.06 0.80
Balance	Mean SD	5.62 0.96	5.54 1.10	5.52 1.09
Conscience	Mean SD	6.97 1.43	6.94 1.34	6.93 1.30
Fearlessness	Mean SD	4.67 1.40	4.82 1.38	4.81 1.39
Self-Responsibility	Mean SD	6.02 1.03	6.08 1.05	6.08 1.05

Figure 6.2 Box plot graph of behavioural flexibility at T1 and Overall FIT score at T1.



Many of the FIT variables violated the assumption of sphericity (as assessed by Mauchly's test), the effect of which is a loss of power by the standard F statistic (Field, 2000). In such a circumstance it is good procedure to report the Greenhouse-Geisser corrected estimates (here this value is reported as opposed to the Huynh-Feldt correction due to the nature of the Greenhouse-Geisser values found, see Field (2000) for an extended explanation). In each case, for the planned comparisons, Sidak values are reported. Although Bonferroni planned contrasts are suitable when the data violates sphericity (Tukey's are not), Field (2000) suggests the Sidak is probably a better measure as it is less conservative than Bonferroni. Findings for the mixed ANOVA's are presented below by FIT variable.

6.5.3.1. Overall FIT score

There was a main effect of time on Overall FIT score (greenhouse-Geisser correction reported), $F(1.074,56.911) = 95.150$, $p<.001$ but no main effect of group and no interaction effect. Sidak comparisons showed Overall FIT Score to increase significantly between T1

and T2 (p<.001), mean scores being 190.91 and 277.86 respectively. This increase was maintained between T 1 and 4 (p<.001), mean score at T4 being 281.31, but that there was no significant increase between T2 and T4.

6.5.3.2. Behavioural Flexibility

There was a main effect of time on behavioural flexibility, the Greenhouse-Geisser corrected estimate was found to be F(1.058,56.081) = 99.348, p <.001, such that behavioural flexibility increased significantly over time. There was no main effect of group and no interaction effect.

It was concluded that behavioural flexibility did increase significantly, as demonstrated by the increase in mean behavioural flexibility score from 32.37 to 46.76 after one month's training. Sidak contrasts were used (see Field, 2000) and these showed that there was a significant increase in behavioural flexibility between T1 and T2 (p < .001) and this was maintained over to the end of the study at T4 (p<.001). There was no difference between the measures at T2 and T4 however. Thus there was no difference between groups A and B at study onset or over the course of the study. Behavioural flexibility was thus found to have increased significantly in the sample as a whole after training. This increase was maintained through to the end of the study.

6.5.3.3. Integrity

There were no main effects of group or training on Integrity scores and no interaction effect.

6.5.3.4. Constancies

For Awareness and Balance, there was no main effect of group (A v B) or training and no interaction effect. However, analysis of Conscience, Fearlessness and Self-responsibility did reveal some differences.

There was no main effect of time on Conscience, however there was a main effect of group, $F(1,53)= 11.974$, $p < .01$. Mean Conscience score for the Group B at T1 was 7.34 whereas Group A's was 5.88. At T2 group B and A's mean scores were 7.27 and 6.00 respectively, and at T3 these were 7.22 and 6.04 respectively. There was also a significant interaction effect, $F(1.275,67.550)=4.88$, $p<.05$. As shown by the mean scores, there was a gradual decrease in Conscience scores in group B over time: 7.34; 7.27 and 7.22. Group A showed a gradual increase: 5.88; 6.00 and 6.04.

There was a main effect of time on Fearlessness (Greenhouse-Geisser correction reported), $F(1.017, 53.9)=12.376$, $p<.01$. Mean scores and Sidak comparisons suggest this was due to a significant increase in Fearlessness between T1 and T3 - 4.67 at T1, rising to 4.82 after training ($p<.01$). There was a decrease in Fearlessness however by the end of the study to 4.81 but this decrease was not significant. There was no main effect of group and no interaction effect. Thus the DSD programme appeared to increase Fearlessness in the whole sample between T1 and T3.

There was a main effect of time on Self-responsibility (Greenhouse-Geisser correction reported), $F(1.001,53.062) = 4.134$, $p<.05$, with mean Self-responsibility scores being 6.02 at T1, 6.08 at T2 and 6.08 at T4. There was no main effect of group and no interaction effect. Planned contrast results did not flag significant changes between measurements over time and given that the multivariate test results were only just significant, it was concluded that there was, in this study at least, no *reliable* change in Self-responsibility.

The results suggest then that the DSD programme did increase FITness. Originally it was hypothesised that only behavioural flexibility would increase significantly, however, Fearlessness also did, as did Overall FIT Score (however this is due directly to the increase in behavioural flexibility). The effects of the DSD programme were independent of group.

6.5.4. Objective Three: To investigate whether the DSD programme was related to BMI change, specifically, is there a dose-response relationship between the extent to which behavioural flexibility changed and BMI changed?

The previous studies have suggested a relationship between BMI and Behavioural Flexibility. If this relationship is causal, then it should follow that a change in one should cause a change in the other. Behavioural flexibility was found to increase significantly over time as participants worked through the DSD programme. This objective seeks to discover whether this was accompanied by a change in BMI which would support the assertion that behavioural flexibility and BMI are causally related. Several analyses were performed. Firstly, the relationship between BMI and behavioural flexibility, at the relevant time points was explored. Recall that previous analyses have already shown BMI and behavioural flexibility to be significantly related at T1, however, did the relationship hold through T2 and T4?

Secondly, the data was analysed to see if BMI had changed significantly from T1 to T4 and was also examined to see whether any such changes were the same for the two groups (if groups A and B differed in BMI change across the study it could be inferred that keeping diaries impacted on BMI change).

Finally, the 'dose-response relationship' between BMI change and behavioural flexibility change was analysed. If the extent to which BMI changed was related to the extent to which behavioural flexibility changed then it would seem more likely that it is the efficacy of the DSD programme in changing behavioural flexibility which is important as opposed to demand characteristics.

6.5.4.1 Relationship between BMI and Behavioural Flexibility T1-T4

Pearson correlation coefficients were computed for all BMI measures (T 1-4) and behavioural flexibility scores (T1, T2 and T4). It can be seen in Table 6.5 that behavioural flexibility was significantly correlated with BMI throughout the study. BMI at T1, T2, T3 and T4 were all found to be negatively correlated with behavioural flexibility at T1, at T2 and at T4. Thus

throughout the study, each measure of BMI was significantly and negatively associated with each measure of behavioural flexibility, showing that those individuals with lower BMI's recorded greater levels of behavioural flexibility at each measurement point.

Table 6.5 Pearson correlation coefficients for BMI at T1-4 and behavioural flexibility at T1,2 & 4.

	1	*2*	*3*	*4*	*5*	*6*	*7*
1.BMI T1	-------						
2.BMI T2	.998**						
3.BMI T3	.990**	.994**	------				
4.BMI T4	.982**	.987**	.995**	------			
5.Behavioural flexibility T1	-.362**	-.368**	-.416**	-.436**	------		
6.Behavioural flexibility T2	-.317*	-.328*	-.374**	-.406**	.951**	------	
7.Behavioural flexibility T4	-.315*	-.325*	-.372**	-.403**	.950**	.998**	------

** Correlation is significant at the 0.01 level (2 tailed)

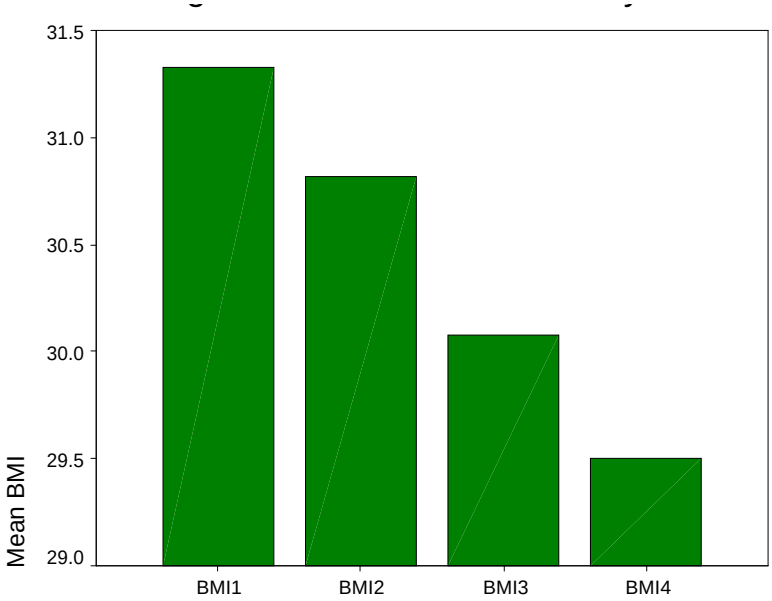
* Correlation is significant at the 0.05 level (2 tailed)

6.5.4.2 BMI change over the DSD Programme and Group Comparisons

BMI data was gathered at 4 points over the study – at DSD programme onset (T1) and then at T2 (after one month of completing DSD activities), T3 and T4 (DSD programme end). Mean BMI scores for the whole group at each time point are shown below in Figure 6.3. This shows that the mean BMI of the whole sample at T1 was within the obese weight category (31.33). As a group, the participants in this study were significantly over weight. Mean BMI, however, was shown to decrease consistently over the course of the study from 31.33 at T1, to 30.82 at T2, 30.08 at T3 and 29.50 at T4. Standard deviations at each time period were between 6.19 and 6.27 showing that although there was a reasonable level of variability

within the sample, the variability remained similar over time. BMI mean score at T4 shows that as a group, the participants were at the BMI level categorised as 'high', with weight having fallen from obese level, i.e. the average weight had moved down a BMI level.

Figure 6.3. Mean BMI scores over the four measurement points in the DSD Programme



The next step was to investigate whether there was an effect of time on BMI and whether there was an effect of group (A v B) on BMI over time. The mean BMI's over time for both the groups are shown below in Table 6.6.

Table 6.6. Mean BMI's at the 4 measurement points by group

Group		**BMI T1**	**BMI T2**	**BMI T3**	**BMI T4**
A	Mean	28.32	27.70	27.04	26.85
(N=14)	SD	2.85	2.78	2.88	3.04
B	Mean	32.36	31.88	31.11	30.41
(N=41)	SD	6.79	6.78	6.69	6.80

As the above table shows, BMI decreases in both groups across the study, although clearly BMI is lower in group A all the way through. Initially, a mixed ANOVA was run (the within

variable was Time with four levels and the between variable was group with two levels) in order to establish whether there was an effect of time on BMI, whether there was an effect of group on BMI and whether there was an interaction effect between time and group. The data was tested for homogeneity of variance and was found to violate this assumption – Levene's test indicated that variances for all levels of time were significant. Consequently, these variables were transformed through standardisation, however, subsequent analyses revealed that Levene's tests for homogeneity of variance were still highly significant which meant the data was unsuitable for this analysis.

Consequently, two analyses were run using tests for nonparametric data. Firstly, the data were tested to see if group had an effect on BMI throughout the study. A Mann Whitney test was run comparing the experimental group to the control group on BMI at each of the four measurement points. The Monte Carlo method of calculating significance was adopted as this gives a more accurate figure (Field, 2005). Since there was no specific hypothesis about the direction of any possible difference between the two groups, two-tailed significance levels were used. Medians, mean ranks and sum of ranks are shown below in Table 6.7.

The results showed that groups A and B did not differ at T1 on BMI (medians were 28.62 and 30.73 respectively), U = 190.00, ns, r = -.25. Similarly, there was no difference between the groups at T2 (medians were 27.71 and 30.19 respectively), U = 190.00, ns, r = -.25, at T3 (medians were 27.11 and 29.63 respectively), U = 197.00, ns, r = -.23 or at T4 (medians: 26.70 and 28.84 respectively), U = 212.00, ns, r = -.20. It should be noted that the significance level did approach significance, and if one-tailed significance levels had been used the groups would have been significantly different at T 1-3 (p = .03). In each case it would appear that group A had a slightly lower BMI than the group B throughout the study. From Figure's 6.4 and 6.5 it can be seen that group A's BMI changed most between T1 and 3 whereas group B's BMI decreased most between T2 and T4. However, the above analysis suggests that these differences are not statistically significant.

Table 6.7 Mean ranks and sum of ranks for BMI at four time points for groups A and B.

	Group	N	Median	Mean Rank	Sum of Ranks
BMI1	*B*	41	30.73	30.37	1245.00
	A	14	28.62	21.07	295.00
BMI2	*B*	41	30.19	30.37	1245.00
	A	14	27.71	21.07	295.00
BMI3	*B*	41	29.63	30.20	1238.00
	A	14	27.11	21.57	302.00
BMI4	*B*	41	28.84	29.83	1223.00
	A	14	26.70	22.64	317.00

Figure 6.4. Mean BMI scores for group B

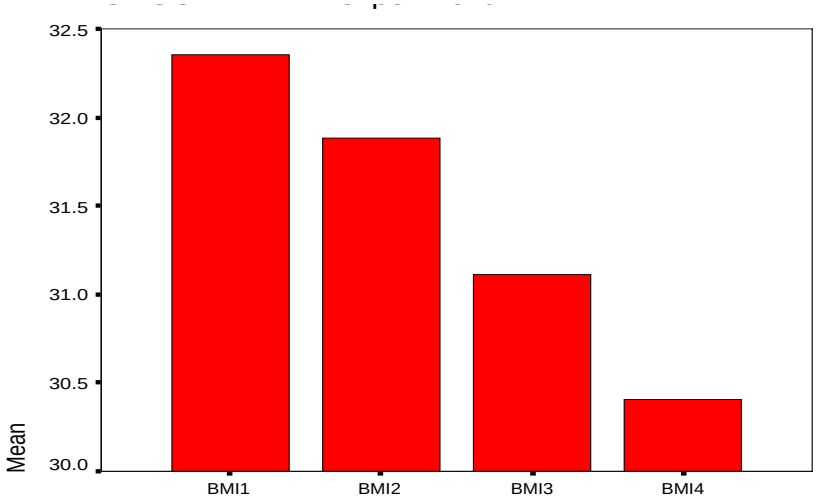
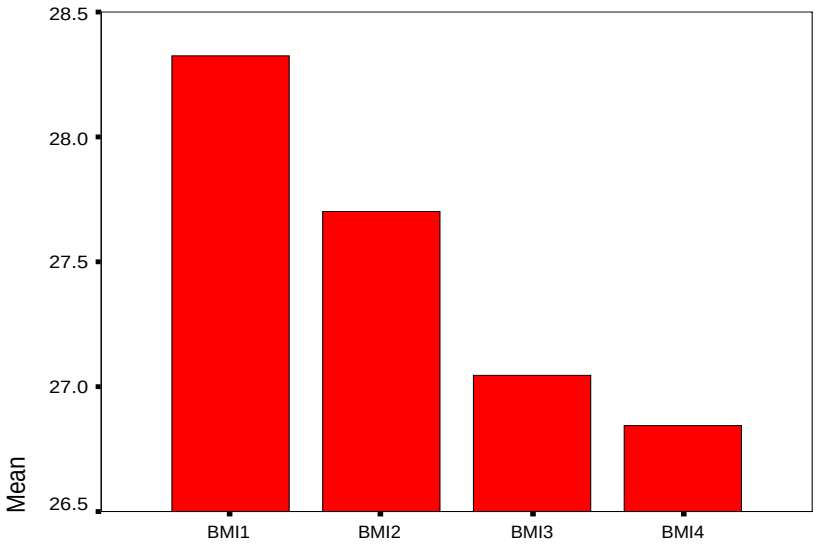


Figure 6.5 Mean BMI scores for group A



A second analysis was carried out in order to establish whether BMI decreased significantly over the course of the study. Since the data did not meet the conditions required for parametric tests to be performed, the nonparametric equivalent was used – Friedman's ANOVA. This analysis showed that BMI did decrease significantly over the four months of the study, X_2 (3) = 146.955, p <.001. In order to establish which comparisons were statistically significant, Wilcoxon signed-rank tests were carried out and a Bonferroni correction was applied to correct for the number of tests run. The following comparisons were carried out:

1. BMI T1 to BMI at T2
2. BMI T1 to BMI T3
3. BMI T1 to BMI T4
4. BMI T2 to BMI T3
5. BMI T2 to BMI T4
6. BMI T3 to BMI T4

The Bonferroni correction was applied (significance level of 0.05 is divided by the number of comparisons performed) and so all effects are reported at a 0.0083 level of significance.

It appeared that BMI decreased significantly between T1 and T2 (T=1, r = -.57), between T2 and T3 (T= 1, r = -.58) and between T3 and T4 (T= 2, r = -.54). Consequently, the differences between T1 and T3, T1 and T4, and T2 and T4 were also significant (T<2 in each case, with the effect size r ranging from -.56 to -.60). These results show that BMI did decrease significantly over the course of the four month study and that a significant decrease occurred over each month, i.e., participants BMI decreased significantly each month. Furthermore, the BMI decrease was steady across the study.

Changes in BMI grouping

Changes in BMI scores resulted in 19 participants moving to a lower BMI group. The number of participants classified as 'obese' and 'overweight' decreased from T1-T4 and the number of participants classified with 'healthy' BMI scores increased by 22% (see Table 6.8).

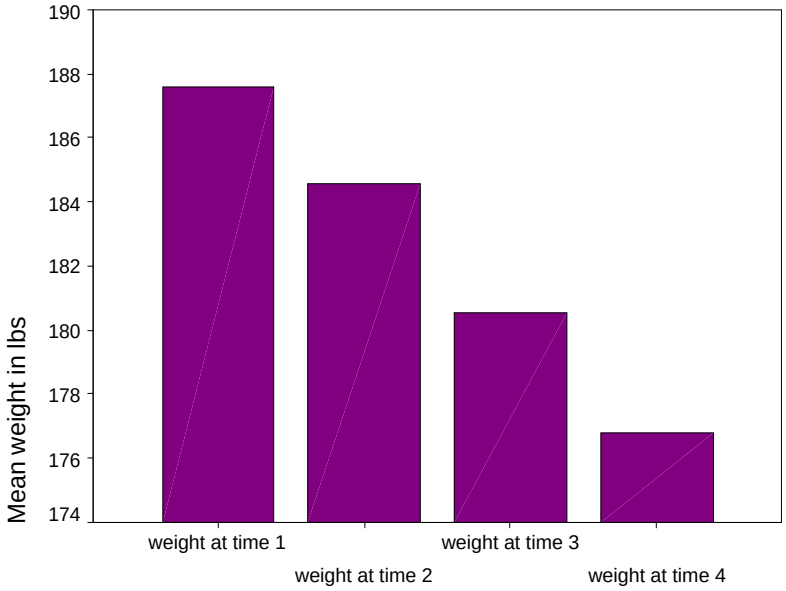
Table 6.8 Frequency of participant's in normal, overweight and obese BMI groups at T1-T4.

BMI classification	**Time 1**	**Time 2**	**Time 3**	**Time 4**
Healthy	6	9	12	16
Overweight	23	21	22	18
Obese	26	25	21	21

Weight Loss

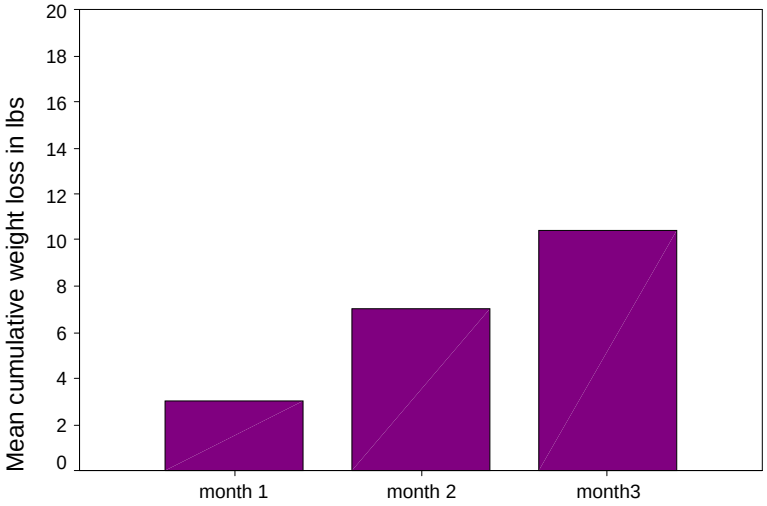
BMI is the primary measure here but changes in actual weight can also be examined in order to see how much weight was being lost over the study. Weight in lbs was measured and mean weight over the course of the study can be seen below in Figure 6.6. In terms of weight in lbs, mean weight for the whole sample was 187.58 lbs (T1), 184.55lbs (T2), 180.55lbs (T3) and 176.80 lbs (T4).

Figure 6.6 Mean weight in lbs across the DSD programme



Average loss (in lbs) for each month was 3.03lbs (month 1), 4.02lbs (month 2) and 3.74lbs (month3) which is steady. Month 2 showed a slightly larger drop in weight than month's one or three. Cumulative decrease in weight is shown below in Figure 6.7. By the end of the DSD programme mean total weight loss was approximately ten pounds.

Figure 6.7 Cumulative weight loss in lbs across the DSD programme



A Friedman ANOVA was run on this since the data was not suitable to be run in a parametric test. Like the BMI data, weight loss in lbs was also significant across the four month trial, $X_2 = 152.733$, $p < .001$. Medians for each time measure were 180.0 lbs (T1), 175 lbs (T2), 172 lbs (T3) and 169 lbs (T4). In order to establish which comparisons were statistically significant, Wilcoxon signed-rank tests were carried out and a Bonferroni correction was applied to correct for the number of tests run. The following comparisons were carried out:

1. weight T1 to weight at T2
2. weight T1 to weight T3
3. weight T1 to weight T4
4. weight T2 to weight T3
5. weight T2 to weight T4
6. weight T3 to weight T4

All effects are reported at a 0.0083 level of significance.

It appeared that weight in lbs decreased significantly between T1 and T2 (T=1, r = -.56), between T2 and T3 (T= 0, r = -.57) and between T3 and T4 (T= 0, r = -.55). Consequently, the differences between T1 and T3, T1 and T4, and T2 and T4 were also significant (T<2 in each case, with the effect size r ranging from -.56 to -.60). These results show that weight did decrease significantly over the course of the four month study and that a significant decrease occurred over each month.

It appears then that weight, and BMI, did decrease significantly across the DSD programme. This occurred in both groups. Participants lost weight steadily such that there was a small but significant decrease in weight or BMI each month. Thus increases in behavioural flexibility do appear to have been accompanied by decreases in BMI. However, the analyses so far have not addressed the 'dose-response relationship' between behavioural flexibility – was the extent to which behavioural flexibility increased related to the extent to which BMI decreased?

6.5.4.3 Analyses To Test For the Presence of a 'Dose-response relationship'

The data was analysed in order to examine whether a 'dose-response relationship' was present. This was performed via a correlation analysis. Changes in behavioural flexibility T1-T2 and T1-T4 were entered, along with change in BMI from T1-T2, T1-T3, and T1-T4. The results showed there to be several significant relationships, shown below in Table 6.9.

Table 6.9 Pearson correlation coefficients and significance values for change in BMI and change in behavioural flexibility

Behavioural flexibility change		***BMI***		***Change***
		T1-T2	**T1-T3**	**T1-T4**
T1 to T2	r	**.267**	**.314**	**.488**
	p	**.048**	**.019**	**.000**
T1 to T4	r	.240	.298	**.458**
	p	.078	.027	**.000**

The above results show clearly that there is a dose-response relationship between BMI and Behavioural Flexibility. Initial BMI change between T1 and T2 is significantly and positively correlated with the extent to which behavioural flexibility changed (T1-T2) – thus the degree of increase in behavioural flexibility is related to the degree of reduction in BMI.

Similarly, the extent to which BMI decreased between T1 and T3 is also significantly and positively related to the extent to which behavioural flexibility increased between T1 and T2. Finally, the extent to which BMI decreased between T1 and T4 is significantly related to the extent to which behavioural flexibility increased both over the initial training period (T1-T2) and to the extent to which behavioural flexibility changed over the course of the study (T1-T4). Thus BMI change was strongly related to changes in behavioural flexibility.

To summarise then, BMI scores across the measurement points within the DSD programme are consistently related to behavioural flexibility scores, such that at every time point increased behavioural flexibility is related to decreased BMI. Secondly, behavioural

flexibility increased significantly across the DSD programme and BMI decreased significantly across the DSD programme. Finally, and perhaps more importantly, the extent to which BMI was found to decrease was significantly related to the extent to which behavioural flexibility increased. Despite the existence of a traditional waiting list group, the findings support the hypotheses that behavioural flexibility and BMI are related and that changing behavioural flexibility can result in changes in BMI.

6.5.5 Objective Four: To investigate whether diet and exercise changed over the DSD programme

There are two relevant analyses to determine whether diet and exercise changed over the course of the DSD programme. Firstly, group A's behaviour can be examined. Behaviour for T0-T1 can be compared to behaviour T1-T4 using repeated measures ANOVA. If behaviour for group A was the same T0-T1 as it was from T1-T4, then completing the DSD programme had no influence on diet/exercise behaviours and any changes would therefore likely be due to the process of keeping diaries.

Secondly, mixed design ANOVA's can be performed on each measure of diet and exercise taken from T1-T4 where one between subjects factor is observed (group: A and B) and one within group variable (diet/exercise measure across the measurement points in the DSD programme) is observed. This allows us to see if there were significant differences in diet or exercise across the DSD programme, but also allows us to see if there were any significant differences between groups A and B on the dependent variables across the DSD programme.

6.5.5.1 Diet and the DSD programme

The first analysis concerned group A's diet across the study – was their behaviour T0-T1 the same as T1-T4? Table 6.10 below shows mean food intake and SD's for group A and F values for main effect of time on the dependent variable. Also shown is whether post hoc comparisons (Sidak comparisons reported) revealed the differences to lie between the

'waiting list' month (T0-T1) and the DSD programme (T1-4) or between the months of the DSD programme (T1-T4) only.

Significant decreases were found for fat intake between T0-T1 and T2-T3 ($p<.01$). A significant difference was also found between T0 –T1 and T3-T4 ($p<.01$), T1-T2 and T2-T3 ($p<.01$) and between T2-T3 and T3-T4 ($p<.05$). Thus there was a significant decrease in fat intake at each month. Intake of the other food groups, or alcohol, did not change significantly.

Overall diet scores increased significantly (higher scores indicating a diet higher in fruit, vegetables, protein and brown carbohydrates and lower in fats, white carbohydrates and alcohol). Significant differences were found between T0-T1 and T2-T3 ($p<.001$) and T0-T1 and T3-T4 ($p<.001$).

Self–report ratings of healthiness of diet were found to increase significantly. Post hoc comparisons revealed significant differences to exist between T0-T1 and T2-T3 ($p<.05$) and between T0-T1 and T3-T4 ($p<.01$). Thus participants rated their diet as becoming increasingly healthier over the course of the DSD programme.

Rated adherence to diet was also found to increase. Post hoc comparisons revealed significant differences to lie between T0-T1 and T1-T2, T2-T3 and T3-T4 ($p<.05$ in each case). Furthermore adherence to diet also increased significantly for group A as the DSD programme progressed with T1-T2 being significantly different to T2-T3 ($p<.05$) and T3-T4 ($p<.05$). Thus participants felt their adherence to a healthy diet became significantly better as the DSD programme progressed.

Table 6.10. Mean food intake, significant F values and post hoc comparisons for group A across DSD programme

Diet/exercise measure		**T0-T1**	**T1-T2**	**T2-T3**	**T3-T4**	**F value & sig.**	**control v DSD change sig?**	**DSD change sig?**
Average daily calorie intake	Mean	1615.51	1518.07	1496.56	1493.39	n/s	n/a	n/a
	SD	405.96	376.34	345.52	342.91			
White carbohydrates	Mean	2.18	1.71	1.69	1.66	n/s	n/a	n/a
	SD	1.85	1.02	1.01	0.99			
Brown Carbohydrates	Mean	0.42	0.46	0.62	0.63	n/s	n/a	n/a
	SD	.76	0.59	0.63	0.64			
Fats	Mean	1.64	0.92	0.70	0.71	16.355	yes	yes
	SD	1.34	0.86	0.01	0.01	p< .001	p<.01	p<.05
Protein	Mean	2.92	2.73	2.67	2.67	n/s	n/a	n/a
	SD	1.68	1.71	1.72	1.72			
Fruit/vegetables	Mean	2.64	2.65	2.96	2.90	n/s	n/a	n/a
	SD	2.06	1.32	1.47	1.48			
Alcohol	Mean	1.28	1.13	1.24	1.26	n/s	n/a	n/a
	SD	1.81	0.99	1.07	1.07			
Total Food Score	Mean	1.85	2.38	3.22	3.26	13.041	yes	no
	SD	3.82	3.85	3.77	3.79	p < .01	p<.001	
Healthiness of diet rating	Mean	3.89	4.26	4.68	4.75	15.168	yes	no
	SD	1.22	0.93	1.02	1.04	p <.001	p<.01	
Adherence to diet rating	Mean	3.24	4.04	4.38	4.41	21.347	yes	yes
	SD	1.78	1.71	1.75	1.76	p< .001	p<.05	p<.05
Ease of adherence to diet rating	Mean	3.23	3.85	3.87	3.87	5.148	no	yes
	SD	1.72	1.83	1.83	1.83	p < .05		p<.05

Mean rated ease of adherence to diet increased significantly once the DSD programme had begun. Sidak comparisons showed there to be significant changes between T1-T2 and T2-T3, between T1-T2 and T3-T4, and between T2-T3 and T3-T4 ($p<.05$ in each case), indicating a steady increase in the extent to which participants felt they could easily adhere to a healthy diet.

Thus it can be seen that some aspects of diet changed significantly between T0-T1 (the 'waiting list' month where only food/exercise diaries were kept) and some changed only once participants had engaged with the DSD programme (T1-T4). Fat intake decreased significantly between T0-T1 and T1-T4 and overall diet appeared to improve significantly. How participants rated their diet also appeared to change between T0-T1 and T1-T4 – rated healthiness of diet, rated adherence to diet, rated ease of adherence to diet and rated enjoyment of exercise all increased significantly from T0-T1 to T1-T4, suggesting that participants perceptions of or feelings about diet and exercise may have altered in a positive manner. Whilst these findings do not rule out an influence of diary keeping, they do suggest, at the very least, that the DSD programme also had an effect on diet and perceptions of dietary behaviour.

A second set of analyses was conducted to examine the sample as a whole. This analysis aimed to establish whether there were differences between groups A and B over the course of the programme (T1-T4) and whether the sample as a whole demonstrated changes in their diet over the course of the programme. A mixed design ANOVA was run for each of the diet variables. Table 6.10 below shows mean scores, for the whole sample, for each diet variable measured.

ANOVA's for each food group were performed - the within variable was time (three levels: T1-T2, T2-T3 and T3-T4). In each case the assumption of sphericity was violated so the Greenhouse-Geisser value is reported. Table 6.12 shows the dependent variables and F values, where significant, for main effect of time (there was no main effect of group or interaction effect on any of the dependent variables). The table also shows the direction of change and which Bonferroni (correction applied) post hoc comparisons were significant.

Table 6.11. Mean food intake for all participants over the DSD programme

Diet/exercise measure		T1-T2	T2-T3	T3-T4
Average daily calorie intake	Mean	1538.32	1539.16	1516.57
	SD	327.20	278.53	280.06
White carbohydrates	Mean	1.40	1.39	1.36
	SD	1.02	1.01	0.99
Brown carbohydrates	Mean	0.71	0.815	0.824
	SD	0.86	0.93	0.94
Fats	Mean	0.87	0.08	0.06
	SD	0.77	0.07	0.09
Protein	Mean	3.01	3.00	3.00
	SD	1.68	1.63	1.64
Fruit/vegetables	Mean	2.99	3.33	3.34
	SD	1.36	1.51	1.51
Alcohol	Mean	0.79	0.88	0.88
	SD	0.88	0.95	0.95
Total food Score	Mean	3.73	4.80	4.87
	SD	4.17	4.12	4.11
Healthiness of diet rating	Mean	4.21	4.63	4.65
	SD	0.99	1.10	1.12
Adherence to diet rating	Mean	4.23	4.58	4.60
	SD	1.63	1.68	1.68
Ease of adherence to diet rating	Mean	4.25	4.26	4.37
	SD	1.55	1.56	1.56

Table 6.12 F values and significance levels for main effect of time on diet variables for whole sample

Dependent variable	F value & sig.	T1-T2 v T2-T3 significance	T1-T2 v T3-T4 significance	T2-T3 v T3-T4 significance
Average daily calorie intake	n/s	n/s	n/s	n/s
White carbohydrates	92.693 p <.001	decrease p<.001	decrease p<.001	decrease p<.001
Brown carbohydrates	23.067 p<.001	increase p<.001	increase p<.001	increase p<.001
Fats	51.259 p<.001	decrease p<.001	decrease p<.001	n/s
Protein	n/s	n/s	n/s	n/s
Fruit/vegetables	189.114 p<.001	increase p<.001	increase p<.001	n/s
Alcohol	38.856 p<.001	increase p<.001	increase p<.001	n/s
Total food score	45.965 p<.001	increase p<.001	increase p<.001	increase p<.01
Healthiness of diet rating	183.352 p<.001	increase p<.001	increase p<.001	n/s
Adherence to diet rating	63.444 p<.001	increase p<.001	increase p<.001	n/s
Ease of adherence to diet rating	6.677 p<.01	n/s	increase p<.05	increase p<.01

For the sample as a whole, intake of white carbohydrate decreased significantly over the entire course of the DSD programme which was accompanied with a significant increase in brown carbohydrate intake all the way through to T4. Fat intake did decrease significantly during the first two months of DSD programme but there was not a further decrease during the last month. Fruit and vegetable intake increased significantly during the first two months of the DSD programme, but did not increase further in the final month. Alcohol intake increased until the end of the second month but did not increase further during month 3. Increasing total diet scores suggest that diet improved significantly until the end of the DSD programme.

With respect to perceptions of diet, participants perceived their diet to become increasingly healthy and reported better adherence until T3 but there were no further changes thereafter. With respect to rated ease of adherence, participants did perceive adherence to become easier until T3.

It can be seen therefore that participant group did not affect diet measures at any point throughout the study. It appears however that the DSD programme was related to dietary behaviours. Several aspects of the participants diets changed: there were increases in brown carbohydrate intake and fruit/vegetable consumption and decreases in white carbohydrate intake and fat intake. Overall, diets did improve, however, it should be noted that there was a small but significant increase in alcohol consumption. With respect to how the participants rated their diet, there were increases in the extent to which they felt their diet was healthy, the extent to which they adhered to a healthy diet and in the ease with which they were able to adhere to this healthy diet. Consequently it can be seen that aspects of diet did change (and in a positive way) over the DSD programme, as did participant perceptions, and analysis of group A data suggests that these changes were facilitated by the DSD programme rather than just by keeping food diaries.

6.5.5.2 Exercise levels and the DSD Programme

As with the dietary variables, data is analysed and presented in two parts. Firstly, group A only data is analysed to determine whether there were differences between exercise during the T0-T1 phase (when participants just kept food and exercise diaries) and T1-T4 (when participants kept both food/exercise diaries and performed DSD activities). Again, if there were no differences between exercise T0-T1 and T1-T4 it could be assumed that the DSD activities had no influence on exercise. Secondly, mixed design ANOVA's were run to determine whether group's A and B differed across the study on any of the exercise measures and whether changes in exercise occurred in the whole sample across the DSD programme.

Table 6.13 below shows mean exercise levels and ratings for group A. Mean scores have been calculated for T0-T1 and for T1-T2, T2-T3 and T3-T4. The table also shows if there was a significant difference in these behaviours over time and if so whether changes in

exercise behaviour occurred between T0-T1 ('control' month) and the DSD programme months or if they just occurred during the DSD programme. Sidak comparisons were performed and Greenhouse-Geisser values are reported throughout as data violated assumptions of sphericity.

Table 6.13. Mean exercise levels and ratings, F values and post hoc comparisons for group A across DSD programme

Diet/exercise measure		**T0-T1**	**T1-T2**	**T2-T3**	**T3-T4**	**F value & sig.**	**Control to DSD change sig?**	**DSD change sig?**
Average daily cardiovascular exercise (mins)	Mean SD	16.72 14.04	17.28 14.27	21.11 15.56	16.93 13.39	4.981 p<.05	yes p<.05	yes p<.05
Average daily resistance exercise (mins)	Mean SD	1.34 1.91	1.55 2.35	1.93 2.42	1.81 2.97	n/s	n/s	n/s
Adherence to exercise rating	Mean SD	2.54 1.37	2.96 1.60	3.61 1.83	3.17 1.86	n/s	n/s	n/s
Ease of adherence to exercise rating	Mean SD	2.35 1.37	3.34 1.91	3.65 2.03	4.00 1.99	n/s	n/s	n/s
Enjoyment of exercise rating	Mean SD	2.56 1.51	3.22 1.85	3.73 1.78	4.49 1.81	7.464 p<.001	yes p<.05	yes p<.05

Table 6.13 shows average time spent performing cardiovascular exercise to have increased significantly during the DSD programme and behaviour during the programme was significantly different to behaviour during T0-T1.The changes in resistance exercise were not statistically significant. With respect to the self-ratings of exercise, each showed a gradual increase over the entire course of the study, so regardless of objective measures, participants felt their adherence levels to be increasing, they found it easier to adhere to their diet and exercise and they also rated exercise as being more enjoyable. Only mean rated enjoyment of

exercise was found to increase between the control and trial months ($p<.05$). Thus participants rated exercise as more enjoyable after beginning the DSD programme.

It appears then that there were some changes in time spent performing cardiovascular exercise, but not resistance exercise, over the DSD programme and that rated enjoyment of exercise also increased from T0-T1 to T1-T4. Since there were some changes in behaviour between T0-T1 and T1-T4 we might conclude that the DSD programme had some influence on exercise behaviour and perceptions of exercise, although we cannot rule out the possibility that keeping diaries also had some effect.

A second set of analyses were run which aimed to establish whether there were differences between groups A and B over the course of the DSD programme in relation to their exercise levels. It also aimed to examine whether the sample as a whole demonstrated changes in their exercise over the course of the programme. In order to establish this ANOVA was run for each of the exercise variables. Table 6.14 below shows mean scores, SD's, significant F values and significance level for main effect of time on the dependent variables, and post hoc comparisons and significance for the whole sample. Greenhouse-Geisser values are reported because the data violated sphericity and Bonferroni comparisons with corrections are reported. Main effects of group and interaction effects for each analysis were all non-significant.

Table 6.14 Means, SD's and main effect of time for exercise variables across the DSD programme

Exercise variable	Mean/SD	T1-T2	T2-T3	T3-T4	F value & sig.	T1-T2 v T2-T3 sig.	T1-T2 v T3-T4 sig.	T2-T3 v T3-T4 sig.
Average daily cardiovascular exercise (mins)	Mean SD	17.54 14.26	20.52 15.70	17.66 14.02	29.262 p<.001	increase p<.001	n/s	decrease p<.001
Average daily resistance exercise (mins)	Mean SD	2.29 2.91	2.57 3.01	3.01 4.29	n/s	n/a	n/a	n/a
Adherence to exercise rating	Mean SD	3.05 1.56	3.73 1.78	3.51 1.95	4.688 p<.05	increase p<.05	increase p<.05	n/s
Ease of adherence to exercise rating	Mean SD	3.69 1.96	3.66 2.03	4.35 1.64	6.303 p<.01	n/s	increase p<.05	increase p<.05
Enjoyment of exercise rating	Mean SD	3.27 1.70	3.74 1.61	4.69 1.72	18.587 p<.001	increase p<.05	increase p<.01	decrease p<.01

Table 6.14 shows that there were changes in some aspects of exercise and perceptions of exercise but that these did not change in a consistent way. Participants significantly increased the time they spent engaging in cardiovascular exercise (for part of the intervention) and rated their adherence to exercise regimes as improved through the course of the DSD programme. Furthermore, the ease with which they could adhere to the exercise regime increased and so did their enjoyment of exercise. It seems that, in relation to exercise, changes in both behaviour and perceptions occurred over the DSD programme.

6.5.6. To investigate if there is a dose-response relationship between the extent to which diet and exercise changed and behavioural flexibility changed.

In order to establish whether the above changes in diet and exercise were related to changes in behavioural flexibility, the extent to which changes occurred in all diet and exercise variables (from T1 to T4) and in all measures of behavioural flexibility (from T1 to T4) were entered into a Pearson correlation analysis. This would establish whether there is a dose-response relationship whereby the extent to which diet or exercise changed was related to the extent to which behavioural flexibility.

Change in several diet measures were found to be significantly correlated with changes in behavioural flexibility (see Table 6.15). Firstly, change in calorie in intake was found to be significantly correlated with change in behavioural flexibility whereby the extent to which calorie intake decreased was related to the extent to which behavioural flexibility increased. Participants who rated themselves as adhering more to a healthy diet also reported greater increases in behavioural flexibility. With respect to exercise, participants who increased their behavioural flexibility to a greater extent also increased the time they spent performing cardiovascular and resistance exercise to a greater extent and rated themselves as having increased their adherence to an exercise regime to a greater extent.

There is some tentative evidence for a dose-response relationship between changes in diet and exercise and changes in behavioural flexibility. The extent to which some FIT variables increased was significantly related to the extent to which changes in intake of some food groups occurred as well as the extent to which time spent exercising increased. Improvements in diet and exercise appear therefore, at least in part, to be attributable to increased levels of behavioural flexibility.

Table 6.15 Significant pearson correlations for changes in diet/exercise and changes in behavioural flexibility

Change in Diet/exercise variable	**Pearson & p value**	**Increase in Behavioural Flexibility**
Calorie intake decrease	r p	-.337 <.05
Rated adherence to diet increase	r p	.376 <.01
Cardiovascular exercise increase	r p	.548 <.001
Resistance exercise increase	r p	.476 <.001
Rated adherence to exercise increase	r p	.571 <.001

6.5.7. Objective 6: To investigate changes in psychological well being

The primary focus of the present study was on physical indicators of well being (BMI), but any improvements in psychological well being would also be important. In order to examine whether psychological well being improved, mixed ANOVA's were run on anxiety and depression scores across the DSD programme. In each case, the within subjects variable was time (3 levels: T1; 2 and 4) and the between subjects variable was group (two levels: A and B). The assumption of sphericity was violated in both analyses and so Greenhouse-Geisser corrections are reported.

There was a main effect of time on anxiety (Greenhouse-Geisser correction reported), $F(1.771,93.884) = 67.70$, $p<.001$. Sidak comparisons revealed that anxiety decreased significantly between T1 and T2 ($p<.005$) with this decrease being maintained until T4 ($p<.005$). Mean anxiety scores were 9.98 at T1, 8.83 at T2 and 8.61 at T4. There was no significant difference between scores at T2 and T4 ($p>.05$). There was no main effect of group (so the two groups did not differ from each other on anxiety) and no interaction effect.

There was a main effect of time on depression (Greenhouse-Geisser correction reported), $F(1.508,79.898) = 27.69$, $p <.001$. Sidak comparisons showed that depression scores decreased significantly between T1 (mean 8.25) and T2 (mean 6.75), $p <.05$, and although there was a further decrease between T2 and T4 (mean depression score at T4 = 6.35), this difference was not significant. There was no main effect of group and no significant interaction effect. Thus the groups did not differ significantly from each across the study, but the sample as a whole showed a significant decrease in depression between T1 and T2.

6.5.8. Objective 7: To model BMI and changes in BMI

Changes in BMI across the DSD programme were significant and it also appears that there were significant changes in both behavioural flexibility and in diet and exercise. This section considers which variables are significant determinants of BMI and changes in BMI over the DSD programme. Analyses will be presented in two ways. Firstly, BMI at T1, T2 and T4 will be modelled. These particular measurement times have been selected in order to determine

which variables pre- DSD programme were important in explaining BMI, which variables were important for explaining BMI after one month of DSD training and which variables are important for explaining BMI after the DSD programme had been completed.

The second analysis is concerned with explaining changes in BMI. This is potentially very complex because BMI was measured at 4 points and consequently change in BMI over several time frames could be modelled. In order to keep this section simple, change in BMI between T1 and T2 (before and after the months DSD training) and change in BMI between T1 and T4 (before and after complete DSD programme) only will be modelled.

6.5.8.1 BMI at T1

BMI at T1 was related only to behavioural flexibility at T1 (r = -.362, p <.01). A simple regression analysis, with only significant correlates entered, showed that behavioural flexibility at T1 was a significant predictor of BMI at T1 (F(1,53) = 7.985, p <.01), accounting for 13.1% of the variance in BMI at T1 (adjusted R square = .115). Table 6.16 below shows the Beta weight and associated statistics.

Table 6.16 Regression analysis of BMI T1 onto behavioural flexibility T1.

	B	**SE B**	**Beta weight**	**t**	**Sig.**
Constant	35.301	1.615		21.862	.000
Behavioural flexibility	-.123	.043	-.362	-2.826	.007

R square = .0120
Adjusted R square = 0.115

6.5.8.2 BMI at T2

BMI at T2 was found to be significantly related to the following variables: behavioural flexibility at T1 (r = - .368, p <.01); behavioural flexibility at T2 (r = -.328, p <.05) and change in time spent performing resistance exercise between T1 and T2 (r = .297, p <.05). Multiple regression analyses were run with significant correlates entered (and data was found

not to violate any assumptions) however the best fit model was constructed from just behavioural flexibility at T1. Table 6.17 below shows the individual beta weights and associated statistics for the best fit model. This model accounted for 36.8% of the variance in BMI at T2 (adjusted R square = .177).

Table 6.17 Regression analysis of BMI T2 onto behavioural flexibility

Variable	**B**	**SE B**	**Beta weight**	**t**	**Sig.**
Constant	34.859	1.612		21.626	.000
Behavioural flexibility T1	-.125	.043	-.368	-2.880	.006

R square = .183
Adjusted R square = .177

It appears at T2, BMI is still predicted only by behavioural flexibility. It is interesting to note that Behavioural Flexibility at both T1 and T2, when entered separately (and not together where they cancelled each other out) produced models that were statistically significant, however, Behavioural Flexibility at T1 accounted for more variance in BMI at T2 than Behavioural Flexibility at T2.

6.5.8.3 BMI T4

BMI at T4 was found to be significantly related to the following variables: behavioural flexibility at T1 (r = - .436, p <.01); behavioural flexibility at T2 (r = -.406, p <.01); behavioural flexibility at T4 (r = -.403, p <.01) and total change in ease of adherence to a healthy diet (r = -.282, p < .05). Several multiple regression analyses were run with significant correlates entered (data was found not to violate any assumptions) however the best fit model was constructed from just behavioural flexibility at T1. Table 6.18 below shows the individual beta weights and associated statistics for the best fit model. This model accounted for 27.5% of the variance in BMI at T4 (adjusted R square = .247).

Table 6.18 Regression analysis of BMI T4 onto behavioural flexibility T1

Variable	B	SE B	Beta weight	t	Sig.
Constant	34.265	1.552		22.077	.000
Behavioural flexibility T1	-.147	.042	-.436	-3.527	.001

R square = .253
Adjusted R square = .247

It appears at T4, BMI is still predicted only by behavioural flexibility. Again it should be noted that behavioural flexibility at T1 and not at T2 or T4, contributed to the best fit model.

6.5.8.4 BMI change between T1 and T2

This section aims to explain BMI change over the training portion of the DSD programme (when individuals where explicitly told to complete the various DSD activities, T1-T2). There were several variables which might predict change in BMI between T1 and T2. Brown carbohydrate intake over month 1 ($r = .313$, $p < .05$), change in exercise adherence between T1 and T2 ($r = .360$, $p < .01$) and change in behavioural flexibility between T1 and T2 ($r = .267$, $p < .05$) were all significantly correlated and were therefore included in the subsequent analysis.

Multiple regression analysis was run in order to establish the best fit model for predicting BMI change T1-T2. Significant correlates only were entered using the enter method. Test statistics showed the data was suitable for analysis. The results suggested that the extent to which rated adherence to exercise had increased between T1 and T2 was the only significant predictor of BMI change T1-T2 ($F(2,52) = 4.187$, $p=.021$). These variables accounted for 37.2% of the variance in BMI change (R square adjusted = .106). Beta weights and associated statistics are shown below in Table 6.19.

Table 6.19 Regression analysis of BMI change T1-T2 onto general efficacy and change in adherence to exercise T1-T2

Variable	B	SE B	Beta weight	t	Sig.
Constant	-.383	.103		3.713	.001
Behavioural flexibility change T1-T2	.005	.007	.110	.727	.471
Change in exercise adherence T1-T2	.082	.041	.304	2.015	.049

R square = .112
Adjusted R square = .106

Although there did appear to be a dose-response relationship between behavioural flexibility increase and BMI decrease, the model above suggests that the extent to which adherence to exercise regimes increased were better able to explain BMI decrease T1-T2. However, it was found that change in exercise adherence T1-T2 was significantly related to aspects of change in behavioural flexibility T1-T2. Thus, one possible model, as tested through regression analysis, is displayed below in Figure 6.8. Beta weights are highlighted in red. Increase in Behavioural Flexibility T1-T2 accounted for 27% of the variance in increased adherence to exercise – statistics are shown below in Table 6.20.- and the model was found to be statistically significant – $F(2,52) = 19.631$, $p < .001$.

Table 6.20 Regression of increased exercise adherence T1-T2 onto increased behavioural flexibility T1-T2

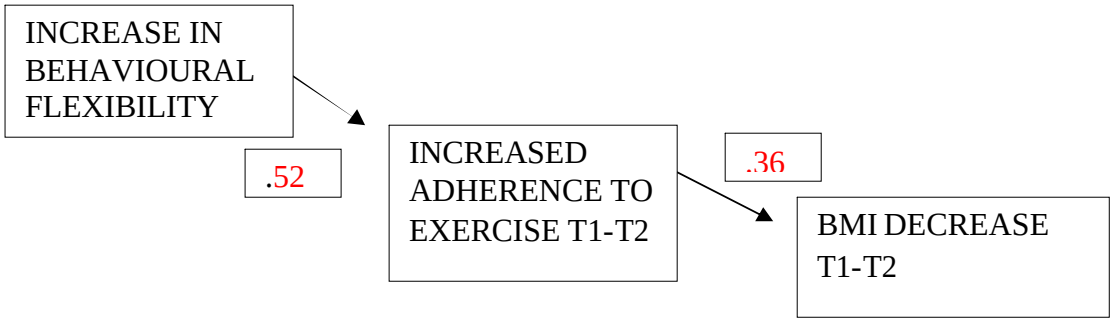
Variable	B	SE B	Beta weight	t	Sig.
Constant	-.588	.338		-1.738	.088
Behavioural flexibility increase T1-T2	.088	.020	.520	4.431	.000

R square = .278
Adjusted R square = .270

Results suggest then that behavioural flexibility's main influence in changing BMI in the training section of the DSD programme could be through altering aspects of exercise, primarily the extent to which individuals are able to adhere to exercise regimes. Such results

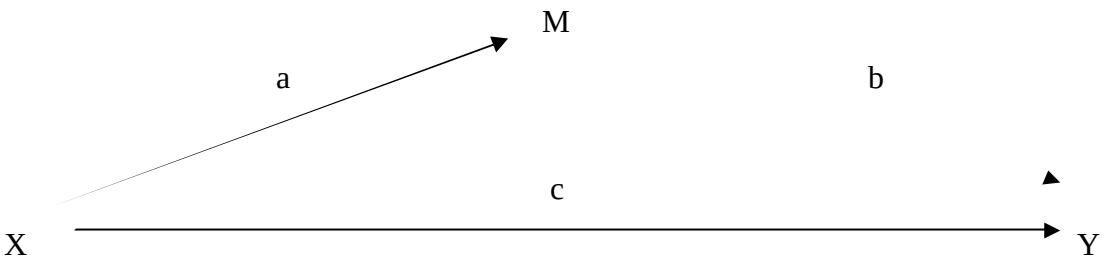
suggest that the exercises within the DSD programme, which did effectively increase behavioural flexibility, may have impacted on health behaviours which have facilitated change in BMI.

Figure 6.8 Predictor variables for BMI decrease T1-T2



The above model suggests that dietary or exercise variables may be mediating the behavioural flexibility change – BMI change relationship. A full mediated model as suggested by Baron & Kenny (1986) is shown below in Figure 6.9. The effect of X on Y may be mediated by variable M, path c is referred to as the direct effect and where complete mediation is found path c' is zero. Partial mediation occurs when X and Y are still related but the strength of the effect is reduced, such that the absolute size of the relationship is still greater than zero when the mediator is controlled.

Figure 6.9. Generic mediated model



Mediation analysis using the Sobel test and the Goodman test (used when sample sizes are small, e.g. Preacher & Hayes, 2004) for mediation was performed. The test statistic for Sobel was returned as 1.82, with p = .06, Goodman's test statistic was 1.86, p = .06. Since p is above 0.05, the association between behavioural flexibility increase (T1-T2) and BMI decrease (T1-T2) is not reduced significantly by the inclusion of the mediator variable (increase in adherence to exercise T1-T2) in the model, i.e. there isn't conclusive evidence for full mediation, although p did approach significance.

6.5.8.5 BMI change T1-T4

The extent to which BMI changed between T1 and T4 was significantly associated with many variables. Several diet variables were related to change in BMI T1-T4: individuals who ate more brown carbohydrate, less white carbohydrate, less fat and had an overall healthier diet changed their BMI the greatest, as did those who found it easier to adhere to a healthy diet. Several exercise variables were also related – increased resistance exercise over the programme, increased adherence to exercise over the programme, increased ease of adherence to exercise over the programme and increased enjoyment of exercise over the programme were all significantly related to greater changes in BMI. Furthermore, the extent to which the white carbohydrate intake decreased, fat intake decreased, calorie intake increased, levels of resistance exercise increased and adherence to exercise increased were all related to the extent to which BMI decreased. Finally, behavioural flexibility at T1, T2 and T4 were all correlated with BMI decrease T1-T4 as was the extent to which behavioural flexibility increased T1-T2 and T1-T4.

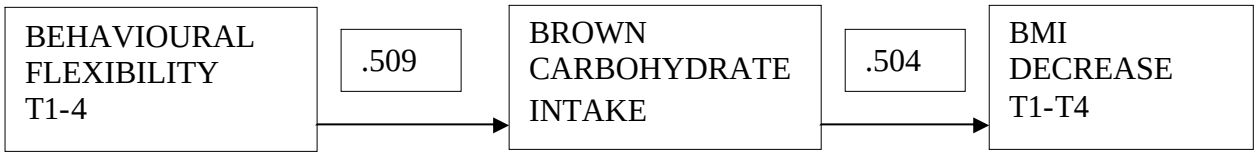
In order to establish which variables were best able to predict BMI change T1-T4, a multiple regression analysis was run entering all the significant correlates (using the enter method) and removing them where the analysis suggested they did not significantly contribute.

The regression analyses revealed that as with BMI change T1-T2, change in behavioural flexibility was significantly related to change in BMI but its influence appeared to be indirect. That is, changes in behavioural flexibility appeared to influence several variables: brown

carbohydrate intake; fat intake; total food score; ease of adherence to diet; calorie change T1-T4; resistance exercise levels; adherence to exercise; ease of adherence to exercise and change of adherence to exercise. In turn these were all related to BMI change. However, because of shared variance, the best fit model suggested that the extent to which behavioural flexibility was able to increase from T1-T4 was only able to predict levels of brown carbohydrate intake (adjusted R square = .018). This in turn was a significant predictor of change in BMI from T1-T4 (adjusted R square = .035). The model is shown below in Figure 6.9 with beta weights.

Mediation analysis was conducted using the Sobel and Goodman tests for mediation. They returned a test statistic of 2.20 with p = .02 (Sobel) and 2.24, p = .02 (Goodman test). This suggests that the association between behavioural flexibility increase (T1-T4) and BMI (decrease (T1-T4) is reduced significantly by the inclusion of average brown carbohydrate intake (T1-T4), i.e. it does play a mediating role.

Figure 6.10 Regression model of BMI change



6.6 Discussion

This study aimed to investigate whether the DSD programme would increase behavioural flexibility and whether BMI would decrease in accordance. It did not directly address dietary or exercise behaviours which are the proximal determinants of successful weight loss, rather, it targeted distal factors – habits. The DSD programme aims to increase Behavioural Flexibility so as to allow individuals to break habits and develop a wide range of behaviours which they feel comfortable performing. The findings were positive: the DSD programme did increase Behavioural Flexibility and participants did lose weight.

6.6.1. The DSD programme and Behavioural Flexibility

It was hypothesised that the DSD programme would increase behavioural flexibility, and this was supported by the analysis – behavioural flexibility did increase significantly after just one month of participation in the programme. This suggests that the tasks involved in completing the programme did facilitate increased behavioural flexibility, although without a comparison control group it could still be argued that behavioural flexibility may have just changed over the month because the participants were keeping diaries and may have been trying to change dietary or exercise behaviour. This is possible but it seems unlikely. To increase behavioural flexibility to the extent to which the participants' did so here, behaviour would have to change along many of the underlying behavioural dimensions, some of which may have only very loose relationships to specific diet or exercise behaviours and are unlikely therefore to have changed because individuals changed what they ate or did some more exercise. Furthermore, there were no differences between group A (who kept food and exercise diaries for a month before they began the DSD programme) and group B on the extent to which they increased their behavioural flexibility. It seems more likely that engaging in the specific DSD exercises was the underlying cause of the increase in behavioural flexibility.

Changes in behavioural flexibility later on in the DSD programme were much smaller than in the first month, and indeed were smaller than anticipated. Although the original increase in behavioural flexibility was maintained, further increments were comparatively small. Perhaps

this is because participants were only explicitly instructed to perform the DSD programme exercises for the first month and merely encouraged to continue with the training on their own thereafter. This might have been enough to maintain increased behavioural flexibility but not enough to induce further significant increments.

6.6.2 The DSD Programme and BMI

BMI was found to decrease significantly across the DSD programme and study as a whole. There was only one real difference between group A and group B. The two group's initial BMI averages were different, such that group A had a significantly lower BMI than group B at T1. This was maintained throughout the DSD programme and the extent to which BMI decreased in the two groups was not significantly different. This suggests that the initial difference occurred by chance. Further, the changes to BMI within the two groups were directly comparable (not significantly different from each other), which suggests that keeping food/exercise diaries was not the only influence on BMI or BMI change. A finding that further strengthens this is that there were no differences between group A and group B on diet or exercise levels, or in the extent to which the diet and exercise variables changed. The finding that both groups' diet and exercise levels changed in a similar way supports the notion that keeping food/exercise diaries does not, by itself, account for the changes found here.

Results show that significant decreases in BMI occurred between measurement at T1 and T2, between T2 and T3 and between T3 and T4. The average amount of weight lost over each month was approximately 3 to 4 lbs which suggests a steady, rather than a dramatic, weight loss. Steady weight loss is assumed to be safer than weight lost on a crash diet (e.g. Kajioka, Tsuzuku, Shimokata & Sato, 2002; Robison, Hoerr, Petersmarck & Anderson, 1995). Steady weight loss may a better route to maintaining a healthy weight because crash diets are too difficult to stick to in the long term. When an individual comes off such a severely restricted diet they are likely to regain any weight they lost (see e.g. Robison, et al, 1995). The amount of weight lost over each month in this DSD programme was steady and regular, which would suggest that were participants to reach their target weight, they would be more likely to

maintain it. Clearly, following up participants for a longer period (i.e. 12 months and beyond) would help to clarify this.

In terms of actual weight lost, mean weight loss for the 55 participants after three months was 4.77 +/- 2.83 kg. Studies promoting a low calorie diet and exercise have found such weight losses as 16.2 +/- 1kg after two years (Latner et al, 2001), approximately 9.0 +/-5.8 kg after 6 months (Harvey-Berino, Pintauro, Buzzell, DiGiulio, Casey Gold, Moldovan & Ramirez, 2002), 5.9 +/- 6.3kg after 1 year (Bacon et al, 2002), 7.8kg +/-0.7kg after 6 months (Frost et al, 2002) and 7.47kg after 10 months (Lowe, Foster, Kerzhnerman, Swain & Wadden, 2001). The findings here are comparable to this, despite the fact that no strict diet was given and no specific exercise regime was suggested. Other studies which have examined 'non-diet' approaches have found little or no actual weight loss (e.g. Lowe et al, 2001) although this does not take muscle gain through increased exercise in to consideration. This would have the effect of decreasing body fat but not weight as the added muscle weight would compensate, in weight terms, for the lost fat.

Although no specific diet or exercise programme was advocated here, participants were issued with information on what constitutes a healthy, balanced diet, approximate calorie intake levels required for weight loss, and some government recommendations regarding exercise in order that the study could control for the effects of knowledge of healthy behaviour. Such guidelines could be viewed as a programme for weight loss (albeit an unstructured one) and could have been followed as such by the participants, so the DSD programme may not be viewed as a purely 'non-diet' approach. Nonetheless, compared to other programmes which have not advocated a specific diet and exercise programme, the DSD programme appears to have been more successful in terms of actual weight lost, at least in the short term. In fact, the DSD programme is comparable in success to programmes advocating a specific diet and exercise programme and providing, on occasion, such assistance as social support, cognitive restructuring and behavioural modification (e.g. Latner et al, 2001).

There was a relationship between BMI and behavioural flexibility at the outset, such that increased behavioural flexibility was related to lower BMI. Thus the original hypothesis that

BMI would be related to behavioural flexibility is supported, as is the hypothesis that this relationship would be maintained throughout the DSD programme. BMI at T2, T3 and T4 appeared to correlate more strongly with behavioural flexibility at T1 than with later measures of behavioural flexibility, although the difference in strength of correlation was not significant. Whether this is an important issue remains to be seen. At face value it could imply that altering ones behavioural flexibility level might not actually be that important, because ultimately, your original behavioural flexibility will always be a stronger determinant of weight. Indeed, initial BMI decrease (over the first month) was only very weakly related to change in behavioural flexibility ($r = .267$, $p = .048$). However, the decrease in BMI by the end of the second month was significantly related to the increase in behavioural flexibility, and by the end of the DSD programme this relationship was highly significant. Thus, the more participants were able to increase their behavioural flexibility, the more weight they were able to lose (and of course the greater the decrease in BMI). This supports the hypothesis that increasing behavioural flexibility would result in decreased BMI.

The fact that behavioural flexibility at T1 was more strongly correlated to BMI even at later stages is interesting and requires further research. Perhaps prolonged follow ups might reveal that later measures of behavioural flexibility do eventually become stronger determinants of BMI than behavioural flexibility at the outset.

A second point of interest is that although BMI change occurred immediately, increased behavioural flexibility was not strongly associated with BMI change until well into the DSD programme. It could be that aspects of the induction or entry into the programme acted as an early form of motivator which allowed the participants to begin to lose weight immediately. This might have been further supported and maintained by feelings of mastery and increased self-efficacy as they completed the DSD programme tasks and found themselves to be eating more healthily, exercising more and losing weight. However, it is known that continuing this level of motivation and determination can be difficult, yet continued increase in exercise and healthiness of diet occurred, as did significant loss of weight. Perhaps later in the study, higher levels of behavioural flexibility allowed a wider array of suitable behaviours to become available to the participants. This would mean that they would be less drawn to old, unhealthy habits and more able to perform suitable positive health behaviours, even in the

face of adversity. Perhaps then the factors which facilitated weight loss changed over the course of the study. In a review of the factors that might predict long term maintenance of weight loss, Elfhag & Rossner (2005) found several factors to be important:

" more initial weight loss, reaching a self-determined goal weight, having a physically active lifestyle, a regular meal rhythm including breakfast and healthier eating, control of over-eating and self-monitoring of behaviours. Weight maintenance is further associated with an internal motivation to lose weight, social support, better coping strategies and ability to handle life stress, self-efficacy, autonomy, assuming responsibility in life, and overall more psychological strength and stability." (pp.67).

Increased behavioural flexibility may promote better coping strategies and overall psychological strength and stability, for example.

6.6.3 The DSD Programme and Changes To Diet and Exercise

In the present study, a design feature was introduced in an attempt to control for the potential effects that diary keeping has on diet and exercise behaviour. There were two groups taking part. Group A kept food and exercise diaries for one month before completing a questionnaire assessing past diet and exercise behaviour and beginning the DSD programmes (T0-T1), whereas group B did not – they attended the induction, completed the questionnaire and *then* began to keep diaries and tackle the DSD activities. Since the questionnaire was assessing what both group A (who had been keeping diaries) and group B (who had not been keeping diaries) had been doing previously, the fact that the two groups were not at all different on past measures of diet and exercise in any way lends some support to the argument that the changes which occurred in the present study were at least in part due to the DSD programme and not due to what they had been doing before the programme. This finding is, however, unusual because previous weight loss has been highlighted as a factor which predicts failure to successfully lose weight in the long term in the future (e.g. Robison, Hoeer, Petersmarck & Anderson, 1995). It does however mean that any changes in BMI observed here are more easily attributed to aspects of the current situation.

Using two groups also permitted an approximate baseline measure of what participants were doing before beginning the DSD programme to be taken, so that behaviour T0-T1 could be compared to behaviour T1-T4. This is not a perfect 'control' measure by any means since it is known that keeping diaries (i.e. monitoring behaviour) can actually change the behaviour in question. However, it did also serve a second purpose. If there were changes between what was done T0-T1 but not later on during the DSD programme (T1-T4), we could safely assume that the DSD activities were not at all related to the changes occurring. Again this is not a perfect control measure because even if changes are observed all the way through the programme, the influence of keeping diaries or placebo effects cannot be ruled out. However, it is difficult to see how dietary and exercise behaviour could be assessed without the participant monitoring their own behaviour.

Looking at group A's data, there were several changes in the diet and exercise variables between the control month (T0-T1) and trial months of the DSD programme (T1-T4). Analyses showed that fat intake did decrease significantly, and did so between the control month and T1 measurement point. Overall diet had improved significantly from the control month to the T2 measurement point, and participants perceptions of healthiness of diet, adherence to diet and ease of adherence to diet all changed for the better as well. Furthermore, actual time spent performing cardiovascular exercise increased and the extent to which individuals rated exercise as enjoyable also increased. What is interesting is that changes occurred in these variables not just between the control month (T0-T1) and DSD trial months (T1-T4) but between the DSD trial months themselves, i.e. exercise levels increased, diets continued to become significantly more healthy and perceptions became significantly more positive from T1 to T4. Although diet and exercise measures showed only small changes over the course of the study, participants did change their BMI, indicating that the number of calories consumed must have altered in relation to the number of calories used up. The measures of diet and exercise taken here were very basic and were perhaps lacking the sensitivity required to detect the full extent of behavioural changes – it may even be the case that changes occurred in other aspects but were not detected. These findings show that actual behaviour did change in group A and although the influence of keeping diaries cannot be ruled out, the data does support the view that completing DSD activities may be related to changing dietary and exercise behaviour.

Considering the sample as a whole, mixed ANOVA results showed there to be no effect of group throughout the trials. Looking at changes in diet and exercise over the trial months, it can be seen that there were some limited changes in actual behaviour in the sample as a whole. Fat intake fell significantly between T1 and T2 and there was a significant increase in average minutes of cardiovascular exercise between T1 and T2. This was followed however by a decrease in cardiovascular exercise by the end of the DSD programme. Changes in other aspects of diet and exercise may have remained undetected because the measurement techniques used here were not sensitive enough.

Results showed that whilst changes occurred in actual behaviour, they did not appear to be statistically significant. However, many of the self-report ratings (subjective measures) relating to diet and exercise did change significantly. Notably, participants perceived adhering to a diet became easier after training and easier still as the DSD programme progressed. Similarly, rated adherence to an exercise regime increased after the DSD training, as did both enjoyment of exercise and ease of adherence to exercise. Despite the fact that these changes are not mirrored in the objective measures taken, the changes in ratings are still important. The DSD programme should have increased the participants' repertoire of behaviours which in turn should have made it easier for them to follow a healthy diet and exercise regime. These results support this – increased adherence and increased rated ease of adherence could have resulted from increased behavioural flexibility thereby making it easier for individuals to follow positive health behaviours. Another important finding is that enjoyment of exercise increased. Enjoyment of exercise has been implicated as being extremely important for adoption and maintenance of exercise behaviour (e.g. Wankel, 1993). Wankel (1993) has argued that increased enjoyment may facilitate maintenance of exercise behaviours and thereby improve health, but deriving enjoyment from exercise might also improve mental health because it may assist in reducing felt stress and improving mood and psychological functioning. This might help to explain the improvements in anxiety and depression levels found here.

Unlike the subjective ratings, fewer measures of diet and exercise appeared to change significantly over the DSD programme. This might suggest that there were not any real changes in behaviour. Rather, participants' perceptions of diet and behaviour changed. Behaviour in this case may have influenced cognition. However, this might be a premature conclusion. As far as exercise is concerned, the amount of time spent doing resistance exercise by the end of the DSD programme was almost double that in the control month and cardiovascular exercise did increase significantly over the three post-training months. With respect to food, fat intake did significantly decrease between pre- and post-training, and although none of the other food group measures changed significantly, it can be seen that daily average calorie intake, white carbohydrate intake and brown carbohydrate intake changed in a way conducive to a healthier diet. Further, total food score (a composite of the various food group intake scores) did change significantly, and in a positive way, indicating that overall, diet did seem to improve. Clearly this is an area which needs further research using more sophisticated measurement tools.

One final aspect of the findings lends support to the argument that the DSD programme and increased behavioural flexibility influenced dietary and exercise behaviour. The results showed some of the diet/exercise variables had a 'dose-response relationship' with behavioural flexibility. Those individuals who became more behaviourally flexible reduced their daily calorie intake to a greater extent and increased adherence to a healthy diet to a greater extent. With respect to exercise, a dose-response relationship was found between the increase in behavioural flexibility and the increase in time spent performing cardiovascular and resistance exercise, as well as the increase in the extent to which exercise regimes were adhered to. Thus there were significant relationships between he extent to which behavioural flexibility increased and the extent to which both subjective and objective measures of diet and exercise improved. Again, while the influence of diary keeping cannot be ruled out, the findings do imply that completing the DSD activities and increasing behavioural flexibility did influence dietary and exercise behaviour and in a positive way.

Individuals are faced, on a daily basis, with circumstances that do not necessarily promote the adoption and maintenance of healthy behaviours. These might include working somewhere where healthy food is not available or not being able to afford to use exercise facilities.

Increased behavioural flexibility might facilitate effective management of these circumstances as the individual may have a wider array of behaviours within their repertoire to choose from. Instead of the old habits to which individuals may previously have automatically defaulted, the DSD programme may have allowed the participants to develop new behaviours which helped them to break way from their habits and overcome difficult circumstances.

These findings have clear implications for weight loss interventions, namely that individuals appear to find it easier to adhere to a healthy diet and exercise regime when their behavioural flexibility is increased.

6.6.4 Fantasy Style and Expectancies

The present study found there to be no relationship between fantasy style or expectations and actual BMI change. Other studies have found relationships between fantasy style, expectancies and weight loss such that individuals who are less likely to fantasise about losing a great deal of weight and more likely to have realistic expectations about weight loss are more likely to successfully lose weight (e.g. Oettingen & Wadden, 1991). In Oettingen & Wadden (1991), findings suggested that negative fantasy style, combined with positive expectations, were the best predictors of actual weight loss. In this study, neither type of fantasy style was associated with weight loss, nor was either type of expectation. Indeed, even combining these variables did not produce significant associations. These findings might have arisen because taking part in the DSD programme allowed individuals with positive fantasies or unrealistic expectations to finally consider the actualities of losing weight. Previously, such individuals may simply have visualised these long terms goals as happening relatively quickly, and without any real effort. The reality, however, is that these goals can take much longer to achieve and can be exceptionally difficult, with multiple situations arising that test the willpower of the individual. Consideration of such situations within the DSD tasks could have served to facilitate the development of plans and behaviours allowing the individual to deal successfully with the given situation – something that

participants in Oettingen & Wadden (1991) did not do and which may have resulted in their failure to achieve the weight loss they expected.

6.6.5 Changes In Psychological Well Being

Two factors which showed highly significant changes throughout the DSD programme were anxiety and depression. Both of these variables decreased substantially, indicating that participants became less anxious and less depressed over the course of the study. Anxiety and depression have previously been shown to be associated with the constancies rather than behavioural flexibility, and indeed additional analyses in the present study revealed there to be no relationship between behavioural flexibility (or changes in behavioural flexibility) and psychological well being, which would suggest that it is not increased behavioural flexibility per se that is responsible. There may have been changes to the constancies, not examined here, which may have played a role, as the earlier studies demonstrated a reliable relationship between the constancies and psychological well being.

It is also possible, however, that successful completion of the DSD programme, increase in positive health behaviours and loss of weight impacted on anxiety and depression. It is quite possible that achievement of any of these things might serve to increase self-esteem, feelings of mastery, self-confidence and so forth, and this in turn may have positively influenced anxiety and depression. Since feelings of helplessness and control are central to both anxiety and depression, increasing one's levels of Fearlessness, Self-responsibility and self-esteem or inducing sensations of mastery might be one way of increasing perceptions of control. This seems more likely than there being a direct relationship between diet/exercise and anxiety and depression. The only significant relationship between depression/anxiety and diet/exercise was between depression at T1 and daily average cardiovascular exercise minutes ($r = -.274$, $p < .05$). It might be that decreased depression was associated with increased cardiovascular exercise, but this relationship was weak and was not observed between measures at other points in the DSD programme (although previous studies have suggested a relationship between cardiovascular exercise and depression, such that exercise can be used to treat mild to moderate depression, e.g. Dunn, Trivedi, Kampert, Clark & Chambliss, 2002). With respect to weight loss being the underlying factor of reduced anxiety

and depression, the data showed there to be no direct relationships between BMI/BMI change and depression/anxiety or change in depression/anxiety. It would seem therefore that variables other than those measured here could be involved in the decrease in depression and anxiety, such as self-esteem and feelings of mastery.

6.6.6 Modelling BMI and Change in BMI

Several variables were found to be related to BMI and change in BMI. These included both proximal measures (diet and exercise – both objective and perceived measures) and distal measures (Behavioural Flexibility). With respect to predicting BMI, behavioural flexibility was a significant predictor for BMI at all measurement points, and in fact was the only significant predictor; dietary and exercise measures were not able to account for unique variance.

The findings were different for BMI change. The regression analyses for total BMI change (from T1-T4) suggested that behavioural flexibility increase influence on BMI decrease was mediated by a dietary variable (brown carbohydrate intake). Thus the data suggested that increasing behavioural flexibility influenced BMI change by affecting changes in diet. Only one measure of diet was shown to be a significant mediator in the present analysis, however it is likely that other dietary or exercise behaviours are important but failed to reach significance here. This may be because of measurement error. The food and exercise diary measures used here were adequate to compare food intake over the DSD programme but may not have been accurate enough for statistical modelling. This is not to detract from the importance of those measures shown to change significantly. Brown carbohydrate intake and resistance exercise might both play an important role in weight loss. The former may be important as some diets (e.g. the GI diet) recommend swapping white carbohydrates for brown since brown carbohydrates release energy more slowly. This reduces feelings of hunger for longer and makes energy available at a pace where it can be used rather than stored as fat. Resistance exercise is also likely to be important since it is vital for increasing muscle mass in the body. Since muscle uses more energy than fat, the more muscle that is carried, the more calories are used up. Clearly this would help in balancing intake with expenditure and therefore with weight loss.

It was hypothesised that increasing behavioural flexibility would assist individuals in adhering to a healthier diet and to improve their exercise levels which would, in turn, promote BMI change. The findings here support this. Increased Behavioural Flexibility was related to changes in various aspects of diet, to changes in exercise levels and to the way in which the participants viewed their diet and exercise levels. Further, several of these changes also appeared to be related to a decrease in BMI. Modelling of total BMI change did find support for a mediated model whereby increased behavioural flexibility resulted in changes in diet which in turn was related to BMI decrease.

6.6.7 Mechanisms for Behaviour Change

How might the DSD programme have assisted these individuals in changing their eating and exercise behaviour when the primary focus was on behaviour in general and not following a strict diet or exercise regime?

Firstly, it is possible that the situational tasks were important, and many of these were directed towards dietary and exercise behaviour. Breaking habits is difficult, however, conscious decision making that involves formulating explicit plans for how to behave in those situations has been shown to be effective (e.g. Gollwitzer, 1996). The situational tasks within the DSD programme did require the individual to think about situations where they felt particularly tempted to behave in an unhealthy way and to think consciously about a more appropriate behaviour they could employ in that situation. Thus individuals did consciously form explicit plans, or implementation intentions, to help them deal with difficult situations.

The DSD programme also involved many tasks that were not specifically related to diet or exercise – could these have been important? The DSD programme required the individuals to engage in novel behaviours every day so completion of the tasks may have changed their usual behaviour and perhaps broke some of their habits. The DSD programme may have provided the participant with a sense of control and promoted an awareness that is lacking with habitual behaviours. In changing habits, the individual is required to take control rather than behave as if on 'automatic pilot' that might be associated with behaving in an habitual

manner (Hassin, Uleman, & Bargh, 2005). Moreover, taking control in one area of life may be the prompt that is required for the participants to take control in other areas. At the same time, requiring someone to make changes gives them greater awareness of their actions and the choices they are making. This is particularly beneficial for dieters as they have been shown to think about and respond differently to food when compared with non-dieters and may be one reason why weight loss resulting from the behavioural and cognitive changes in these studies was sustained over time (Baumeister et al., 1994). Dieters tend to ignore their internal cues, i.e. listening to their body and being aware of hunger and instead are guided by external cues, such as images, food aromas or time (Herman & Polivy, 1975; Rogers & Hill, 1989). Using the DSD programme to focus on distal habits in order to increase behavioural flexibility may have reduced the emphasis on thinking about food. Habits may have been broken and a sense of agency may have been introduced in that individuals became more aware of themselves and of being in control of their actions (Hassin et al., 2005).

It is possible that habits do not exist in isolation. If several habitual behaviours are attached to the same goal then they may 'form a web' where they are linked to each other. Several authors have proposed such a hierarchical representation for habits (see Aarts & Dijksterhuis, 2000). It could be argued that breaking even one small habit, even if it were not explicitly related to dietary or exercise behaviour, might weaken an entire web which might contain weight related habits. Theoretically, weakening all the remaining habits within that web might result in an increase in conscious processing more of the time. Thus an initial change in processing level changes one behaviour which in turn changes cognition. In turn this could change several other behaviours. These changes do not require any sustained willpower or effort – something that is required in dietary or exercise based interventions which so often seem to fail in the long term.

The sorts of behaviours required to complete the activities within the DSD programme could be seen to facilitate feelings of control. When completed correctly, such behaviours should have allowed the individual to perform a novel behaviour or to have dealt with someone in a more effective way. In either case this could instill a sense of success and achievement that may be attributed to the individual. Performing novel behaviours has been argued to be one of the situations which elicit a change from habitual 'thinking' to active thinking whereby the

individual ‘moves up a cognitive gear’ (Louis & Sutton, 1991). The DSD programme, then, might increase feelings of control and increase awareness and conscious processing since it requires the successful completion of novel behaviours. Increased feelings of control and increased conscious awareness are important factors in changing behaviour. Since the DSD tasks were not confined to one area of life, their effects may have spread throughout the different aspects of life so that individuals may ultimately have altered levels of awareness and control in relation to diet and exercise.

One other possible reason for the DSD programme’s success could be related to the reduction in anxiety and depression. Depression and anxiety were shown to be significantly reduced in this study, possibly because of the completion of novel behaviours. Findings from the field of positive psychology show that completing novel behaviours is associated with long term increases in happiness and a reduction in depression (Seligman, Steen, Park & Peterson, 2005). Furthermore, behavioural novelty in the form of theatre performances by older people had a positive effect on their cognitive health and resulted in an improved sense of well-being (Noice, Noice, & Staines, 2004).

Negative psychological states such as anxiety, depression and stress elicit a variety of different coping mechanisms, both adaptive and maladaptive. Lindquist, Beilin & Knuiman (1997) have argued that unhealthy eating is a maladaptive coping mechanism used by individuals who report higher levels of occupational stress and higher blood pressure. Furthermore, Elfhag & Rossner (2005) have reviewed the evidence and argue individuals who cannot maintain their weight loss tend to use eating as a means of coping with stress and as a means of regulating mood. If this intervention reduced levels of such negative states then it might have reduced the need for coping strategies and obviously therefore the use of negative coping strategies. Furthermore, increased behavioural flexibility could have served to furnish individuals with more appropriate coping strategies even if they were still required.

The findings here have clear implications – both in terms of the DSD programme and behavioural flexibility and in terms of BMI change. It is clear that, in the short term at least, the DSD programme achieved several things. Firstly, behavioural flexibility showed a marked increase. One avenue for future research is clearly to investigate the effects of longer

periods of training, possibly with more structured activities and support. Again, follow up at later dates would be beneficial in tracking behavioural flexibility levels once 'official' training periods are completed. Nonetheless, the training was successful and increased behavioural flexibility may have benefits in other life areas such as work, relationships and personal projects, so it may be possible to use FIT as a basis for intervention in other areas.

With respect to BMI change, although the influence of diary keeping cannot be ruled out, the DSD programme does appear to have enjoyed some success, in a way that is comparable to other weight loss programmes. This implies it may be of use in tackling the ever growing problem of obesity, even if the nature of the behavioural flexibility – BMI relationship still needs to be confirmed empirically. Clearly further research is needed here.

6.6.7. Limitations and Future Research

Although this pilot study did attempt to control for some factors, the design was methodologically limited in a number of ways and a properly controlled investigation of the DSD's ability to change behavioural flexibility, diet, exercise and BMI is obviously required. The first limitation concerns the 'waiting list' group. This group was not a true waiting list group and it would certainly have been useful to have such a condition whereby a group of participants had their BMI, diet and exercise behaviours tracked for several months whilst another group proceeded with the DSD programme. This would necessitate a much larger sample that was employed here. One significant shortcoming was the failure to measure FITness and BMI in group A from the time they began keeping diaries. This was a serious oversight and does significantly impact on the conclusions which can be drawn. Although the evidence does support the hypothesis that completing the DSD programme increased behavioural flexibility and that increased behavioural flexibility was related to changes in diet, exercise and BMI, it does not rule out other explanations. As has been discussed above, keeping diaries might account for the changes as might simply partaking in an intervention, regardless of what it is asking you to do.

One other possibility concerns the nature of measuring behavioural flexibility. Traditional psychological questionnaires require individuals to tick boxes or circle one number on a

scale, but the FIT profiler asks participants to indicate ranges. This type of response system might be difficult for some individuals to understand and it might be that other individual differences, such as intelligence or Social Economic Status (SES), have influenced FIT profiler responses. Diet, exercise and obesity have all been shown to be related to factors such as SES (e.g. Evans, Newton, Ruta, MacDonald & Morris, 2000; Hulshof, Brussard, Kruizinga, Telman & Lowik, 2003; Pamuk, Makuc, Heck, Reuben & Lochner, 1998) and it may be that these factors have contributed to the observed changes.

It is clear that the study requires control groups in order that the cause of BMI and behaviour changes might be inferred. The methodology applied here did not permit this and allows for several possible explanations for the observed outcomes. Firstly, 'placebo' or 'expectation' effects of simply taking part in any intervention may have occurred. To this end, a comparison group who performed some intervention, perhaps based on behavioural techniques, would have been useful. It might have been useful to advertise for volunteers without focussing on the weight loss aspect as this would reduce the possibility that expectation effects had occurred. Secondly, in order to examine whether dietary and exercise behaviour changed and also became easier to follow, it would be necessary to design a control group whereby individuals attempt to follow a traditional diet and exercise programme for weight loss in the absence of behavioural techniques that might facilitate adherence to this. For long term success to be evaluated follow ups at much later stages are required, perhaps at 1, 2 and 3 years. This would have been extremely useful here but the timeframes just did not permit this. As it stands, the observed outcomes do not permit any conclusions regarding the permanency of behavioural or BMI changes to be drawn.

With respect to the actual programme itself, there were several areas that could be improved. As already stated the programme needs to run for much longer time periods with follow ups over years rather than months. It would be useful to investigate whether aspects of Inner FITness would change over time as well as behavioural flexibility (Outer FITness).

The study would have benefited from process evaluation measures in order to investigate what the participants actually did and whether this was related to the outcomes observed. For example, did participants who completed both daily and weekly tasks fare better than those

who attempted only weekly tasks? Furthermore, the autonomy afforded participants may have resulted in positive outcomes or negative outcomes and it is unknown whether participants were actually able to behave differently in the daily tasks.

The measures of diet and exercise need considerable work. The quantity and quality (in terms of health value) of dietary behaviour needs to be measured with a greater deal of accuracy, as do measures of exercise including the specific type, intensity and weekly frequency. At the same time, the food/exercise diaries need to be kept very simple so that they are easy to complete, particularly if participants have to record information for months or years.

Given the limitations outlined here, there seems to be two obvious avenues for future research. The first would be to do a follow up study employing a qualitative approach, exploring the underlying psychological processes that the participants underwent as well as exploring their perceptions and views of the DSD programme. Strengths and weaknesses of the programme could be explored, the activities actually completed might be clarified and those aspects of the programme directly responsible for participant success might be elucidated.

A second avenue would be to perform a second intervention with proper control conditions in place. This would include a proper waiting list group and two comparison intervention groups, one which required the participants to follow a traditional calorie controlled diet and exercise programme without techniques designed to support behavioural change and one which perhaps focussed only on behavioural change techniques. The study would also require more measures of FITness and BMI taken throughout, giving more reliable and valid findings. Such a study would further need to employ more accurate measures of diet and exercise and should follow participants for a much longer length of time, measuring behavioural flexibility, health behaviours and BMI for at least a year after the DSD programme had been completed. In fact, for long term weight loss to be assessed, follow ups may need to take place for several years after DSD programme completion.

6.7. Conclusion

The DSD programme aimed to increase behavioural flexibility. It accomplished this. There was also evidence which supports the existence of direct and mediated relationships between behavioural flexibility and BMI. Behavioural flexibility, and the extent to which it changed, was related to BMI and the extent to which that changed, but increased Behavioural Flexibility was also related to changes in perceptions of, and feelings towards, diet and exercise as well as some changes in actual diet and exercise. Some of these behaviours were in turn related to BMI change. Participants displayed a steady and significant decrease in BMI across the DSD programme. Performing the DSD programme may have weakened the 'webs' of habits held by participants and allowed them to behave in a more conscious way. Increased Behavioural Flexibility may have allowed the individuals to increase their behavioural repertoire and feel comfortable in a wider array of situations and this may also have instilled a greater sense of control. Other variables previously found to predict weight loss – expectations, fantasy style and previous dieting/weight loss – were not found to relate to BMI change in the present study.

There were some significant methodological shortcomings, particularly with respect to the study design and the measurement of diet and exercise. A proper waiting list control condition and comparable intervention conditions would allow for more robust findings that lend greater support to the model theorised here. More accurate measures might have been more sensitive to subtle changes in food intake or exercise (frequency, intensity and duration) which may have allowed more accurate modelling of BMI change. Other studies have employed measures such as food diaries (e.g. Swinburn, Metcalf & Ley, 2001) to measure dietary behaviour. Swinburn et al (2001) for example employed a diary whereby participants calculated fat intake for 2 days each week that rotated from week days to weekends. A fat-counter booklet was used by participants to estimate the fat content of foods. A similar approach might have been useful here, but would need to be modified in order to measure other dietary components. Similarly, it may have been useful to measure frequency, intensity and duration of exercise, although there is no quick, easy measurement tool for this which is both reliable and valid.

Future research might employ a more rigorous design and more accurate measurement, or consider the effect of the DSD programme on either subpopulations (such as children or adolescents) or other areas of life (e.g. work). Nonetheless, the intervention outlined here, the DSD programme, could be a useful tool for facilitating weight loss, particularly in light of the finding of a dose-response relationship between behavioural flexibility increase and BMI decrease and between behavioural flexibility increase and diet/exercise behaviour improvement. The exact mechanisms by which behavioural change and BMI decrease occurred have not been demonstrated here, in part because of the methodological limitations and in part because quantitative research does not necessarily permit the underlying psychological processes to be examined. Future research might therefore take a qualitative approach to exploring the psychological and behavioural changes undergone by participants completing the DSD programme. This would also permit exploration of the hypothesis that the observed effects were placebo effects or were the result of keeping diaries.

Chapter 7.
Qualitative Follow-up to the DSD Programme

7.1. Introduction

The previous study aimed to pilot an intervention designed to increase participant's behavioural flexibility and assist them in weight loss. Both of these outcomes were achieved – participants significantly increased their behavioural flexibility and BMI decreased markedly. However, the exact process by which increased behavioural flexibility resulted in decreased BMI requires elucidation. However, it is unknown how well participants engaged with the programme and what they actually did. Furthermore, the exact psychological processes or changes which occurred in order for behavioural flexibility to increase and BMI to decrease are unknown. In order to improve understanding of how behavioural flexibility relates to health behaviours and BMI, and to improve the DSD programme's efficacy and usability, follow up research is required.

7.1.1. Assessing Weight Loss Interventions

With many of the interventions used to promote health, there may be several expected outcomes including improved psychological health (e.g. increased self-esteem), improved social support, altered cognitions and improved physical health (e.g. weight loss, increased energy, reduced cholesterol levels and so on). These outcomes, as done so in the previous study, are generally effectively measured and evaluated with quantitative methods and analysis. However, what these quantitative methods may fail to capture are the "intermediary steps, processes or mechanisms" (Buijs, Ross-Kerr, Cousins & Wilson, 2003, pp. 96) that take place between the introduction of an intervention and the anticipated outcomes. Pearson, Lewis, Wall, Jenkins, Nafziger & Weinehall (2001) have referred to the stage between intervention introduction and outcome measurement as the 'black box' (see Figure 7.1).

The processes occurring within the black box stage tend to be relatively less well understood and well known, as was the case with the intervention programme described in Chapter 6. Such processes are not always readily amenable to identification, especially by quantitative methods. An increased understanding of the processes within this stage allows one to see how

a programme functions and therefore how and why it works (or does not). This in turn permits improvement of the intervention as well as better measurement of the outcomes (Pearson et al, 2001).The best way to examine the processes within the 'black box' can be to conduct qualitative analyses. As Buijs et al (2003) discuss, qualitative methods are suitable for gathering information on little known topics, they can provide information on why programmes were or were not successful and may be useful in evaluating psychological impacts/outcomes that maybe varied and/or unexpected by the researcher.

Figure 7.1. The relation of the black box to programme introduction and evaluation

(Source: Buijs et al 2003, pp 96).

The DSD programme may have achieved some level of success, but there are several 'black box' aspects as well as practical considerations that need examination would benefit from further analysis. Firstly, it might be useful to explore what sort of as already discussed, clarification of whether significant changes in diet and exercise actually occurred and in what way perceptions of diet and exercise changed is required. For example, did participants change their entire diet or were they just more able to cut out one or two types of food? Did they perceive exercise as being easier to perform? Secondly, there are also some more practical concerns. Although participants were given diary type worksheets for helping them to plan and record the tasks they selected, they were not required to fill them in or return them to the researcher. Thus it is unknown exactly which tasks they did or indeed whether they actually kept the diaries. There were three main types of task: weekly tasks; daily relationship tasks and daily situational tasks. Within the weekly tasks there were 50 to choose from and the participants were given total discretion over which ones they chose to perform. With the daily relationship tasks, participants were allowed to work on any relationship with any person, and even within that they were able to work on any behavioural dimension they

felt appropriate. Similarly with the daily situational tasks, it was their responsibility to identify situations where their health behaviours were inappropriate and work on those. Therefore, the participants may have been doing completely different tasks, so not only is it important to discover what they did, it may also be the case that some of these attempts were more valuable and/or more successful than others. . For example, did those participants who lost most weight focus on a particular type of task or was it that they tackled all three types? Again, if this was the case, it would clearly be beneficial to discover what they weare and why they may or may not have worked.

Thirdly, psychological processes or changes other than to behavioural flexibility were not monitored. The previous studies data was supportive of a mediated model whereby increased behavioural flexibility facilitated changes in diet and exercise which in turn facilitated changes in BMI. However, the nature of the study design did not permit causal inferences to be made and therethere may have been other psychological, behavioural or social impacts of the programme. For example they may have may have been changes in other variables, such asexperiencedfelt increased self-esteem or self-confidence, their expectations may have altered expectations and perceived control, which may help to explain how participants lost weight. Perhaps they developed a sense of mastery, viewed exercise differently, decided to train for some event or finally controlled cravings. There are numerous potential impacts of the DSD programme, especially since the tasks were not just specifically aimed at changing dietary/exercise behaviour, and furthermore these impacts may have been different at various points varied as the programme progressed. Trying to predict and capture these with quantitative methods may prove difficult.

Finally, the way in which participants viewed the programme may be of value since the intervention was a pilot and it is unknown whether participants fully grasped the rationale and practical requirements. Their perceptions of what they were asked to do and how the programme was intended to work are likely to may have had some affect on them (for example, expectations, motivations, intentions, behaviours) and this could have influenced the outcome. Participants may have viewed the programme as a psychological aid to losing weight, or perhaps more as a tool for changing their thoughts and feelings in general which would then impact on their behaviour. Differences in these perceptions may have influenced

the participant's ability to complete the programme, alter their behavioural flexibility and lose weight.

Accessing perceptions, which are very individual, could be difficult using only quantitative methods. Consequently, a qualitative approach was employed since it would be impossible for anyone to predict adequately all the possible perceptions, thoughts, feelings and behaviours that may have altered. Secondly, the participants themselves may need help in expressing what occurred as often individuals may not always be fully aware of the processes that took place. A semi-structured interview methodology is more likely to be effective in this situation than is a questionnaire.

The aim of this study then is to explore in more detail which aspects of behaviour changed, the psychological processes which might underlie any such changes in diet or exercise, and participants' perceptions of the rationale and practical requirements of the programme.

7.2. Literature Review

With respect to health behaviours, qualitative work has tended to focus mainly on examining individual's perceptions with respect to the behaviours, or on factors that may encourage or prevent them from performing these behaviours, rather than evaluating interventions. Programmes or interventions, when evaluated, tend to be performed via traditional quantitative methods, perhaps with a cursory nod in the qualitative direction to elicit the participant's views on how the programme might be improved. However, given that qualitative evaluation might be both appropriate and useful for increasing knowledge of individuals' perceptions and beliefs regarding health behaviours, as well as uncovering the inner processes of an intervention, it is curious that so few studies have made use of this form of evaluation. However, some studies have taken a qualitative approach and whilst they have not necessarily examined interventions, they have examined individuals' perceptions and feelings towards health behaviours (e.g. Dohm, Beattie, Aibel & Striegel-Moore, 2001; Eyler, Baker, Cromer, King, Brownson & Donatelle, 1998; Young, Gittelsohn, Charleston, Felix-Aaron & Appel, 2001; Ziebland, Robertson, Jay & Neil, 2002; Carter-Nolan, Adams-

Campbell, & Williams, 1996; Airhihenbuwa, Kumanyika, Agurs & Lowe, 1995; El-Kebbi, Bacha, Ziemer, Musey, Gallina, Dunbar & Phillips, 1996).

7.2.1 Qualitative Investigations Into Diet and Exercise Behaviours

A number of studies have examined diet and exercise behaviours in a variety of populations, primarily with a view to uncovering barriers and facilitators to such behaviours. Airhihenbuwa et al (1995) examined perceptions and beliefs about exercise, rest and health among African-Americans using focus group interviews. Participants tended to believe that their jobs or daily activities counted as exercise (which would be accurate for those with physical jobs) and consequently felt that rest (outside of work) was more important that exercising. There were caveats to this however – exercise was deemed important if weight loss was a goal and was also important for younger males who used exercise to improve their physiques. Although exercise was viewed as contributing to well-being, it was also viewed as a stressor rather than a therapy for illness. With respect to actually exercising, participants were unwilling to pay and noted a preference for group-related activities with a strong social element. Other than lack of money, and needing rest, a barrier for females was that exercising messed up their hair and made them hot, so they could not exercise at lunchtime.

This study however did focus on a particular ethnic group and the results may not be applicable to those individuals who undertook the DSD programme. Nonetheless, clarification of whether participants perceived a reduction in barriers to healthy behaviours and whether their perception of exercise/diet changed as they worked through the DSD programme would be beneficial.

Other qualitative research has explored patterns of exercise and perceived barriers and facilitators in minority women. Eyler et al (1998) suggested that women may have been confused about exercise. They noted a distinction between physical activity and exercise (thus many were active but not exercisers), but when asked to give examples of physical activity they cited things like jogging and swimming (traditionally viewed as forms of exercise). Perceived barriers were classified as either environmental or personal. The former

included access to facilities, safety, race and cultural issues and bad weather whereas the latter included things like lack of time, health concerns, lack of motivation, lack of social support, age issues, lack of knowledge and poor self-esteem. Facilitators were also classified as environmental or personal. The environmental factors were good access/transport, fine weather and pleasant scenery with personal facilitators being social support, self-motivation, knowledge, self-esteem and time management. The authors suggested that any programme would need to consider these perceived barriers and facilitators. Of interest in the present study is whether perceptions of barriers and facilitators changed throughout the DSD programme, since participants did in fact rate the health behaviours as having become easier as the DSD programme progressed.

Other research has looked at the factors which motivate individuals to exercise or to lose weight. Young et al (2001) investigated African-American women's motivations for exercise and weight loss and. They found that motivators to begin exercising were health concerns, weight control, stress reduction and the influence of others, but the motivators to continue exercising were feeling good and having more energy. The reasons then for adopting exercise may not be the same as those for maintaining it. This study also examined differences between women who had and had not successfully lost weight. Unsuccessful women were more likely to refer to foods as 'good' or 'bad' and differentiate between normal eating habits and 'going on a diet'. They were more likely to suffer from fatigue but did think that losing weight might give them more energy. Those women who had successfully lost weight and maintained it changed their eating habits and patterns which included changing methods of cooking, reducing portion sizes, eating more fruit and vegetables and reducing the amount of red meat they ate. It was generally accepted that exercise was important in order to lose weight in the first place and to maintain that weight loss. The study employed here should allow insight into participant perceptions of changes to diet and exercise and whether there were differences in perceptions between those that were more and less successful.

7.2.2. Qualitative Evaluations of Weight Loss Interventions

Few studies have evaluated weight loss interventions qualitatively, which is curious given that no programme is 100% successful. This form of evaluation might be used to improve

success rates. One exception is Buijs et al (2003) who studied senior citizens' participation in a health programme. The aim of employing a qualitative analysis here was toto not just explore participation, but also to look at programme impacts and discover precisely how it worked. The programme was aimed at senior citizens (adults over the age of 60 years) with the overall goal being to increase their independence and improve quality of life. This was done by holding exercise classes, providing newsletters and by holding 'health corners' where qualified professionals were at hand to answer questions and participants could chat with one another. Twenty three individuals participated (2 men and 21 women), ranging in age from 61 to 90 years. Individual semi-structured interviews were conducted with 34 participants (as well as with some family members) and one focus group was performed with the programme staff. Analysis of the data was by content analysis which involved reducing the material and identifying meanings and themes.

Results showed there to be several factors underlying participation – perceived benefits, encouragement from others, a positive social atmosphere and having fun. Another possible facilitator was self-efficacy, as eighty-five percent of participants said they would be capable of the exercises before beginning participation. Factors which served as barriers to participation included other priorities, poor health, and forgetting to attend. Additionally, it was reported that main reasons for programme withdrawal were
programme change (e.g. to staff members or times) and not liking other participants.

Programme impacts were physical, mental and social. The majority of participants stated 'feeling better' and this term represented feeling better mentally and physically (e.g. 'feeling perked up' and 'having more energy'). The participants noted several specific physical improvements including weight loss, increased strength and flexibility and feeling less pain. Conversely, those who dropped out noted more aches. Mental and social impacts on the participants were noticed by staff – mood improvements after exercise, increased social skills and interaction and improved concentration.

The facets of the programme that appear to have contributed to its success were five fold. Firstly, both participants and staff noted that having fun and enjoying the programme was a major reason for attending. Secondly, the programme was readily adaptable such that if the

situation demanded it, the exercises could be changed. Furthermore, individuals could change the way certain exercises were carried out to suit themselves. Thirdly, autonomy was crucial. Participants were not pressured to take part or stay in the programme, rather they were encouraged to decide for themselvesmake their own mind up, as were they allowed to choose the classes and sessions they attended themselves. A fourth key element was that of social interaction. The classes facilitated meeting new people and creating new friendships which in turn increased social interactions and allowed problems to be shared and dealt with. Finally, the development of meaningful staff-participant relationships was important. Staff took extra time to listen to participants and work with them on a more personal one – to – one basis so that empathic bonds were developed. The manneor of the staff appears to have encouraged trust between staff and participants as well as fostering a comfortable environment and self-efficacy. In fact, the feeling of comfort fostered within the programme also seems to have been important in facilitating participation. The five key elements all contributed to a sense of comfort and safety and this appears to have been important in participation.

The programme features and effects might relate to various aspects of well being. SWB may have been improved because on a day to day basis the programme was fun, enjoyable and facilitated social interaction. In line with Self Determination Theory (e.g. Ryan & Deci, 2001) participants may have improved their well being in the long term because they were able to meet the three core needs of autonomy; competence and relatedness.

Several of these elements underpinning well being in the above programme may have been present in the DSD programme. It is possible that participants found aspects of the DSD programme to be enjoyable and fun and many of the tasks encouraged social interaction, leading to improved SWB. They were able to adapt or tailor the programme to their own circumstances and they had complete control of what they did, when they did it and how they did it. They were also able to adapt or tailor the programme to their own circumstances and they had complete control of what they did, when they did it and how they did it, which may have met the need for autonomy. Continued success with the tasks and weight loss may have met the need for competence. Whether participants found the programme to meet the need for relatedness is more ambiguous. Finally, since some aspects of the programme involved interacting with others, it may have facilitated, or indeed improved, social interaction. The

present study should allow us to examine whether the participants perceived the DSD programme to have these beneficial elements.

The findings of Buijs et al (2003) demonstrate the value of carrying out qualitative research. Employing only a quantitative analysis might have revealed participation levels and given some indication of weight changes for example, but adding a qualitative aspect provided a richer wealth of information on those factors which contributed to its success as well as giving insight in to the factors which may have served as barriers to participation.

The presentis study has several aims. Firstly, it intends aims to examine what dietary and exercise changes took place. Secondly, participant perceptions and beliefs about diet and exercise will be investigated. A third aim is to uncover the mechanism by which changes took place, how and why did the DSD programme work (or did not)? Finally, this study will address the practicalities of the DSD programme to see where it might be improved.

7..3. Research Questions

1. How did participants perceive the rationale and practical requirements of the programme?
2. What did participants do differently?
   Did the DSD programme change behaviour in a wide range of settings or did it just change diet and exercise behaviour and if so how?
3. How did participants feel about diet and exercise after the programme?
4. How and why did the programme work (or didn't it work)?
   Were habits changed? Were there changes in psychological constructs such as feelings of control and self-efficacy? Did the programme meet the needs of the participants and did well being change? What kind of experiences did the participants have?

7.4 Method

7.4.1 Design

This study was qualitative in design, employing semi-structured interviews to gather data. The interviews were conducted by the author who was known to all participants from the previous intervention study.

7.4.2 Participants

Participants volunteered to participate by responding to an email asking for volunteers to take part in a post-intervention follow-up to the DSD programme. They were informed that the purpose of this study was to gather more specific information about what they did within the programme and their thoughts and feelings about the programme, how it worked and what impacts it had had on them.

Eight participants responded and took part. Seven were female. Ages ranged from 23 to 54, mean age being 34.5. The male/female ratios were approximatelyroughly representative of the participants in the original intervention study group but age range in thehis present study was smaller as was average age (original group was comprised of fifty five participants, nine of which were male, age ranged from 23 to 61, mean age 44). Ethics approval was received for this study (protocol number BS/R/003 I).

The original intervention group was compared to the interview study group on the extent to which they changed their behavioural flexibility, psychological well being, weight, diet and exercise levels, with mean scores presented below in Table 7.1.

Mean scores were similarreasonably equivalent across all variables with calorie intake being one exception, although this is likely to be due to one participant's (RP) anomalous increase. This is supported by the fact that ANOVA analyses of the two groups revealed no significant differences on any of the above variables, suggesting that the interview study group were

representative of the original intervention group. One difference noted, however, was that there were five participants in the original intervention that were following the Atkins diet, and of these five, three went on to take part in the interview study, thus over representing the number of individuals on this particular diet. This is mentioned here as each of the three individuals following the Atkins in the interview study felt strongly that this diet was a significant factor in their weight loss, compared to participants that were following any other type of diet.

The eight participant's outcomes are detailed below in Tables 7.2 and 7.3 and 7.4 charting their total weight loss, total behavioural flexibility changes, changes to psychological well being and overall changes in calorie intake, diet and minutes spent exercising. In a following section there is a discussion of each participant in turn as their interview results will later be discussed in relation to their results from the original intervention.

Table 7.1 Mean changes in weight, behavioural flexibility, psychological well being, diet and exercise levels for DSD programme and qualitative study groups

Variable	Programme Group (N=55)	Qualitative study group (N=8)
Total weight change over intervention (lbs)	-10.44	-10.13
Total behavioural flexibility change over intervention	+15.00	+15.68
Total change in anxiety	-1.36	-1.38
Total change in depression	-1.91	-2.13
Change in average exercise levels (mins)	0.83	1.78
Change in diet score	1.14	0.68
Change in average daily calorie in take	-21.75	17.95
Total change in conscience score	-0.01	-0.02
Total change in Self-responsibility	1.33	1.17
Total change in Awareness score	0.14	0.45
Total change in Balance score	-0.11	0.23
Total change in Fearlessness score	0.14	-0.01
Total change in depression	-1.91	-2.13
Total change in anxiety	-1.36	-1.38
Change in average exercise levels (mins)	+0.83	+1.78
Change in diet score	+1.14	+0.68
Change in average daily calorie intake	-21.75	+17.95

(NB: An increase in diet score indicates that the diet became healthier with an increase in brown carbohydrates, proteins, fruit and vegetables and a decrease in fats, alcohol and white carbohydrates)

Table 7.2 Participants' weight and behavioural flexibility changes between the start and finish of the DSD programme

Participant	Gender	Age	Weight change over DSD programme (in lbs)	Weight change between DSD programme and follow-up (lbs)	Total weight change (lbs)	Behavioural flexibility change over DSD Programme
IG	F	29	-10	-5	-15	+22.47
LA	F	28	- 4	0	- 4	+11.95
RP	M	35	- 6	0	- 6	+ 2.11
BM	F	54	-21	+3	-18	+21.57
EM	F	30	-21	-21	-42	+27.09
LU	F	34	- 9	+3	- 6	+15.82
SK	F	23	-17	+5	-12	+15.07
CO	F	43	+ 7	0	+ 7	+ 9.33
RP	M	35	- 6	0	- 6	+ 2.11

Table 7.3. Changes to psychological well being

Participant	Anxiety	Depression
IG	-1.00	-3.00
LA	-1.00	0.00
BM	-1.00	0.00
EM	-1.00	0.00
LU	-1.00	-2.00
SK	-4.00	-3.00
CO	-1.00	-7.00
RP	-1.00	-2.00

Table 7.4 Total change in FIT constancies, anxiety and depression over the DSD programme

Participant	Total Conscience change	Total Self-responsibility change	Total Awareness change	Total Balance change	Total Fearlessness Change	Total Depression change*	Total Anxiety Change*
IG	0.30	1.70	0.00.	0.00	0.10	-3.00	-1.00
LA	0.55	1.75	0.00	0.05	0.05	0.00	-1.00
RP	0.00	1.45	0.00	0.05	0.05	-2.00	-1.00
BM	0.50	1.80	0.00	0.05	0.05	0.00	-1.00
EM	0.00	1.40	0.60	0.05	0.05	0.00	-1.00
LU	0.10	1.75	2.00	0.05	0.10	-2.00	-1.00
SK	-1.45	-2.15	0.90	1.55	-0.55	-3.00	-4.00
CO	0.00	1.70	0.10	0.00	0.05	-7.00	-1.00

** Daily average minutes spent exercising (includes cardiovascular and resistance exercise). + indicates an increase, - a decrease.*

*** diet score was calculated based on summing brown carbohydrate, protein, fruit and vegetable intake and subtracting white carbohydrate, fat and alcohol intake. + indicates and improved diet , - indicates a diet that has increased in sugar and fat.*

**** NA indicates that the participant did not provide this data.*

7.4.3 Individual Participant Discussion

IG is a twenty nine year old female, living with her partner and completing a master's degree. Her weight loss over the intervention was 10lbs, with a further 5 lbs lost over the six months between the end of the intervention study DSD programme and the interview follow up. IG increased her Behavioural flexibility by 22.47 points (a significant increase). IG reported a decrease in both anxiety and depression levels. She recorded no overall increase in the average minutes she spent exercising over the three month DSD programmeintervention, but did note an increase in her diet score and a reduction in average daily calorie consumption. IG was following the Atkins diet. With respect to other aspects of FIT, IG showed very small

increases in Conscience, Self-responsibility and Fearlessness, but no change in Balance or Awareness. IG demonstrated a large decrease in depression and a small decrease in anxiety.

LA is a twenty eight single mother working as a full-time professional. Her weight loss over the interventionDSD programme was 4 lbs which she maintained to interview follow up but did not increase. LA demonstrated an 11.93 increase in behavioural flexibility over the programme. LA reported no change in depression levels but a small decrease in anxiety. She noted no change in overall exercise levels over the three months but did record a small increase in diet score. LA did not record daily calorie intake and was also following the Atkins diet. LA showed very similar changes to IG in FIT scores – small increments to Conscience, Self-responsibility and Fearlessness, but also a small increment to Balance. She showed no change in her Awareness or levels of depression but noted a small decrease in anxiety.

RP, a 35 year old single male, works as an engineer. He demonstrated a 6lb weight loss over the intervention which was maintained to interview follow up. RP recorded a 2.11 increase in behavioural flexibility, with a decrease in average minutes spent exercising, a decrease in diet score and a significant increase in average daily calorie intake. RP did increase resistance exercise however, but this was at the expense of cardiovascular exercise. The interview revealed he was making efforts to increase power and strength (as opposed to cardiac fitness) through weight training and his diet reflected this in that he had increased protein intake through the inclusion of more red meat and cheese as well as traditionally more healthy foods such as white meat and fish. This might explain the increased calorie intake and reduced diet score. RP reported a one point decrease in anxiety and a two point decrease in depression. Other than a slight increase in Self-responsibility, RP showed very little change in any of the FIT constancies but did note a 2 point decrease in depression with a one point decrease in anxiety.

BM is a married 54 year old female working in administration. BM lost 21 lbs over the intervention but gained three between then and the interview follow up. Her behavioural

flexibility score was increased by 21.57 points (a large increase) and she recorded a 5 minute increase in average minutes spent exercising. She demonstrated a small increase in diet score and a large decrease in average calorie intake. There was no change to BM's depression levels but there was a one point decrease in anxiety.With respect to her FIT score changes, there was no change to her Awareness but the other four constancies each showed a small increase. BM reported no change in depression levels but there was a one point decrease in anxiety.

EM is a 30 year old single female, currently training to be a driving instructor but previously working on a farm. EM lost 21 lbs over the intervention and a further 21 lbs between intervention and interview follow up. EM showed the largest increase in Behavioural flexibility with an increase of 27.09. She reported no change in depresson scores but a one point decrease in anxiety. Her average daily time spent exercising increased by nearly 5 minutes, her diet score increased and her daily calorie intake dropped by well over 150 calories per day. EM was also on the Atkins diet and had been for some time before beginning the DSD programme.EM showed small increments in each of the constancies, as well as a one point decrease in anxiety, but no change in depression.

LU is a 34 year old married female working as a personal assistant. She has two children. LU lost 9 lbs over the intervention but had gained 3 lbs by the interview follow up. She recorded a 15.82 increase in Behavioural flexibility but a 5 minute decrease in average time spent exercising per day. However, her diet score increased and her daily calorie intake showed a small decrease. LU recorded a one point decrease in anxiety and a two point decrease in depression.LU showed larger changes in her FIT scores with Awareness and Self-responsibility showing increases of more than one point, and Conscience, Balance and Fearlessness also showing a small increment. LU reported feeling less depressed and marginally less anxious.

SK is 23 year old female living with her partner. She works in marketing. SK lost 17 lbs over the intervention but had gained 5 lbs by the interview follow up. SK showed a 15.07 increase

in Behavioural flexibility, no change in exercise levels, but a small increase in diet score and decrease in calorie intake. SK showed a large decrease in both anxiety (three points) and depression (four points).She reported a decrease in Conscience, Self-responsibility and Fearlessness but a small increase in Awareness and Balance. Despite the decrease in some aspects of FITness, she reported a large decrease in both depression (3 points) and anxiety (four points).

CO is a 43 year old female, divorced, working as a manager. CO gained 7 lbs over the intervention which she maintained through to the interview follow up. CO's exercise levels were constant throughout the study, but she did record a diet score increase. CO did not record her calorie intake but showed a nine point increase in her behavioural flexibility. CO recorded a very large decrease in depression – seven points – as well as a small decrease in anxiety (one point). She showed no change in Conscience or Balance scores, a very slight increase in Awareness and Fearlessness, and a small increment in Self-Responsibility. CO noted an extreme drop in levels of depression (seven points) and a small decrease in anxiety.

7.4.4 Procedure/Interviews

The aim of this study was to uncover more specific details about what the participants had done throughout the programme, as well as investigating their perceptions of the programme itself and the impact it had on them – cognitively, emotionally, behaviourally, physically and socially. Clarification of these topics might allow us to see how the programme worked and allow us to see if any whether any changes occurring had been maintained. Given that each participant's experiences and perceptions might be very different, a methodology that could address this was required. Semi-structured interviews were employed as these allow the researcher to capture a more thorough account of an individual's experience (Smith, 1996). The flexible nature of the semi-structured interview allows unexpected avenues to be examined and interesting areas to be investigated in more detail than a structured interview or questionnaire could. When coupled with a qualitative analysis, data gathered from semi-structured interviews can be elaborated upon, as opposed to being reduced, as happens with

quantitative analysis (Smith, 1996). Interviews took place approximately six months after completion of the DSD programme.

An interview schedule was drawn up (see *Appendix twelve*) that attempted to use neutral questions that would not bias respondents' replies, with probes considered should the respondents a). have difficulty in understanding what the question asked or b). say something of interest that would need to be followed up.

The schedule needed to address practical information regarding the tasks that they carried out, but also needed to elicit more personal information about their perceptions and feelings. It was felt that the initial questions should address the practical aspects of what they actually did as these would not be found intrusive and would initiate recollections of the experiences. Participants were first asked about the weekly tasks:

"Starting with the weekly tasks, can you tell me please if you attempted any of these, and if so what were they?"

The interview then addressed how the participants felt about doing these tasks:

"Can you tell me how you felt about doing these tasks?"

The participants were then questioned on which of the daily relationship tasks they tackled, and were asked to explain what exactly they did and why.. Similar probes to those above were used to Probes were used to explore individual's perceptions of success and the impact these tasks had on them, for example how the tasks made them feel and whether completing them had an effect on how they later felt and behaved. elicit how they found these tasks. This was followed by questions pertaining to the situational tasks and how the participants felt about these.

When it had been ascertained which of the tasks had been performed, the participants were questioned on what they felt to be difficult about the programme, and what, if anything, they felt were their major successes and failures. In particular, probes were asked to explore

changes to dietary or exercise behaviours, for example, had they adopted a specific diet, had they just avoided some specific foods and had they exercised regularly?

Having ascertained what they had done and why, the interviews moved on to examining the participants' perceptions of their diet and exercise behaviour in particular.

The next stage was to try to uncover what the underlying mechanism may have been for changes in behaviour or BMI change. Probes here were designed to encourage the participant to be more specific about any psychological impacts, for example feeling less anxious or less depressed, having more esteem etc as opposed to just simply 'feeling better'.

"Did you find that you were able to change any habits? Could you tell me what these habits were and how you managed to break them?"

"Did you feel that you broke any habits you had? If so, were these habits related to food or exercise?"

"Did you find yourself thinking more about what to do in any given situationWhat sorts of thoughts did you have when you entered the situations you felt were previously difficult?"

"Did you find yourself feeling happier over the course of the DSD programmeTell me about how you felt over the course of the DSD programme? For example, what kind of positive or negative emotions did you have?"

Finally, participants' views on how appropriate and effective the DSD programme was as a weight loss device were accessed. Were participants explicitly aware at the time that the DSD programme was assisting them in their weight loss attempts? Did they feel it was useful and could they see the point of the programme?

7.4.5. Analysis

The aim of this analysis was to draw out meaningful themes from the participants' accounts of what they did, their perceptions of the programme and any psychological or behavioural changes that may have occurred. The approach adopted in the present study was thematic analysis, which has been defined as "a method for identifying, analysing and reporting patterns (themes) within data. It minimally organises and describes your data set in (rich) detail" (Braun & Clarke, 2006, pp. 79). In thematic analysis, a theme has been defined as something that "captures something important about the data in relation to the research question and represents some level of patterned response or meaning within the data set" (Braun & Clarke, 2006, pp. 82). Themes are picked out from the data using researcher judgement and not by quantifiable methods such as prevalence. Similarly, the importance of the theme (i.e. whether it is a key theme or not) is judged by the researcher and not by prevalence.

This approach has been adopted here for several reasons. Firstly, it is a flexible technique and it is not attached to an existing theoretical framework. Many alternatives exist for analysing qualitative data, such as content analysis or discourse analysis, however, thematic analysis was selected over these because "thematic analysis does not require the detailed theoretical and technological knowledge of approaches….it can offer a more accessible form of analysis, particularly for those early in a qualitative research career." (Braun & Clarke, 2006, pp.81). In the present study thematic analysis has been used as an essentialist or realist method to explore and report on the participant's experiences and meanings.

In the present study, there were some tentative hypotheses proposed to explain how increased behavioural flexibility is related to BMI change. Increased behavioural flexibility may have facilitated habit breaking, or perhaps participants experienced increased feelings of mastery, self-efficacy and control through successful task completion and this provided them with the ability to lose weight, or perhaps completing novel tasks improved SWB which in turn reduced negative coping strategies such as binge eating, and this was responsible for weight loss. However, no one theory was being tested and there may have been other unexpected reasons. As such, thematic analysis in the present context has taken an inductive approach

where the themes that are identified are related to the data themselves and the process does not try to fit the data into a pre-existing coding frame. The analysis has attempted to provide a 'rich' description of the whole data set, as opposed to one particular aspect, which has the limitation of potentially losing some depth and complexity but is a "particularly useful method when you are investigating an under-researched area, or you are working with participants whose views on the topic are not known" (Braun & Clarke, 2006, pp. 83). In addition, where possible, themes have been identified at a semantic level: themes are identified in relation to what has been explicitly said and the researcher does not try to read beyond what has been said. This is because the analysis has focussed on exploring and describing the entire data set rather than on one particular aspect of it.

Braun & Clarke (2006) outline a recursive six step process for performing thematic analysis and this has been followed in the present study. Step 1 requires the researcher to familiarise herself with the data by transcribing the data, reading and re-reading the data and noting down any ideas. In step two, data is coded in a systematic manner across the entire data set and data is collated for each code. In the present study coding was performed manually due to the small sample size. In step three codes are gathered together into potential themes and all data relevant to each theme is assembled. At step four, themes are firstly checked in relation to the data extracts to see if there is support for them. They are then checked across the entire data set to again check for consistency. This permits a 'thematic map' to be drawn. At the next step the themes are defined and named with continued analysis to refine the specific details of that theme. This leads onto the final step which is to write up the report. Here, the best extracts are selected and the themes are related back to the research questions and relevant literature.

7.5. Thematic Analysis

Thematic analysis, as outlined by Braun & Clarke (2006), was used to draw out themes arising in the data set and a thematic map was drawn up to explore hierarchies within the themes (see *Appendix Thirteen)* - the themes and their relationships to each other are introduced and summarised below. This is followed by a detailed analysis of the themes with

reference to the research objectives. A detailed discussion of findings follows this in section 7.6.

7.5.1. Thematic Mapping of Themes and Their Relations

The key theme identified was that the participants' perceptions of the programme's rationale and the practicalities of completing the programme directed what they actually did. Tasks were selected on the basis of relevance, practicality and ease. Participants perceived the programme to require a significant amount of effort and organisation. The theme of 'relevance, practicality and ease' related to several sub themes: weekly task completion; situational tasks versus daily tasks, failure to focus on behavioural dimensions and volitional successes/motivational failures. The weekly tasks and situational versus daily tasks sub themes were in turn related to lower level themes: changes to psychological states and cognitions, consistent changes to dietary behaviour and exercise through the weekly tasks. In turn these themes were related to several themes concerning the precise nature of the changes: control, self-efficacy; enjoyment; satisfaction; habitual behaviour and dietary and exercise behaviours perceived as habits. There were two other themes which were related to the failure to focus on behavioural dimensions: some effects were task dependent and the feeling that changes were not permanent.

7.5.2 Objective One: How Did Participants Perceive the Rationale and Practicalities of the DSD Programme?

The first theme to emerge here considered the practicalities of the programme.

Theme One – Effort and Organisation

Participants felt there was a lot of effort and organisation required in making time to plan and perform the tasks. Participants seemed to have felt that it took quite a lot of effort and time to complete the DSD programme because of the worksheets, thinking about relationships and

situations that needed work and deciding which tasks to tackle. Additionally participants were required to plan and organise the performance of these tasks.

"I did think that maybe all the worksheets and diaries and stuff were, well, uhh, I don't know, just really going to be far too much to do on top of the exercises and trying to eat properly, go to the gym and the rest of it. I was a bit intimidated I suppose." IG.

"A lot of it seemed like too much for me to fit in, so that worried me a bit." LS.

"…I thought it was quite a lot to think about all at once. And quite a lot to do as well." CO.

This was the case for the majority of participants, not just those already struggling to balance work, children, partners, friends, exercise and diet. It is possible that participants viewed the DSD programme as just another 'chore' that was making their burden even heavier. So, instead of viewing it as a means for eventually making things easier, they viewed the programme as one more thing to be squeezed in to an already hectic schedule. The programme might benefit from modification as it may have been too demanding for many people. This would be especially important if it was to run for longer periods of time. The activities would have to be manageable within busy schedules in order for participants to be able to complete them successfully. This would be especially important if the programme was to run for months as opposed to weeks. One possibility might be to begin with weekly tasks only and then gradually build in situational tasks later on.

Theme Two – Preference For Weekly tasks

Themes two and three relate to both perceptions of the practicalities and rationale of the programme. Looking first at theme two, participants were more enthusiastic about attempting the weekly tasks than the daily tasks.

"…the weekly things, I thought those would be ok 'cos I could take K along, or whatever." LA.

"[the weekly tasks]. I did one a week and completed them all… they were not too difficult and mostly quite fun… I enjoyed them on the whole." IG.

Participants viewed the weekly tasks as social outings or leisure activities which would have a direct, positive effect and would also be easier to accommodate. The preference for these tasks begins to suggest that the participants did not fully grasp the programmes rationale (this point is returned to and explored in more detail later), and in terms of practicalities, the participants favoured aspects of the programme which were directly related to weight loss and were easier to complete. The only exception to this was RP, who appeared to tackle more of the relationship tasks. RP's primary reason for attempting the DSD programme was not weight loss (and to some extent this is reflected in his relatively small weight loss - 6 lbs over the three month trial). Rather, he was interested in just being healthier by avoiding junk food, drinking less and exercising more, in particular doing more resistance exercise to increase power and strength. This may have allowed him to have a wider view of the DSD programme – seeing more of its potential benefits than just weight loss – and he was perhaps more motivated to try some of the tasks which were less obviously associated with weight loss. A curious finding here is that despite RP's attempt at the relationship tasks, as well as some situational and weekly tasks, his overall behavioural flexibility increase was only 2.11 points, this does however tally with his smaller weight loss.

Theme Three - Preference for situational over relationship daily tasks

As with theme two, theme three again suggests that participants had a preference for aspects of the programme which had clear practical value in relation to weight loss. Participants were asked to complete both relationships tasks (where they had to change their behaviour in a meaningful relationship) and situational tasks where participants acknowledged dietary or exercise situations, personal to them, where they were swayed from following their diet or exercising. Some examples of such situations include buying fatty foods in the supermarket or not going to the gym after work because they were too tired or hungry. Participants were asked to think of behaviours which would be more appropriate in those situations – for example, in the supermarket situation, a more appropriate behaviour might be to avoid the bakery or aisles with sweets/crisps and only go to the supermarket after a meal so there were

no feelings of hunger. The participants tended to demonstrate a general preference for the situational daily tasks over the relationship tasks (only three of the eight participants interviewed attempted daily relationship tasks, and again, one of these was RP whose main goal was not to actually lose weight).

"I couldn't see that I was going to bother with those (relationship tasks), even right away, I was just thinking that I wanted to be doing other things, so frankly, I just didn't bother." (EM).

In the case of some participants, such as LA, the lack of engagement with the relationship tasks was accompanied by smaller weight losses. However, this was not the case for every participant. EM lost a considerable amount of weight (21 lbs over the trial and a further 21 lbs since) and this occurred despite the fact she tackled no relationship tasks at all. However, if we go on to examine situational task completion, it can be seen that EM did tackle these and was quite successful. The situational tasks were heavily favoured, with every participant attempting these. In the main, participants appeared to tackle these tasks in terms of diet or drinking behaviour (as opposed to exercise behaviour) in specific situations.

"The worst for me is eating chocolate and drinking lager. So I, uhm, bought some tangerines instead and ditched the tins of lager. I quite like vodka and cranberry juice, so I had that instead." IG.

"I also did some things other than going to the pub for a bit. Suggested going for dinner or to the cinema instead of perpetually being in the bar at the weekend." RP.

As already noted, of the two participants who did attempt the daily relationship tasks, one was not on the DSD programme to lose weight per se. It does seem that for those whose primary goal was to lose weight, the relationship tasks were of less interest.

Theme Four – Perceptions of programme rationale and practicalities influenced what participants chose to do, and Theme Five– Relevance, practicality and ease

When questioned on what they tackled, participants' responses gave insight into how they perceived the rationale of the programme as well as information about what they actually did. Their responses led to identification of the primary theme that what they chose to do was influenced by how they perceived the programme, as well as the sub theme of relevance, practicality and ease. These are discussed together as they are closely related.

Participant responses suggested for the majority of them, the tasks (weekly and daily) which they chose to tackle were selected on the basis that they could readily see the relevance of the task, that the task had practical utility, and that the task could be completed with a relative degree of ease. This means that tasks were selected on the basis of three main reasons. Firstly, the participants could readily see the purpose of the weekly tasks and their value – these tasks were obviously related to moving away from habits and routines and changing what they saw to be behaviour which hindered weight loss.

"By and large I saw what you were getting at with those things..." BM

This was particularly true of the weekly tasks that involved exercise with all of the participants indicating that many of the weekly tasks they attempted were exercise based.

"So the weekly ones that were about exercising, uh, I did them. The new class and bike ride and I walk anyway with the dogs so… oh yeah and the sit-up one." EM.

These seem to have been favoured on the basis that their purpose was palpable and easily reconciled with the goal of weight loss; it allowed the participants to 'kill two birds with one stone'.

It also seems however that some tasks were selected for the social significance attached to the task, for example, completion of the exercise class task allowed some individuals to gain some social contact.

"I tried a new exercise class with a friend, which was actually nice because with the job and K I don't always see as much of my friends as I would like." LA

"… mostly the exercise ones, ah, the walk in the country – that was nice because my husband came too. I also did the bike thing, and I joined a different exercise class." BM.

Situational tasks were chosen over the relationship tasks for the same reasons that weekly tasks were chosen over daily. Like the weekly tasks, the situational tasks were perceived to be considerably more relevant and of more value to the participants, particularly in terms of practicality.

"If I hadn't been primarily concerned with losing weight I might have had more patience for planning and doing these (relationship tasks). As it was, I felt more drawn to doing the diet ones." BM

"… and because it (situational task) was more directly related to shifting weight, I think I was much more, uh [pause], more motivated." IG.

"Yeah, they (situational tasks) were a bit more sensible I think and because I was already trying to follow a diet and exercise a bit they seemed more practical, you know?" LA.

In addition to relevance and practicality, participants also used the ease or convenience of tasks in deciding whether to attempt them. For example, with respect to the weekly tasks, one participant stated:

"I did the supermarket thing, but that was easy really because the new Tesco opened." LA.

The same participant, with respect to the relationship tasks stated that:

"… but it was just too difficult to think of things to do and how to do them and you know, all that stuff." LA.

This has a serious implication. Seemingly, participants have grasped the most basic notion of the DSD programme, that is, to change inappropriate behaviours. They also appear to have tackled enough of the programme for benefits to appear - the previous study did indicate that significant increases in behavioural flexibility occurred and Table 7.2 shows that all participants in this study increased their behavioural flexibility. Thus, whether the participants were aware of their increasing flexibility or not, tackling even a limited number/type of tasks did help to increase behavioural flexibility. Nonetheless, participants, in the main, seem to have chosen tasks on the basis that they were easy, convenient and relevant which does not wholly reflect decision making as prescribed by FIT. One aim of the tasks (for increasing behavioural flexibility) was to encourage participants to put themselves outside of their comfort zone so that they would attempt to learn new, more appropriate behaviours (and thereby increase their comfort zone and behavioural flexibility), however, when asked how completing the tasks made them feel, the majority of participants did not report any negative emotions at all. This could reflect increasing self-efficacy or confidence, but it could also imply that participants did not report negative emotions because they were not attempting to move out with their comfort zone.

Participants' responses could therefore be an indicationth that their perception of the programmes rationale was inaccurate. The programme was designed to serve as a means for increasing behavioural flexibility that would in turn help with performing behaviours associated with weight loss, but participants' responses suggest they have viewed the DSD programme only as a practical aid for sticking to their diet and/or exercise regime (this point is returned to later). They chose tasks that seemed less challenging, or easier to perform, and it is quite possible that the tasks selected did not involve any considerable movement away from operating out with the comfort zone or involve behaving in a way that was different form normal.

In summary, the identified themes suggest that participants viewed the programme as quite taxing and as requiring a significant amount of planning, organisation and time to complete. Additionally, they may have failed to comprehend fully how completing daily relationship tasks would actually influence behaviours which might facilitate weight loss. What they actually chose to do was strongly influenced by both the lack of understanding of the rationale and the time/effort required. There was a general preference for the weekly tasks over the daily tasks because they were more readily reconciled with the longer term goal of weight loss. Participants also viewed these tasks as easier and more convenient – they had fewer problems building these into their lives than the other tasks, in part because these required less preparation. The major successes reported by the participants appeared to include the weekly tasks, however, all participants also successfully completed the daily situational tasks and appeared to have successfully broken negative habits. Failures and difficulties both involved the daily tasks, and in particular the relationship tasks. The majority of participants failed to engage with these relationship tasks, arguing that they seemed less relevant and very complicated and difficult to complete.

7.5.3 Objective Two: What Did Participants Do Differently?

This objective was concerned with the sorts of behavioural changes participants made – what did they actually do differently? Were they able to make changes to a wide variety of behaviours in a wide range of settings or were the changes limited to dietary and exercise behaviours in relevant situations? If so, what changes did occur to dietary and exercise behaviour?

Several themes were identified here: Failure to focus on behavioural dimensions; volitional successes and motivational failures; bad food habits and implementation plans, and exercise through weekly tasks. These are explored below.

Theme Six – Failure to focus on Behavioural Dimensions in situational tasks

Within the FIT theory, behavioural flexibility is measured via 15 behavioural dimensions::

- Unassertive - Assertive
- Trusting of others – Cautious of others
- Calm/relaxed – Energetic/driven
- Reactive – Proactive
- Flexible – Definite
- Outer-directed – Inner-directed
- Risky – Cautious
- Behave as I wish – Behave as expected
- Spontaneous - Systematic
- Single-minded – Open-minded
- Conventional - Unconventional
- Individually-centred – Group-centred
- Firm – Gentle
- Introverted – Extroverted
- Lively – Not Lively

Participants were told explicitly to use either these dimensions, or if more appropriate, to devise their own, and work on their behaviour within these dimensions (for both situational and relationship tasks). Thus they were asked to think of relationships and situations where they did not behave appropriately and think how they should behave. They were then to change that behaviour along a dimension, e.g. if they tended to be unassertive with their children or in a restaurant, they were to behave more assertively. Given that all participants did report an increase in behavioural flexibility, the assumption would be that they did try to be more flexible along these dimensions since these are the dimensions which are assessed by the FIT profiler and would need to have changed for scores to have increased (unless of course there were strong social bias effects). However, with respect to the situational tasks, the participants seemed unable to bring up unaided in the interviews the exact dimensions they felt were appropriate to work on. Rather, they discussed situations where they felt they were tempted, or food stuffs/types that they craved, but without going into any real detail on the actual dimensions that were involved.

This was not the case with the two participants who tackled relationship tasks. RP for example explicitly worked on becoming more group oriented at work and BM worked on being more assertive with her mother-in-law.

Curiously this may not have been hugely influential on results, as might have been predicted. BM lost a considerable amount of weight and showed a significant increase in Behavioural flexibility butwhereas RP did not. EM and SK both also reported significant weight loss and significant increases in Behavioural flexibility, yet did not explicitly comment on any dimensions.

Despite the failure of participants to state explicitly the dimensions they worked on in given situations, it seems that the majority of individuals focussed on the reactive – proactive dimension. Many discussed the development of strategies used to help them avoid particular food stuffs. For example, IG kept tangerines in the house instead of chocolate, EM made sure she was never hungry whilst on the shop floor, RP attempted to try things other than going to the pub at the weekend and SK swapped calorie and fat laden desserts for healthier options. This might be viewed as proactively dealing with a problem as opposed to simply trying to react to it. Another dimension that seemed to be relevant is that of assertiveness – BM explicitly tried to be more assertive and in his attempts to do something other than to always go to the pub, RP also had to be more assertive.

Theme Seven – Volitional Successes and Motivational Failures

The identification of this theme is based on the finding that participants did not report uniform changes in behaviour and the differences can be viewed in terms of volition versus motivation. Participants were most successful in changing habits using the weekly tasks – every participant reported completing several of these, although as already discussed this seems to be because they selected tasks which were readily accomplished within their existing routines or plans, for example, shopping at a different supermarket when a new superstore had just opened. This may be important given that the primary function of these tasks was to get participants to operate out with their usual routines. The other area of successful behaviour change appears to be in completing situational tasks. Every participant mentioned at least one example of a situation they had difficulty in and also cited new behaviours that they attempted to perform instead. In all, it seemed they were reasonably successful in carrying out these new behaviours, with no participant stating specific examples

of failures. When they were motivated to tackle a task, they did so. It is clear, however, that participants failed to complete the relationship daily tasks, but this seems to be because they chose not to attempt them, as opposed to attempting but failing. For example, SK did not tackle any of these, nor did IG, EM or LS. Failure occurred when motivation was lacking.

The participants' decision to not tackle the relationship tasks appears to be due to their perceptions of the tasks being unrelated to weight loss, linking back to objective one. Participants did not readily connect these tasks to losing weight, even though the task – bbehavioural fflexibility – weight loss chain was clearly presented to them.

"I wasn't sure what they were all about, what I was supposed to be doing exactly. And really, how they were going to help me. The sheets and stuff were quite confusing for me too so I avoided them." SK.

"…I wanted to do the diet and exercise ones first as I found it easier to see the relevance of them.." IG.

Perhaps the fact that the situational tasks were obviously related to weight loss (and consequently had more immediate benefits), whereas the relationship tasks would have a had a less obvious long term benefit, is why the former were chosen over the latter. Putting long term benefits ahead of short-term satisfaction can beis found to be notoriously difficult by many, and this might in part explain why individuals did not attempt the relationship daily tasks.

With respect to the weekly and situational tasks that participants did tackle, there were no reports of major failures - when participants did intend to do a task, they were able to perform it. This suggests that participants' problems were not volitional in nature, rather they were motivational (see the above quote by EM). When participants had motivated themselves to perform a task, they did it, but where motivation was lacking, as with the relationship tasks, they tended to fail. Viewed in terms of the theory of planned behaviour, the participant's inability to perform tasks would be related to the cognitions directly underlying intention. The interviews suggest that the participants' attitudes and perceived behavioural control

(PBC) may have influenced their motivational levels. Their attitudes towards the weekly and situational tasks were more favourable and positive than the attitudes towards the relationship tasks. Further, some participants suggested that they could not think of relationships to work on and those who did attempt the relationship tasks stated they were difficult. Thus, in order to improve participants' performance of the relationship tasks, their attitudes towards the tasks would need to be changed. Additionally, some way of increasing their PBC could be introduced – this might be in the form of addressing some of the barriers they might face or by increasing their perceived self-efficacy.

Theme Eight –Bad food habits and implementation plans

One obvious change to participants' behaviour concerns their ability to identify and change what they saw as 'bad habits'. Participants all identified poor habits that may have been difficult to break in the past and had perhaps been responsible for weight gain or failure to lose weight. In order to successfully do something different, participants formed 'implementation plans' to be able to deal with these habits/situations and their responses indicated these plans had been successful.

"The worst for me is eating chocolate and drinking lager. So I, uhm, bought some tangerines instead and ditched the tins of lager. I quite like vodka and cranberry juice, so I had that instead." IG.

"…I'll sit down and drink a few glasses of red. I know that's not very good to do. I wanted to try to get round that habit… I just finished the red wine and didn't buy anymore (laughs), I did actually have to detour round THAT aisle…" LA.

"I also did some things other than going to the pub for a bit. Suggested going for dinner or to the cinema instead of perpetually being in the bar at the weekend." RP.

"… I worked on my big diet issue – biscuits at night… I stopped going down that aisle in the supermarket, got in some fruit for nibbling on and made an attempt to go out a bit more in the evening. That seemed to work pretty well." BM.

"…I focused a bit more on the diet thing. I DO like chocolate, which, obviously, you just are not supposed to eat on Atkins. And I was working in Tesco's at the time, so was having it in front of me ALL the time. What I did instead was to make sure I wasn't hungry when I was on the shop floor, and I would drink diet drinks to help with the craving for sugar." EM.

"S and I usually have dessert after dinner and its always ice cream or crumble or something. There isn't any need of it and I really had to cut that out, but it was difficult because S still wanted it. I did some things to get round that. The first was to get weight watchers stuff – it's still not good for you but less bad than normal supermarket things and we had those. I also tried having fruit and sometimes would just busy myself with something else while he had pudding." SK.

These, however, are specific situations and do not necessarily reveal if diet changed consistently. For example, did respondents change what they ate at every meal so that overall their diets were lower in fat and sugars and higher in protein, fruit and vegetables?

Despite the participants' ability to identify bad dietary habits, there were differences in whether they just focussed on changing bad habits or whether their whole diet changed significantly. Those individuals following a particular diet (especially those on the Atkins diet) demonstrated a greater change in overall diet, such that everything consumed had to be prescribed by that diet, EM for example. Those individuals who were not following a particular diet made good attempts to break bad habits (those they perceived to be particularly responsible for weight gain) but did not necessarily change drastically what meals they ate. IG and EM for example were both following the Atkins diet and adhered diligently to this, cutting out carbohydrates and eating more protein and vegetables (but not reducing fat intake), whereas RP, for example, broke the habit of drinking alcohol every weekend but did not necessarily change other aspects of his diet.change his diet very much.

These individual differences may help to explain why the diet measures appeared to be less related to BMI changes than expected. Some individuals made changes only to their only with respect to their bad habits, such as snacking at night, which may have had a small impact on all diet measures taken. Owhilst others changed their diet to include more fruit and vegetables but not necessarily less fat or more protein. Still others changed their diet as per the Atkins diet which includes more vegetables and protein but also possibly more fat and fat. Finally, some participants may have shown the whole spectrum of changes on the measures taken. In addition to the measures used, which were possibly lacking in precision,

Theme Nine – Exercise through completion of the weekly tasks.

Few individuals recognised that they had bad habits in relation to being inactive to their activity levels and consequently made plans to do more exercise or to overcome situations where by their intentions to exercise were not acted upon (RP being the exception). The majority of participants indicated that the main mechanism forby which they increaseding their exercise levels was via the weekly tasks, many of which involved doing some form of exercise activity.

"I did one (weekly tasks) related to trying new exercise classes… I also bought a new bike. I don't drive so you know, that meant I could get about, complete the cycling activity and get some exercise all in one." IG.

Certainly, of those participants who lost the most weight, completing the exercise weekly task was a common theme. For example, IG (lost 10lbs), EM (lost 21 lbs), BM (lost 21 lbs) and SK (lost 17 lbs) all state having completed several exercise based weekly tasks. However, it does not seem that significant weight loss could have resulted from simply increasing physical activity levels through completing weekly tasks based on exercise. Firstly, the tasks would not have provided enough calorie usage to actually account for the weight lost and secondly, exercise levels did not change dramatically over the study for the participants (EM being the one exception, but note although she tackled some weekly tasks, she did not complete one every week). Several participants did not change their exercise levels at all. Rather, it seems that they dropped planned exercise sessions in favour of

completing exercise based weekly tasks as opposed to performing their normal exercise sessions in addition to weekly tasks.

In summary, what participants actually did differently depended on how they perceived the DSD programme, what they were motivated to do and whether they were already following a particular diet. Participants who focussed on weekly and situational tasks demonstrated a relatively specific change to their actual behaviour – they changed their dietary and exercise behaviours. This was particularly true of those participants already following a prescribed diet – they were more likely to report only attempting those tasks which would be directly helpful in adhering to the diet (e.g. EM). Participants who tackled all three types of task were more likely to demonstrate changes in other areas of their life. Their responses suggest quite strong associations between how the programme was perceived, what was actively engaged with and what changes occurred. It appears that there were significant individual differences in dietary and exercise behaviour changes over the course of the DSD programme. Some individuals had prescribed regimes to stick to and in order to stick to them they had to demonstrate more consistent changes to all aspects of their diet and exercise levels. Other participants changed only one or two specific behaviours where they attempted to break specific habits perceived to be particularly unhelpful to their goal of weight loss. Overall however there was a positive shift in diet and exercise levels with individuals tending to improve their diet and increase activity levels and it also appears that individuals tended to form implementation plans which facilitated successful adherence to a healthier diet and exercise regime.

7.5.4. Objective Three: How did participants feel about diet and exercise after the DSD programme?

Two themes emerged with respect to health behaviours post-DSD programme: identification of bad habits and lack of confidence in ability to maintain changes.

Theme Ten – Identification of Bad Habits

Firstly, participants expressed a tendency to look now at their behaviour in terms of habits. Thus, tendencies to eat poorly or stay in watching television instead of exercising came to be perceived as bad habits that needed to be broken. As humans we tend to behave in a It is normal for individuals to display a variety of habitual behaviours since habitual behaviour can save on cognitive resources which then become available for use elsewhere. manner and However, habitual behaviours may not this tendency often leads us to behave inappropriately. always be appropriate. Although most people can recognise that they have 'bad habits', for example smoking or biting their nails, they might not recognise that not eating healthily or not exercising can also be viewed as 'bad habits' that need to be changed. This was an important point in the programme and it is a positive sign that participants have grasped this and have begun to perceive their behaviour in this way.

"I suppose, looking at bad habits as such and as not being appropriate…" IG.

"..I now like to look at being naughty as habits and that being good, or whatever, you know, you can maybe look at it as trying new things." LA.

"Yeah, especially the habit bit. I remember you saying about the constant effort it can take to stick to an exercise thing or diet, and thinking that was how I felt. You know, everyday a real effort... Having little contingency plans and thinking in terms of habits and challenges is something I have taken to and use." RP.

"I understand that not exercising or eating junk food or whatever can be bad habits, if you will, and that, well, er, breaking these habits is difficult. And I see that the FIT thing would help..." BM.

The evidence suggests that these changes in perceptions were accompanied by successful changes in behaviour. As already discussed, all participants were able to identify their bad food habits and successfully break them too – all participants were able to cite at least one

example of a habit that they had broken. However, it remains to be seen whether breaking one or two habits led to a weakening of all habitual behaviour within the 'habit web'.

Theme Eleven – Lack of confidence in permanency of changes

A second theme identified referred to the permanency of the changes made. Participants did view diet and exercise differently from before completion of the DSD programme, and as already discussed, they had also made changes to their dietary and exercise behaviour. However, responses indicated that they perceived these changes to lack permanency. From the interviews, it can easily be seen is evident that the DSD programme had some impact on behaviour, at least in the short term, since each and every respondent reported changing inappropriate diet or exercise related behaviours. This is further reinforced by the finding in the actual intervention that each participant lost weight – in order for this to have occurred they must have increased the number of calories they burned up or the number of calories they consumed, i.e. done more exercise or eaten less/more healthily. However, it is interesting to investigate how the participants perceived these changeshow the participants viewed these changes warrants examination. Two interesting points were identified in the interviews. Firstly, the participants tended to slightly underestimate how much their behaviour had changed and secondly, they demonstrated a lack of confidence in their ability to maintain these changes permanently. For example, when asked whether the daily relationship tasks had affected how she behaved now or in the future, IG stated:

"I don't really know. I think maybe as far as work goes." IG.

This was despite the fact she claimed to have been quite successful in her attempts at completing the task. Similarly, when asked if the DSD programme had had a permanent impact on her behaviour, she commented:

"I don't want to say that my behaviour has changed for ever but at the moment I am being quite good…" IG.

Similarly, SK noted that although she was still eating healthily and doing exercise, she found it boring and did not think about the DSD programme very much.

As with IG, EM had previously stated that she had completed daily situational tasks and this appeared to have helped her in sticking to her diet, yet she did not feel that t
The DSD programme had impacted on her behaviour outside of dieting and exercising. When asked if it had had an impact, she responded:

"Not really. As I said, I was sticking to the Atkins and exercising regularly anyway before I started. I had several strong reasons to lose weight and they initially got me motivated. Later, it was the previous success and ability to do it that started to make not want to be unhealthy. I wouldn't say that the programme had any really obvious impact".

With respect to permanent changes in behaviour, EM believed that her continuing motivation to reach her target weight and remain healthy would have a stronger influence, although she did believe that the DSD programme might be something she would use should her motivation decrease.

Perhaps this underestimation of behaviour change and lack of confidence in its permanence results from the failure of the majority of participants to tackle all aspects of the programme. Their focus on health behaviour related tasks and issues with planning, effort and organisation might underlie their lack of confidence – perhaps if they had completed the relationship tasks and felt more able to plan and organise their activities, they might have more confidence in their abilities. Alternatively, the participants may have felt they had failed to meet the expectations of the DSD programme and this undermined their confidence. Again this suggests that the DSD programme requires modification and is presented differently to participants such that the tasks are more easily assimilated into their lives. Early success is likely to lead to motivation and continued engagement with the programme which in turn should lead to greater changes in behavioural flexibility and well being.

The participants who had more success with the daily relationship tasks seemed more positive about the impact of the DSD programme on them: RP, BM and CO all noted that

their behaviour within certain relationships had changed and that this had improved the relationship and their mood states or overall happiness. BM, for example, noted that her behaviour towards her mother-in-law had become more assertive and when asked about the continuation of this, replied:

"[pause} that's difficult to say. I think so in that I know to not always let her say or do what she thinks. Sometimes, it's not worth the bother but sometimes it is so now maybe I will (be more assertive)".

She also noted that others found her to be more active and "*a bit happier with myself*", so the DSD programme had had a beneficial effect therefore on both her activity levels and her relationship with both her husband and her mother-in-law.

Similarly, CO noted that "*…I did see some benefit from behaving differently with my husband and that is something I would like to keep going*".

In summary, individuals were able to perceive their behaviour differently. Dietary and exercise behaviour came to be viewed in terms of good and bad habits, and with respect to the bad habits, the participants felt more confident about avoiding these behaviours because the situational tasks allowed them to develop strategies to break them. Participants were able to break not just one habit but several. These changes in habitual behaviour were facilitated by previous successes; the participants were more aware that there were other things they could be doing that would be of more benefit to them. Engaging in these other behaviours was not just more obvious but also more likely. This could suggest that their increased Behavioural flexibility encouraged more conscious thought (with respect to habits) and furthermore, it seems that breaking one habit did indeed may have lead to a weakening of their habit webs such that other habits were more readily changed.

7.5.5. Objective Four: How and why did the DSD programme work (or didn't it work)?

The aim of this objective was to explore what psychological processes, states or changes had been experienced by participants with a view to examining whether it was the DSD programme per se that affected changes in the individual and if so what the effective mechanism might have been. There were three key themes identified from responses: there were changes to psychological states and cognitions; perceptions of the DSD programme as an aid to weight loss and some effects were task dependent. These key themes were related to several sub-themes which concerned specific changes or states: control; self-efficacy; enjoyment; satisfaction and habitual behaviour.

Theme Twelve – Enjoyment and satisfaction

With respect to the impact of the DSD programme on feelings, participants reported a variety of emotions, both positive and negative. There was however an overall trend for participants to enjoy the weekly tasks they tried.

"… I switched the phone off but that was just nice..." LA.

"…I think they were not too difficult and mostly quite fun…I enjoyed them, on the whole, so the only obvious impact was that they were fun." IG.

"I tried a new exercise class with a friend, which was actually nice because with the job and K I don't always see as much of my friends as I would like." LA

"… mostly the exercise ones, ah, the walk in the country – that was nice because my husband came too. I also did the bike thing, and I joined a different exercise class." BM.

As already noted however, there was a trend for the participants to select tasks which were not particularly challenging, so this might partially explain why they found the tasks so enjoyable, as opposed to difficult or negative in some other way. Some participants did note that not all the tasks they tackled were enjoyable.

"Some were good fun, some not, but I didn't feel uncomfortable or bad." RP.

"…I either enjoyed them or I didn't…" BM.

This may reflect the fact that perhaps the participant's choice of task in some cases was a little more reaching – not all the tasks attempted were straightforward and easily accomplished. Several participants noted that they 'felt better' upon completion of tasks which may reflect a sense of achievement, and they also commented that successfully completing not just the weekly, but also the daily tasks, did provide a sense of satisfaction and achievement. Overall, the participants did indicate that the during the DSD programme they did not feel particularly negative and the DSD programme was a positive experience – not just because they were successful and appeared to be losing weight, but also because aspects of it were fun and enjoyable.

"Overall, the programme had a positive effect on me, I think. I did enjoy most of the weekly tasks because I like to try new things, but it also allowed me to spend time with my boyfriend doing interesting things and not just doing housework or watching tv! I don't know if I feel a lot happier, but then I am not really a negative person anyway." IG.

Some participants indicated that they had felt less negative recently, and suggested that the DSD programme, alongside watching their diet, exercising and maintaining all their other normal activities distracted them so that they felt their lives were quite full and had with a good sense of purpose. In response to being questioned about their emotional states and how they coped, several participants indicated that they often drunk more alcohol to cope with such negative feelings, however, none specifically stated binge eating as a coping mechanism. Participants generally enjoyed a more positive emotional state throughout the DSD programme because it engaged them and several aspects of the tasks provided enjoyment and a sense of satisfaction. This maycould have aided several of them in reducing their alcohol consumption and this might have helped them lose weight. However, those who specifically stated that alcohol was one method they used for coping with negative emotions (LA and RP) were not among the participants who radically changed their BMI. It seems

more likely A more probable explanation is that the positive emotional states enjoyed by the participants did not facilitate weight loss because they decreased maladaptive coping, but perhaps but because they supported attempts to change behaviours by increasing self-esteem or self-confidence.

Theme Thirteen – Increased Self-efficacy and Control

As discussed above, participants acknowledged that they felt more able to tackle the tasks as the programme progressed, indicating increases in self-efficacy. However this does not necessarily mean they felt more in control. With respect to feelings of control, one participant did directly indicate that she had a greater knowledge of her options and felt that their choices were up to them.she had greater ownership of the choices available to her.

"Well, I saw that it was up to me whether I spent time doing pleasant activities with my husband so if I wanted to do these things then I had to sort it out myself." CO

No other participant referred directly to feeling more in control. Again, their actions suggest they were more in control because each participants cited several examples of how they changed their behaviour and did so successfully for the duration of the programme – increased control may be inferred from this but it is not possible to say with authority that an increase in control assisted with completion of tasks or whether increased control resulted in increased BMI change.

Theme Fourteen – Changing habitual behaviour

As discussed above, participants expressed a tendency to look now at their behaviour in terms of habits. Their reports indicated that changes in perceptions were accompanied by successful changes in behaviour and that successfully breaking one habit did facilitate changes in behaviour in other dietary or exercise related situations. However, from their responses, it seems this might have occurred in a number of different ways. situations Firstly, there was the suggestion that if the goal was to lose weight, there seemed to be little point in removing only one habit – all of them needed to be broken. Thus a complete overhaul was required.

Secondly, success with one habit resulted in feelings of self-efficacy, and possibly control, which appears to have encouraged and assisted in tackling other behaviours. Thirdly, and perhaps most importantly, participants described being more aware of other ways to look at and behave in those situations so that those habitual behaviours usually 'automatically' engaged in became seen as just one option.

"Completing some of the tasks was good. But it did also make me, and EC [her boyfriend] think that in the evenings we could go to the park and rollerblade or go out on our bikes, you know, instead of going to the cinema or watching TV." IG.

"Yes. I started eating more fruit at night rather than the biscuits and decided to try and make sure I always had the five portions [of fruit and vegetables] every day. Set that as another goal. And really it's not that hard at all. I also tried to eat new foods every week so don't just eat the same old things. I think one of those tasks said to do that… once you start trying new things you realise how many other types of foods there are even just in the local supermarket." BM.

Theme Fifteen – The DSD programme as an aid to weight loss

When asked what they thought of the DSD programme as a weight loss device, participants placed little emphasis on the DSD programme, preferring to ascribe success to other factors. This was despite the fact that they all lost weight during the programme. There were three main points of interest in their replies.

Firstly, several participants believed the diet they were following before starting the programme was the main reason for their weight loss – namely the Atkins diet, a diet programme that advises a reduction in carbohydrate intake and promotes increased protein intake instead.

Secondly, several participants stated that they felt the DSD programmeFIT worked more as a tool to be used in situations where they were tempted to stray from their diet or exercise regime:

"I suppose in the long run it [the DSD programme] might serve as a weight loss device, I think it was really more of a crutch for tricky situations. At the end of the day you still have to have the willpower and motivation – either to stick to your diet or exercise, or to stick to the tasks FIT I think." BM.

This implies that rather than truly becoming more behaviourally flexible, especially in a wide sense, they may have tended instead to improve the appropriateness of their behaviour in particular situations only.

Finally, it seems that the participants viewed the programme as quite complex and difficult to plan and implement, which often served as a distraction from actually exercising or following their diet, rather than something which might support their efforts. Participants were provided with DSD task diaries to help them form implementation plans and keep a check on what they had done, however, completion of these diaries was at the participant's discretion and they were not required to return the diaries to the researcher.

"I think it was kind of more like a whole life thing rather than a weight thing and that maybe losing weight was like a side affect [laughs]. For someone like me I would definitely be thinking that it needs to be about the weight loss, otherwise what's the point? I wasn't caring about doing things at work or whatever and all the sheets just made it even more complicated – and that's one of the things that can make losing weight even harder I always think. You know, its bloody complicated – what you can eat, what you can't eat, what exercise you should be doing, where to get stuff, when to do stuff, it just goes on and on! And what if you have a job and all other things going on like planning a wedding, moving house – it all takes hard work and then you just need to chill out, not mess about filling in sheets and thinking about listening to some other radio station." SK.

"I don't think it did too much for me but then I felt like I had no time or energy to put in to completing the programme. I have always felt that eating healthy food takes not just self-control, but it also takes a considerable amount of planning and organising, because it takes effort and time to find food that you can actually eat….So you have to have fresh food in the house and make your lunch in the morning and so on. And then if you are going swimming that day you have to remember to pack your bag and make time in the morning for that too. I think that sometimes I can do this but when I am feeling down or tired it's too difficult, and frankly trying to do this DSD thing on top of all that was just beyond me. Perhaps if I was a lady of leisure then I might have been more inclined or whatever, but I found it too difficult to be organised for work, run the house, plan my diet and exercise and complete the FIT thing on top of that". CO.

Participants were reluctant to perceive the DSD programme as having been the primary determinant of successful weight loss and the possibility that it was not instrumental remains. However, participants did cite the DSD programme as having changed they way they perceived their health behaviours and also felt that although it may have had limited affects on their actual behaviour, the programme had a positive affect on their well-being.

Theme Sixteen – Task dependent impacts

The above discussion suggests that only a few participants felt the DSD programme impacted on areas of their life other than health behaviours, and had wider affects such as improving mood. These wider influences seem to be dependent on the tasks tackled. Those who noted improvements in other areas of their lives, such as with work or with family (BM and RP), were those who attempted the daily relationship tasks. Those participants who stuck to tasks based on health behaviours noted no real changes noted primarily changes other than to their diet or exercise levels with some reporting some increased sense of well being. It may be that for real changes in behaviour across the spectrum, and therefore for Behavioural flexibility itself to really improve, a wider range of tasks would need to be undertaken.

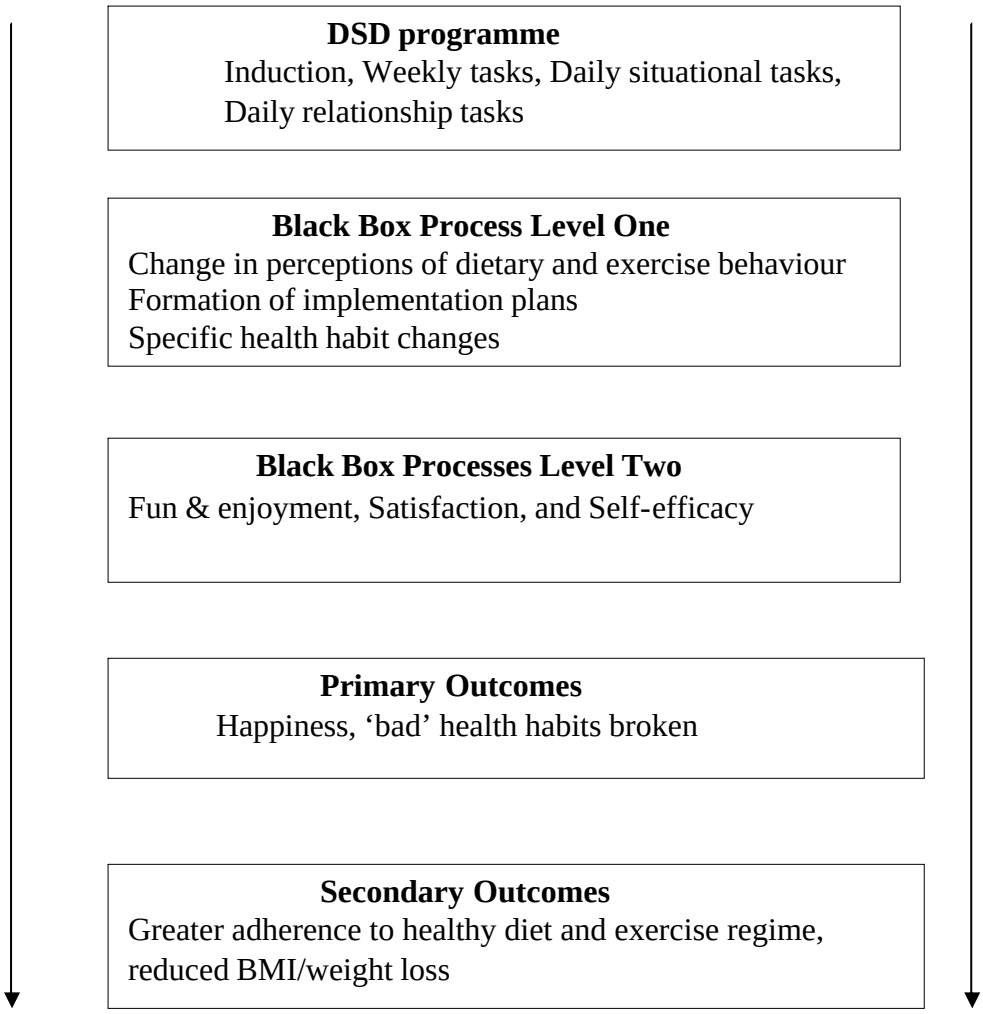
7.6. General Discussion

7.6.1: Black Box Processes

A model of how the DSD programme was hypothesised to have worked is shown in Figure 7.2.

The first process believed to have occurred in the black box is a change in the participants' perceptions of their health behaviour. The induction to the DSD programme may have begun this process as it presented to the participants the view that we often rely on 'automatic' or habitual behaviours that might not be particularly appropriate. Contemplation of the situations they should tackle for the situational tasks highlighted for them the occasions on which they behaved in a habitual way. Participants came to understand that they behave in certain ways some of their behaviour is not as fully under conscious control as they may previously have thought, regardless of what the situation is and actually demands. Habit has been presented as a multi-faceted construct comprising lack of awareness, difficulty with control and mental efficiency (Verplanken, 2006). If lack of awareness is a key feature then one of the first steps in changing a habit would be to become more aware of the habitual behaviour. The DSD programme encouraged individuals to consider their behaviour in a variety of environments and encouraged them to attempt different activities which are likely to have increased awareness, allowing for altered perceptions of behaviour.

Figure 7.2: Hypothesised Black Box Processes and Outcomes of the DSD Programme



It was previously assumed that the primary condition necessary for a habit to form was frequent repetition of that behaviour. It is now argued that whilst this is often (but not always) a requirement, other conditions must be present, one of which is stability of environmental context (Verplanken, 2006). Habits are cued by contextual factors which include location, time, mood and other individuals (e.g. Wood, Tam & Guerrero, 2005). Thus individuals may behave in the same way in the same place, or at the same time every day or even when they encounter the same people. Past behaviour has been shown to be significant predictor of future behaviour (e.g. Conner & Abraham, 2001; Norman, Conner & Bell, 2000; Norman & Smith, 1995) and more recently, De Bruijn, Kremers, De Vet, De Nooijer, Van Mechelen &

Brug (2007) have shown that habit strength moderates the intention – behaviour relationship postulated in the theory of planned behaviour (TPB). Thus intention may only able to predict behaviour when habit strength is low. This suggests that behaviour is often at the mercy of habits which themselves are not under lied by the sorts of cognitions present in the TPB. It follows from this that interventions based on altering such cognitions in order to effect change in habitual behaviours will fail – this is argued in a recent paper by Verplanken & Wood (2006) who discuss a large body of diverse literature noting that changing minds is rarely related to changing behaviour. What is therefore required is an intervention that alters the factors which *do* support habits: contextual or environmental stability.

The DSD programme requires individuals to do something different which by its very nature necessitates changes to contextual and environmental factors. This could explain the successful changes to diet and exercise levels discussed by individuals in the qualitative follow up. Wood, Tam & Guerrero Witt (2005) examined the exercise, reading, and TV habits of students and found these were stable only over a change of university when the performance context remained the same. This disruption to habits lead some students to return to intentional processing, lending further support to the findings of De Bruijn et al (2007) that habit strength moderates the effect intentions have on behaviour.

The second set of black box processes within the DSD programme occurred after successful completion of the tasks – participants found the tasks to be enjoyable, fun and satisfying and their successful completion of them also increased self-efficacy. It is important to note here that participants might not have been pushed out of their comfort zone when tackling these tasks since the tasks were often chosen on the basis that the participants saw them as being 'easy'. Despite this potential lack of challenge participants did still report feelings of satisfaction upon completion so it is possible that some aspect of the tasks was stimulating or challenging in some way.

These processes lead to several outcomes for the participants. Firstly, the increased self-efficacy encouraged individuals to attempt and complete other tasks. As task completion progressed so did participant confidence and efficacy. Other habits could then be broken, although again these habits tended to be related to diet or exercise so changes were still

specific to health behaviours. Nonetheless, participants did report that they 'felt better' – so one outcome then was to feel happier. The black box processes and primary outcomes lead to the participants successfully adhering to healthy diets and exercise regimes and losing weight.

As with the Buijs et al (2003) study, having fun seemed to be relatively important to programme success. Several participants reported finding the tasks fun and enjoyable, and some noted that task selection was influenced by how boring or enjoyable the tasks were perceived to be. Social interaction did not appear to be a key contributory factor here (although it was mentioned by participants as both a pleasant outcome of some of the tasks and a reason for task selection) which differs from the results of Buijs et al (2003) who argued that social interaction was an important contributory factor to their programme's success. The programme here differed from that of Buijs et al (2003) in several ways which would explain this difference. Firstly, their programme directly targeted weight loss behaviour – the DSD programme did not. Secondly, the participants here were not senior citizens like those in Buijs et al (2003) and this may be important because whilst the participants in this study worked and interacted with their families and colleagues every day which senior citizens may not do. That is to say that the participants in the present study already engaged in adequate levels of social interaction. Finally, the nature of the tasks involved in the DSD programme differed to those in the Buijs et al (2003) study because whilst the latter tended to involve group activities, the activities in the present study may have been both individual and group.

Autonomy was important infor both studies. In Buijs et al (2003), autonomy allowed participants to control which activities they participated in and they were not forced into doing things they did not want to, or felt unable to, do. Similarly in the present study, participants had complete control over which weekly tasks they selected and what situations and relationships they tackled. They were not given a prescribed diet nor were they given an exercise regime to follow, so they were autonomous in what they undertook. In the present study participants not only enjoyed autonomy but they may also have enjoyed increased feelings of control as the DSD programme progressed. This may be one mechanism by which

psychological well being was improved as suggested by SDT theory which argues that fulfilment of the need for autonomy brings well being (e.g. Ryan & Deci, 2001).

Despite the programmes success, participants did have some failures and they did report some barriers. As found in Young et al (2001), time management was important to the participants in order to fit the tasks in to often busy schedules. Those who had the motivation to do this or were able to find time tended to complete more tasks. For example, IG was able to make time but LA and CO were less able – respective Behavioural flexibility gains for IG, LA and Co were 22.47, 11.95 and 9.33. Respective weight changes were -10 lbs, -4lbs and +7lbs. Thus it seems that interventions which provide participants with assistance in managing their time in order to fit exercise etc in could be valuable.

In Eyler et al (1998), participants noted both environmental and personal barriers and facilitators, however in the present study the participants discussed primarily personal barriers and facilitators. Here, time (as discussed above) and motivation arose as being the two most important barriers to task completion. Those individuals who lost the most weight were those who were either strongly motivated to complete the DSD tasks or those that were strongly motivated to stick to a particular diet. It may be beneficial to adapt the programme to include factors that might increase motivation. Young et al (2001) found that individuals who were most successful at losing weight had increased motivation to continue as a result of feeling good and having more energy. This seemed to be an important factor in the present study – participants did report feeling better and it does seem that this facilitated their performance – and this may be something that could be built in more explicitly to the DSD programme.

With respect to the elements found to be important in Buijs et al (2003), an important factor for the older participants was the adaptability of both the content of the programme and the manner in which it was delivered. To a certain extent, participants in the DSD programme were able to adapt the programme to their own needs and situations, but the delivery of the programme was kept standardised across the two induction sessions for group A and group B. These lasted two hours and provided comprehensive information regarding the rationale behind the programme as well as guidance with the practical aspects. Breaks in the induction

session did allow for interaction between participants and the author, but total interaction time was not more than 30 minutes. There was no further face to face interaction with the participants, so programme delivery may be considerably less relevant. With regard to the content of the programme, no participants referred to its adaptability, or lack thereof, although several were concerned they could not see the relevance of some of the tasks. This may be something that requires modification, both in terms of making the participants see the relevance of the tasks and in terms of altering the tasks set.

Participant autonomy within the programme was found to be important by Buijs et al (2003), but was not noted explicitly by the participants here. Nonetheless, they were given complete control over the tasks they selected, when they did them and the manner in which they did them. It is possible, however, that participants were given too much freedom or not enough support. Buijs et al found that the relationship between staff member and participant was very important in motivating the participants. In the DSD programmeFIT intervention, participants had only one face to face encounter with the researcher, and this may have been inadequate. In order to promote motivation, more meetings might have been useful. For example, a once weekly or even monthly group meeting might have provided a level of interaction suitable for fostering a more meaningful relationship.

Young et al (2001) found that one difference between women who maintained a healthy weight and those who did not was the way in which they viewed food. The former group had a more varied diet and were less likely to think about food in terms of whether it was ‘good’ or ‘bad’ - successful weight maintainers may have more likely to be able to eat healthily all the time, whereas unsuccessful weight maintainers seemed to talk about going on diets, implying that their usual eating patterns were not particularly healthy. This could be an important factor in the in the DSD programme which advocated a permanent shift in eating habits rather than following some highly restrictive diet for a period then returning to a normal diet. Perhaps this may be one factor which contributed to its success.

The above model and discussion concerns the similarities between participants, what they did, and the outcomes they achieved. However, there were some striking differences across

several variables that make predicting weight loss post-intervention actually quite difficult. The analysis suggests that the participants should really have tried to tackle relationship tasks as this would have increased the breadth of the DSD programme's impact. BM for example attempted all kinds of tasks and demonstrated a considerable increase in Behavioural flexibility. BM also demonstrated an improved diet, a sizeable reduction in calorie intake and an increase in average time spent exercising. Consequently she lost a lot of weight – 21 lb over the intervention. However, RP, on the face of it at least, who also tackled weekly, situational and relationship tasks but, showed less than a three point increase in Behavioural flexibility. Furthermore RP, decreased his overall levels of exercise, decreased the healthiness of his diet and showed an increase in calorie intake. The dietary and exercise aspects of his results may in part be explained by his attempts to increase strength and power, but why his behavioural flexibility score did not increase further is ambiguous.

In a similar vein, EM expressed a general lack of patience with the programme and failed to tackle any relationship tasks. She felt that the key to her considerable weight loss was the Atkins diet and motivation which she claimed was a result of early weight loss success as opposed to the DSD programme. Yet EM also showed the largest Behavioural flexibility increase of the interview group with an increase of over 27 points. EM had little faith in the programme'tasks ability to help her lose weight so perhaps was reluctant to attribute success to the programme. The large increase in EM's bBehavioural Flexibilityehavioural flexibility might also have been in part due to her increased confidence. EM had successfully lost over 40 lbs by interview follow up and had maintained a reasonably taxing exercise regime for almost a year, giving her much more confidence in her ability not just to lose weight and be healthy, but to make serious life changes. For example, EM had made some serious changes to her place and nature of work.

CO also demonstrated some unusual results. Despite having tackled very few of the tasks, and, by and large, giving up on the programme, CO demonstrated a nine point increase in Behavioural flexibility and a seven point decrease in reported depression, clearly indicating that something had occurred. CO also actually gained weight, despite her diet seeming to improve. Quite why CO should overcome relatively severe depression remains unclear.

The findings here imply that successful interventions, whether they are geared towards promoting exercise or weight loss or some other health behaviour, require that participants are motivated. Participants must also be able to overcome any barriers that they may perceive, be they environmental or personal. Thus, interventions should have in built features that tackle these issues. In the present study, the factors which promoted this were making the participants more aware of their behaviour, encouraging them to make implementation plans, and giving them novel tasks to complete from which they derived enjoyment, satisfaction and increased levels of self-efficacy. Initial successes, arising in part from altered perceptions, discretion in task selection (autonomy) and having fun, seemed to foster increased well-being, thus fulfilling the needs hypothesised by SDT as important for well being (autonomy, competence and relatedness; Ryan & Deci, 2001). This might be something that any behaviour change programme should utilise. Buijs et al found that the key factor in helping participants to feel motivated was the fostering of a sense of comfort which is not the same, however both studies have demonstrated that an increased sense of efficacy is beneficial, but in either case, the participants were made to feel able.

Other research has found implementation intentions to be important in determining the regulation of weight (Bagozzi & Edwards, 2000). The process of goal striving (e.g. Gollwitzer, 1990) involves behavioural intentions which specify the behaviour to be performed and end-state intentions which refer to the outcome to be achieved. The former plays a central role in the theory of planned behaviour, as discussed in previous chapters, and as such is determined by variables such as attitudes and perceived behavioural control. The latter is determined by variables such as efficacy and plans such as implementation intentions, and whilst behavioural intentions are a representation of the "likelihood to act, end-state intentions constitute commitments to realise a desired outcome" (Bagozzi & Edwards, 2000, pp 256).

Implementation intentions are specific to place, time and action, so are contingent upon certain conditions being met. In practical terms this makes them useful in attempts to change unwanted behaviour, for example, an implementation intention can be drawn up to combat

eating chocolate (action) in front of the TV (place) in the evening (time), and indeed implementation intentions have been shown to increase the likelihood that intended behaviours are actually performed (e.g. Gollwitzer & Brandstatter, 1997). However, as Bagozzi & Edwards (2000) discuss, implementation intentions are hypothesised to work in two ways. Firstly, they might have an effect on cognition by directing the individual's attention and increasing awareness in the situation concerned. Secondly, they might influence volition by developing and strengthening links between the situation and the intended behaviour, to the extent that that situation 'automatically' elicits that behaviour. This would suggest that implementation intentions really work by allowing a bad habit to be replaced with a good one. This is in line with the present studies findings which suggest that participants did increase awareness of their behaviour in specific situations but the end result was the replacement of bad habits with more appropriate, 'good' habits. Whilst it could be argued that the participants did technically increase their behavioural repertoire, the findings do not suggest that participants displayed a true increase in behavioural flexibility. This would require them to move away from 'automatic' behaviour and their reported use and satisfaction with implementation intentions suggests the opposite.

Bagozzi & Edwards (2000) examined goal striving (where the goal was weight loss) in relation to three appraisal processes tested for their underlying importance on performance of goal directed behaviours. The three appraisal systems were self-efficacy, outcome expectancies and affect. Self-efficacy is defined as the belief that one can actually perform the relevant behaviour and it has shown to be an important determinant of dieting and exercise behaviours (see Bagozzi & Edwards, 2000). It represents internal strength. Outcome expectancies are evaluations of the extent to which performing a given behaviour will actually lead to the desired outcome and Schwarzer & Fuchs (1996; cited in Bagozzi & Edwards, 2000) showed that expectancies did predict both intention to eat healthy foods and actual dietary behaviour. The third appraisal mechanism, "affect towards means" (Bagozzi & Edwards, 2000, pp.257-258) does not relate directly to the goal but represents motivation nonetheless because individuals are more likely to be motivated to perform behaviours which are enjoyable or pleasant (i.e. induce positive affect) than behaviours which are unpleasant. This is more of an emotional than cognitive appraisal. Parallels between these systems and the psychological states and cognitions thought to underlie well being could suggest some

form of relationship. For example, a favourable appraisal of self-efficacy and subsequent performance of behaviour might fulfil the need for competence (which SDT argues is necessary for well being) and lead to further increases in self-efficacy. A favourable appraisal of affect with subsequent elicitation of positive affect might promote SWB. A favourable appraisal of outcome expectancies and subsequent performance of behaviour might result in the choosing of actions which fulfil the need for relatedness.

Bagozzi & Edward's test of the influence of these appraisal systems on action revealed that the three systems did underpin the initiation of action, with respect to both dietary and exercise behaviours. The authors argue that when the appraisals of specific goal directed behaviours are favourable, the individual will then form an implementation intention and these two processes will make the action much more likely. In the present study, participant responses indicated that all three appraisal systems may have determined behaviour. The goals that participants initially formed and strove towards (which tasks were completed) were done so on the basis of outcome expectations (that they would lead to weight loss), but later implementation intentions and behaviours may have also been guided by self-efficacy (derived from previous success) and affect (also derived from previous enjoyable experiences).

Bagozzi & Edwards (2000) found some differences between dietary and exercise behaviour with respect to the appraisals used and have argued that diet and exercise behaviours differ in the level of difficulty involved in implementing the behaviours. They argue that dietary behaviours, compared with exercise behaviours, are easier to implement because they comprise simpler action sequences and therefore higher subjective evaluations of success, compared to exercise behaviour. Decisions to eat more healthily can be made and followed through in a relatively short time frame, compared to the decision to exercise, because they require little in the way of planning, preparation or physical effort and as such one positive appraisal might be sufficient to form intentions and implementation plans. In contrast exercise behaviour might only occur when all three appraisals are favourable. This might explain why so many participants reported making specific changes to dietary habits as

opposed to exercise behaviour – plans could be evaluated and executed in a shorter time frame and with more ease.

Despite its apparent success, the DSD programme seems to have worked in unanticipated ways and could be made more 'user-friendly'. As already mentioned, additional and frequent meetings between researcher and participants could significantly have improved participation levels and/or reduced drop out rates as was reported in the Buijs et al (2003) study, with more meetings fostering a more meaningful staff-participant relationship. At regular meetings, homework tasks could be set and this might improve the programme in several ways. Firstly, it would break the tasks and programme down into manageable segments which do not overwhelm participantsbits so that it appears more manageable. Secondly, meetings with staff might allow both parties to work on time management strategies or work on implementation intentions so that the how, why, where and when of each task was planned out. Furthermore, appraisals of self-efficacy, outcome expectations and affect could be explored. Thirdly, group meetings would provide social interaction which canwould hopefully provide a forum for discussion on each others experiences and problems and thus give some social support. This form of weekly meeting has shown to be a strong contributor to the success of the commercial weight loss programme Weight Watchers.

A second way in which the programme might be improved is by reinforcing the point of increasing behavioural flexibility and the reasoning behind doing non-health behaviour tasks. This shwould help to increase behavioural flexibility and might mean that participants were able to note impacts in other areas of the life. These can potentially be extremely positive, for example improved well-being or increased self-esteem, which might have some effect on participant's ability to perform positive health behaviours. The DSD programme did appear to support weight loss - participants used it as a appear to hcrutch in specific situations - however it was designed to work as a tool for changing ones behaviour in all across situations. Perhaps the programme had too broad a focus and participants were not interested in making changes to their entire lives. It might make more sense to reformulate the programme as a health behaviour habit change programme for those who want to lose weight

and provide a more generic ‘Do Something Different’ programme for those who want to make more fundamental changes to their lives.

One further aspect of the programme which needs considerable work is that of diaries/paperwork. Participants did note that the worksheets given to them for working out their behavioural flexibility and recording what they had been doing were too complicated and just too much hard work to complete on a regular basis. The DSD programme therefore needs to be simplified both in terms of its rationale and in terms of the practical requirements. It needs considerable reworking of both the amount and form of the worksheets, although possibly participants might find this easier to deal with if they completed them at weekly meetings.

7.6.2 Limitations and Future Research

The greatest and most obvious limitation to this study is clearly the small sample size and the potential lack of generalisability of findings. Although participants here did vary in age and the degree to which they increased their behavioural flexibility or changed their weight, they are not necessarily representative of the original intervention group as a whole, or indeed of the population. It would be valuable to perform this study with more participants and furthermore, it could be extremely useful to use focus groups to elicit information. Discussion with other participants might facilitate further insight into any psychological changes for example that took place and using focus groups might also introduce ideas or concepts not considered by the researcher, helping in the development of methods that would improve the programme. A related idea is that making use of a deeper thematic analysis might also be beneficial, perhaps exploring aspects of well being such as need fulfilment, implementation intentions and appraisal systems for goal directed behaviour.

An alternative line of further enquiry could be a positivist study whereby some of the hypotheses discussed here are tested empirically. Bagozzi & Edwards study of goal directed behaviour was correlational and they argued that future research might manipulate self-efficacy, outcome expectancies and affect to explore how these systems work with each other

to direct plans and behaviour. A longitudinal study manipulating FITness and/or these appraisal systems and exploring their influences on implementation intentions, behaviour and weight loss may be of value both in terms of explaining what underpins successful weight loss but also in terms of successfully modifying the DSD programme. Given the parallels between the psychological processes and states underlying both the above appraisal systems and well being, future research might also explore whether well being is related to how plans and behaviours are appraised or whether well being is an outcome of how plans and behaviours are appraised.

7.7. Conclusion

Participants demonstrated definite preferences for weekly over daily tasks and this appears to have been because they were perceived as being more relevant to their goals of weight loss. It may also be that weekly tasks were favoured simply because they were weekly and not daily – i.e. convenient, easier and less time consuming. Participants also demonstrated a preference for situational over relationship tasks, being significantly more motivated to tackle these - and this appears to have been because they were perceived to be more relevant and more appropriate for weight loss. Participant's outcome expectation evaluations were more favourable for weekly versus daily tasks and were more favourable for situational versus relationship tasks. Participants did not select tasks on the underlying principles of the DSD programme, i.e. that the tasks would challenge them and require them to behave differently. Tasks were chosen on the basis that they would be easy to complete, easy to accommodate and would have some immediately obvious practical value.

The biggest impact the programme had in terms of psychological processes and states appears to have been on the way participantsthey viewed their health behaviours, with the programme making them perceive them as habits that needed to be changed for the better. Not only did their perceptions change but their awareness of behavioural options also changed which allowed them to change their bad habits. Thus the need to draw up implementation plans and the act of doing weekly tasks may have helped to increase awareness of situations and behaviours and opened the participants' minds to the notion of behaving differently.

With respect to feelings, the programme did seem to induce a more positive sense of well-being – participants referred mainly to this as 'feeling better', and this was supported by quantitative measures which showed a marked decrease in anxiety and depression. It is suggested that this arose because the tasks were novel, fun and enjoyable (inducing SWB) and because successful completion of the tasks and successful weight loss fulfilled the needs of autonomy, competence and relatedness which SDT (Ryan & Deci, 2001) proposes to underlie personal development and well being.

It does seem that behaviours were altered (diet improved and activity levels slightly increased), although there was a definite lack of confidence that this change would be permanent. It is suggested this is because they did not tackle a wide enough array of tasks for a real change in Behavioural flexibility to have occurred. Very few participants noted an impact on other areas of their life, although this could be presumably because very few attempted the relationship tasks which should facilitate more widespread changes.

Finally, findings suggested that participants did not view the DSD programme as an actual weight loss device, rather, it was used as a crutch in situations where participants were tempted to eat unhealthily. In the short term this seemed to induce more positive health behaviours, but participants did not have confidence in these changes being permanent. The DSD programme may have facilitated weight loss but follow up interviews with the participants indicate that it may not be a true test of the FIT theory. Although participant's behavioural flexibility scores increased and weight decreased, responses under interview indicate the reason for the weight loss was not just increased behavioural flexibility, rather participants were able to change negative health behaviours in favour of positive health behaviours. They did this using implementation intentions which work because they facilitate new behaviours. The selection of the new behaviour, in the relevant situation, is made more automatic, i.e. the new behaviour becomes adopted because it requires less effortful processing than alternatives. This is in direct contrast to what behavioural flexibility is supposed to be – the decreased use of automatic behaviours and increased use of effortful processing to decide upon the most appropriate behaviour. Possible explanations for the increase in behavioural flexibility scores are that successful task completion boosted self-

efficacy and this made them feel like they *could* behave differently even if that were not strictly true, or that there was a social bias in their responding.

The programme could be improved in several ways, the most prominent being to modify it so that it is branded as a specific health behaviour change programme for those who do not want to make changes to their entire life. One problem here could be that the changes may not be permanent – further research over longer time periods is needed to explore the temporal nature of the changes which take place. For those looking to make much wider changes to their lives and who are less concerned with weight loss, a programme with a much broader spectrum might be offered.

If the DSD programme were to be modified into a health habit changing programme, several features might be built in to improve efficacy. Firstly, adding a social component, similar to that of the weight watchers programme, could be useful. Participants could meet regularly as a group with a staff member to discuss progress and work out future homework tasks. Working on their own as they did was not conducive to fostering motivation and the likelihood of tasks being completed might be increased by breaking the programme down into weekly segments. Secondly, the programme might make more direct use of Bagozzi & Edwards (2000) findings on appraisal systems to help them select behaviours and form plans to overcome bad habits.

In conclusion, there may have been three mechanisms underlying behaviour change and weight loss in the DSD programme. Firstly, the weekly tasks and preparation for the situational tasks increased participant awareness of situations and behaviours – an important step to changing habitual behaviour is to increase awareness of the behaviour (which preparing for the situational tasks did) and to change environmental or contextual cues (which the weekly tasks did). Secondly, autonomous completion of the novel weekly tasks was fun, enjoyable and satisfying which all worked towards increasing various aspects of psychological well being and increasing self-efficacy. These changes made attempts at other tasks more likely. Thirdly, participants formed implementation intentions for new behaviours, seemingly replacing old habits with new ones. The implementation intention formation may have been supported by favourable appraisals of self-efficacy, outcome expectations and

affect. Only the first mechanism is evidence that the DSD programme worked in the way intended – by significantly increasing behavioural flexibility and comfort zones. Given this, the DSD programme might be modified such that it can be offered as a health habit change programme for those individuals who were interested only in changing health behaviours, or could be extended and developed to be a true intervention for increased behavioural flexibility where individuals make changes to all aspects of their life.

The DSD programme may not have worked entirely in the way intended, however, two of the main outcomes were significant improvements to both psychological and physical well being. The following chapter discusses the relationships between FITness and well being in more detail.

Chapter 8
General Discussion And Conclusions

8.1 Introduction

This programme of research has shown that the framework is predictive of well being to some extent. Both Inner FITness (the constancies) and behavioural flexibility have been found to relate to psychological and physical well being and the behaviours that facilitate these. To this end FITness may have both direct and indirect relationships with well being, these being both 'temperamental' and 'instrumental'. These relationships will be considered with suggestions for future research and practice integrated throughout the chapter. This chapter begins with a summary of the findings. This is followed by reflection on the relationships between FITness and aspects of Subjective Well Being (SWB). The chapter then goes on to examine the relationship between FITness and the activities which individuals can engage in to bring about personal development and eudaimonia. FITness and physical well being are then discussed with a closer examination of behavioural flexibility and habits. Finally, the implications for theory, research and practice are discussed and conclusions reached.

8.2. Summary of Findings

Study 1 explored the potential relationships between FIT, well being, perceptions of work, personal projects and health behaviours. It was hypothesised that FIT would be related to well being and this was supported – Inner FITness was strongly associated with both anxiety and depression such that individuals with greater levels of FITness reported significantly lower levels of anxiety and depression. In contrast to the findings of many other studies, perceptions of work were not associated with well being. However, Inner FITness did correlate with some perceptions of the demands and supports-constraints people perceived within their work. Individuals whose Inner FIT scores were higher perceived some aspects of their work to be less demanding and better supported than less FIT individuals. Perceptions of the demands and supports-constraints of personal projects were not associated with well

being. However, when projects were rated using Little's project dimensions, well being was found to be related to project structure such that more anxious and depressed individuals rated the structure of their projects more negatively. Finally, there was some preliminary evidence for a tentative relationship between FIT levels and exercise and BMI, with more FIT individuals reporting greater levels of exercise and lower levels of BMI, although the research was hampered by several limitations: small sample size; poor measures and conceptualisations of frameworks and cross-sectional methodology.

Study 2 used the theory of planned behaviour as a framework to explore potential relationships between FIT, BMI and the behaviours underlying weight management and physical well being. Behavioural flexibility was significantly related to BMI such that individuals with high BMI's reported significantly lower levels of behavioural flexibility. Some aspects of Inner FITness were shown to be related to the cognitions underlying intention to behave in a given way (PBC in particular), but behavioural flexibility was not. It was hypothesised that behavioural flexibility may moderate the intention-behaviour relationship but this was not borne out by statistical analysis. Since BMI was not related to performance of the weight regulation behaviours examined, it may be that the study did not measure the most important weight regulation behaviours or did so for too short a time. Alternatively, it was suggested that the role of behavioural flexibility in weight management is via processes or variables not assessed through the TPB. One variable discussed in this regard was habit.

Study 3 examined whether behavioural flexibility could be manipulated through an intervention and whether this would influence BMI in a pilot intervention of the Do Something Different (DSD) programme. Participants were encouraged to 'Do Something Different' and changes in behavioural flexibility, BMI, diet and exercise were tracked for three months. Behavioural flexibility increased significantly and BMI decreased significantly. There were also significant changes to diet and exercise levels. Total BMI change was related to changes in behavioural flexibility via a dose-response relationship: the greater the increase in behavioural flexibility, the greater the decrease in BMI. Regression analyses suggested that changes in diet may have mediated this relationship. However, the nature of the study design (lack of proper waiting list group and control group) meant that the changes in BMI could

have been facilitated by other factors including the keeping of food and exercise diaries or the demand characteristics of taking part in an intervention. Furthermore, if BMI change was attributable to the DSD programme, the precise psychological changes which took place required clarification.

Study 4 was a qualitative follow up on a sub sample of the participants in study 3. It aimed to examine participant's perceptions of the rationale and practicalities of the DSD programme and to explore the psychological changes, processes or states experienced by participants in order to help elucidate the mechanisms for weight loss. Results revealed that participants did not perceive the DSD programme in the way intended but behavioural flexibility was still increased because two elements were successfully adopted: completion of novel weekly tasks and increased awareness of behaviour (in some situations). This facilitated the formation of implementation intentions (possibly helped by favourable appraisals of self-efficacy, outcome expectations and affect) which helped individuals to break 'bad' health behaviour habits and introduce 'good' health behaviour habits. Psychological well being was also improved. The results suggested this could be because participants derived enjoyment, satisfaction and increased self-efficacy from completing the tasks, leading to increased SWB. They may also have led to fulfilment of the needs of autonomy, competence and relatedness, which may underlie well being that stems from personal development. Although the outcomes observed could be attributable to other factors, the results provided preliminary evidence that increasing FITness might be a useful way to improve psychological and physical well being. The theme of habitual behaviour was found to emerge in studies two, three and four. Habits can have a strong effect on future behaviour (e.g. Brug, de Vet, de Nooijer & Verplanken, 2006) and Verplanken (2006) and Wood & Neal (2007) have argued that habits are triggered by environmental and contextual cues – changing these cues may therefore be a key to breaking bad habits and thus the weekly tasks, i.e. 'doing something different', could have been important for weight loss.

Overall there is good evidence to suggest that FIT is related to well being. Inner FITness (particularly Self-responsibility and Fearlessness) demonstrated reliable relationships with anxiety and depression whereas Outer FITness (behavioural flexibility) was shown to be related to BMI. The evidence for FIT influencing well being via personal development

activities is less reliable, although increased Inner FITness was associated with perceiving work characteristics more positively and it appears that increasing levels of behavioural flexibility facilitates the adoption of positive health behaviours.

8.3 FITness and SWB

The most pervasive finding in this programme of research was that the two primary measures of SWB taken here (anxiety and depression) were consistently related to FITness. Both anxiety and depression scales were related to aspects of Inner FITness. In particular, the constancies of Fearlessness and Self-responsibility were strongly associated with anxiety and depression such that individuals reporting higher levels of anxiety and depression had lower levels of Fearlessness and Self-responsibility. This was the case in every sample. The relationship between Fearlessness and anxiety in particular was strong enough to raise concerns that the measure of Fearlessness within the FIT Profiler (Fletcher & Stead, 1999) was essentially a measure of anxiety, but to some extent this would be unavoidable since anxiety is a form of fear. However, as is argued below, they are not necessarily the same thing. Nonetheless, the extent to which the measure of Fearlessness in the FIT profiler does assess anxiety (or lack thereof) could be more fully investigated.

The prevailing view of anxiety and depression as emotional disorders is that they have a strong cognitive component which may influence the content of thoughts, thought processes themselves or both. That is to say that both anxiety and depression involve changes in the content of thoughts (producing what has been termed a negative set, e.g. Beck, 1963) and changes in cognitive processes. This latter aspect manifests itself in the form of impairments to many cognitive processes including memory and attentional set shifting (see Austin, Mitchell & Goodwin, 2001 for a discussion). Furthermore, as noted by Austin et al, these emotional disorders may also involve changes in motivation and meta-cognition (thinking about thinking). The constancies, or Inner FITness, represent decision making templates and are therefore part of our cognitive system, so relationships between the constancies and emotional disorders that may involve cognitive alterations should exist.

Anxiety and fear share aspects in common but they may not be the same thing. Davis, Walker & Lee (1997) for example have argued that fear has clear adaptive functions for the individual, is triggered by a specific stimulus and will be felt for short periods of time whereas anxiety may be triggered by a wider array of cues, can present itself for an indefinite period of time and does not necessarily have an adaptive function. However, individuals who are generally more fearful are more likely to also be more anxious. Ollendick and colleagues have reliably found that depression is less likely to be associated with fear than anxiety is, but anxiety and depression are usually related (e.g. Ollendick & Yule, 1990). The results here suggested relationships between depression and anxiety and between depression, anxiety and the FIT constancy of Fearlessness.

This could be explained using the Tripartite model of anxiety and depression. This model proposes that although anxiety and depression can be differentiated on the basis that hypervigilance is present in anxiety but not depression, and anhedonia is present in depression but not anxiety, they "share a significant non-specific component that encompasses general affective distress and other common symptoms" (Clark & Watson, 1991, pp. 330). This general affective distress has been referred to as Negative Affect (NA) and may be both a transient state and stable trait (Clark & Watson, 1991). Although its title implies negative *emotions*, NA has been implicated as an influence on perceptions and indeed health (e.g. Payne & Morrison, 2002). Clark & Watson (1991) suggest that individuals with high levels of NA have more negative ratings of their peers, see themselves as victims and report higher levels of dissatisfaction with themselves, their work and their lives in general. The negative biasing effect of NA on self-reports of job stressors and work conditions has been demonstrated (McCrae, 1990; but see Spector et al, 2000). Trait anxiety, a core aspect of NA, has been shown to significantly reduce the relationship between perceived work characteristics and strain outcomes when it is statistically controlled for which implies NA may be a significant source of these strain outcomes.

It seems probable that NA is more than just an affective state, it involves cognitions too. There may therefore either be some overlap between NA, Fearlessness and Self-responsibility, or, perhaps NA is a product of low Fearlessness and Self-responsibility. Thus Inner FITness may be the variable which underpins both anxiety and depression rather than

NA per se. Although NA and cognitive alterations (both content and process) are strongly associated with depression and anxiety, these may be symptoms of depression and anxiety as well as being influential in the *development* of depression and anxiety (Rude, Wenzlaff, Gibbs, Vane & Whitney, 2002). Genetic studies have shown that trait NA has significant heritability and that individuals demonstrating high levels of NA often go on to develop depression (see Clark, 1991) which suggests that NA precedes depression and anxiety. FIT's role within this requires elucidation – for example, is NA the primary outcome of low Inner FITness which in turn gives rise to increased anxiety and depression?

The relationship between NA and Inner FITness seems to be a fruitful area for future research. NA might be conceptually indistinct from Inner FITness or it may have clear relationships with several constancies including Awareness, Fearlessness, Self-responsibility and Balance. What then might be of greater interest is whether Inner FITness plays a role in determining levels of trait or state NA and if so to what extent? An associated line of investigation may be a neuropsychological one. As discussed above, the frontal lobes have been linked to levels of NA but have also been touted as being responsible for a wide array of functions including impulse control. Impulse control in turn has been associated with a variety of personal problems including obesity (Tice, Bratslavsky & Baumeister, 2001). Perhaps there is a relationship between frontal lobe functioning, FITness, NA, emotional disorders and obesity.

Self-responsibility was also found to be consistently related to well being. It has been proposed by Fletcher & Stead (2000a) to be the constancy responsible for setting missions and ensuring that those missions are completed. Furthermore, individuals high in Self-responsibility are thought to believe they have control over themselves and over their environments. To this extent Self-responsibility may be concerned with motivation and volition. The results in the present programme of research support the theory that Self-responsibility is related to perceptions of control, motivation and volition since decreased motivation and perceptions of control are features of anxiety and depression (e.g. Austin et al, 2001; Clark, 2001; Endler, Speer, Johnson & Flett, 2001; Scarpa & Luscher, 2002) and those individuals reporting lower levels of Self-responsibility also reported greater levels of anxiety and depression.

Finally, the present programme of research used limited indicators of well being, focussing on NA aspects of SWB rather than positive affect (PA) aspects as many other studies have (e.g. happiness and satisfaction). The Tripartite model argues that NA does have this positive counterpart (PA), so future research might consider both NA and PA's roles in the various processes investigated here. Whilst it has been argued that decreased levels of anxiety and depression (or NA) in the present research have indicated improved well being, it could be argued that increased PA is an additional requirement for the claim of improved well being to be fully evidenced.

8.4. FITness, Well Being and E & P Properties

One argument presented in this thesis was that much of the previous research on well being has failed to successfully demonstrate that environmental factors are a significant determinant of well being. This is primarily because the measures typically employed are not objective indicators of the environment. More often than not they are contaminated by properties of the individual (P properties) so the effect may be illusory – it is largely due to P properties. The results here showed no relationship between perceptions of work demands, constraints or supports and anxiety and depression. Previous research using Payne's (1979) work demands-constraints-support model found support for the notion that individuals rating their job as more demanding and constrained/less supported would also report the highest levels of strain (e.g. Jones, Fletcher & Ibbetson, 1991). There were no significant results in the present sample which was heterogeneous in terms of job type and social economic status. Payne & Fletcher (1983) had argued that effect sizes were larger in heterogeneous samples but this finding was not replicated here.

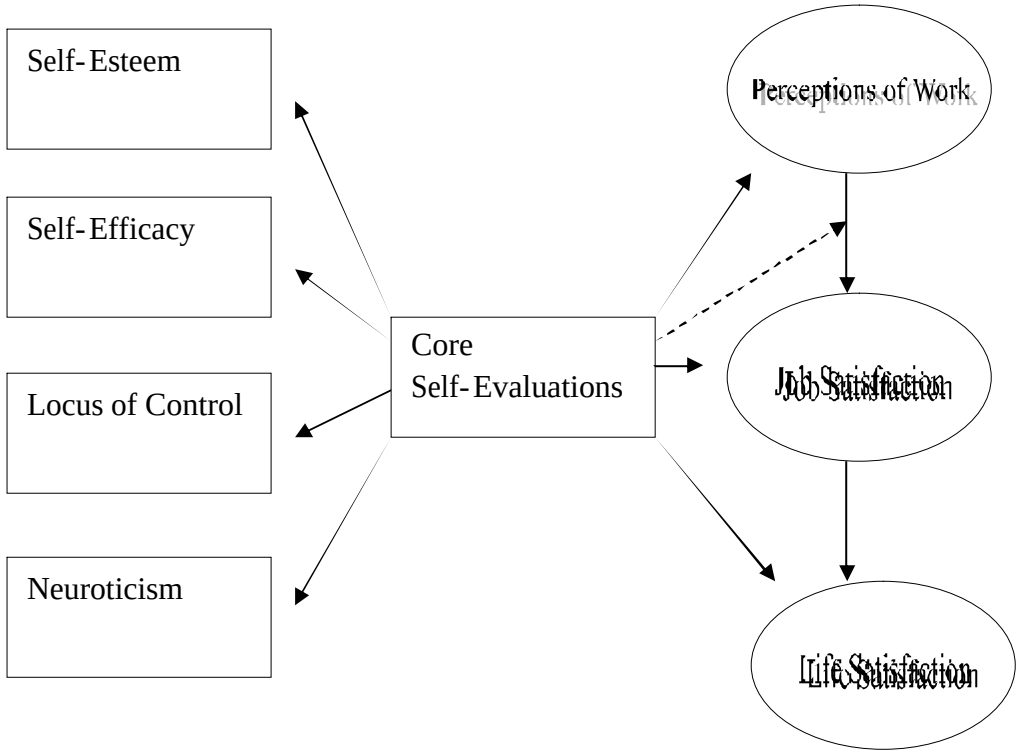
Fletcher (2003) presents a compelling argument for the role of the individual in determining perceptions of work and strain levels drawing on several strands of evidence. One strand is the role that NA plays in determining perceptions of work (see the discussion above). However, well being can also be assessed through variables which represent positive affect (PA) – satisfaction and happiness for example. There is some evidence that measures of PA are also determined by personal level variables or P properties as are perceptions of work.

Judge, Locke, Durham & Kluger (1998) have discussed the notion of core self evaluations. These are evaluations made by the individual regarding themselves, other individuals and reality. They are represented by the four dispositions of self-esteem, self-efficacy, locus of control and neuroticism which the authors argue reflect a common core-evaluations factor. These core evaluations have been proposed as an influence on perceptions of work characteristics, job satisfaction and life satisfaction. This is depicted below in Figure 8.1.

As Figure 8.1 shows, Judge et al (1998) proposed that core self-evaluations have a direct effect on perceptions of work characteristics and job satisfaction but they further proposed that core evaluations also moderate the relationship between work perceptions and job satisfaction. Individuals with high levels of self-esteem and efficacy, an internal locus of control and low levels of neuroticism should hold more positive core evaluations and therefore have more positive perceptions of work and increased job and life satisfaction. The model in Figure 8.1 was mainly tested in a cross-sectional study using questionnaire measures. Three samples were used: doctors; students from an American university and students from an Israeli university. LISREL was used to conduct the analyses which revealed partial support for the model.

Results suggested that the four aspects of core evaluations were related to each other: those with greater self-esteem had greater self-efficacy, an internal locus of control score and lower levels of neuroticism, thus they "bring a positive frame to the events and situations they encounter" (Judge et al, 1998, pp.31). This was in contrast to the negative frame held by individuals with low levels of self-esteem and self-efficacy, an external locus of control and high levels of neuroticism. These core evaluations were all statistically related to the outcomes specified in the model: perceptions of work characteristics; job satisfaction and life satisfaction. There was a strong relationship between perceived job characteristics and job satisfaction and between job satisfaction and life satisfaction. The authors suggested that individuals who are satisfied are so not just because they "feel happier and are more in control, but also because they see more variety, challenge and intrinsic worth in their work" (p31).

Figure 8.1 Judge et al's (1998) hypothetical model of influence of core self-evaluations on NA, PA and work perceptions



Source: Judge, Locke, Durham & Kluger, 1998, pp.18.

Since the design of Judge et al's study was cross-sectional in nature it is possible that the relationships were not necessarily in the direction prescribed – for instance people may feel more self-efficacious and more in control because the job they are doing is within their capabilities and is inherently well designed. Nonetheless their findings are largely in line with those reported here. Core evaluations and Inner FITness variables could share many common components. The present programme of study suggested that there may be relationships between FIT and self-efficacy (individuals in the DSD programme reported increased self-efficacy), locus of control (several aspects of FIT correlated with locus of control in study 1) and between FIT and anxiety and depression (which are outcomes associated with higher levels of neuroticism). Whilst core self-evaluations provide a different view of the individual

than typical personality variables, they still do not adequately account for the individual as a whole and in particular they do not really address the cognitive aspect which would appear to be important if perceptions are going to be investigated. Thus further research is required, in particular the role of FIT in positive affect outcomes such as PA and satisfaction.

8.5 FITness, Personal Development and Well Being

Waterman (1993; cited in Ryan & Deci, 2001) argued that well being, or eudaimonia, occurs when individuals engage in activities which hold true with their core values and which provide 'Personal Expressiveness' (see also Sheldon, Elliot, Ryan, Chirkov, Kim, Wu, Demir, & Sun, 2004). Whilst SBW might reflect some short-term affective state, eudaimonia appears to relate to long term personal development which brings meaning and life satisfaction. The present programme of research looked at people's propensity to engage in the sorts of activities that might contribute to the attainment of eudaimonia using Personal Project Analysis and the DSD programme. It was suggested that more FIT individuals would be more likely to engage in these activities since they would recognise their importance for well being and also feel more able to tackle them. Since there was a good level of participant autonomy in choice of activities (particularly in the DSD programme), performing said activities should not have violated core values, although this cannot be determined with certainty.

Results from study 1 were not conclusive. There was some tentative evidence that more FIT individuals were more likely to select personal development projects than less FIT individuals. The statistics did not reach significance but it was argued this could have been due to the nature of the data. The data showed differences in behavioural flexibility between those who did and did not select projects. This warrants further investigation. A conventional Personal Project Analysis could be used where participants report their own projects rather than drawing from a list as in study 1. This might permit an analysis of the type of projects and their relationship to FITness and well being. Alternatively, future research might examine leisure activities in a more general way to examine whether individuals leisure time is filled with the sorts of activities that might bring about PE or not, and the extent to which this is able to predict well being.

Results from the DSD programme intervention were more illuminating. Anxiety and depression levels were significantly reduced with the completion of the DSD programme. This may have been due to the engagement with novel tasks and increased self-efficacy.

The eudonomic approach to well being is more concerned with developmental aspects. To some extent it appears to consider the extent to which people are self-actualised or are functioning at their full potential. This perspective is shared with FIT theory which is a framework for internal transformation. Individuals with low levels of FITness are seen to have more potential to fulfil than individuals with high levels of FITness and Fletcher & Stead (2000a) offer a series of tasks by which internal transformation of both the constancies and behavioural flexibility can be achieved. To this extent then, individuals with greater levels of FITness may be more likely to have fulfilled more of their potential and have achieved eudaimonia, reporting greater Personal Expressiveness (Waterman, 1993; cited in Ryan & Deci, 2001), i.e. to have greater levels of well being. In study 3, individuals completing the DSD programme tackled several new activities and dramatically changed their behaviour. There were significant reductions in both anxiety and depression. This suggests that well being was facilitated by undertaking new activities which assisted in the fulfilment of potential.

This suggests there may be two likely mechanisms for improving well being demonstrated in the present programme of research. Firstly, anxiety and depression may be underpinned by low levels of some constancies (Self-responsibility and Fearlessness in particular). This may reflect aspects of SWB. To improve levels of SWB it may be necessary to increase levels of aspects such as Self-responsibility and Fearlessness (note Fletcher & Stead, 2000a do suggest exercises for increasing all aspects of FIT). Secondly, well being (in the form of eudaimonia or personal development) may be improved by developing levels of behavioural flexibility. Alternatively, way of viewing well being and its relationship with FITness may be as a hierarchical progression as was suggested with the DSD programme. Doing something different facilitates changes in perceptions and cognitions which in turn facilitate feelings of enjoyment, satisfaction and self-efficacy. This would result increased happiness and alterations to automatic thoughts and behaviours (or weakened habit webs). This may

feedback to increase levels of perceived control and self-efficacy and further improve levels of well being. Additional examination of this would be of both great academic and practical significance in order to establish whether the hierarchical hypothesis can be empirically supported.

8.6. FITness and Physical Well Being

FITness has some relationship with psychological aspects of well being. However, does it also relate to any physical aspects of well being? The present research used Body Mass Index (BMI) as an indicator of physical well being with individuals in the high or obese BMI categories showing poorer well being. Individuals in these categories recorded significantly lower levels of behavioural flexibility than individuals with lower BMI's. The DSD programme produced an increase in behavioural flexibility levels that were directly related to weight loss in a dose-response relationship. This suggests a direct link between behavioural flexibility and weight maintenance. Initial data indicated that individuals with increased behavioural flexibility also recorded increased exercise levels and lower BMI's suggesting that behaviourally flexible individuals were more active too. Results from those participating in the DSD programme suggested that as behavioural flexibility increased, diet and exercise levels improved. Further research using more precise measures variables of diet and exercise could elucidate whether behavioural flexibility plays an important role in diet and exercise levels. We also need to know the exact way in which behavioural flexibility might affect diet and exercise.

One suggestion was that increased behavioural flexibility weakened old habits. Participants reported that it became easier to adhere to healthy diets and exercise programmes as their behavioural flexibility increased which supports the view that old habits were weakened as new behaviours developed. This is discussed in more detail in the following section.

8.7. Behavioural Flexibility and Habits

Qualitative follow up of study 3 indicated that changes in behavioural flexibility were accompanied by alterations in the way individuals viewed their behaviour (i.e. changes in cognition), coming to view it in terms of habits (good or bad). Habit has been presented as a multi-faceted construct comprising lack of awareness, difficulty with control and mental efficiency (Verplanken, 2006). If lack of awareness is a key feature then perhaps one of the first steps in changing a habit is to become more aware of the habitual behaviour and the context in which it occurs. The DSD programme encouraged individuals to consider their behaviour in a variety of environments, isolate those habitual behaviours which they would like to change and encouraged them to attempt different activities which are likely to have changed cognitions, increased awareness and allowed altered perceptions of behaviour.

It has been hypothesised that habit formation requires stability of environmental context (Wood & Neal, 2007; Verplanken, 2006) and that habitual behaviour is cued by external factors such as location, time, mood and other individuals (e.g. Wood, Tam & Guerrero Wit, 2005). The DSD programme causes changes to contextual and environmental factors which may have been one of the factors underlying participant's successful behaviour change. Another possibility is raised by the findings of Verplanken (2006). The above discussion suggested that psychological well being improved because the participants engaged in activities facilitating changes to cognitions which in turn facilitated feelings of enjoyment, self-efficacy and increased happiness. Verplanken (2006) conducted a study on the negative thinking that is regularly seen in depressive and anxious individuals. He found that the extent to which this negative thinking was habitual predicted levels of self-esteem and anxiety and depressive symptoms. It may be that habitual negative thinking by participants in study 3 was disrupted by the DSD activities in the same way that their outward habitual behaviour was. The DSD programme changed contexts which might have included changes to external triggers (location, time, activities) as well as psychosocial aspects such as interactions with others and mood. In turn these changes may have disrupted habitual thinking - individuals may have learned that more desirable outcomes could be achieved through different behavioural responses (e.g. behaving more assertively with your boss or friend). It is possible that these more desirable outcomes and continued change to contextual factors resulted in the

habitual thinking becoming weakened and perhaps removed which in turn meant fewer anxiety or depressive symptoms. The suggestion here is that trying new behaviours in new contexts produced new ways of thinking which in turn affected behaviour.

An associated benefit of changing the individual's environment is that new conditions can be provided that may permit the development of new, more desirable habits. The findings from the present study are consistent with this although they do not provide strong support. In order to establish whether new, positive habits are formed as a result of doing the DSD programme, a longer follow up would be required as would a measure of habitual behaviour (e.g. Verplanken & Orbell, 2003).

The nature of the DSD programme and the increased behavioural flexibility would suggest that individuals should become less habitual, including both desirable and undesirable habits. However, in study 3 individuals were asked to form implementation intentions which may effect a change in behaviour by making selection of the new behaviour more 'automatic'. Orbell & Vanplanken (2005; cited in Verplanken, 2006) hypothesised that in this case intentions are designed to trigger a specific behavioural response to some environmental cue – the same mechanism by which habits are assumed to operate. Thus it may be that participants increased their behavioural flexibility and weakened old habits through new environments and situations which triggered new behaviours. Implementation intentions may assist in this but may have lead to new dietary and exercise habits being formed, albeit positive habits. An alternative explanation is that increased behavioural flexibility may have meant that the implementation intentions which were formed were specific just to the day in question and were not used with any greater frequency – this specificity may have negated the development of new habits. Clearly further research is warranted.

8.8. Implications For Theory, Research and Practice

Despite the methodological limitations inherent in the present programme of research, the findings suggest both direct (temperamental) and indirect (instrumental) aspects of the individual are important in well being. This supports Fletcher & Stead's theory that higher levels of FIT do protect against mental ill health although the role behavioural flexibility may play in this is still unknown. There was considerably less evidence to support their assertion that FITter individuals would also be physically fitter since smoking behaviour and alcohol consumption were not related to FITness in study one. The relationships between exercise and diet and FITness were weak.

Several other assertions made by Fletcher & Stead (2000a) also warrant further testing. For example, the proposed relationship between emotional intelligence and FITness (FITter individuals should demonstrate greater EI than less FIT individuals, Fletcher & Stead, 2000a) could be examined. However, the concept of emotional intelligence (EI) is a controversial one with some authors maintaining that EI is little more than g or personality (e.g. Davies, Stankov & Roberts, 1998; Schulte, Ree & Carretta 2004), and those authors who argue for its existence are little able to agree on its precise nature (e.g. Salovey & Mayer, 1990 and Bar-On, 1997).

Bar-On's model of EI does bear some similarity to FIT and it may turn out to be that they describe the same underlying psychology. Bar-On's formulation of EI proposes that there are five key elements: Interpersonal awareness; Intrapersonal awareness; Adaptability; Stress Management and General Mood. Both models are concerned with how aware individuals are of what is going on internally and externally, both models are concerned with how adaptable and flexible individuals are, and both models are concerned with psychological well being and the ability of the individual to manage that. One difference is that FIT takes a more cognitive approach than Bar-On. A study by Austin, Saklofske & Egan (2005) examined relationships between the EQ-i (Bar-On's conceptualisation of EI), well being and health correlates. EI was found to relate to some psychological indicators of well being (social network size, satisfaction with social network, and temporal satisfaction with life) but was not consistently related to health correlates. Regression analyses suggested that when

personality was controlled for, EI had little impact. Some further research into the validity of FIT might be warranted, exploring its relationship to personality and EI, for example.

A central line of enquiry that warrants further investigation is the role of FIT in behaviour change. Manipulating some aspects of FITness may have permitted individuals to adopt positive health behaviours more easily. Whether FIT is more able to explain differences in existing behaviour, and the ability to change behaviour, better than other psychological constructs or models such as the TPB, locus of control and self-efficacy, remains to be seen. It is clear that whilst the theory of planned behaviour can predict behaviour in the short term, it may not be useful as a predictor of long term behaviour or behaviour change unless previous behaviour and the role of implementation intentions is factored in – this finding is becoming well established (e.g. Verplanken & Faes, 1999). There was some evidence for a direct and consistent relationship between FIT and TPB components but only between Inner FITness and PBC. Teixeira et al (2005) have demonstrated that the psychological reasons behind poor health behaviours vary from individual to individual and so there may be little point in comparing FIT's ability to explain health behaviour to other constructs.

It could be that the individual variation in the factors underlying weight gain is one reason why the DSD programme was able to help so many different participants. The nature of the programme encouraged autonomy in task selection so participants were free to give thought to what their precise problems were and select a task relevant to that problem, rather than being given a list of generic things to do which may or may not have any bearing for that individual. This would imply that weight management interventions need to promote autonomy (again in line with Deci & Ryan's theory of well being) and be more tailored to the individual. The reasons for lack of success in the past, both with theory and with practice, could be that either the theory or programme has considered only a few psychological constructs (and so hasn't offered the correct solution to all the individuals) or has been too complex (because it has tried to offer all possible solutions to all individuals). Perhaps 'individual tailoring' is more successful when the individual is given control over *what* is tailored but is given help with *how* it is tailored (e.g. guides on forming implementation intentions and action plans). This tailoring also allowed people to set their own goals and so they could make small changes or larger ones depending on their particular circumstances.

A related implication for theory, research and practice concerns habits. There is a growing literature on the 'habit' construct (e.g. Verplanken, 2006; Wood & Neal, 2007) but it is still limited given the role past behaviour has been shown to have on future behaviour (e.g. Brug, de Vet, de Nooijer & Verplanken, 2006). It seems unlikely that successful long term behaviour change would not involve breaking habits and/or forming new ones, but the relationship between behavioural flexibility and habitual behaviour is not at all clear. Fletcher & Stead (2000a) suggest that more FIT individuals are less prone to behaving in a habitual manner. This is partly because they are more Aware, and partly because they have a greater array of behaviours which are comfortable and easily performed. Verplanken (2006) eloquently points out that habitual behaviour develops when behaviour is *satisfactorily* repeated in stable contexts. Fletcher & Stead argue that less behaviourally flexible individuals prefer to adopt behaviours which they have used in the past because they are more comfortable and not because the situation necessarily demands them. However, this neither requires the behaviour to have been either satisfactory or for the context to be stable. Thus the 'inappropriate' behaviours theoretically displayed by individuals with low behavioural flexibility are not necessarily habits. It may be that participants in the DSD programme did increase their behavioural flexibility and also lost weight primarily because they formed new habits. However, it may also be that behavioural flexibility and habits are not associated in that way. Future research might consider habitual behaviour in relation to behavioural flexibility to establish whether they are independent constructs.

Another central implication from the present programme of research would be that affecting change in the individual, rather than changing environmental conditions, could be more likely to lead to improved well being. This might occur in two main ways. Firstly, changing aspects of Inner FITness (the constancies) could change levels of anxiety and depression (NA aspects of SWB) – the temperamental view of explaining well being's relationship with personality. Secondly, changing aspects of Outer FITness (behavioural flexibility) might change habitual behaviour that may lead to improved SWB and facilitate personal development by bringing about fulfilment of the needs of autonomy, competence and relatedness (Ryan & Deci, 2001). This is the instrumental view of how well being and the individual are connected.

Whether SWB and personal development activities interact is of great interest and has not been adequately resolved here or elsewhere. The present thesis hypothesised that an individual's level of FITness would be the primary determinant of both SWB and what individuals did to achieve personal development. Thus relationships between SWB and personal development activities (and perceptions of) existed only because they were both underpinned by FITness. There was some evidence to support this but causal inferences can not be drawn here. It may be that work characteristics or project characteristics do not influence well being. Furthermore, constructs such as Negative Affectivity and Positive Affectivity, their role in determining SWB and perceptions of personal development activities, and their relationship to FITness, has not been adequately addressed. A tentative hypothesis might be that Inner FITness influences constructs such as NA and PA, as well as influencing perceptions of activities whilst behavioural flexibility influences behaviour with respect to the activities. This might feedback to influence NA and PA as well as influencing measures of well being. Clearly the existence and nature of the relationships needs considerable work.

The present programme of research has established that there are relationships between FIT and well being, but it has raised as many questions as it has answered. Do SWB and personal development aspects of well being interact or are they both just underpinned by individual differences such as FIT? Are the relationships explored here between anxiety and depression and FIT reflected in measures of PA aspects of SWB as well? How do constructs such as Negative Affectivity and Positive Affect relate to FIT (if at all) and well being? Would EI also be relevant? Does 'doing something different' account for all the behaviour changes observed or are they more a product of diary keeping and placebo effects? Does behavioural flexibility have any relation to habitual behaviour? If not does making changes to habitual behaviour lead to better weight management than changing behavioural flexibility? These are just some of the questions that are important.

There is clearly a need for more methodologically sound research. The research reported here was in part cross sectional, may have lacked proper controls and used simple methods for measuring health behaviours. Furthermore, the study samples were not large enough to permit the use of sophisticated statistics. Structural equation modelling, to examine the

potentially complex models hypothesised here, would clearly be of great value, but examining many variables or designing models with multiple parameters requires far larger samples than employed here. A good starting point for future research would be a long term intervention based on the DSD programme that monitors and models behavioural flexibility, habitual behaviour and psychological well being (both PA and NA aspects). Such a study should have a proper waiting list group and should consider some control group that perhaps tackles some behavioural modification techniques. Follow up should employ sophisticated statistical analyses and take place over years and not just months in order to establish whether any changes that do occur can actually be maintained.

8.9. Conclusion

FIT variables were related to well being, and there was a direct relationship between Inner FITness and negative affect aspects of SWB (anxiety and depression). Indirect relationships between FIT (particularly Outer FITness) and well being have been harder to establish here, primarily because of methodological limitations, but there is tentative evidence to suggest that behavioural flexibility may be trainable. This might bring about changes to perceptions, experiences and behaviours which in turn may facilitate personal development and SWB. The FIT theory does require further testing. It was suggested that the relationships hypothesised to exist between EI and FIT could be explored. Additionally, relationships between personality and intelligence might be investigated.

More work needs to be done to establish whether there are causal relationships between FIT, well being and personal development activities. This is particularly so given the ambiguity surrounding the role of constructs such as NA in determining both perceptions of the environment and well being outcomes. A longitudinal design applied to Judge et al (1998), where their central concept of core evaluations is replaced by FIT, could be one useful route for further research since their model (see Figure 8.1) proposed that core self-evaluations account for self-esteem, self-efficacy, locus of control and neuroticism on one hand and perceptions of work, job satisfaction and life satisfaction on the other.

There is evidence to suggest that the DSD programme can be used to alter behaviours which in turn can improve well being, but this may not be directly changing habits. The programme encouraged increased awareness of behaviour and bad habits in particular, but it seems that it is the formation of implementation intentions which enabled new behaviours to be adopted and physical well being to be altered. However, doing something different may have had a positive influence on psychological well being. Participants not only 'did something different' from their usual routines but also 'did something different' from one another, underlining the importance of individual differences for health behaviour. As asserted by Teixeira et al (2005), weight management problems can be underpinned by completely different mechanisms in different individuals. Thus a key implication for theories of health behaviour change, and interventions based on them, is that they will never be able to adequately explain behaviour in all individuals by including only a few variables. Future research might therefore empirically examine the importance of participant autonomy in health promotion interventions – already suggested by Buijs et al (2003) to be a factor in programme success – but should employ a much more rigorous design than used here, with a larger sample size.

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Appendix One: Study one lifestyle questionnaire

LIFESTYLE QUESTIONNAIRE

Your help is required in investigating links between individual's occupations, leisure activities, attitudes, beliefs and knowledge. The following questionnaire is designed to elicit information about you as a person, and you in relation to your work, your leisure activities and your personal goals, or projects.

Please be assured from the outset that all data will be treated with the strictest confidentiality, with only general trends being analysed – your personal details will not be made available to any other party.

It is important to note that:

- All people are different. I am interested in how you feel personally, and not how you think others see you, or how you would like to be seen.
- There are no "right" or "wrong" answers. With that in mind, it is important that you answer all questions as honestly as you can.
- You should answer all questions with your immediate feelings and not dwell too long on a particular question.
- Normally it is best to stick with your first reaction, but if you need to alter your answer, simply cross out the original and replace it.

The lifestyle questionnaire is interested in the following:

- Biographical information about you.
- Your eating and drinking patterns.
- Your leisure activities.
- Your occupation and attitudes towards it.
- Current personal projects.
- Your knowledge, values, beliefs and attitudes.

SECTION 1: YOUR DETAILS

a) Biographical information

Gender

Height **ft** **inches** **Weight** **st** **lbs**

Marital Status

Number of children

Ethnic Origin (please circle) Caucasian Asian African
Indonesian Other (please state)_____

b) Lifestyle Information

How many cigarettes do you smoke in a week?

How many units of alcohol do you consume in a week?
(Glass of wine = 1 unit; pint of lager/cider/beer = 2 units; single measure of spirit = 1 unit)

	Never	Almost never	Sometimes	Most days	Every day
How often do you eat fried foods ?	1	2	3	4	5
How often do you eat foods which contain a lot of fat ? (e.g. chocolate, crisps, dairy products, red meat, chips)	1	2	3	4	5
How often do you eat at least 5 portions of fruit/vegetables a day?	1	2	3	4	5
How often do you eat foods high in fibre?	1	2	3	4	5
How often do you do the following types of exercise?					
Do aerobic exercise: Do aerobic exercise: Cardiovascular work such as running or swimming	1	2	3	4	5
Sports such as football, rugby or tennis	1	2	3	4	5
Martial arts such as judo and karate	1	2	3	4	5
Exercise classes such as aerobics and step.	1	2	3	4	5
Strengthening exercise such as weight lifting	1	2	3	4	5
Flexibility training, such as yoga.	1	2	3	4	5

c) Work: Your present occupation

What is your job title?	**What is your job title?**	**What is your job title?**
Is this job (please circle)	Employed	Self-employed
	Voluntary	Student
Which business sector do you work in? (please circle)	Manufacturing	Financial
	Services/Utilities	Academic
	Other	

How many years have you been in your current occupation? How many years have you been in your current occupation?How many years have you been in your current occupation?

How many staff are you responsible for?

How many hours do you work in a typical week in your place of work?

How many hours do you work (job related) in a typical week in your home?

How long does it take you to travel to/from work? (please circle)	less than 30 mins	30 mins – 1 hr
	1 – 2 hrs	more than 2 hrs
What is your salary? (please circle)	less than £10 000	£10 000 - £19 000
	£20 000- £29 000	£30 000 - £39 000
	£40 000 - £49 000	more than £50 000

SECTION 2: EVALUATION OF YOUR CURRENT OCCUPATIONSECTION 2 : Evaluation of your current occupationSECTION 2 : Evaluation of your current occupation

This section is designed to gather information about work stressors, that is the demands that you may find stressful at work, and the resources which may or may not be available to help you cope with these demands.

Below is a list of work demands that your occupation may require you to cope with. Please indicate on the scale, by circling the appropriate number, whether you feel each item is not demanding, mildly demanding or highly demanding.

	Not at all demanding		Mildly demanding		Highly demanding
Job pressures	1	2	3	4	5
Having too much to do	1	2	3	4	5
Having too little to do	1	2	3	4	5
Being responsible for people	1	2	3	4	5
Being responsible for equipment	1	2	3	4	5
Demands from others	1	2	3	4	5
Conflicting demands/roles	1	2	3	4	5
Over-under promotion	1	2	3	4	5
Keeping up with other organisations	1	2	3	4	5
Organisational climate	1	2	3	4	5
Office politics	1	2	3	4	5
Organisational structure	1	2	3	4	5
Organisational/job changes	1	2	3	4	5
Major decisions	1	2	3	4	5
Expectancies of others/organisations	1	2	3	4	5

Next I would like to you to indicate on the scale the extent to which the following factors either support or constrain your abilities to cope with the demands above. If the factor neither supports or constrains your ability please circle number 3.

	Supports		Neither supports or constrains		Constrains
Being clear about my role	1	2	3	4	5
Job discretion, autonomy or control	1	2	3	4	5
Quality of relationship with boss	1	2	3	4	5
Quality of relationship with colleagues	1	2	3	4	5
Quality of relationship with subordinates	1	2	3	4	5
Union membership	1	2	3	4	5
Role ambiguity	1	2	3	4	5

Variety level/skill utilisation	1	2	3	4	5
Social perception of job	1	2	3	4	5
Participation in decisions	1	2	3	4	5
Payment/reward system	1	2	3	4	5
Quality of equipment	1	2	3	4	5
Physical working conditions	1	2	3	4	5
How work is planned/managed	1	2	3	4	5

SECTION 3 : PERSONAL PROJECTS

I am interested in studying the kinds of activities and concerns that people have at different stages of their lives. These are called *personal* projects. All of us have a number of projects at any given time that we think about, plan for, and carry out, and sometimes (although not always) complete.

Here are some examples of projects:

Completing my English essay
Trying to help my friend get along with others
Overcoming fear of meeting new people
Getting more exercise
Trying to finish my book
Taking a trip to France
Cutting the grass
Finding a job
Redecorating the lounge
Trying to clarify my religious beliefs
Losing ten pounds
Making a birthday present for my friend.

As you can see, personal projects range from short term, finite projects such as cutting the grass, to long term, indefinite projects, which may require a permanent endeavour. It is these latter projects which I am interested in. Below is a list of 16 projects relating to the main areas of people's lives: work; social life; physical health; and mental health. I would like you to read through these projects and decide which, IF ANY, of these projects you have begun within the last month, or have planned and intend to begin within the coming month. In the boxes next to the projects, I would like you to rank order these projects (only the ones you have begun / intend to begin) in order of their importance to you. The most important one should be ranked number one.

The columns along from the list of projects contain a variety of benefits, or outcomes associated with performance and/or completion of personal projects. I am interested in which of these triggered your intention to begin each project. Please rank order ONLY those benefits which are relevant to your decision to commence each project, with 1 representing most important. Please ignore any benefits which did not influence your decision, or which you are not interested in achieving.

Personal Projects		BENEFITS / OUTCOMES			
	Project order of importance	Increase fitness	Improve health/ reduce risk of illness	Lose weight	Change body shape
1. Exercise regularly					
2. Stop smoking					
3. Eat a balanced diet					
4. Reduce alcohol consumption					
5. Learn to relax/ relax more often					
6. Develop my spirituality					
7. Begin therapy/counselling					
8. Take up new activities or leisure pursuits/ learn new things.					
9. Spend more time with family/friends					
10. Improve relationship with partner					
11. Work harder/ take on more responsibility/ get a promotion					
12. Change career					

Increase energy	Learn new skills	Improve psychological	Reduce stress/ anxiety	Sleep better	Make new friends	Improve interpersonal relationships	Have fun	Improve performance

In this part of the questionnaire, I would like to know your thoughts about and feelings toward those projects which you selected previously. You are being asked to rate each one of your projects on 19 different dimensions, using a scale of 1 to 10. Below is a description of each of the 19 dimensions:

1. **Importance** : how important each project is to you at the present time.
   (10 = very important, 1 = not at all important)
2. **Enjoyment** : how you enjoy working on each project
   (10 = great enjoyment, 1 = no enjoyment at all)
3. **Difficulty** : how difficult you find it to carry out each project
   (10 = very difficult, 1 = not at all difficult)
4. **Visibility**: how visible each project is to the relevant people who are close to you, that is, how aware are they of the project.
   10 = completely visible, 1= not at all visible)
5. **Control** : how much you feel you are in control of the project
   (10 = complete control, 1 = no control over)
6. **Initiation** : how much you feel responsible for having initiated each project
   (10 = fully responsible for initiating a project, 1 = not at all responsible)
7. **Stress** : how stressful it is for you to carry out each project
   (10 = very stressful, 1 = very relaxing)

8. **Time adequacy**: how much you feel that the amount of time you spend working on each project is adequate

(10 = time spent on project is adequate, 1 = time spent on project is not at all adequate)

9. **Self-identity**: how typical of you each project is
(10 = project is very typical of me, 1 = project is not at all typical of me)

10. **Other's view**: how important people close to you think the project is
(10 = project is seen by others as very important, 1 = it is not seen as important)

11. **Value congruency**: to what extent each project is consistent with the values which guide your life
(10 = totally congruent with my values, 1 = totally incongruent)

12. **Progress** : how successful you have been in the project so far
(10 = very successful, 1 = no success at all)

13. **Challenge** : to what extent each project is challenging and demanding
(10 = most challenging, 1 = not at all challenging)

14. **Absorption** : to what extent you become engrossed or deeply involved in a project.
(10 = I generally get absorbed in the project, 1 = I tend to be uninvolved when carrying out the project)

15. **Outcome** : how likely it is that you are able to achieve the desired outcome
(10 = I am very able to achieve the desired outcome, 1 = I am completely unable to achieve the desired outcome)

16. **Commitment** : how committed you feel you are to performing and / or completing each project
(10 = I am completely committed to the project, 1 = I am not all committed)

17. **Motivation** : how motivated you feel you are to carry out each project
(10 = I am very highly motivated to perform the project, 1 = I am not at all motivated)

18. **Number of previous attempts**: how often have you tried the project before
(10 = many times, 1 = never before)

19. **Amount of effort put in previously**: how much effort you put in to the previous attempts
(10 = a lot of effort, 1 = no effort)

Please write in the spaces provided the name of each project, and enter them into the grid with the most important in the first space and so on. Please rate each project on all 19 dimensions by choosing the number from 1 to 10 (inclusive) which best represents your thoughts / feelings.

PROJECTS

1	2	3	4	5	6	7	8	9	10	11	12

DIMENSIONS

1. Importance
2. Enjoyment
3. Difficulty
4. Visibility
5. Control
6. Initiation
7. Stress
8. Time adequacy
9. Self-identity
10. Other's view
11. Value congruency
12. Progress
13. Challenge
14. Absorption
15. Outcome
16. Commitment
17. Motivation
18. No of previous Attempts
19. Effort of previous attempts

In this section, I am interested in investigating in more detail the demands which you must respond to as you perform your projects, as well as those environmental and personal factors which either support your efforts, or constrain / hinder your attempts.

Demands are things in your environment which require a response, they represent things which have to be done and the environment in which the individual is placed. They may be technical, intellectual, social or financial.

Supports are resources which are relevant to the demands of the individual. They may be technical, intellectual, social or financial, and they help the individual to meet the demands.

Constraints represent a lack of available resources which would make meeting the demands easier. Constraints may stop the benefits of existing supports being realised, as well as effecting how an individual copes with demands.

Each project has its own separate list containing questions relating to these demands, supports and constraints. For each project which you are involved with, please locate the appropriate list and answer the questions. Ignore parts which ask questions about those projects which are irrelevant to you.

1. EXERCISING REGULARLY

Below are a list of demands which you face when you try to conform to your exercise plan. On the scale, please indicate how much of a demand each statement represents for you by circling a number.

	Not at all demanding		Mildly demanding		Very demanding
Finding/making time to exercise	1	2	3	4	5
Finding the energy to exercise	1	2	3	4	5
Finding appropriate facilities	1	2	3	4	5
Meeting the financial cost	1	2	3	4	5
The demands of others (e.g. work, family, friends)	1	2	3	4	5
Finding the motivation	1	2	3	4	5

Below are a list of factors which may serve either to support your ability to meet demands, or hinder/reduce your ability to meet those demands. Please indicate on the scale whether each factor either supports, constrains or neither supports or constrains your ability to meet the demands of the project.

	Supports		Neither supports or constrains		Constrains
Weather/climate/season	1	2	3	4	5
Proximity of location of facilities	1	2	3	4	5
Quality/quantity of facilities	1	2	3	4	5
Price of facilities	1	2	3	4	5
Amount of equipment required	1	2	3	4	5
Job type/hrs worked	1	2	3	4	5
Exercising in a group	1	2	3	4	5
Amount of energy needed	1	2	3	4	5
Support from family/friends	1	2	3	4	5
Previous exercise experiences	1	2	3	4	5
Visibility of positive results	1	2	3	4	5
Knowledge of how to exercise/ positive benefits	1	2	3	4	5
Level of commitment	1	2	3	4	5
Level of motivation	1	2	3	4	5
Amount of satisfaction/enjoyment derived	1	2	3	4	5
Ability to stick to program	1	2	3	4	5

2. STOP SMOKING

Below are a list of demands which must be met when trying to stop smoking. Please indicate on the scale how much of a demand you feel each item is for you.

	Not at all demanding		Mildly demanding		Very demanding
Physical cravings for a cigarette	1	2	3	4	5
Psychological cravings for a cigarette	1	2	3	4	5
Cost of quitting aids (e.g. patches, gum etc.)	1	2	3	4	5
Social situations	1	2	3	4	5

Below are a list of factors which may act as supports or constraints upon your ability to meet the demands of quitting smoking. Please indicate on the scale whether each item supports, constrains, or neither supports or constrains your ability to meet the demands.

	Supports		Neither supports or constrains		Constrains
Aids for quitting	1	2	3	4	5
Smoking policy at work	1	2	3	4	5
Smoking policy of leisure facilities	1	2	3	4	5
Type of leisure facilities used (e.g. pubs, clubs, cinema etc.)	1	2	3	4	5
Smoking status of friends/family	1	2	3	4	5
Support from friends/family	1	2	3	4	5
Replacement of smoking with another activity (e.g. exercise, eating etc.)	1	2	3	4	5
Length of time you smoked	1	2	3	4	5
Previous cessation history	1	2	3	4	5
Visibility of positive results	1	2	3	4	5
Knowledge of effects of smoking /how to give up	1	2	3	4	5
Level of commitment	1	2	3	4	5
Level of motivation	1	2	3	4	5
Satisfaction/enjoyment derived	1	2	3	4	5
Your ability to quit	1	2	3	4	5

3. EATING A BALANCED DIET

Below is a list of demands which you must meet when you attempt to eat a healthy, balanced diet. Please indicate on the scale how much of a demand you feel each item is.

	Not at all demanding		Mildly demanding		Highly demanding
Coping with hunger pangs	1	2	3	4	5
Coping with cravings for the wrong foods	1	2	3	4	5
Meeting cost of healthy foods	1	2	3	4	5
Finding healthy foods	1	2	3	4	5
Learning new recipes and cooking methods	1	2	3	4	5
Eating 5 portions of fruit/veg a day	1	2	3	4	5
Demands from others (e.g. family, friends, work)	1	2	3	4	5

Below are a list of factors which may act as supports or constraints upon your ability to meet the demands of eating a healthy balanced diet. Please indicate on the scale whether each item supports, constrains, or neither supports or constrains your ability to meet the demands.

	Supports		Neither supports or constrains		Constrains
Diet aids (e.g. slimfast)	1	2	3	4	5
Taste of healthy foods	1	2	3	4	5
Cost of healthy foods	1	2	3	4	5
Ease of preparation of healthy foods	1	2	3	4	5
Ease of purchase of healthy foods	1	2	3	4	5
Diet of those around you	1	2	3	4	5
Support from family/friends	1	2	3	4	5
Flexibility of diet plan	1	2	3	4	5
Previous diet experiences	1	2	3	4	5
Visibility of positive results	1	2	3	4	5
Level of commitment	1	2	3	4	5
Level of motivation	1	2	3	4	5
Amount of enjoyment/satisfaction derived	1	2	3	4	5
Ability to stick to plan	1	2	3	4	5
Knowledge of what is/is not a healthy diet/ benefits of eating healthily	1	2	3	4	5

4. REDUCTION OF ALCOHOL CONSUMPTION

Below is a list of demands which you must meet when you attempt to reduce your intake of alcohol. Please indicate on the scale how much of a demand you feel each item is.

	Not at all demanding		Mildly demanding		Highly demanding	
Coping with physical cravings	1	2	3	4	5	
Coping with psychological cravings		1	2	3	4	5
Relaxing in social situations without alcohol.	1	2	3	4	5	

Below are a list of factors which may act as supports or constraints upon your ability to meet the demands of reducing alcohol consumption. Please indicate on the scale whether each item supports, constrains, or neither supports or constrains your ability to meet the demands.

	Supports		Neither supports or constrains		Constrains
Type of leisure activities you do	1	2	3	4	5
Friends/family who drink	1	2	3	4	5
Support from friends/family	1	2	3	4	5
Availability of non-alcoholic options	1	2	3	4	5
Previous drinking experiences	1	2	3	4	5
Visibility of positive results	1	2	3	4	5
Knowledge of how to reduce intake/ effects of over-consumption	1	2	3	4	5
Level of commitment	1	2	3	4	5
Level of motivation	1	2	3	4	5
Ability to reduce intake	1	2	3	4	5
Amount of enjoyment/satisfaction derived	1	2	3	4	5

5. LEARN TO RELAX/RELAX MORE OFTEN

Below is a list of demands which you have to meet when trying to relax more. Please indicate on the scale how much of a demand you feel each item to be.

	Not at all demanding		Mildly demanding		Highly demanding
Finding time to relax	1	2	3	4	5
Finding methods of relaxation	1	2	3	4	5
Being able to relax	1	2	3	4	5
Demands of others (e.g. work, family, friends)	1	2	3	4	5

Below are a list of factors which may act as supports or constraints upon your ability to meet the demands of relaxing more often. Please indicate on the scale whether each item supports, constrains, or neither supports or constrains your ability to meet the demands.

	Supports		Neither supports or constrains		Constrains
Type of job you do	1	2	3	4	5
Hours you work	1	2	3	4	5
Support from family/friends	1	2	3	4	5
Proximity of facilities used to relax	1	2	3	4	5
Availability of facilities used to relax	1	2	3	4	5
Cost of facilities used to relax	1	2	3	4	5
Visibility of positive results	1	2	3	4	5
Knowledge of how to relax/ benefits of relaxing	1	2	3	4	5
Level of commitment	1	2	3	4	5
Level of motivation	1	2	3	4	5
Amount of enjoyment/satisfaction derived	1	2	3	4	5
Ability to relax	1	2	3	4	5

6. DEVELOP MY SPIRITUALITY

Below are a list of demands which you must meet when trying to develop your spirituality. Please indicate on the scale how much of a demand you feel each item is.

	Not at all demanding		Mildly demanding		Highly demanding
Finding time to devote to yourself	1	2	3	4	5
Demands of others (e.g. friends, family, work)	1	2	3	4	5
Facing up to your shortcomings	1	2	3	4	5
Finding a philosophy/faith to believe in	1	2	3	4	5
Finding a place of worship etc.	1	2	3	4	5

Below is a list of factors which may act to support or constrain your ability to meet demands. Please indicate on the scale the extent to which you feel each item to either support, constrain or neither support or constrain your abilities to meet the demands.

	Supports		Neither supports or constrains		Constrains
Availability of information	1	2	3	4	5
Flexibility of schedule	1	2	3	4	5
Type of job	1	2	3	4	5
Number of hrs worked	1	2	3	4	5
Support from family/friends	1	2	3	4	5
Visibility of positive results	1	2	3	4	5
Knowledge of faiths/philosophies and benefits of inner peace	1	2	3	4	5
Previous spiritual experiences	1	2	3	4	5
Level of commitment	1	2	3	4	5
Level of motivation	1	2	3	4	5
Amount of enjoyment/satisfaction derived	1	2	3	4	5
Ability to develop spirituality	1	2	3	4	5

7. BEGIN THERAPY / COUNSELLING

Below is a list of demands you must meet when beginning therapy. Please indicate on the scale how demanding you feel each item to be.

	Not at all demanding		Mildly demanding		Highly demanding
Admitting you need help/ have problems	1	2	3	4	5
Finding time to visit therapist	1	2	3	4	5
Finding the right therapist	1	2	3	4	5
Meeting the cost of therapy	1	2	3	4	5
Dealing with social stigma	1	2	3	4	5
Thinking it won't work	1	2	3	4	5

Below are a list of supports/constraints which will affect your ability to cope with the demands. Please indicate on the scale the extent to which you feel each item either supports, constrains or neither supports or constrains your abilities.

	Supports		Neither supports or constrains		Constrains
Availability of therapists	1	2	3	4	5
Availability of information	1	2	3	4	5
Cost of therapy	1	2	3	4	5
Proximity of therapist	1	2	3	4	5
Flexibility of work schedule	1	2	3	4	5
Type of job	1	2	3	4	5
Number of hrs worked	1	2	3	4	5
Support from family/friends	1	2	3	4	5
Knowledge of therapy/benefits of therapy	1	2	3	4	5
Visibility of positive results	1	2	3	4	5
Previous therapy experiences	1	2	3	4	5
Level of commitment	1	2	3	4	5
Level of motivation	1	2	3	4	5
Ability to work with therapist	1	2	3	4	5
Amount of enjoyment/satisfaction derived	1	2	3	4	5

8. TAKE UP NEW ACTIVITIES/LEISURE PURSUITS/LEARN NEW THINGS

Below is a list of demands which you must meet when you attempt to take up new activities. Please indicate on the scale how much of a demand you feel each item is.

	Not at all demanding		Mildly demanding		Highly demanding
Finding the time	1	2	3	4	5
Finding the necessary facilities	1	2	3	4	5
Meeting the financial cost of facilities/ equipment	1	2	3	4	5
Demands from others (e.g. family, friends, work)	1	2	3	4	5
Finding something you want to do	1	2	3	4	5
Finding the courage to begin something new	1	2	3	4	5

Below are a list of factors which may act as supports or constraints upon your ability to meet the demands of taking up new activities. Please indicate on the scale whether each item supports, constrains, or neither supports or constrains your ability to meet the demands.

	Supports		Neither supports or constrains		Constrains
Weather/climate/season	1	2	3	4	5
Proximity of facilities	1	2	3	4	5
Cost of facilities/equipment	1	2	3	4	5
Quality/quantity of facilities	1	2	3	4	5
Activities of friends/family	1	2	3	4	5
Support from friends/family	1	2	3	4	5
Scheduled time of activities	1	2	3	4	5
Flexibility of work hrs	1	2	3	4	5
Visibility of positive results	1	2	3	4	5
Previous participation in activities	1	2	3	4	5
Knowledge of how to take up or perform activities/benefits of participation	1	2	3	4	5
Level of commitment	1	2	3	4	5
Level of motivation	1	2	3	4	5
Ability to perform new activities	1	2	3	4	5
Amount of enjoyment/satisfaction derived	1	2	3	4	5

9. SPEND MORE TIME WITH FAMILY/FRIENDS

Below are a list of demands which you must meet when attempting to spend more time with family/friends. Please indicate on the scale the extent to which you feel each item to be demanding.

	Not at all demanding				Highly demanding
Work	1	2	3	4	5
Number of hours worked	1	2	3	4	5
Extra curricular commitments	1	2	3	4	5
Demands of others	1	2	3	4	5
Meeting financial cost	1	2	3	4	5

Below is a list of factors which may act to either support or constrain your ability to meet the demands of trying to spend more time with family and/or friends. Please indicate on the scale the extent to which you feel each item either supports, constrains or neither supports or constrains your ability to meet the demands

	Supports		Neither supports or constrains		Constrains
Flexibility of work schedule	1	2	3	4	5
Proximity of work to home	1	2	3	4	5
Schedule of friends/family	1	2	3	4	5
Activities done by yourself and others	1	2	3	4	5
Previous experiences of spending time with family/friends	1	2	3	4	5
Knowledge of benefits of spending time with family/friends	1	2	3	4	5
Level of commitment	1	2	3	4	5
Level of motivation	1	2	3	4	5
Amount of enjoyment/satisfaction derived	1	2	3	4	5
Ability to make time to spend with family/friends	1	2	3	4	5

10. IMPROVE RELATIONSHIP WITH PARTNER

Below is a list of demands which you may have to respond to when you attempt to improve your relationship with your partner. Please indicate on the scale the extent to which you feel each item to be demanding.

	Not at all demanding		Mildly demanding		Highly demanding
Time	1	2	3	4	5
Work demands/hours	1	2	3	4	5
Your willingness to listen/understand	1	2	3	4	5
Demands of others	1	2	3	4	5
Their willingness to listen/understand	1	2	3	4	5
Existence of bad habits in relationship	1	2	3	4	5

Below is a list of supports/constraints which may affect your ability to meet the demands of improving work conditions. Please indicate on the scale whether you feel each item supports, constrains or neither supports or constrains your ability to meet those demands.

	Supports		Neither supports or constrains		Constrains
Quality of relationship	1	2	3	4	5
Your communication skills	1	2	3	4	5
Their communication skills	1	2	3	4	5
Flexibility of your schedule	1	2	3	4	5
Input/support from others	1	2	3	4	5
Previous attempts to improve relationship	1	2	3	4	5
Knowledge of how to improve relationship/ benefits of improved relationship	1	2	3	4	5
Level of commitment	1	2	3	4	5
Level of motivation	1	2	3	4	5
Amount of satisfaction/enjoyment derived	1	2	3	4	5
Ability to make improvements	1	2	3	4	5

11. TAKE ON MORE RESPONSIBILITY/WORK HARDER/GET A PROMOTION

Below is a list of demands which you may face when you attempt to take on more responsibility at work, work harder or get a promotion. Please indicate on the scale the extent to which you feel each item to be demanding.

	Not at all demanding		Mildly demanding		Highly demanding
Job pressureS	1	2	3	4	5
Having too much to do	1	2	3	4	5
having too little to do	1	2	3	4	5
Being responsible for people	1	2	3	4	5
Being responsible for equipment	1	2	3	4	5
Demands from others	1	2	3	4	5
Over-under promotion	1	2	3	4	5
Keeping up with others/organisations	1	2	3	4	5
Organisational climate	1	2	3	4	5
Office politics	1	2	3	4	5
Organisational structure	1	2	3	4	5
Organisational/job changes	1	2	3	4	5
Major decisions	1	2	3	4	5
Expectancies of others/organisations	1	2	3	4	5

Below is a list of factors which may serve to support or constrain your attempts to meet the demands. Please indicate on the scale the extent to which you feel each item either supports, constrains or neither supports or constrains your ability to meet the demands.

	Supports		Neither supports or constrains		Constrains
Job discretion, autonomy or control	1	2	3	4	5
Quality of relationship with boss	1	2	3	4	5
Quality of relationship with colleagues	1	2	3	4	5
Quality of relationship with subordinates	1	2	3	4	5
Union membership	1	2	3	4	5
Role ambiguity	1	2	3	4	5
Variety level/skill utilisation	1	2	3	4	5
Participation in decisions	1	2	3	4	5
Payment/reward systems	1	2	3	4	5
Quality of equipment	1	2	3	4	5
Physical working conditions	1	2	3	4	5
How work is planned/managed	1	2	3	4	5
Previous attempts to increase responsibility/ performance	1	2	3	4	5
Knowledge of methods/benefits	1	2	3	4	5
Level of commitment	1	2	3	4	5
Level of motivation	1	2	3	4	5
Amount of enjoyment/satisfaction derived	1	2	3	4	5
Ability to make improvements	1	2	3	4	5

13. CHANGE CAREER

Below is a list of demands which you may have to respond to when attempting to change your career. Please indicate on the scale the extent to which you feel each item is demanding.

	Not at all demanding		Mildly demanding		Highly demanding
Finding career to suit you	1	2	3	4	5
Developing the skills/experience etc.	1	2	3	4	5
Finding the opportunities	1	2	3	4	5
Demands from others	1	2	3	4	5
Adapting to new organisational climate/ structure	1	2	3	4	5
Adapting to new work politics	1	2	3	4	5
Adapting to new income	1	2	3	4	5

Below is a list of factors which may serve to support or constrain your ability to meet these demands. Please indicate on the scale the extent to which you feel each item either supports, constrains, or neither supports or constrains your ability to meet these demands.

	Supports		Neither supports or constrains		Constrains
Support from friends/family	1	2	3	4	5
Availability of new opportunities	1	2	3	4	5
Your mobility	1	2	3	4	5
The skills and experience you possess	1	2	3	4	5
Previous attempts to change your career	1	2	3	4	5
Knowledge of how to change your career/ benefits of changing career	1	2	3	4	5
Level of commitment	1	2	3	4	5
Level of motivation	1	2	3	4	5
Amount of enjoyment/satisfaction derived	1	2	3	4	5
Ability to change your career	1	2	3	4	5

SECTION 6

This section is for those who felt none of the projects listed in section were relevant to them. I am interested in why you were not interested in beginning any of these projects. Below is a list of reasons commonly cited for not adopting the above projects. Please tick those reasons that you feel apply to you. They are not specific to any particular project.

I cannot be bothered
Not enough time
My family takes up all my spare time
My friends take up all my spare time
The goals are not important to me
It is too much hassle
My friends/family are not interested in it
I am too lazy
My friends/family do not support me
I lack the confidence to do it
I work too many hours
I cannot commit to it
Work is too far from home
No facilities near by
I lack the energy to do it
I do not know how to go about beginning it
Poor quality facilities
I have already achieved all these goals
Too much equipment required
I cannot afford it
I am not capable of it
I lack the motivation
I do not need to achieve these goals
I do not enjoy it
I have several other ongoing projects
(please state what)

Other reasons
(please state) _____

_____

SECTION 7

In this final section, I am interested in investigating your own beliefs and attitude towards life in general. Below is a list of statements which I would like you to respond to by deciding whether you agree with each item. Please indicate on the scale whether you agree, disagree, or neither agree or disagree with each item. Your first reaction to each item is the one you should go with, do not think for too long.

	Strongly agree				Strongly disagree
Those who try their best will achieve the most.	1	2	3	4	5
Thinking positively will help to bring success.	1	2	3	4	5
It is difficult to overcome the circumstances into which one is born.	1	2	3	4	5
Individual ability can be developed through hard work.	1	2	3	4	5
Hard work is not enough.	1	2	3	4	5
Happiness is down to the individual, others cannot make it so.	1	2	3	4	5
Other people can have strong influences on one's life.	1	2	3	4	5
The successes in my life are the result of:					
hard work	1	2	3	4	5
my ability	1	2	3	4	5
easy goals	1	2	3	4	5
good luck	1	2	3	4	5
lots of help from others	1	2	3	4	5
The failures in my life are the result of:					
lack of hard work	1	2	3	4	5
lack of ability	1	2	3	4	5
having too difficult goals	1	2	3	4	5
bad luck	1	2	3	4	5
lack of help	1	2	3	4	5
I enjoy tackling complex problems	1	2	3	4	5
I enjoy trying to solve complex Problems	1	2	3	4	5

I want opportunities to increase my knowledge and skills.	1	2	3	4	5
Curiosity is the driving force behind much of what I do.	1	2	3	4	5
I want to find out how good I can be at work	1	2	3	4	5
I prefer to work things out for myself.	1	2	3	4	5
What matters most is that I enjoy what I do.	1	2	3	4	5
Outcome is not as important as having gained a new experience.	1	2	3	4	5
I prefer setting my own goals.	1	2	3	4	5
I prefer work which is totally absorbing.	1	2	3	4	5
I enjoy relatively simple straightforward tasks	1	2	3	4	5
I am motivated by the grades/money. I earn	1	2	3	4	5
I am keenly aware of the grade/money levels I want to achieve.	1	2	3	4	5
I enjoy being recognised for my achievements.	1	2	3	4	5
I seldom think about grades/salary and promotion.	1	2	3	4	5
To me success means doing better than others.	1	2	3	4	5
I have to feel that I am earning something for what I do.	1	2	3	4	5
I'm concerned about how others will react to my ideas.	1	2	3	4	5
I feel there is no point doing a good job if nobody knows about it.	1	2	3	4	5
I prefer working on projects with clearly specified procedures.	1	2	3	4	5
I'm less concerned with what work I do than what I get for it.	1	2	3	4	5
I am not concerned about what other	1	2	3	4	5

people think of my work.					
I prefer having someone set my goals for me.	1	2	3	4	5

THE FIT PROFILER

This section is concerned with how you might think and behave in any given circumstance. Please consider the following thoughts and behaviours and indicate the range that you might exhibit at any given time. This should be done in terms of what we call the comfort zone or the preferred zone. For example, you may do something under pressure from someone/something else which you would not ordinarily do and this may make you feel uncomfortable. If this is the case, you should not include it in your range.

Instructions for answering the questions

Use the following examples as a guide:

Should you feel that you generally show your feelings freely, you might indicate this by showing a narrow range:

1. Do you show your feelings **freely** **keep them to yourself?**

5 4 3 2 1 0 1 2 3 4 5
Freely Neither one or the other Keep to myself

Alternatively, you may feel that generally you are somewhere in the middle with the possibility of showing your feelings freely at times. In this case you may indicate this by showing the following range:

2. Do you show your feelings **freely** **keep them to yourself?**

5 4 3 **2 1 0** 1 2 3 4 5
Freely Neither one or the other Keep to myself

Another possibility is that you feel you shift around the middle point, so something like the following may be more appropriate:

3. Do you show your feelings **freely** **keep them to yourself?**

5 4 3 2 **1 0 1** 2 3 4 5
Freely Neither one or the other Keep to myself

You may show them freely at times and keep them to yourself at others. You might indicate this by using the whole range:

4. Do you show your feelings **freely** **keep them to yourself?**

5 4 3 2 1 0 1 2 3 4 5
Freely Neither one or the other Keep to myself

You may have no firm inclination but err towards showing your feelings sometimes as in the following:

5.	Do you show your feelings **freely** **keep them to yourself?**	**5 4 3 2 1 0 1 2 3 4 5** Freely Neither one or the other Keep to myself

You may indicate any range you wish. But remember that the range should only include those thoughts and behaviours which feel comfortable to you and by your own choosing. 0 will represent 'Neither one nor the other' for every question.

If you understand, please continue.

1 Do you behave in an assertive or unassertive manner?	**5 4 3 2 1 0 1 2 3 4 5** Unassertive Assertive
2 Does the thought of failure fill you with fear?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
3 Are you are forward looking person or a backward looking person?	**5 4 3 2 1 0 1 2 3 4 5** Backward looking Forward looking
4 Do you feel you have a choice in life or no choice at all?	**5 4 3 2 1 0 1 2 3 4 5** Always a choice Never a choice
5 When work is over can you relax?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
6 Do you have a conventional or unconventional manner?	**5 4 3 2 1 0 1 2 3 4 5** Conventional Unconventional
7 Do you think that moral and ethical standards have to be nevercompromised to achieve success?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No
8 Are you aware of what you are doing?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No

9 Do you generally feel apprehensive or confident?	**5 4 3 2 1 0 1 2 3 4 5** Apprehensive Confident
10 Do you believe it is important to develop a balance between work and home?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
11 Are you trusting or cautious of others?	**5 4 3 2 1 0 1 2 3 4 5** Trusting Cautious
12 Do you feel you have control over what happens to you?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
13 Do you find yourself worrying about personal matters whilst at work?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
14 Do you believe that people are essentially trustworthy?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
15 Would you consider yourself to be a predictable person?	**5 4 3 2 1 0 1 2 3 4 5** Yes, very No
16 Do you find yourself day dreaming?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
17 Do you feel apprehensive when you are the centre of attention?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
18 To what extent do you feel luck contributes to your success?	**5 4 3 2 1 0 1 2 3 4 5** A large extent Not at all

19 Are you a passionate or apathetic person?	**5 4 3 2 1 0 1 2 3 4 5** Very passionate Very apathetic
20 Are you a calm/relaxed or energetic/driven person?	**5 4 3 2 1 0 1 2 3 4 5** Calm/relaxed Energetic/driven
21 When you are at work do you wish you weren't?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
22 Do you find it easy to keep a secret/confidence?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
23 Do you monitor/analyse things you have done?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
24 Are you a reactive or proactive person?	**5 4 3 2 1 0 1 2 3 4 5** Very reactive Very proactive
25 Are you generally committed or uncommitted to the things you do?	**5 4 3 2 1 0 1 2 3 4 5** Highly committed uncommitted
26 Generally, do you do things because you think you can do them or must do them?	**5 4 3 2 1 0 1 2 3 4 5** Must do Can do
27 Do you meet difficult situations head on or try to avoid them?	**5 4 3 2 1 0 1 2 3 4 5** Head on Avoid
28 Do you believe you can change	**5 4 3 2 1 0 1 2 3 4 5**

the way you are?	Yes, greatly	No, not at all
29 How important do you believe it is to be alone?	**5 4 3 2 1 0 1 2 3 4 5** Very	Not at all
30 Are you group or individually orientated?	**5 4 3 2 1 0 1 2 3 4 5** Group	Individually
31 Do you find yourself rushing or can you find time for something else?	**5 4 3 2 1 0 1 2 3 4 5** Always rushing	Always find time
32 Do you think that moral and ethical standards should be upheld?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always	No never
33 Do you monitor/analyse the actions and words of others?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always	No never
34 Does putting forward an unpopular view worry you?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always	No never
35 Are you a risk taker or a cautious person?	**5 4 3 2 1 0 1 2 3 4 5** Risk taker	Cautious
36 Are you a caring or uncaring person?	**5 4 3 2 1 0 1 2 3 4 5**	

	Very caring Very uncaring
37 Do you feel in control?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
38 Does your personal life adversely affect your work life?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
39 Do you believe you have to tell lies to be successful?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
40 Do you behave as you wish or as others expect?	**5 4 3 2 1 0 1 2 3 4 5** As I wish As expected
41 Are you always clear as to why you did something or are you often surprised with yourself?	**5 4 3 2 1 0 1 2 3 4 5** Always clear Often surprised
42 Does the fear of rejection stop you from doing things you want to do?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
43 To what extent do you take charge of your life?	**5 4 3 2 1 0 1 2 3 4 5** A large extent Not at all
44 Are you a spontaneous or systematic person?	**5 4 3 2 1 0 1 2 3 4 5** Spontaneous Systematic
45 When you are work is your mind on other things?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
46 Are you a decisive or indecisive person?	**5 4 3 2 1 0 1 2 3 4 5**

	Very decisive Very indecisive
47 Do you feel that adherence to moral and ethical standards will inhibit your professional development?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
48 Do you find it difficult to attend to more than one thing at a time?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
49 Are you a single-minded or open-minded person?	**5 4 3 2 1 0 1 2 3 4 5** Single-minded Open-minded
50 Are you a confident or cocky person?	**5 4 3 2 1 0 1 2 3 4 5** Very confident Very cocky
51 Is there a fearful feeling at the back of your mind?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
52 Do you have feelings of guilt about the things you have said and done?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
53 When you are away from people you care about do you miss them?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
54 Are you an introverted or extroverted person?	**5 4 3 2 1 0 1 2 3 4 5** Very introverted Very extroverted
55 When told someone's name do you forget it Instantly?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
56 Do feelings of insecurity make you fearful?	**5 4 3 2 1 0 1 2 3 4 5**

Yes, always No never

57 Are you able to control any angry feelings you might have?
5 4 3 2 1 0 1 2 3 4 5
Yes, always No never

58 Are you a definite or flexible person?
5 4 3 2 1 0 1 2 3 4 5
Very definite Very flexible

59 Are you a domineering person or a humble person?
5 4 3 2 1 0 1 2 3 4 5
Very domineering Very humble

60 Do you feel that your home life should take precedence over your work life?
5 4 3 2 1 0 1 2 3 4 5
Yes, always No never

61 Do you think honesty is the best policy?
5 4 3 2 1 0 1 2 3 4 5
Yes, always No never

62 Do you have to read something more than once to fully take it in?
5 4 3 2 1 0 1 2 3 4 5
Yes, always No never

63 Would you consider yourself to be a firm or gentle person?
5 4 3 2 1 0 1 2 3 4 5
Very firm Very gentle

64 Do you think it is possible to be ethical/moral and successful?
5 4 3 2 1 0 1 2 3 4 5
Very much so No, never

65 Are you an aggressive or unaggressive person?
5 4 3 2 1 0 1 2 3 4 5
Very aggressive Very un-aggressive

66 How often do you bump into things?
5 4 3 2 1 0 1 2 3 4 5
Very often Never

67 Do you think that work should take precedence over your home life?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
68 Would you consider yourself to be a lively person?	**5 4 3 2 1 0 1 2 3 4 5** Very lively Not lively
69 Do fearful feelings stop you from doing what you want?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
70 Do you take responsibility for what happens to you?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
71 Do you feel that there is a fuzzy line between right and wrong?	**5 4 3 2 1 0 1 2 3 4 5** Very fuzzy Not fuzzy at all
72 How often do you forget appointments?	**5 4 3 2 1 0 1 2 3 4 5** Very often Never
73 Would you consider doing something unethical or immoral if you could see a successful outcome?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
74 Does entering new situations and meeting new people worry you?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never
75 Do you believe that being in the right place at the right time is luck?	**5 4 3 2 1 0 1 2 3 4 5** Yes, always No never

Below are a number of statements which refer to thoughts and feelings. Consider each one in turn. Please say how often each one applies to you over the last few weeks, by circling the appropriate category.

1.Feelings of sadness in the morning.	Never	Very rarely	Now and again	Often frequently
2.Finding it difficult to think on the spot and concentrate.	Never	Very rarely	Now and again	Often
3. Feeling low and wanting to give up trying.	Never	Very rarely	Now and again	Often
4.Feeling as if you are 'falling apart at the seems' but unsure why	Never	Very rarely	Now and again	Often
5. Lack of interest /enjoyment in food	Never	Very rarely	Now and again	Often
6. Feeling uneasy and needing to escape	Never	Very rarely	Now and again	Often
7. Feeling life is too difficult to cope with.	Never	Very rarely	Now and again	Often
8. Worrying about things which causes feelings of tension and strain.	Never	Very rarely	Now and again	Often

Appendix Three: Pearson Correlation Coefficients For FIT, LOC and Well Being

	Overall FIT score	Behavioural flexibility	Integrity	Awareness	Balance	Conscience	Fearlessness	Self-responsibility	Internal loc	External loc	Anxiety	Depression
Overall FIT Score	1											
Behavioural Flexibility	.966(**)	1										
Integrity	.377(**)	.208(*)	1									
Awareness	.243(*)	.096	.709(**)	1								
Balance	.367(**)	.253(**)	.696(**)	.413(**)	1							
Conscience	.077	-.019	.611(**)	.344(**)	.295(**)	1						
Fearlessness	.347(**)	.231(*)	.756(**)	.392(**)	.410(**)	.162(*)	1					
Self-responsibilit	.323(**)	.180	.799(**)	.540(**)	.438(**)	.340(**)	.595(**)	1				
Internal LOC	-.196(*)	-.134	-.264(**)	-.170(*)	-.202(*)	-.198(*)	-.124	-.277(**)	1			
External LOC	-.091	-.099	.159(*)	.009	.095	.147	.160	.113	-.118	1		
Anxiety	-.123	-.050	-.502(**)	-.280(**)	-.323(**)	-.157	-.558(**)	-.423(**)	.087	-.071	1	
Depression	-.108	-.068	-.345(**)	-.133	-.305(**)	-.020	-.435(**)	-.292(**)	.107	.036	.769(**)	1

** Correlation is significant at the 0.01 level (1-tailed).

* Correlation is significant at the 0.05 level (1-tailed).

Appendix Four. Multiple regression of FIT variables onto Anxiety

Descriptive Statistics

	Mean	Std. Deviation	N
anxiety	9.4587	2.42110	109
awareness	6.0720	1.01319	109
balance	5.6321	1.16785	109
fear	5.2619	1.71316	109
responsibility	6.3028	1.09646	109

Correlations

		anxiety	awareness	balance	fear	responsibility
Pearson Correlation	anxiety	1.000	-.280	-.323	-.558	-.423
	awareness	-.280	1.000	.413	.392	.540
	balance	-.323	.413	1.000	.410	.438
	fear	-.558	.392	.410	1.000	.595
	responsibility	-.423	.540	.438	.595	1.000
Sig. (1-tailed)	anxiety	.	.002	.000	.000	.000
	awareness	.002	.	.000	.000	.000
	balance	.000	.000	.	.000	.000
	fear	.000	.000	.000	.	.000
	responsibility	.000	.000	.000	.000	.
N	anxiety	109	109	109	109	109
	awareness	109	109	109	109	109
	balance	109	109	109	109	109
	fear	109	109	109	109	109
	responsibility	109	109	109	109	109

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	responsibility, balance, awareness, fear[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: anxiety

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.574[a]	.330	.304	2.01981	.330	12.794	4	104	.000

a. Predictors: (Constant), responsibility, balance, awareness, fear

b. Dependent Variable: anxiety

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	208.782	4	52.195	12.794	.000[a]
	Residual	424.282	104	4.080		
	Total	633.064	108			

a. Predictors: (Constant), responsibility, balance, awareness, fear

b. Dependent Variable: anxiety

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	15.480	1.381		11.212	.000	12.742	18.218		
	awareness	-.013	.235	-.005	-.056	.956	-.479	.452	.668	1.498
	balance	-.177	.194	-.085	-.911	.364	-.561	.208	.737	1.357
	fear	-.641	.145	-.453	-4.431	.000	-.927	-.354	.616	1.624
	responsibility	-.250	.246	-.113	-1.018	.311	-.737	.237	.521	1.920

a. Dependent Variable: anxiety

Coefficient Correlations[a]

Model			responsibility	balance	awareness	fear
1	Correlations	responsibility	1.000	-.161	-.364	-.450
		balance	-.161	1.000	-.218	-.188
		awareness	-.364	-.218	1.000	-.059
		fear	-.450	-.188	-.059	1.000
	Covariances	responsibility	.060	-.008	-.021	-.016
		balance	-.008	.038	-.010	-.005
		awareness	-.021	-.010	.055	-.002
		fear	-.016	-.005	-.002	.021

a. Dependent Variable: anxiety

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions				
				(Constant)	awareness	balance	fear	responsibility
1	1	4.894	1.000	.00	.00	.00	.00	.00
	2	.058	9.166	.05	.02	.02	.76	.00
	3	.024	14.429	.06	.07	.97	.00	.05
	4	.013	19.311	.73	.69	.00	.04	.00
	5	.012	20.613	.16	.23	.00	.20	.95

a. Dependent Variable: anxiety

Casewise Diagnostics[a]

Case Number	Std. Residual	anxiety	Predicted Value	Residual
8	2.135	14.00	9.6876	4.31244
45	2.621	14.00	8.7066	5.29345
80	-2.340	5.00	9.7272	-4.72719
91	2.236	14.00	9.4843	4.51565
92	2.617	13.00	7.7139	5.28606
97	-2.313	5.00	9.6710	-4.67097

a. Dependent Variable: anxiety

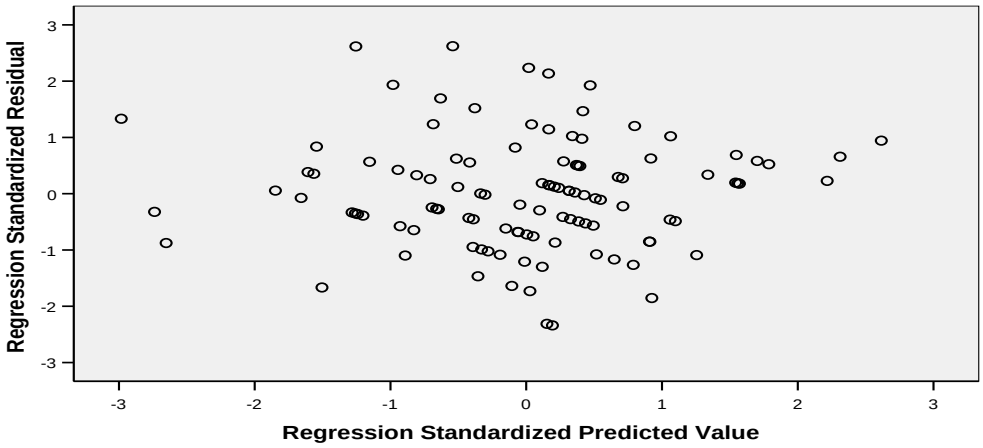
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	5.3111	13.0953	9.4587	1.39038	109
Residual	-4.72719	5.29345	.00000	1.98205	109
Std. Predicted Value	-2.983	2.616	.000	1.000	109
Std. Residual	-2.340	2.621	.000	.981	109

a. Dependent Variable: anxiety

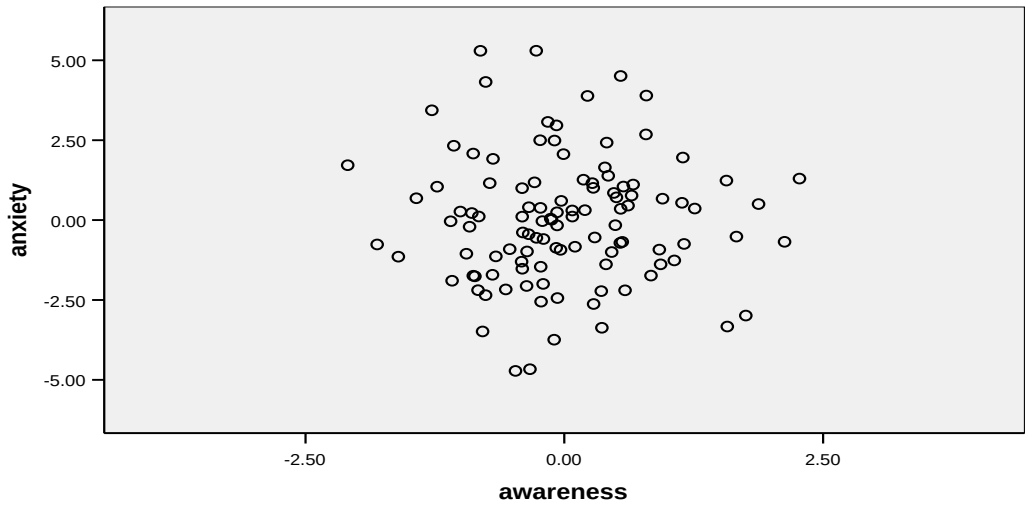
Scatterplot

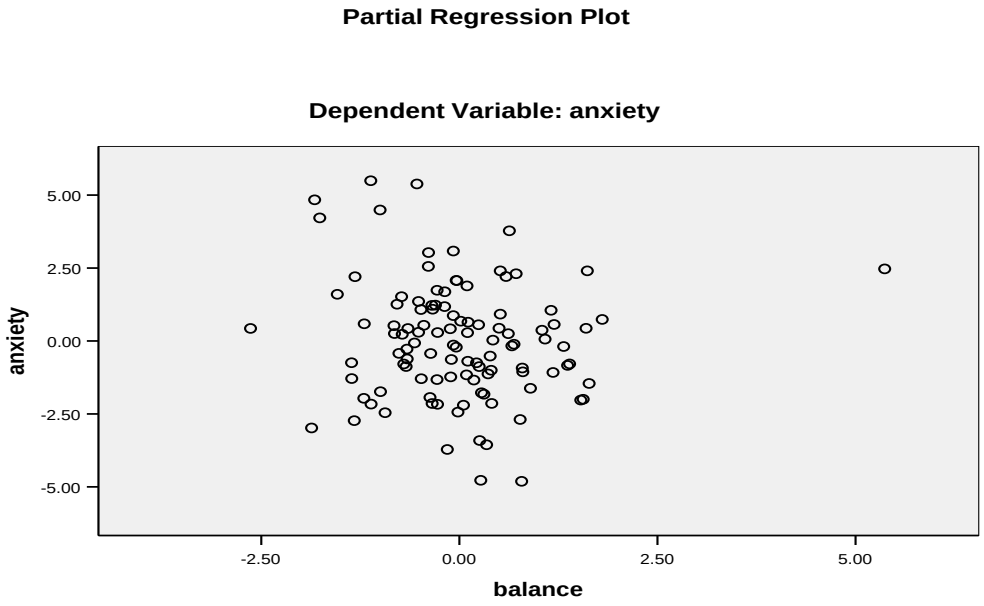
Dependent Variable: anxiety

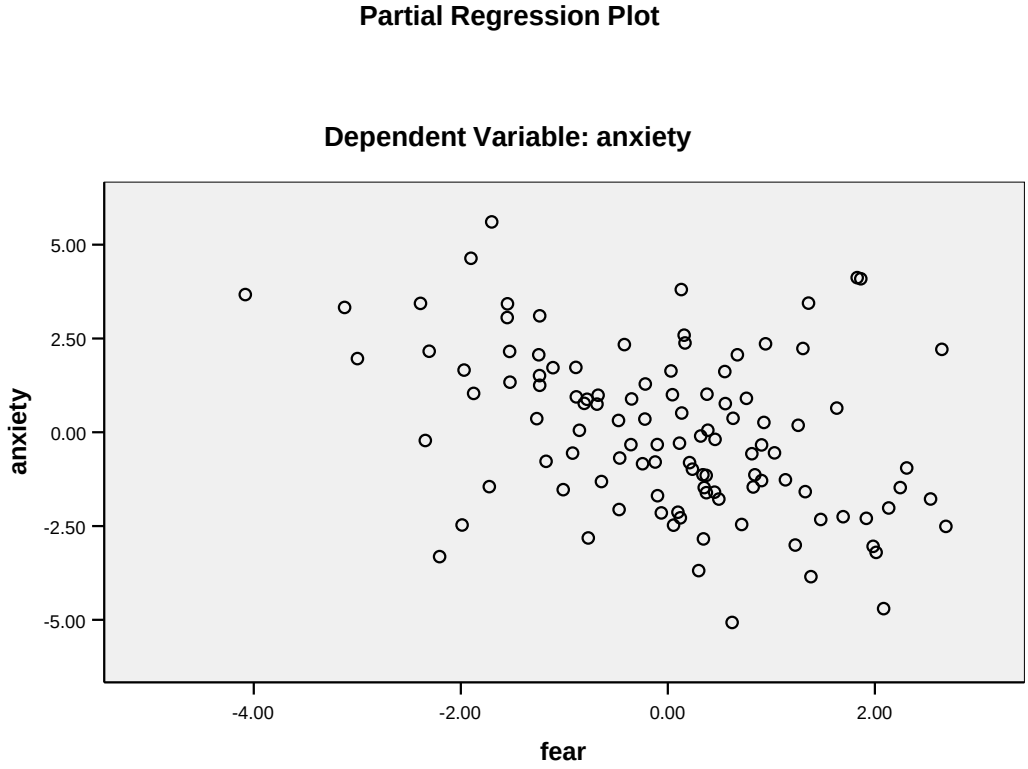


Partial Regression Plot

Dependent Variable: anxiety

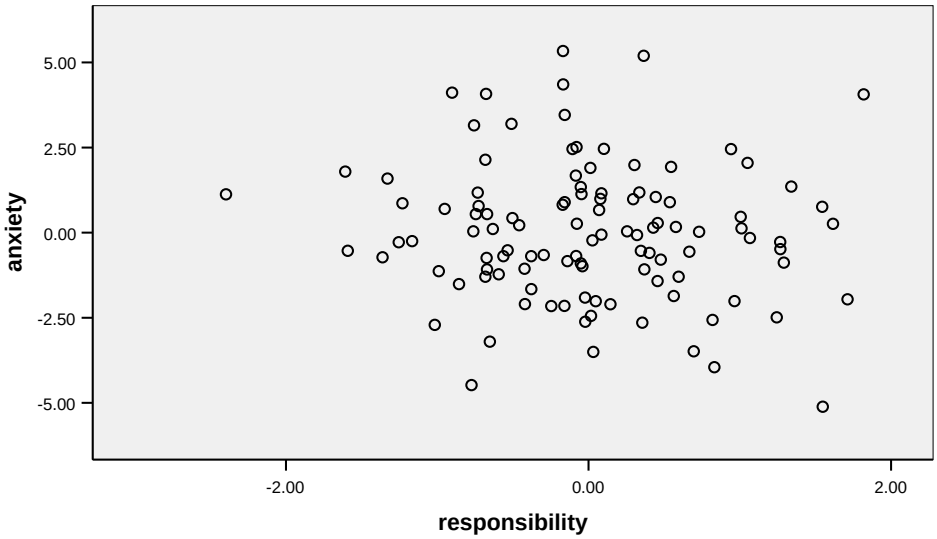






Partial Regression Plot

Dependent Variable: anxiety



Appendix Five. Multiple regression of FIT variables onto Depression

Descriptive Statistics

	Mean	Std. Deviation	N
depression	7.9817	2.60691	109
balance	5.6321	1.16785	109
fear	5.2619	1.71316	109
responsibility	6.3028	1.09646	109

Correlations

		depression	balance	fear	responsibility
Pearson Correlation	depression	1.000	-.305	-.435	-.292
	balance	-.305	1.000	.410	.438
	fear	-.435	.410	1.000	.595
	responsibility	-.292	.438	.595	1.000
Sig. (1-tailed)	depression	.	.001	.000	.001
	balance	.001	.	.000	.000
	fear	.000	.000	.	.000
	responsibility	.001	.000	.000	.
N	depression	109	109	109	109
	balance	109	109	109	109
	fear	109	109	109	109
	responsibility	109	109	109	109

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	responsibility, balance, fear[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: depression

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.456[a]	.208	.186	2.35267	.208	9.201	3	105	.000

a. Predictors: (Constant), responsibility, balance, fear

b. Dependent Variable: depression

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	152.781	3	50.927	9.201	.000[a]
	Residual	581.182	105	5.535		
	Total	733.963	108			

a. Predictors: (Constant), responsibility, balance, fear

b. Dependent Variable: depression

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	12.927	1.460		8.855	.000	10.033	15.822		
	balance	-.337	.220	-.151	-1.530	.129	-.774	.100	.774	1.292
	fear	-.561	.168	-.369	-3.340	.001	-.895	-.228	.618	1.618
	responsibility	-.015	.266	-.006	-.056	.956	-.543	.514	.600	1.666

a. Dependent Variable: depression

Coefficient Correlations[a]

Model			responsibility	balance	fear
1	Correlations	responsibility	1.000	-.265	-.507
		balance	-.265	1.000	-.206
		fear	-.507	-.206	1.000
	Covariances	responsibility	.071	-.016	-.023
		balance	-.016	.049	-.008
		fear	-.023	-.008	.028

a. Dependent Variable: depression

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	balance	fear	responsibility
1	1	3.911	1.000	.00	.00	.00	.00
	2	.055	8.441	.09	.05	.76	.00
	3	.022	13.284	.22	.95	.00	.11
	4	.012	18.152	.69	.00	.24	.89

a. Dependent Variable: depression

Casewise Diagnostics[a]

Case Number	Std. Residual	depression	Predicted Value	Residual
45	3.190	15.00	7.4949	7.50514
53	-2.141	4.00	9.0382	-5.03815
72	2.010	12.00	7.2710	4.72901
76	2.114	12.00	7.0274	4.97257
91	2.283	14.00	8.6282	5.37178

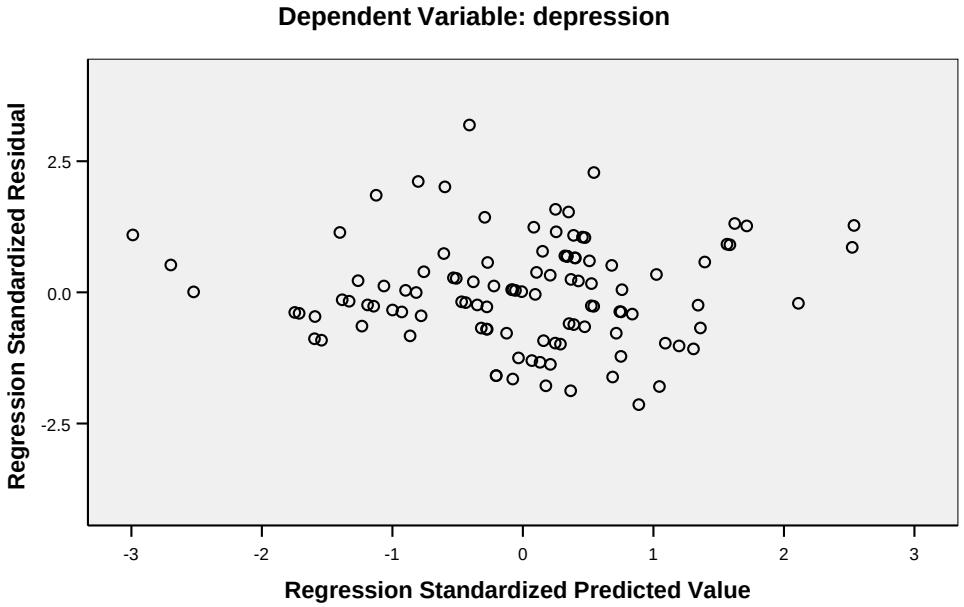
a. Dependent Variable: depression

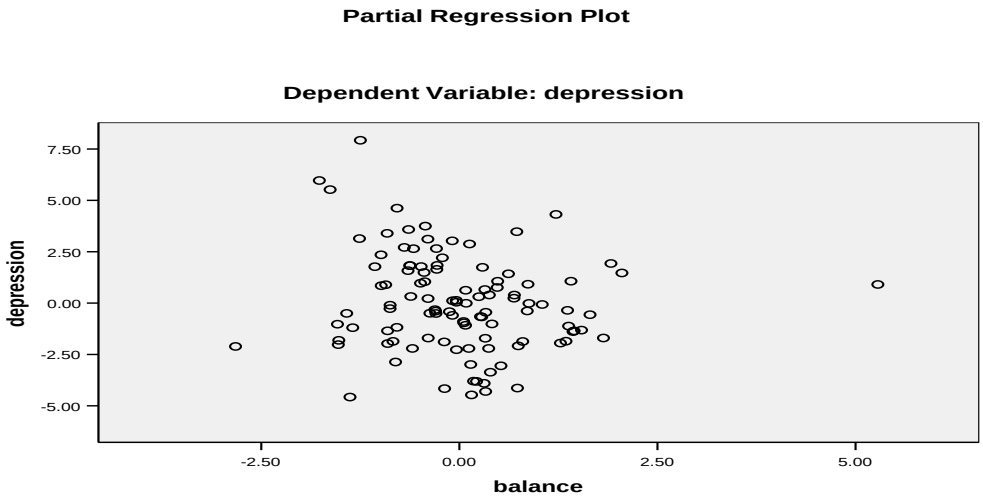
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.4265	10.9990	7.9817	1.18939	109
Residual	-5.03815	7.50514	.00000	2.31977	109
Std. Predicted Value	-2.989	2.537	.000	1.000	109
Std. Residual	-2.141	3.190	.000	.986	109

a. Dependent Variable: depression

Scatterplot





Appendix Six: Pearson Correlation Coefficients For FIT and Work Demand Factors

		1	2	3	4	5	6	7	8	9	10	11	12
1.	Overall FIT score	1			.								
2.	Behavioural Flexibility	.966(**)	1										
3.	Integrity	.377(**)	.208(*)	1									
4.	Awareness	.243(**)	.096	.709(**)	1		.						
5.	Balance	.367(**)	.253(**)	.696(**)	.413(**)	1		.					
6.	Conscience	.077	-.019	.611(**)	.344(**)	.295(**)	1						
7.	Fearlessness	.347(**)	.231(**)	.756(**)	.392(**)	.410(**)	.162(*)	1					
8.	Self-Responsibility	.323(**)	.180(*)	.799(**)	.540(**)	.438(**)	.340(**)	.595(**)	1		.		
9.	Work demands factor 1 Organisational aspects	.100	.090	.011	.054	-.018	-.103	.083	.026	1			
10.	Work demands factor 2 Pressures	-.065	-.096	.048	-.015	.056	.127	-.009	.002	.000	1		
11.	Work demands factor 3 Competition	-.317(**)	-.326(**)	.035	.070	-.054	.005	-.005	.141	.000	.000	1	
12.	Work demands factor 4 Responsibility	-.058	-.019	-.243(**)	-.318(**)	-.089	-.026	-.229(**)	-.237(**)	.000	.000	.000	1

** Correlation is significant at the 0.01 level (1-tailed).

* Correlation is significant at the 0.05 level (1-tailed).

Appendix Seven: Questionnaire To Assess Theory of Planned Behaviour Variables For Six Health Behaviours

This questionnaire is concerned with how you might think and behave with respect to six different health behaviours. Please consider the following thoughts and behaviours and indicate on the scale (by circling) the number which best represents how you feel.

Part One : Behavioural Intentions

I intend to keep my daily calorie in take under the recommended limit for the next week
Definitely do not 1 2 3 4 5 6 7 Definitely Do

I plan to keep my daily calorie in take under the recommended limit for the next week
Definitely do not 1 2 3 4 5 6 7 Definitely Do

I intend to eat five portions of fruit/vegetables every day for the next week
Definitely do not 1 2 3 4 5 6 7 Definitely Do

I plan to eat five portions of fruit/vegetables every day for the next week.
Definitely do not 1 2 3 4 5 6 7 Definitely Do

I intend to eat high fibre foods every day for the next week
Definitely do not 1 2 3 4 5 6 7 Definitely Do

I plan to eat high fibre foods every day for the next week.
Definitely do not 1 2 3 4 5 6 7 Definitely Do

I intend to avoid fatty/fried foods for the next week
Definitely do not 1 2 3 4 5 6 7 Definitely Do

I plan to avoid fatty/fried foods for the next week.
Definitely do not 1 2 3 4 5 6 7 Definitely Do

I intend to avoid junk/processed food for the next week
Definitely do not 1 2 3 4 5 6 7 Definitely Do

I plan to avoid junk/processed food for the next week.
Definitely do not 1 2 3 4 5 6 7 Definitely Do

I intend to exercise at least three times this week
Definitely do not 1 2 3 4 5 6 7 Definitely Do

I plan to exercise at least three times this week
Definitely do not 1 2 3 4 5 6 7 Definitely Do

b). Desire

I would like to keep my daily calorie in take to under the recommended limit
Definitely do not 1 2 3 4 5 6 7 Definitely Do

I want to keep my daily calorie in take to under the recommended limit
Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I would like to eat five portions of fruit/vegetables every day for the next week
Definitely do not 1 2 3 4 5 6 7 Definitely Do

I want to eat five portions of fruit/vegetables every day for the next week
Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I would like to eat high fibre foods every day for the next week
Definitely do not 1 2 3 4 5 6 7 Definitely Do

I want to eat high fibre foods every day for the next week
Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I would like to avoid fatty/fried foods for the next week
Definitely do not 1 2 3 4 5 6 7 Definitely Do

I want to avoid fatty/fried foods for the next week
Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I would like to avoid junk/processed food for the next week
Definitely do not 1 2 3 4 5 6 7 Definitely Do

I want to avoid junk/processed food for the next week
Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I would like to exercise at least three times this week
Definitely do not 1 2 3 4 5 6 7 Definitely Do

I want to exercise at least three times this week
Strongly disagree 1 2 3 4 5 6 7 Strongly agree

c). Expectations

I expect to eat five portions of fruit/vegetables every day for the next week
Unlikely 1 2 3 4 5 6 7 Likely

How likely is it that you will eat five portions of fruit/vegetables every day for the next week?
Unlikely 1 2 3 4 5 6 7 Likely

I expect to eat high fibre foods every day for the next week
Unlikely 1 2 3 4 5 6 7 Likely

How likely is it that you will eat high fibre foods every day for the next week?
Unlikely 1 2 3 4 5 6 7 Likely

I expect to avoid fatty/fried foods for the next week
Unlikely 1 2 3 4 5 6 7 Likely

How likely is it that you will avoid fatty/fried foods for the next week?
Unlikely 1 2 3 4 5 6 7 Likely

I expect to avoid junk/processed food for the next week
Unlikely 1 2 3 4 5 6 7 Likely

How likely is it that you will avoid junk/processed food for the next week?
Unlikely 1 2 3 4 5 6 7 Likely

I expect to exercise at least three times this week
Unlikely 1 2 3 4 5 6 7 Likely

How likely is it that you will exercise at least three times this week?
Unlikely 1 2 3 4 5 6 7 Likely

Part two: Attitudes

My keeping my calorie in take to under the recommended limit would be:

a. Bad 1 2 3 4 5 6 7 Good

b. Harmful 1 2 3 4 5 6 7 Beneficial

c. Unpleasant 1 2 3 4 5 6 7 Pleasant

d. Unenjoyable 1 2 3 4 5 6 7 Enjoyable

e. Foolish 1 2 3 4 5 6 7 Wise

My eating five portions of fruit/vegetables every day for the next week would be:

a.	Bad	1	2	3	4	5	6	7	Good
b.	Harmful	1	2	3	4	5	6	7	Beneficial
c.	Unpleasant	1	2	3	4	5	6	7	Pleasant
d.	Unenjoyable	1	2	3	4	5	6	7	Enjoyable
e.	Foolish	1	2	3	4	5	6	7	Wise

My eating foods high in fibre every day for the next week would be:

a.	Bad	1	2	3	4	5	6	7	Good
b.	Harmful	1	2	3	4	5	6	7	Beneficial
c.	Unpleasant	1	2	3	4	5	6	7	Pleasant
d.	Unenjoyable	1	2	3	4	5	6	7	Enjoyable
e.	Foolish	1	2	3	4	5	6	7	Wise

My avoiding fatty/fried foods for the next week would be:

a.	Bad	1	2	3	4	5	6	7	Good
b.	Harmful	1	2	3	4	5	6	7	Beneficial
c.	Unpleasant	1	2	3	4	5	6	7	Pleasant
d.	Unenjoyable	1	2	3	4	5	6	7	Enjoyable
e.	Foolish	1	2	3	4	5	6	7	Wise

My avoiding eating junk/processed foods for the next week would be:

a.	Bad	1	2	3	4	5	6	7	Good
b.	Harmful	1	2	3	4	5	6	7	Beneficial
c.	Unpleasant	1	2	3	4	5	6	7	Pleasant
d.	Unenjoyable	1	2	3	4	5	6	7	Enjoyable
e.	Foolish	1	2	3	4	5	6	7	Wise

My exercising at least three times this week would be:

a.	Bad	1	2	3	4	5	6	7	Good
b.	Harmful	1	2	3	4	5	6	7	Beneficial
c.	Unpleasant	1	2	3	4	5	6	7	Pleasant
d.	Unenjoyable	1	2	3	4	5	6	7	Enjoyable
e.	Foolish	1	2	3	4	5	6	7	Wise

Part three: Subjective Norms

People who are important to me think I should keep my daily calorie in take under the recommended limit for the next week

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

People who are important to me think I should eat five portions of fruit/vegetables every day for the next week

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

People who are important to me think I should eat high fibre foods every day for the next week

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

People who are important to me think I should avoid eating fatty/fried foods for the next week

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

People who are important to me think I should avoid eating junk/processed foods for the next week

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

People who are important to me think I should exercise at least three times over the next week

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

Part Four: Perceived Behavioural Control

How much control do you feel you have over keeping your daily calorie in take to under the recommended limit for the next week

No control 1 2 3 4 5 6 7 Complete control

Whether I keep my daily calorie in take to under the recommended limit for the next week is entirely up to me

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

For me to keep my daily calorie in take to under the recommended limit for the next week would be

Difficult 1 2 3 4 5 6 7 Easy

How much control do you feel you have over eating five portions of fruit/vegetables every day for the next week?

No control 1 2 3 4 5 6 7 Complete control

Whether I eat five portions of fruit/vegetables every day for the next week is entirely up to me

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

For me to eat five portions of fruit/vegetables every day for the next week would be
Difficult 1 2 3 4 5 6 7 Easy

How much control do you feel you have over eating high fibre foods every day for the next week?
No control 1 2 3 4 5 6 7 Complete control

Whether I eat high fibre foods every day for the next week is entirely up to me
Strongly disagree 1 2 3 4 5 6 7 Strongly agree

For me to eat high fibre foods every day for the next week would be
Difficult 1 2 3 4 5 6 7 Easy

How much control do you feel you have over avoiding fatty/fried foods for the next week?
No control 1 2 3 4 5 6 7 Complete control

Whether I avoid fatty/fried foods for the next week is entirely up to me
Strongly disagree 1 2 3 4 5 6 7 Strongly agree

For me to avoid fatty/fried foods for the next week would be
Difficult 1 2 3 4 5 6 7 Easy

How much control do you feel you have over avoiding junk/processed food for the next week?
No control 1 2 3 4 5 6 7 Complete control

Whether I avoid junk/processed food for the next week is entirely up to me
Strongly disagree 1 2 3 4 5 6 7 Strongly agree

For me to avoid junk/processed food for the next week would be
Difficult 1 2 3 4 5 6 7 Easy

How much control do you feel you have over exercising at least three times over the next week?
No control 1 2 3 4 5 6 7 Complete control

Whether I exercise at least three times over the next week is entirely up to me
Strongly disagree 1 2 3 4 5 6 7 Strongly agree

For me to exercise at least three times over the next week would be
Difficult 1 2 3 4 5 6 7 Easy

Thank you for taking the time to complete this questionnaire.

Appendix Eight: Do Something Different Programme Instructions and Scoring

The first step in the DSD programme is to measure your behavioural flexibility and increase awareness of how you behave within important relationships and weight related situations. There are two scoring sheets attached for you to work through during the induction session. Please read the instructions carefully and feel free to ask any questions you need to.

Behavioural Flexibility Scoring - Part A - Relationships

This section is designed to measure how flexible your behaviour is within 6 relationships which are of importance to you. You choose which six. Some examples are your boss, your colleagues, people who report to you, your partner, your best friend, your children, people you don't know and so on. At the top of each scoring page, write the relationship name in the space provided, e.g. partner.

Behavioural Flexibility within the FIT profiler is measured on 15 behavioural dimensions listed below:

16. Unassertive - Assertive
17. Trusting of others – Cautious of others
18. Calm/relaxed – Energetic/driven
19. Reactive - Proactive
20. Flexible - Definite
21. Outer-directed – Inner-directed
22. Risky – Cautious
23. Behave as I wish – Behave as expected
24. Spontaneous - Systematic
25. Single-minded – Open-minded
26. conventional - Unconventional
27. Individually-centred – Group-centred
28. Firm – Gentle
29. Introverted – Extroverted
30. Lively – Not lively

In the coming pages, you will be asked to rate your behaviour within each of your chosen relationships, according to the above dimensions. The scales will be the same as the ones used in the FIT profiler, which will allow you to see if your behaviour tends in one specific direction and how wide its range is.

The first thing to do is to record your behavioural range on the scale provided.

Once you have completed this for each of the 15 dimensions, you must then look at the POLARITY for each dimension. Polarity refers to whether your behaviour tends in one direction. If you have recorded a range which does not span the '0' point in the middle, then your range has polarity, either to the LEFT of the '0' or to the RIGHT. If it does cross the '0' point then your behaviour does not have any polarity and you should leave that blank. Otherwise, right in an L or an R, according to which direction you rated your behaviour.

Next you must record your behavioural range for each dimension – this is the spread between your scores for each behaviour, for example if you have recorded a range from 5 through 0 to 5, then your range is 10. If there is no range, i.e. you have circled just one number, then you must record 0.

Once you have calculated both the range and the polarity, copy them both into the appropriate boxes in the Total Dimension Score Table at the end. Please ensure the numbers are in the right position.

Next you should add the individual ranges and insert the total in the appropriate boxes (down and across).

Finally, you should rate each how 'successful' you think each relationship is, for you and the other. The way you interpret or define 'success' is up to you. Score this success indicator on a 1-100 percent scale where higher percentages are more successful.

Relationship 1 : _____

Please consider the way that you behave in your interactions with the person named above. Under Polarity record either an L or an R depending on the polarity of your response. If your response spanned the 0, then there is no polarity and you should write in n/a. Then record the range of your response, e.g. if you response ranges from 5 through to the other 5, then your range is 10. Put 0 if you only circled one number

			Polarity L R	Range
a)	5 4 3 2 1 0 1 2 3 4 5 Unassertive neither one or the other Assertive			
b).	5 4 3 2 1 0 1 2 3 4 5 Trusting Of others neither one or the other Cautious of others		_____	_____
c).	5 4 3 2 1 0 1 2 3 4 5 Calm/ Relaxed neither one or the other Energetic/ Driven		_____	_____
d).	5 4 3 2 1 0 1 2 3 4 5 Reactive neither one or the other Proactive		_____	_____
e).	5 4 3 2 1 0 1 2 3 4 5 Definite neither one or the other Flexible		_____	_____
f).	5 4 3 2 1 0 1 2 3 4 5 Outer-directed neither one or the other Inner-directed		_____	_____
g)	5 4 3 2 1 0 1 2 3 4 5 Risky neither one or the other Cautious		_____	_____
h).	5 4 3 2 1 0 1 2 3 4 5 Behave as expected neither one or the other Behave as I wish		_____	_____
i).	5 4 3 2 1 0 1 2 3 4 5 Spontaneous neither one or the other Systematic		_____	_____
j).	5 4 3 2 1 0 1 2 3 4 5 Single-minded neither one or the other Open-minded		_____	_____
k).	5 4 3 2 1 0 1 2 3 4 5 Conventional neither one or the other Unconventional		_____	_____
l).	5 4 3 2 1 0 1 2 3 4 5 Individually-centred neither one or the other Group-centred		_____	_____

m). 5 4 3 2 1 0 1 2 3 4 5 _____ _____
Firm neither one or the other Gentle

n). 5 4 3 2 1 0 1 2 3 4 5 _____ _____
Introverted neither one or the other Extroverted

o). 5 4 3 2 1 0 1 2 3 4 5 _____ _____
Lively neither one or the other Not lively

Relationship 2 : _____

Please consider the way that you behave in your interactions with the person named above. Under Polarity record either an L or an R depending on the polarity of your response. If your response spanned the 0, then there is no polarity and you should write in n/a. Then record the range of your response, e.g. if you response ranges from 5 through to the other 5, then your range is 10. Put 0 if you only circled one number

			Polarity L R	Range
b)	5 4 3 2 1 0 1 2 3 4 5 Unassertive neither one or the other Assertive			
b).	5 4 3 2 1 0 1 2 3 4 5 Trusting Of others neither one or the other Cautious of others		_____	_____
c).	5 4 3 2 1 0 1 2 3 4 5 Calm/ Relaxed neither one or the other Energetic/ Driven		_____	_____
d).	5 4 3 2 1 0 1 2 3 4 5 Reactive neither one or the other Proactive		_____	_____
e).	5 4 3 2 1 0 1 2 3 4 5 Definite neither one or the other Flexible		_____	_____
f).	5 4 3 2 1 0 1 2 3 4 5 Outer-directed neither one or the other Inner-directed		_____	_____
h)	5 4 3 2 1 0 1 2 3 4 5 Risky neither one or the other Cautious		_____	_____
h).	5 4 3 2 1 0 1 2 3 4 5 Behave as expected neither one or the other Behave as I wish		_____	_____
i).	5 4 3 2 1 0 1 2 3 4 5 Spontaneous neither one or the other Systematic		_____	_____
j).	5 4 3 2 1 0 1 2 3 4 5 Single-minded neither one or the other Open-minded		_____	_____
k).	5 4 3 2 1 0 1 2 3 4 5 Conventional neither one or the other Unconventional		_____	_____
l).	5 4 3 2 1 0 1 2 3 4 5 Individually-centred neither one or the other Group-centred		_____	_____

m). 5 4 3 2 1 0 1 2 3 4 5 _____ _____
Firm neither one or the other Gentle

n). 5 4 3 2 1 0 1 2 3 4 5 _____ _____
Introverted neither one or the other Extroverted

o). 5 4 3 2 1 0 1 2 3 4 5 _____ _____
Lively neither one or the other Not lively

Relationship 3 : _____

Please consider the way that you behave in your interactions with the person named above. Under Polarity record either an L or an R depending on the polarity of your response. If your response spanned the 0, then there is no polarity and you should write in n/a. Then record the range of your response, e.g. if you response ranges from 5 through to the other 5, then your range is 10. Put 0 if you only circled one number

			Polarity	Range
			L R	
c)	5 4 3 2 1 0 1 2 3 4 5 Unassertive neither one or the other Assertive			
b).	5 4 3 2 1 0 1 2 3 4 5 Trusting Of others neither one or the other Cautious of others		_____	_____
c).	5 4 3 2 1 0 1 2 3 4 5 Calm/ Relaxed neither one or the other Energetic/ Driven		_____	_____
d).	5 4 3 2 1 0 1 2 3 4 5 Reactive neither one or the other Proactive		_____	_____
e).	5 4 3 2 1 0 1 2 3 4 5 Definite neither one or the other Flexible		_____	_____
f).	5 4 3 2 1 0 1 2 3 4 5 Outer-directed neither one or the other Inner-directed		_____	_____
i)	5 4 3 2 1 0 1 2 3 4 5 Risky neither one or the other Cautious		_____	_____
h).	5 4 3 2 1 0 1 2 3 4 5 Behave as expected neither one or the other Behave as I wish		_____	_____
i).	5 4 3 2 1 0 1 2 3 4 5 Spontaneous neither one or the other Systematic		_____	_____
j).	5 4 3 2 1 0 1 2 3 4 5 Single-minded neither one or the other Open-minded		_____	_____
k).	5 4 3 2 1 0 1 2 3 4 5 Conventional neither one or the other Unconventional		_____	_____
l).	5 4 3 2 1 0 1 2 3 4 5 Individually-centred neither one or the other Group-centred		_____	_____

m). 5 4 3 2 1 0 1 2 3 4 5 _____ _____
Firm neither one or the other Gentle

n). 5 4 3 2 1 0 1 2 3 4 5 _____ _____
Introverted neither one or the other Extroverted

o). 5 4 3 2 1 0 1 2 3 4 5 _____ _____
Lively neither one or the other Not lively

Relationship 4 : _____

Please consider the way that you behave in your interactions with the person named above. Under Polarity record either an L or an R depending on the polarity of your response. If your response spanned the 0, then there is no polarity and you should write in n/a. Then record the range of your response, e.g. if you response ranges from 5 through to the other 5, then your range is 10. Put 0 if you only circled one number

			Polarity		Range
			L	R	
d)	5 4 3 2 1 0 1 2 3 4 5 Unassertive neither one or the other Assertive				
b).	5 4 3 2 1 0 1 2 3 4 5 Trusting Of others neither one or the other Cautious of others		_____		_____
c).	5 4 3 2 1 0 1 2 3 4 5 Calm/ Relaxed neither one or the other Energetic/ Driven		_____		_____
d).	5 4 3 2 1 0 1 2 3 4 5 Reactive neither one or the other Proactive		_____		_____
e).	5 4 3 2 1 0 1 2 3 4 5 Definite neither one or the other Flexible		_____		_____
f).	5 4 3 2 1 0 1 2 3 4 5 Outer-directed neither one or the other Inner-directed		_____		_____
j)	5 4 3 2 1 0 1 2 3 4 5 Risky neither one or the other Cautious		_____		_____
h).	5 4 3 2 1 0 1 2 3 4 5 Behave as expected neither one or the other Behave as I wish		_____		_____
i).	5 4 3 2 1 0 1 2 3 4 5 Spontaneous neither one or the other Systematic		_____		_____
j).	5 4 3 2 1 0 1 2 3 4 5 Single-minded neither one or the other Open-minded		_____		_____
k).	5 4 3 2 1 0 1 2 3 4 5 Conventional neither one or the other Unconventional		_____		_____
l).	5 4 3 2 1 0 1 2 3 4 5 Individually-centred neither one or the other Group-centred		_____		_____

m). 5 4 3 2 1 0 1 2 3 4 5 _____ _____
Firm neither one or the other Gentle

n). 5 4 3 2 1 0 1 2 3 4 5 _____ _____
Introverted neither one or the other Extroverted

o). 5 4 3 2 1 0 1 2 3 4 5 _____ _____
Lively neither one or the other Not lively

Relationship 5 : _____

Please consider the way that you behave in your interactions with the person named above. Under Polarity record either an L or an R depending on the polarity of your response. If your response spanned the 0, then there is no polarity and you should write in n/a. Then record the range of your response, e.g. if you response ranges from 5 through to the other 5, then your range is 10. Put 0 if you only circled one number

			Polarity L	Polarity R	Range
e)	5 4 3 2 1 0 1 2 3 4 5 Unassertive neither one or the other Assertive				
b).	5 4 3 2 1 0 1 2 3 4 5 Trusting Of others neither one or the other Cautious of others		_____		_____
c).	5 4 3 2 1 0 1 2 3 4 5 Calm/ Relaxed neither one or the other Energetic/ Driven		_____		_____
d).	5 4 3 2 1 0 1 2 3 4 5 Reactive neither one or the other Proactive		_____		_____
e).	5 4 3 2 1 0 1 2 3 4 5 Definite neither one or the other Flexible		_____		_____
f).	5 4 3 2 1 0 1 2 3 4 5 Outer-directed neither one or the other Inner-directed		_____		_____
k)	5 4 3 2 1 0 1 2 3 4 5 Risky neither one or the other Cautious		_____		_____
h).	5 4 3 2 1 0 1 2 3 4 5 Behave as expected neither one or the other Behave as I wish		_____		_____
i).	5 4 3 2 1 0 1 2 3 4 5 Spontaneous neither one or the other Systematic		_____		_____
j).	5 4 3 2 1 0 1 2 3 4 5 Single-minded neither one or the other Open-minded		_____		_____
k).	5 4 3 2 1 0 1 2 3 4 5 Conventional neither one or the other Unconventional		_____		_____
l).	5 4 3 2 1 0 1 2 3 4 5 Individually-centred neither one or the other Group-centred		_____		_____

m). 5 4 3 2 1 0 1 2 3 4 5 _____ _____
Firm neither one or the other Gentle

n). 5 4 3 2 1 0 1 2 3 4 5 _____ _____
Introverted neither one or the other Extroverted

o). 5 4 3 2 1 0 1 2 3 4 5 _____ _____
Lively neither one or the other Not lively

Relationship 6 : _____

Please consider the way that you behave in your interactions with the person named above. Under Polarity record either an L or an R depending on the polarity of your response. If your response spanned the 0, then there is no polarity and you should write in n/a. Then record the range of your response, e.g. if you response ranges from 5 through to the other 5, then your range is 10. Put 0 if you only circled one number

			Polarity L	Polarity R	Range
f)	5 4 3 2 1 0 1 2 3 4 5 Unassertive neither one or the other Assertive				
b).	5 4 3 2 1 0 1 2 3 4 5 Trusting Of others neither one or the other Cautious of others		_____		_____
c).	5 4 3 2 1 0 1 2 3 4 5 Calm/ Relaxed neither one or the other Energetic/ Driven		_____		_____
d).	5 4 3 2 1 0 1 2 3 4 5 Reactive neither one or the other Proactive		_____		_____
e).	5 4 3 2 1 0 1 2 3 4 5 Definite neither one or the other Flexible		_____		_____
f).	5 4 3 2 1 0 1 2 3 4 5 Outer-directed neither one or the other Inner-directed		_____		_____
l)	5 4 3 2 1 0 1 2 3 4 5 Risky neither one or the other Cautious		_____		_____
h).	5 4 3 2 1 0 1 2 3 4 5 Behave as expected neither one or the other Behave as I wish		_____		_____
i).	5 4 3 2 1 0 1 2 3 4 5 Spontaneous neither one or the other Systematic		_____		_____
j).	5 4 3 2 1 0 1 2 3 4 5 Single-minded neither one or the other Open-minded		_____		_____
k).	5 4 3 2 1 0 1 2 3 4 5 Conventional neither one or the other Unconventional		_____		_____
l).	5 4 3 2 1 0 1 2 3 4 5 Individually-centred neither one or the other Group-centred		_____		_____

m). 5 4 3 2 1 0 1 2 3 4 5 _____ _____
Firm neither one or the other Gentle

n). 5 4 3 2 1 0 1 2 3 4 5 _____ _____
Introverted neither one or the other Extroverted

o). 5 4 3 2 1 0 1 2 3 4 5 _____ _____
Lively neither one or the other Not lively

Behavioural Flexibility Scoring - Part B - Situations

This section is designed to measure how flexible your behaviour is within 6 situations which are of importance to you with respect to your dietary and exercise behaviour and the temptations you encounter. For example, it might be that you are always tempted, whilst shopping in the supermarket, to buy sweets or crisps, or it might be that although you always intend to go to the gym first thing you can never actually get out of bed and go. It might be that you can never resist that chocolate dessert when out for dinner, or perhaps you are too afraid of going to that aerobics class.

Choose six situations where you find it difficult to stick to a healthy eating/exercise routine (write a brief description of that situation in the space provided on each page), and then think about how your behaviour is within that situation. How is your behavioural flexibility in those situations? You will be asked to rate it according to the 15 Behavioural Dimensions below:

31. Unassertive - Assertive
32. Trusting of others – Cautious of others
33. Calm/relaxed – Energetic/driven
34. Reactive - Proactive
35. Flexible - Definite
36. Outer-directed – Inner-directed
37. Risky – Cautious
38. Behave as I wish – Behave as expected
39. Spontaneous - Systematic
40. Single-minded – Open-minded
41. Conventional - Unconventional
42. Individually-centred – Group-centred
43. Firm – Gentle
44. Introverted – Extroverted
45. Lively – Not lively

In the coming pages, you will be asked to rate your behaviour within each of your chosen situations, according to the above dimensions. The scales will be the same as the ones used in the FIT profiler and the measurement is the same as in the relationship section. Circle the appropriate numbers, record your polarity and your range, and then finally rate how successful you feel you are in each situation, out of 100. Again, you should copy these over onto the table at the end, and count up your scores to give total range and dimension scores.

Appendix Nine: DSD Programme Diaries (Food/Exercise and DSD Tasks)

Daily Food in take and Exercise Diary

1. Approximately how many calories did you consume today?

2. Approximately how much fat did you consume today? (please circle)

0-29 grams 30-59 grams 60-75 grams 76+ grams Don't know

3. I ate healthily today

1 2 3 4 5 6 7
Strongly disagree **Strongly agree**

4. Please indicate how many times you have eaten each of these foods today by ticking the appropriate boxes

	Not at all	Once	Twice	Three times	Four times	Five + times
Bread and rolls (white)						
Bread and rolls (brown)						
Pasta/rice/potatoes (white)						
Pasta/rice (brown/wholemeal)						
Chips or other fried foods (e.g. packet of crisps, fried bacon or egg)						
Red meat (e.g. steak)						
White meat, fish, pulses						
Dairy products high fat (e.g. full fat milk, cheese)						
Dairy products low fat (e.g. skimmed milk, low fat yoghurt)						
Fruit/vegetables/salad (e.g. 1 apple, fruit juice, portion of broccoli)						
Biscuits, cake, chocolate, sweets (e.g. slice of cake, mars bar)						
Alcoholic beverages (e.g. glass of wine, half pint lager)						

5. I adhered to my diet today

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

6. I found it easy to stick to my diet today

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

7. Please indicate below what exercise you did today:

Exercise Type e.g. jogging, yoga, aerobics class, squash	Length of time spent doing exercise	Intensity

8. I stuck to my exercise regime today

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

9. I enjoyed exercising today

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

10. I found it easy to stick to my exercise regime today

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

The DSD Programme Diary

Part 1:Weekly Tasks: DO SOMETHING DIFFERENT TODAY!

From the list below choose 4 activities to perform every week that you do not normally do and that you wouldn't normally feel comfortable doing.

	Choose 4 per week from this list	Name It	Tick
1	Newspaper – change it or start taking one		
2	Magazine – change it or start taking one		
3	TV – stop watching it		
4	Radio – change channels or start listening		
5	Food – try a new cuisine (low fat!)		
6	Bus ride – go somewhere new		
7	Public meeting – go to the local town hall		
8	Write a story – 3 pages any subject		
9	Paint/draw – any medium		
10	Live sport – choose and local event and watch		
11	Charity work – choose any local group		
12	Domestic chores – do something new		
13	Read – fiction or non-fiction (join library)		
14	Sport – take on something new		
15	Exercise – join a new class		
16	Dance – learn a new type of dance		
17	Do a five mile cycle		
18	Contact – out of touch old friend/family member		
19	Shop – do weekly food shop on your own		
20	Shop – somewhere different		
21	Museum/exhibition – visit any local one		
22	Walk – 5miles + on local countryside route		
23	Exercise – do 30 sit ups every day at home		
24	Spell – use dictionary to learn 50 new words		
25	Broken friends – make moves to repair the past		
26	Cinema – go on your own to watch a film		
27	Foreign language – start to learn a new language		
28	Music – buy music of a different type		
28	Clothes – wear something totally different		
29	Theatre – go and see a play		
30	Juggle – learn to juggle		

Part 2a : Daily Behavioural Tasks - Relationships

The aim of the daily tasks is to increase your Total Dimension Scores for all the Behavioural Dimensions:

1. **Unassertive – Assertive**
2. **Trusting of others – Cautious of others**
3. **Calm/relaxed – Energetic/driven**
4. **Reactive – Proactive**
5. **Definite – Flexible**
6. **Outer–directed - Inner-directed**
7. **Risky – Cautious**
8. **Behave as expected – Behave as I wish**
9. **Spontaneous – Systematic**
10. **Single-minded – Open-minded**
11. **Conventional – Unconventional**
12. **Individually-centred – Group-centred**
13. **Firm – Gentle**
14. **Introverted – Extroverted**
15. **Lively – Not lively**

reaching as close to the maximum as is APPROPRIATE. Bear in mind that in some relationships it may never be APPROPRIATE to behave at either or both of the range extremities, for example, it may never be appropriate to behave completely as you wish at work!

Start with the total dimension score which is lowest, and within that select the relationship in which you perform the narrowest range of behaviours. Concentrate on only one relationship and one Behavioural Dimension at a time.

Your task is to behave differently in that relationship, according to which dimension you are working on, so as to increase the range of behaviours which you can perform. This will help you to be able to behave APPROPRIATELY in more situations.

For example if you are normally only very driven with your partner, you might like to try being more relaxed with them. Focus on doing just that.

Part 2a: Daily FIT Exercises – Relationships Diary

Date _____

Behavioural Dimension worked on today _____

Relationship worked on today _____

Original polarity score for this dimension and relationship _____

Original range for this dimension and relationship _____

Comfort Zone for this dimension and relationship (e.g. –2 to 3) _____

Today I feel I extended the range of behaviours I can exhibit in this behavioural dimension in the above relationship.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

If you feel you did, by how many points on the scale, and in which direction, do you think you have moved?

Points : Direction (left/right):

The behaviour was comfortable to perform

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

I have increased my comfort zone

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

My goal(s) for tomorrow are:

Part 2b: FIT Exercises – Situations

The aim of the daily tasks is to increase your Total Dimension Scores for all the Behavioural Dimensions:

1. **Unassertive – Assertive**
2. **Trusting of others – Cautious of others**
3. **Calm/relaxed – Energetic/driven**
4. **Reactive – Proactive**
5. **Definite – Flexible**
6. **Outer–directed - Inner-directed**
7. **Risky – Cautious**
8. **Behave as expected – Behave as I wish**
9. **Spontaneous – Systematic**
10. **Single-minded – Open-minded**
11. **Conventional – Unconventional**
12. **Individually-centred – Group-centred**
13. **Firm – Gentle**
14. **Introverted – Extroverted**
15. **Lively – Not lively**

reaching as close to the maximum as is APPROPRIATE. Bear in mind that in some situations it may never be APPROPRIATE to behave at either or both of the range extremities, for example, it may never be appropriate to behave completely as you wish at the gym!

Start with the total dimension score which is lowest, and within that select the situation in which you perform the narrowest range of behaviours. Concentrate on only one situation and one Behavioual Dimension at a time.

Your task is to behave differently in that situation, according to which dimension you are working on, so as to increase the range of behaviours which you can perform. This will help you to be able to behave APPROPRIATELY more often in that situation.

For example, if you are tempted to nibble food when at a party because you are introverted and it's a means of avoiding interaction, which you are not comfortable with, you need to become more extroverted.

Part 2: Daily FIT Exercises – Situations Diary

Date _____

Behavioural Dimension worked on today _____

Situation worked on today _____

Original polarity score for this dimension and situation _____

Original range for this dimension and situation _____

Comfort Zone for this dimension and situation (e.g. –2 to 3) _____

In the space below describe what you did today in order to increase the range of behaviours, for the chosen dimension and situation. If you didn't do anything different, please explain why.

Explain how it was different to how you might normally have behaved.

Today I feel I extended the range of behaviours I can exhibit in this behavioural dimension in the above situation.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

If you feel you did, by how many points on the scale, and in which direction, do you think you have moved?

Points : Direction (left/right):

My goal(s) for tomorrow are:

Appendix Ten: Food Intake and Exercise Questionnaire For DSD Programme

FIT and DSD Programme Participant Questionnaire

Part 1: Personal Details

Name **Age** **Gender**

Occupation

Height **Weight**

Heaviest adult weight?

Lowest adult weight?

Part 2: Current Dietary Behaviour

Are you currently following a diet?

If so, which one?
(e.g. Weight Watchers, Dr Atkins protein diet)

Amount of weight lost following this diet?

Number of months on this diet?

How easy have you found it to adhere to this diet?
(please circle the appropriate number on the scale)

1 2 3 4 5 6 7

Very difficult **Very easy**

What are the main difficulties (if any) that you have trying to stick to your diet?
e.g. cravings for specific foods, not being able to control hunger pangs, willpower, not able to find low calorie/fat foods whilst at work, I like food, etc

What are the main reasons for wanting to lose weight?

e.g. improve health, improve self-esteem, better body shape, improved body image

Part 3: Previous Dietary Behaviour

Have you tried diets in the past?

If you have attempted to follow diets in the past, please fill in the table below, using a separate line for each diet type:

DIET FOLLOWED	NUMBER OF TIMES DIET WAS ATTEMPTED	AMOUNT OF WEIGHT LOST ON EACH OCCASION	EASE WITH WHICH YOU STUCK TO THIS DIET (1=VERY DIFFICULT, 7=VERY EASY)

In the past, what have been the reasons for not sticking to these diets?

In the past, have you successfully lost weight only to put it back on?

If so, how many times?

And what have been the reasons for putting the weight back on?

<u>Part 4: Exercise Behaviour</u>

Current Exercise Behaviour:
(Exercise involves at least 20 minutes of moderate/vigorous physical activity. Exercise includes activities such as jogging, aerobics, rugby, tennis etc, but not activities which form part of your daily life such as walking to the bus stop or dancing at discos, etc.)

- **In total, how many times a week do you exercise (please make this a TYPICAL week)?**

In the table overleaf please indicate the different types of exercise you do, the number of times in a TYPICAL week you perform this exercise, the length of time you spend performing this exercise on each occasion and the intensity with which you perform it (Low intensity e.g. walking, raises heart rate
Medium Intensity e.g. aerobics, raises heart rate, produces a sweat
High intensity e.g. running, raises heart rate significantly, produces a sweat, will leave you out of breath.)
If you go to the gym, please separate cardio/aerobic workout times from weights/resistance times, e.g. write gym-cardio in one line and gym-resistance in another.

EXERCISE TYPE E.G. JOGGING, YOGA,AEROBICS CLASS, SQUASH	NUMBER OF TIMES PER WEEK	LENGTH OF TIME ON EACH OCCASSION	INTENSITY

How long have you been following this exercise regime?

To what extent do you enjoy exercising?

1 2 3 4 5 6 7
Not at all Very much so

To what extent do you find it difficult to stick to government recommended levels of exercise (at least 30 minutes every day or weekly equivalent)?

1 2 3 4 5 6 7
Very difficult Not at all difficult

Part 5: Previous Exercise Behaviour :

Have you had other exercise regimes previously, and if so how many?

Briefly, describe the types of exercise you used to do on each occasion and how many times a week you would perform them.

In the past, how difficult have you found it to adhere to these regimes?

1	2	3	4	5	6	7
Very difficult					Not at all difficult	

What have been your reasons for abandoning these regimes?
e.g. not enjoying them, not being motivated, not enough time, physical injury etc.

Part 6: Weight Loss Goals and Expectations

1. How many pounds would you *like* to lose during this FIT programme?

2. How many pounds do you *expect* to lose during this FIT programme?

3. How likely do you think it is that during this programme you will lose the amount of weight that you have specified in question 1?

1	2	3	4	5	6	7
Not likely						Very likely

4. Do you feel that you will be successful in this weight loss programme?

1	2	3	4	5	6	7
Not successful						Very successful

5. How confident are you that after this programme is completed you will have lost the amount of weight you specified in question 1?

1	2	3	4	5	6	7
Not at all confident						Very confident

Part 7: Fantasies

Below you will read four hypothetical scenarios. You are asked to imagine yourself as the main character in each scenario and to complete them, in writing,
by describing the stream of thoughts and images that occur to you. After each scenario, please rate your responses for positivity, negativity and intensity, as well as indicating your imagined body shape, on the scales provided.

Scenario 1

You have just completed the FIT programme. Tonight you have made plans to go out with a old friend whom you haven't seen in about a year. As you wait for your friend to arrive, you imagine …..

My response was positive

1	2	3	4	5	6	7
Not at all						Very much so

My response was negative

1	2	3	4	5	6	7
Not at all						Very much so

My response was intense

1	2	3	4	5	6	7
Not at all						Very much so

My imagined body image was

1	2	3	4	5	6	7
Unacceptable						Ideal

Scenario 2

You have just completed the FIT programme. You are going on a summer holiday to a hot, sunny island. You imagine yourself on the beach and ……

My response was positive

1	2	3	4	5	6	7
Not at all						**Very much so**

My response was negative

1	2	3	4	5	6	7
Not at all						**Very much so**

My response was intense

1	2	3	4	5	6	7
Not at all						**Very much so**

My imagined body image was

1	2	3	4	5	6	7
Unacceptable						**Ideal**

Scenario 3

You have just completed the FIT programme and you are out for dinner with some close friends in an expensive restaurant. The menu contains primarily rich, high calorie/fat, but extremely tasty food. This is what your friends order. However there are healthier, albeit less appealing, options. As the waiter takes you orders……

My response was positive

1	2	3	4	5	6	7
Not at all						Very much so

My response was negative

1	2	3	4	5	6	7
Not at all						Very much so

My response was intense

1	2	3	4	5	6	7
Not at all						Very much so

My imagined body image was

1	2	3	4	5	6	7
Unacceptable						Ideal

Scenario 4

You have just completed the FIT programme. You are due to exercise this evening after work but you are hungry and have had a stressful, tiring day. As you prepare to leave work you imagine…….

My response was positive

1	2	3	4	5	6	7
Not at all						Very much so

My response was negative

1	2	3	4	5	6	7
Not at all						Very much so

My response was intense

1	2	3	4	5	6	7
Not at all						Very much so

My imagined body image was

1	2	3	4	5	6	7
Unacceptable						Ideal

Appendix Eleven: Descriptive Statistics For Group A and Group B

Group		age	BMI T1	BMI T2	BMI T3	BMI T4	BMI change after month 1	BMI change after 2 months	BMI change after three months	Total BMI change
	Mean	44.68	32.3565	31.8830	31.1094	30.4068	.4735	1.2471	.7026	1.9497
	N	41	41	41	41	41	41	41	41	41
B	Std. Deviation	8.915	6.79352	6.78480	6.68949	6.80138	.42283	.97866	.41869	1.20113
	Mean	42.00	28.3225	27.7025	27.0475	26.8459	.6201	1.2750	.2017	1.4767
	N	14	14	14	14	14	14	14	14	14
A	Std. Deviation	11.115	2.84708	2.78356	2.87699	3.04299	.40681	.60163	.94602	1.05755

group		amount of weight lost on current diet	number of weeks on current diet	number of times a week they do cardio exercise	total number of minutes spent doing cardio per week	number of times they do resis a week	total number of minutes spent doing resis per week	average daily cardio time pre study	average daily resistance time pre study	total number of minutes spent exercising per week	time on exercise programme in months	enjoy exercising?	extent to which adhere to gov. levels?	difficulty with adhering to government levels?	how many pounds would you like to lose?	how many pounds do you expect to lose?
B	Mean	6.5000	6.0882	1.7317	74.3415	.5610	20.7317	10.6202	.0801	95.0732	16.7927	4.0244	2.7561	2.3171	15.6098	10.0732
	N	18	17	41	41	41	41	41	41	41	41	41	41	41	41	41
	Std. Deviation	5.56512	6.44747	2.12161	90.39237	1.44998	64.01719	12.91320	.20714	117.82707	40.97941	1.94278	2.09500	1.75270	6.84426	3.71073
A	Mean	10.2000	14.6000	2.4286	120.7143	1.0714	26.0714	17.2449	.1531	146.7857	33.0714	5.0714	3.0000	2.9286	18.7857	9.5714
	N	5	5	14	14	14	14	14	14	14	14	14	14	14	14	14
	Std. Deviation	3.89872	16.93517	2.02729	91.87904	1.94004	39.32990	13.12558	.27715	101.15881	56.51476	1.73046	2.07550	2.33582	11.43664	3.50196

group		total fantasy positivity	total fantasy negativity	weight loss expectations numerical
B	Mean	4.9207	2.8659	4.3415
	N	41	41	41
	Std. Deviation	1.22275	1.11677	1.60639
A	Mean	4.8214	3.2143	4.2857
	N	14	14	14
	Std. Deviation	.64621	.55346	1.72888

Appendix Twelve: Semi-structured Interview Schedule For DSD Programme Follow Up Study

Interview

Hi and thank you for agreeing to take part. This is a short interview looking at your thoughts, views, opinions on and feelings about the DSD programme which you completed last year. I am going to ask you about the different activities you were asked to do, successes, failures and your own thoughts and feelings about the experience. Are you ready to begin?

JH - What did you expect the programme to be?

JH - Overall, how did you feel about what was offered to you?

JH - The induction, did you find this useful?
Prompt – did it make clear to you why you were being asked to do the different tasks?

JH – Can you explain to me what you thought about the concept of behavioural flexibility and its relation to weight loss?

JH - Within the programme, there were daily and weekly activities for you to complete.
Starting with the weekly ones, can you tell me please if you attempted any of these, and if so what were they?

JH –How successful do you think you were?
Prompt – In what way?

JH – Can you tell me how doing them made you feel?

JH - What sort of difficulties, if any, did you face with the weekly activities?

JH - With respect to the daily activities, you were given relationships to work on as well as specific diet situations.
Looking first at the relationships, what were your thoughts about these?

JH - Can you tell me if you attempted to change your behaviours and if so, what sort of behavioural dimensions did you tackle?

JH - How did you feel about doing these? How did you feel during or after attempting these?

JH – How successful do you feel you were?

JH – Do you think that doing these made a difference to how you behave now or will do in the future?
Prompt- In what way?

JH - With respect to the diet specific situation activities, did you tackle these at all?

JH - Can you tell me which ones you tackled?

JH - Do you feel you were successful?

JH - How did you view these tasks?
Prompt – did you see the reasoning behind them?
did they help you to make appropriate decisions?

JH - How did doing these make you feel?

JH – Tell me about how your diet changed specifically. For example, did you follow a particular diet, or just try to eat more healthily?

JH – What changes occurred to your exercise levels?

JH - So would you say this has had a lasting impact on your diet or exercise behaviour?

JH - Did you find that you were able to change any habits? Could you tell me what these habits were and how you managed to break them?
Did you feel that you broke any habits you had? If so, were these habits related to food or exercise?"

JH - Did you find yourself thinking more about what to do in any given situationWhat sorts of thoughts did you have when you entered the situations you felt were previously difficult?

JH - Did you find yourself feeling happier over the course of the DSD programmeTell me about how you felt over the course of the DSD programme? For example, what kind of positive or negative emotions did you have?"

JH - What did you think about the worksheets that came with the programme? Would you change them at all?

JH - Overall, in what way has the DSD programme had an impact on how you think about diet and exercise?

JH - Overall, in what way has the DSD programme had an impact on how you feel about diet, exercise and your weight?

JH - Overall, in what way has the DSD programme had an impact on how you behave?

JH - Overall, what were your main successes and failures?
And your main difficulties?

JH - Why do you think that was?

JH - The programme did ask you to make behavioural changes in all aspects of your life, not just in health behaviours, but do you feel that it actually affected how you behave in other areas of your life?
Prompt – which areas specifically and why?
so have you noticed benefits in other areas?

JH - What do you think could be changed in this programme to make it more appealing or easier to implement?

Appendix Thirteen: Thematic Map Of Themes From Semi-Structured Interviews